

The Wireless ^{6^d} Constructor

Vol. XVI.

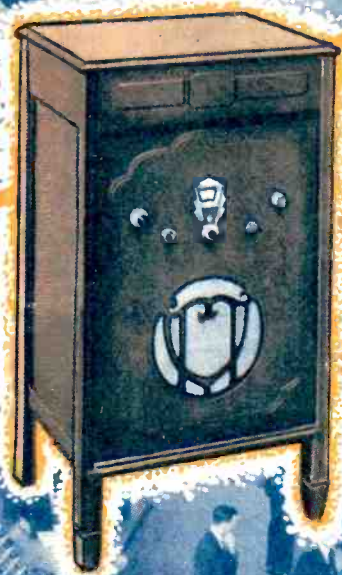
SEPTEMBER, 1933.

No. 83.

THIS MONTH
an
**ILLUSTRATED
REVIEW OF
OLYMPIA**

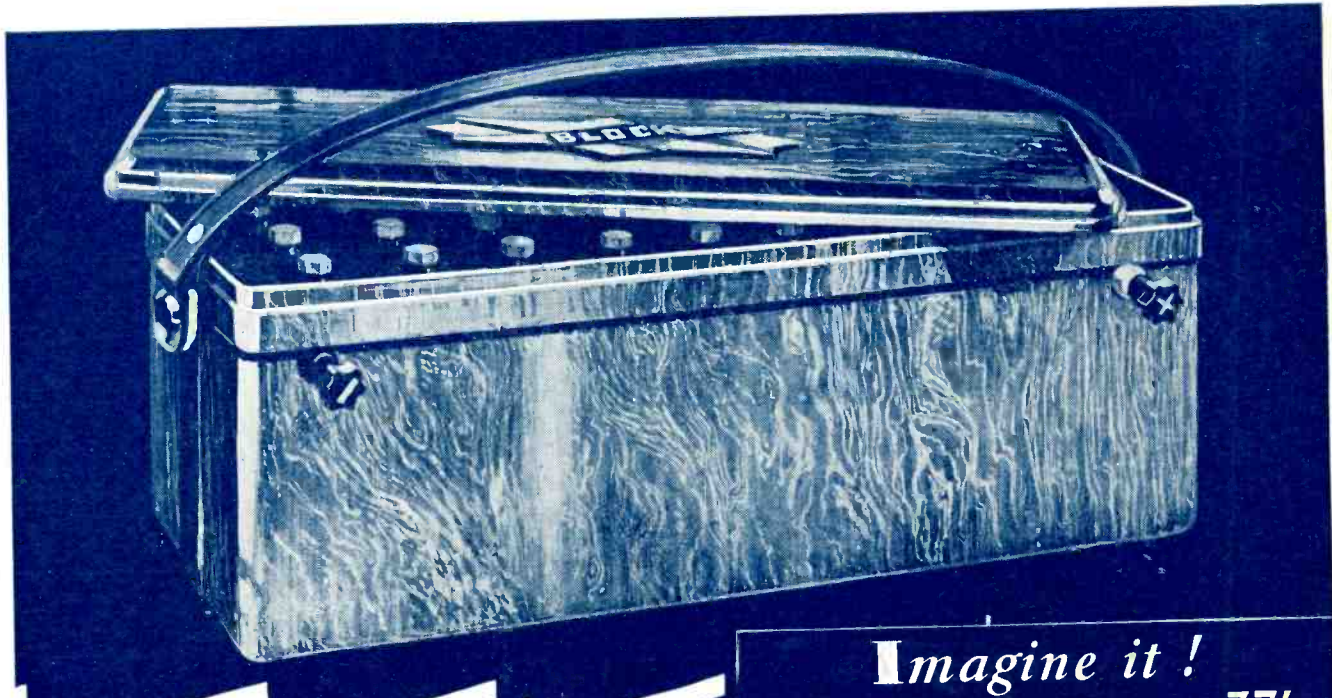


AND



**S.T.'S OLYMPIA
RADIOGRAM**

By
JOHN SCOTT-TAGGART



Now H.T.

Imagine it!
 60 v 5000 mah H.T. 14 3/4" x 4 3/4" 37/6
 30 v " " " 8 3/16" x 4 5/8" 21/-
accumulators

half the size!

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● A new era opens. Gone are the costly dry batteries. Gone are the bulky H.T. accumulators. To-day comes a new kind of H.T. source—a plate-less accumulator hardly bigger than the old dry battery itself. ● Startlingly low in first cost, it costs you nothing after except for occasional re-charging. The secret is the Block plate-less cell, that does away with the old weight, space and weakness of accumulator plates. ● Non-fragile. Elegant (the case is coloured bakelite). More durable than the plate type; and inexpensive. Go straight to Stand 22—or straight to your dealer!

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BLOCK

PLATE-LESS ACCUMULATORS

Block Batteries Ltd, Abbey Road, Barking, Essex.

What a boon!

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Price of L.T. 80^{a.h.}/_{2.v.} 11/6

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As some of the arrangements and specialties described in this Journal may be the subjects of Letters Patent the amateur and trader would be well advised to obtain permission of the patenters to use the patents before doing so.

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ST Used the 'PARAFEED' for his 'OLYMPIA RADIOGRAM'



**PARAFEED
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INDUCTANCE
80-100 Henries
Nickel Core, Screened Interior. Weight 3 1/2 ozs. Patent No. 316449. List No. DY28 **8/6**

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PARAFEED secured first specification because:—
Fidelity of tone at all strengths of output is absolutely necessary with a radiogram, hence the selection by S.-T. of the "Parafeed" and its system of amplification.
"Parafeed" has gained priority of specification by all leading designers and manufacturers of modern sets, particularly where colossal volume is entailed—"Parafeed" prevents distortion in all circuits—Class B included!

'MICRION' ADJUSTABLE INDUCTANCE COIL

with the New
POWDERED IRON CORE
Supersedes all dual-range coils. Amazing invention for increasing selectivity. The only dust iron cored coil with a micrometer adjustment on both medium and long waves.

It enables replacement of existing coil without interfering with calibration. The greatest and most opportune coil development of modern times. *List No. BY36*

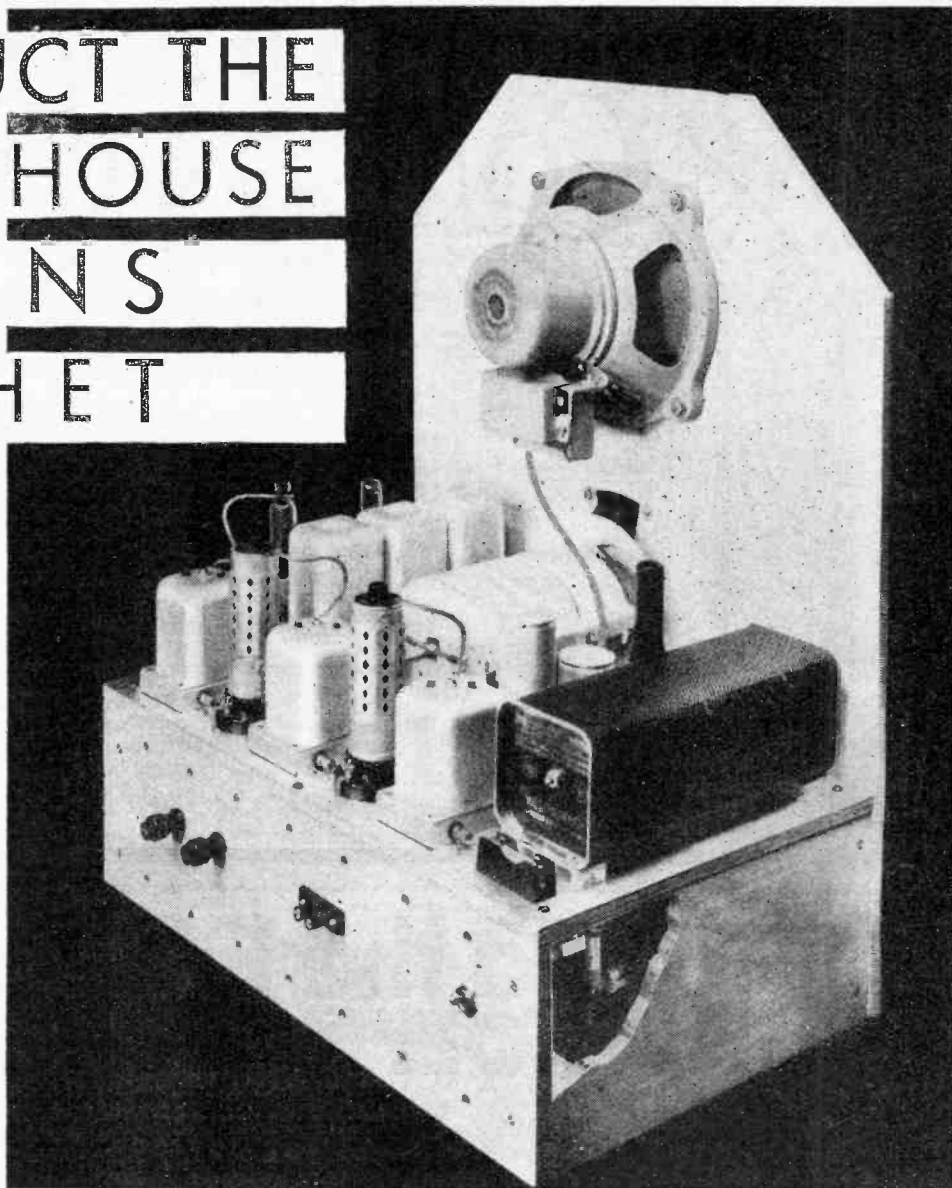
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See this coil at **STAND 41** Radio Exhibition, Olympia

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The first ALL-METAL A.C. Mains Superheterodyne receiver designed for the home constructor.

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- ★ AUTOMATIC VOLUME CONTROL
- ★ SINGLE DIAL TUNING.
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- ★ NOVEL RADIOGRAM ARRANGEMENT, last I.F. valve used as L.F. amplifier on gramophone.

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The WIRELESS CONSTRUCTOR

The EDITOR'S CHAT

Readers' Opportunity—Outstanding Sets at the Show—The Best Ever

As this issue of THE WIRELESS CONSTRUCTOR comes out on the day the Radio Exhibition opens at Olympia, it is timely to remind readers that, for the next ten days, they have an opportunity of inspecting, not only a great variety of magnificent examples of the radio industry's commercial set designs, but a more than usually interesting number of devices peculiarly dear to the heart of the home constructor.

Era of Progress

Probably never in the history of radio has there been such an intense period of ingenious development and progress as during the last six months. In that short period the amateur has seen the advent—at any rate, in this country—of Quiescent Push-Pull, "Class B" amplification, Permeability Tuning, unbreakable valves, "Cold" valves, and a host of other fascinating and valuable developments.

Our Stand

In particular, readers of THE WIRELESS CONSTRUCTOR will be interested in our Stand at Olympia, where they will be able to examine for themselves the original models of such famous sets as the "S.T.300" and the "S.T.400," together with Mr. Scott-Taggart's latest contribution to set design—the "S.T. Olympia Radiogram."

Seeing's Believing

The latter set is fully described on other pages in this issue. It is a set which, as Mr. Scott-Taggart points out, is a combined radio receiver and electric gramophone which calls for an absolute minimum of handling and adjustment.

In the words of our distinguished contributor, it is "a true grand-

mother's receiver; and there are few of us who at some time or another did not feel grandmotherly, and would like to sit back in an armchair, just turn a single knob and receive a dozen stations at excellent strength, perfect quality, and without interference."

Come and see this set for yourself on our Stand at Olympia; and, incidentally, come and have a chat with some of our technical representatives who will be there solely to be

the Exhibition ended at Olympia last year.

Mr. Moody and his enthusiastic staff had to work at concentrated high pressure a week before the Exhibition began in order to get everything ready for the opening day.

Superb Organisation

And a week only just gave them time to build, for example, the Radio Theatre at Olympia, which seats 2,300 people—quite apart from all

The National Radio Exhibition

OPENS:
TUES., AUG. 15th.

CLOSES:
THURS., AUG. 24th.

A CORDIAL INVITATION

to "The Wireless Constructor" Stand—No. 11—is extended to all our readers who visit The Radio Exhibition at Olympia. Amongst the many varied attractions there will be found the original models of

The S.T.
300

S.T.'s OLYMPIA
RADIOGRAM

The S.T.
400

Be sure to Visit "The Wireless Constructor" STAND 11

of service to you. Don't forget the number—STAND 11.

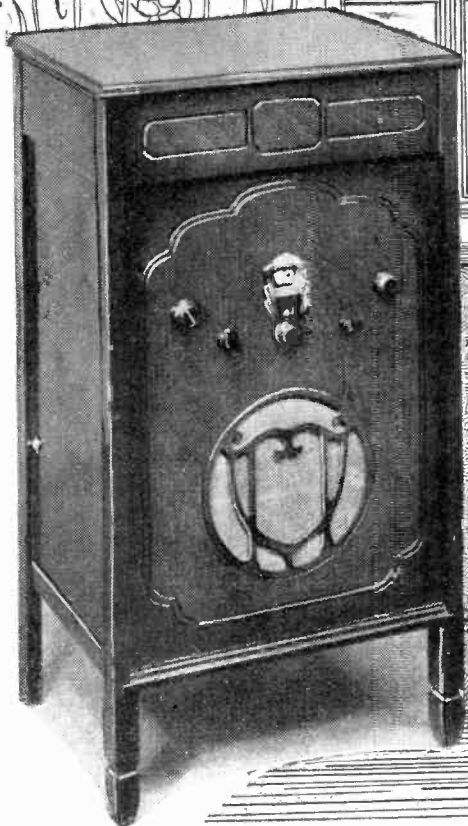
With the opening of Olympia, we wonder how many people realise the tremendous task involved in organising such a gigantic Show. Undoubtedly, Mr. Alex Moody, the organiser of the National Radio Exhibition, has a genius for his job. He has organised every Radio Exhibition at Olympia since the first one held in 1926, but he admits frankly that this year the Exhibition is the biggest undertaking of all of them.

In a recent interview, he stated that he started to prepare for it as soon as

the technical difficulties of seeing that the stands were properly put up, rules and regulations observed as regards lighting, preparation of catalogues, and a thousand and one other details which the organisers of an Exhibition on a big scale have to contend with.

Mr. Moody not only deserves the hearty congratulations of the radio industry, but he deserves the congratulations and the very sincere thanks of the hundreds of thousands of people in this country who will be visiting Olympia during the next few days, and who will see the finest Radio Show ever organised in this country.

S.T.'S OLYMPIA



Replete with every modern refinement, including iron-core coils, ganged tuning, and pre-detector volume control, this magnificent all-electric radio-gramophone calls for the absolute minimum of handling and adjustment. Designed by the engineer who first introduced the one-knob control principle into this country, it is a receiver that cannot fail to exercise a universal appeal to all those who have A.C. in their homes.

I AM enthusiastic about this set. What is more, I am advising all my non-technical friends to buy it complete, or to build it themselves, or get someone to do so for them.

In the life of every radio designer there are occasions when he is especially enthusiastic about a receiver which he has produced. The completion of this Olympia Radio-gram in my laboratories has given me an especial pleasure in that the complete outfit has a universal appeal to all those who have A.C. in their homes.

A Musical Instrument

I have always been perfectly frank in explaining my various sets, and I shall be saying nothing new when I state that they have all been designed to give the absolute maximum of selectivity and signal strength. I quite realise, however, that there is a large section of the public—in fact, probably 75 per cent of the public—which wants a radio set purely as a musical instrument and for education, amusement and news.

IDEAL

FOR

THE

HOME



**EASILY
HANDLED**



RADIOGRAM



Readers of this journal, if making sets solely for themselves and their families, are prepared to fit additional controls in order to get the maximum out of a receiver, either in the way of output volume, sensitivity or selectivity.

Dozens of Stations

Even these readers, however, will often hanker for a stand-by receiver which will give good results with an absolute minimum of manipulation. Consideration for other members generally is the underlying motive for a desire for maximum simplicity.

Here, then, in this Olympia Radiogram is provided a combined radio receiver and electric gramophone which calls for an absolute minimum of handling and adjustment. It is a true grandmother's receiver, and there are few of us who, at some time or another, do not feel grandmotherly and like to sit back in an armchair, just turn a single knob and receive dozens of stations at excellent strength, perfect quality and without interference.

Build This Set

If you come into this category and possess A.C. mains supply, then I frankly do not believe you will do better than build or buy this receiver.

I am inclined to think that there will be a great many readers who will wonder what on earth has happened to me to make me produce a one-knob set. Have I suddenly changed my whole viewpoint or principles?



By
**JOHN
SCOTT-TAGGART**

A.M.I.E.E., F.Inst.P.

FOR
VOLUME
AND
TONE
ON
RECORDS
OR
RADIO



The designer standing beside his latest triumph.

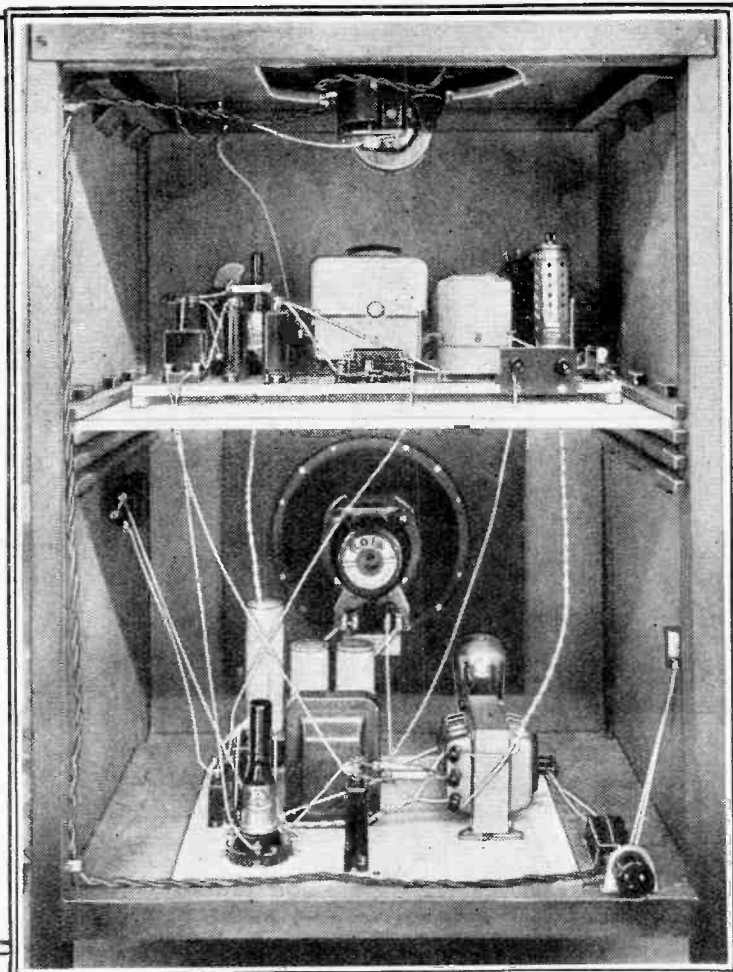
Nothing of the kind I have always stoutly maintained, and still do so, that a one-knob set is the ultimate ideal.

As the introducer of the one-knob principle to this country, the design of such a receiver involves no departure from principle.

In the case of a mains receiver, especially one using, as this one does, the new iron-core inductances, one can afford some of the inevitable compromises which are bound up in one-knob control, and which may constitute a definite disadvantage in a battery receiver.

For A.C. Mains

I have developed two mains receivers prior to this one, but

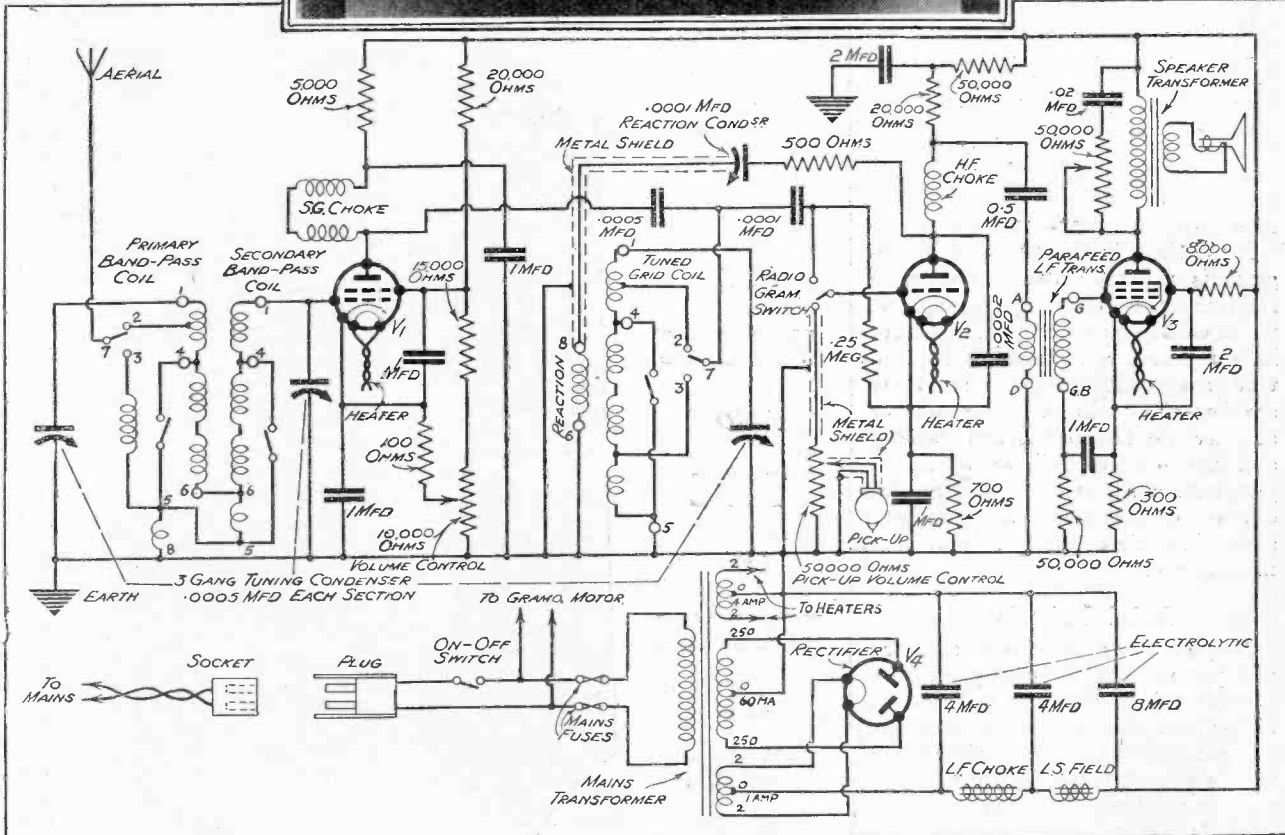


in neither case was one-knob control used.

In both cases (I am referring now to the A.C. "S.T.300" and "S.T.400") the receivers were designed originally for battery models; but in the present case there is no battery model design at all, and the whole set, from start to finish, has been designed purely and solely for the constructor or user who has A.C. mains.

One-Knob Set

This, of course, alters the whole design considerably, and if a vote were taken of A.C. users, there would not, in my opinion, be the slightest doubt whatsoever that they would plump for a one-knob set.



An examination of the theoretical circuit reveals the fact that certain vital leads are screened so as to eliminate any likelihood of stray coupling effects. Another noteworthy feature is the insertion of a ballast resistance in series with the S.G. volume-control potentiometer. The pilot lamp is fed from the 4 amp. transformer heater winding.

S.T.'s Olympia Radiogram—continued

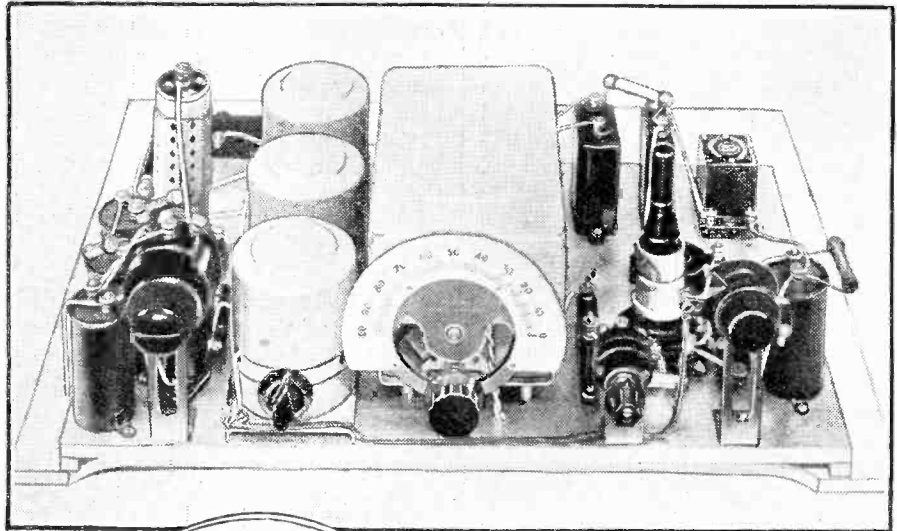
A mains receiver has so many points in its favour as regards maintenance costs and trouble that, sooner or later, most people will limit themselves to an A.C. set. It is regrettable that home constructors do not go in more for a mains receiver, but I think that the fault lies chiefly in the high cost of components, which makes it more difficult to compete with the manufactured article.

Universal Receiver

The present Radiogram, however, is definitely one which can hold its own with any factory-built set in its class, and my opinion—which is, perhaps, rather prejudiced—is that it will give more than the ordinary results obtainable with a three-valve A.C. set.

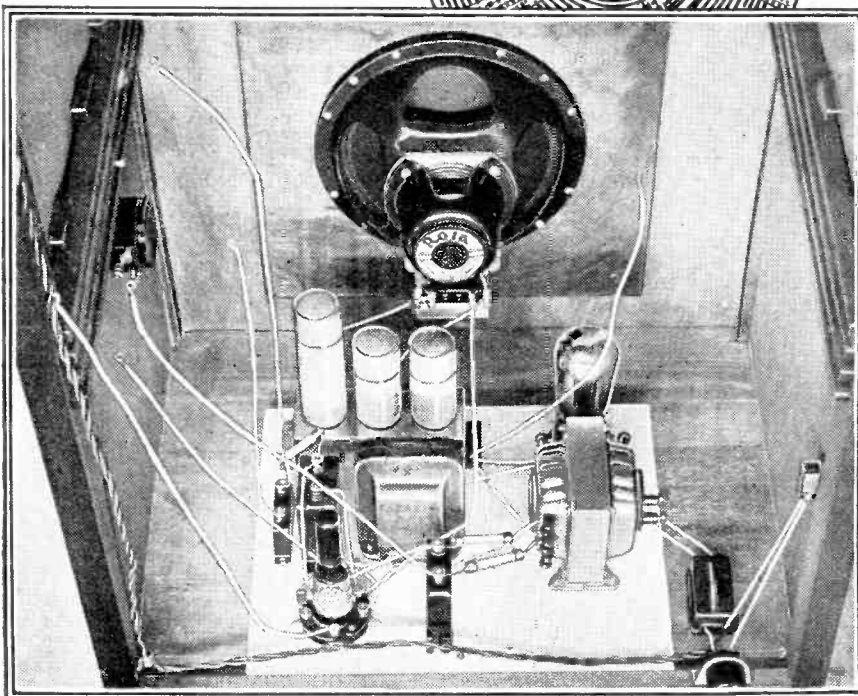
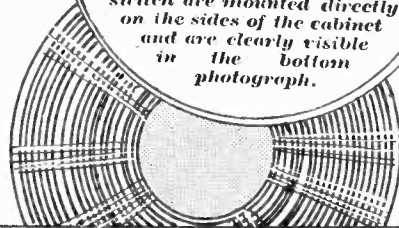
It represents the best results which can be obtained with one-knob control, and these results are so excellent, due to the circuit, the components, the valves and—may I breathe it?—the general design, that I am confidently recommending it as a universal receiver for those having A.C. mains.

Those who have deplored my "last ounce" theory in the design of battery sets will, no doubt, be pleased to note the more conventional features of this receiver. The input arrangement consists of two



IN TWO SECTIONS

These two photographs show the radio and mains sections of the Olympia Radiogram, the S.G. and detector section (top) forming a complete unit, which slides into position above the mains and output portion of the receiver. The tone control potentiometer and "on-off" switch are mounted directly on the sides of the cabinet and are clearly visible in the bottom photograph.



tuned circuits, coupled together by a common inductance. It is, in fact, a band-pass scheme which, due to the use of iron-core coils, has achieved an entirely new significance, because the losses hitherto associated with band-pass circuits have been very greatly minimised.

Those who, like myself, have felt that there has been much band-pass ballyhoo will regard the input circuit of my Radiogram as a loose-coupled arrangement of very great efficiency. Those who revel in square peaks,* retention of the high notes, and so forth, will give me their blessing and say that one sinner brought to repentance is worth a score of those who have paid lip service to the square peak.

Efficiency Maintained

I am amused, but hardly flattered, at the thought that the majority of radio designers will applaud this set as "in keeping with the best modern practice." My explanation for adhering to "the best modern practice" is that the new coils have made the profoundest impression on me when used in a combination such as that disclosed in this article.

The second reason is that the simplifying of control prevents anything very startling in the way of originality or hotted-up efficiency. The third reason is that owing to the very great magnification obtainable from all A.C. valves one can afford certain compromises and still maintain efficiency.

* My typist took this down as "queer peaks."

S.T.'s Olympia Radiogram—continued

therefore there will be a damping down of the signals with consequent reduction of volume.

Avoiding Oscillation

Self-oscillation, of course, is always a problem in even the most effectively screened receivers, and most factory-built sets using variable-mu valves are provided with a ballast resistance which prevents the grid of the S.G. valve approaching too closely a point of maximum mutual conductance. As variable-mu valves vary quite considerably as regards their characteristics, it is quite an easy matter to design a receiver which errs on the side of safety, and consequently on the side of inefficiency.

I have preferred to keep the ballast resistance on the low side so that the constructor does not suffer if he happens to purchase a valve which has a mutual conductance rather on the low side. The worst that could happen to him is that when the volume control is in the extreme clockwise direction, the S.G. valve may oscillate; the very smallest turning back of the volume control will stop this.

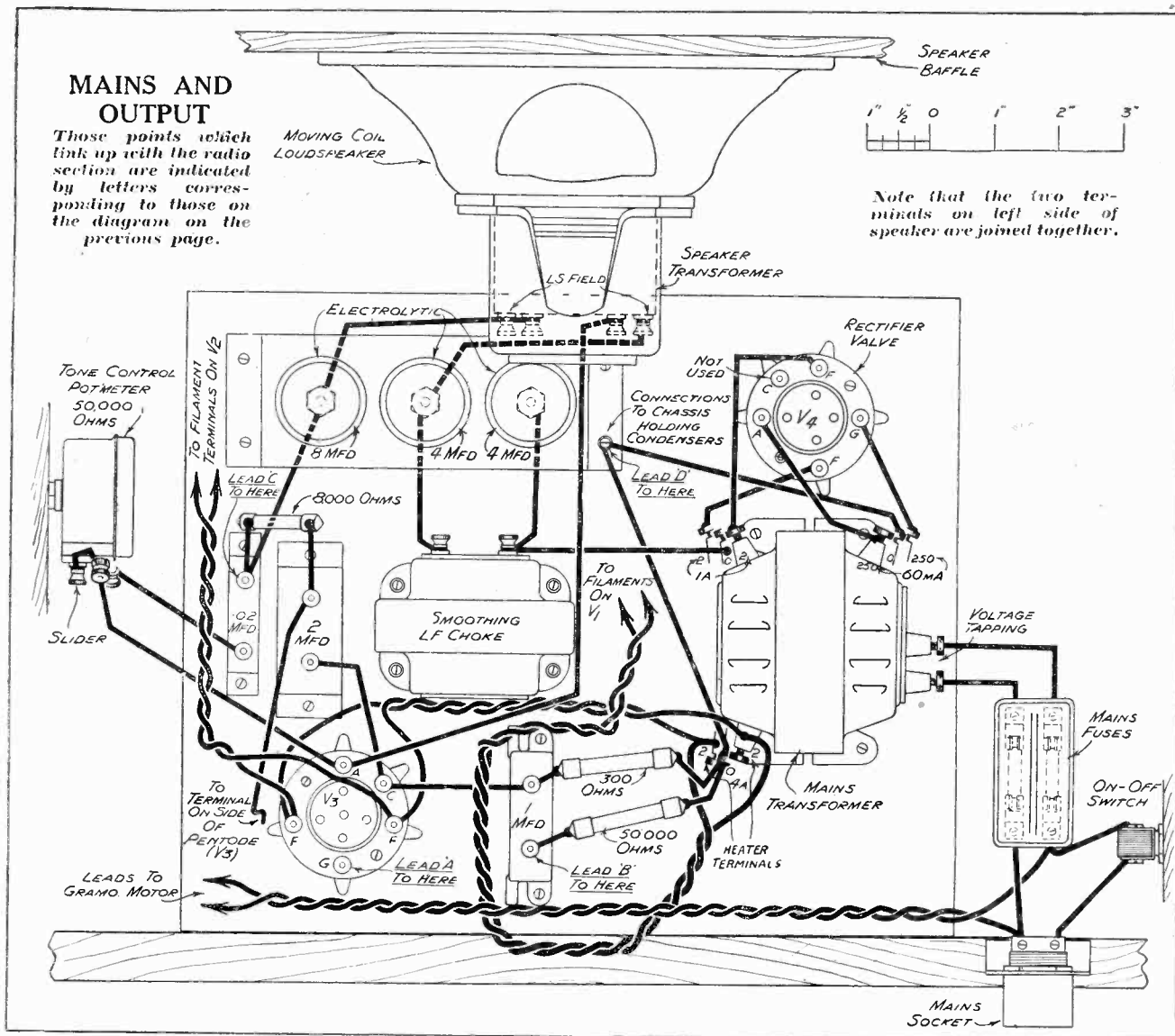
If the constructor wishes to remove completely the possibility of oscillation, it is the simplest matter in the world to increase the value of the ballast resistance at a maximum cost of one shilling. After careful consideration of the pros and cons, I

prefer to keep the value to that given.

The set is fitted with a reaction control on the extreme right of the front of the set, and no comment is called for regarding this feature. The on-off switch is found on the left-hand side of the cabinet, while on the right-hand side we have the knob for the tone-control, which consists of an .02-mfd. condenser and a variable resistance of 50,000 ohms.

Valuable Addition

This device is a very valuable addition to any outfit which is to be used either for radio or gramophone work. Heterodyne whistle and other interference of a high-pitched character



Radio or Records At Will

may be cut out by means of this tone-control, and the listener can give full play to his whims and tastes as regards what constitutes good quality.

This sometimes depends upon one's mood, or the type of music being listened to, and I regard a tone-

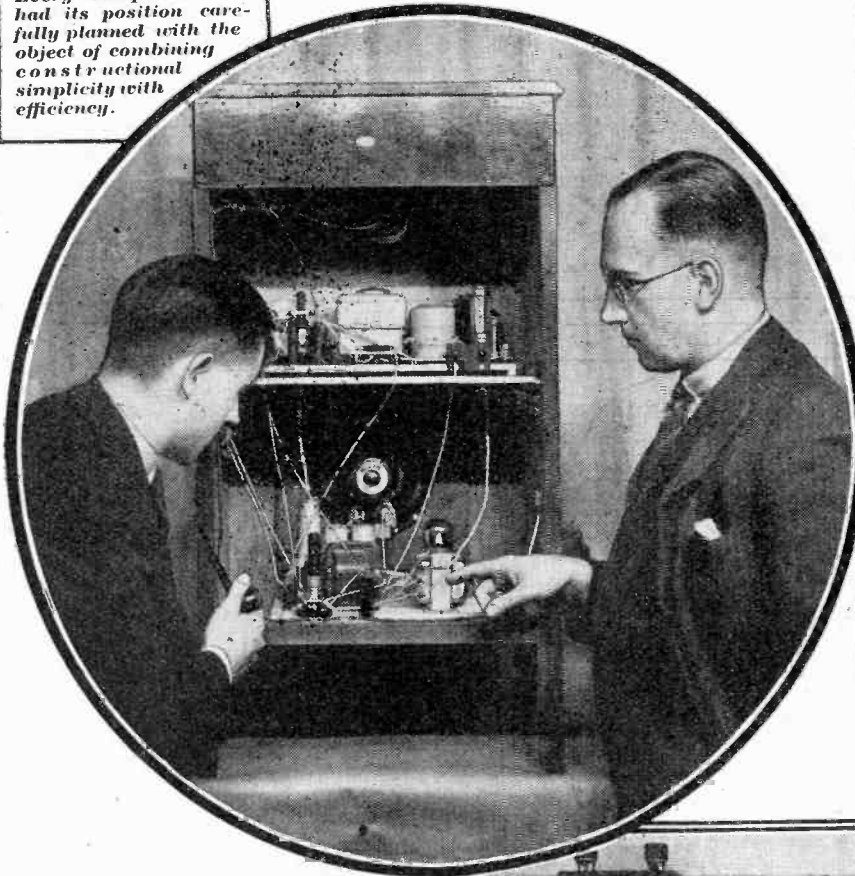
control as a cheap but essential feature of the complete outfit. from just as little as possible, because in an A.C. set, more than in any other, there are all sorts of reasons for placing things where they are, the usual object being to prevent hum from the mains.

Nothing is more annoying than the background of a hum in between items in the programme, and this

outfit is particularly free from such disturbance. In fact, without aerial and earth even, the set is absolutely quiet. Careful arrangement of the layout and the smoothing and decoupling systems is responsible for this excellent state of affairs.

SIMPLICITY

Every component has had its position carefully planned with the object of combining constructional simplicity with efficiency.



Double Smoothing

The mains-excited moving-coil speaker has its energising field included in the smoothing circuit, so that we have, in effect, two stages of smoothing—a general purpose iron-core choke being also in the smoother circuit. Generous decoupling throughout the set also greatly minimises any risk of hum including the rarer and more subtle causes of the annoyance.

The cabinet used is a good sound job for the purpose, but there are other makes which would prove effective. It will be seen from the illustrations that the set is divided into two portions, each of which is mounted on a baseboard. These baseboards are then fixed to the shelf or bottom of the cabinet as the case may be.

Metallised Baseboard

The shelf itself could, of course, be used as a baseboard, but there are one or two reasons which make a separate baseboard a convenience. A special baseboard covered with metal is supplied by Peto-Scott, and this can be recommended as an alternative and probably a better

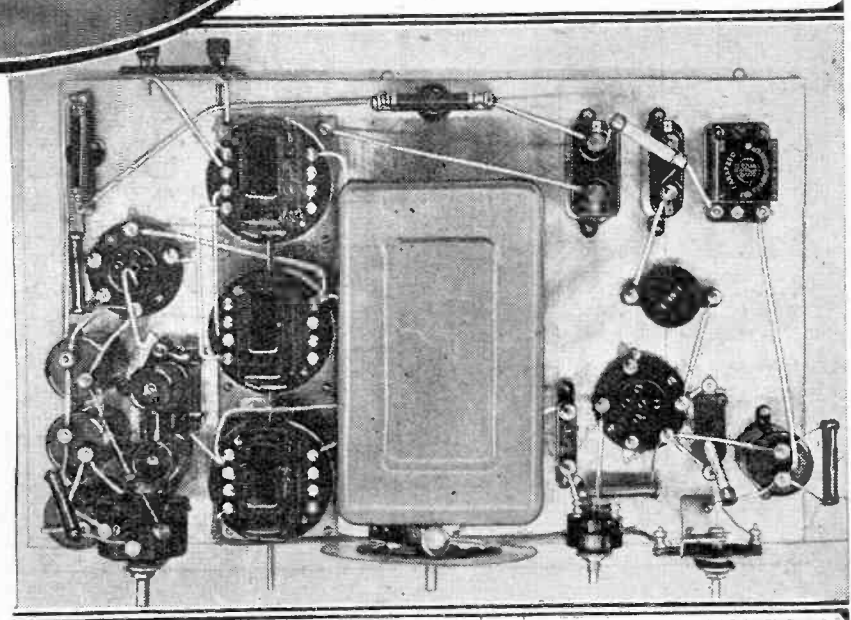
control as a cheap but essential feature of the complete outfit.

The volume control for records is to be found next to the turntable on the top of the radiogram. There is a great deal to be said for having two separate volume controls, one for radio and the other for the radiogram, and one is saved that constant alteration of setting when one is alternately using radio and gramo.

Wavechange Switching

The bottom left-hand switch on the front of the set is to give one medium-wave or long-wave reception. The radiogram switch calls for no special comment.

The layout of the whole arrangement is one which should be departed



S.T.'s Olympia Radiogram—*continued*

arrangement than laying foil on a sheet of ply.

The whole of the wiring is "above board," except for some heater wiring. The average constructor probably greatly prefers above-board wiring, and the whole wiring, in fact, presents no difficulties whatever. The receiver is just as easy to make as any battery set.

No Danger at All

There is still, I find, a little prejudice against mains sets on the score of alleged danger. A more senseless bogey it would be hard to imagine.

If you deliberately paddle your two hands simultaneously around the mains transformer terminals, you may, after half an hour, happen to touch two which will remind you that the apparatus is best touched only when the current is switched off. But even so, by the use of insulated terminals and insulated wire, it is becoming increasingly difficult to do the most crassly stupid things.

There are no adjustments to be made on the mains transformer once the voltage has been set to suit the mains. This brings us, therefore, to the main portion of the receiver where the maximum voltage is about 200 volts D.C.—enough to tickle you, certainly, but I never heard of anyone suffering any ill-effects.

The Shock Myth

In any case, the whole of the parts which the constructor might want to

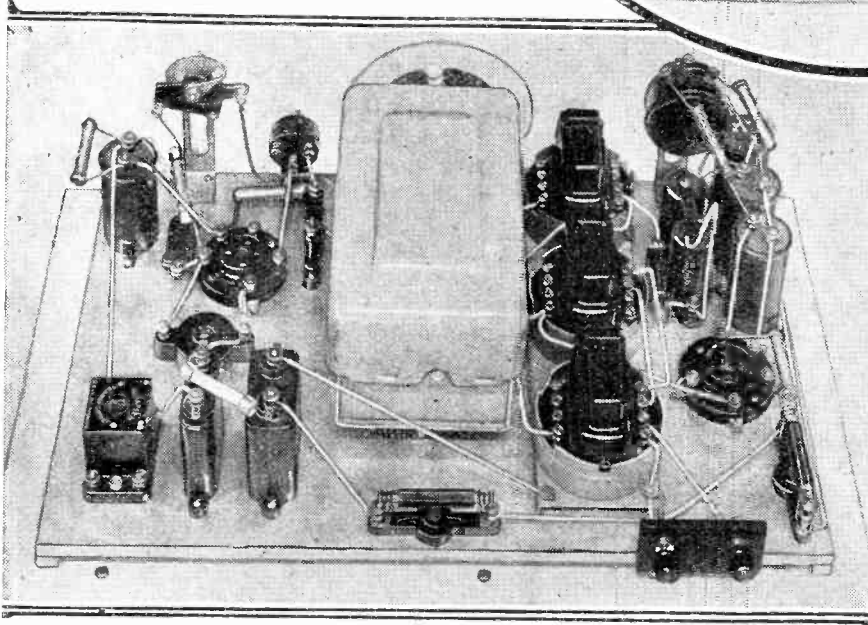
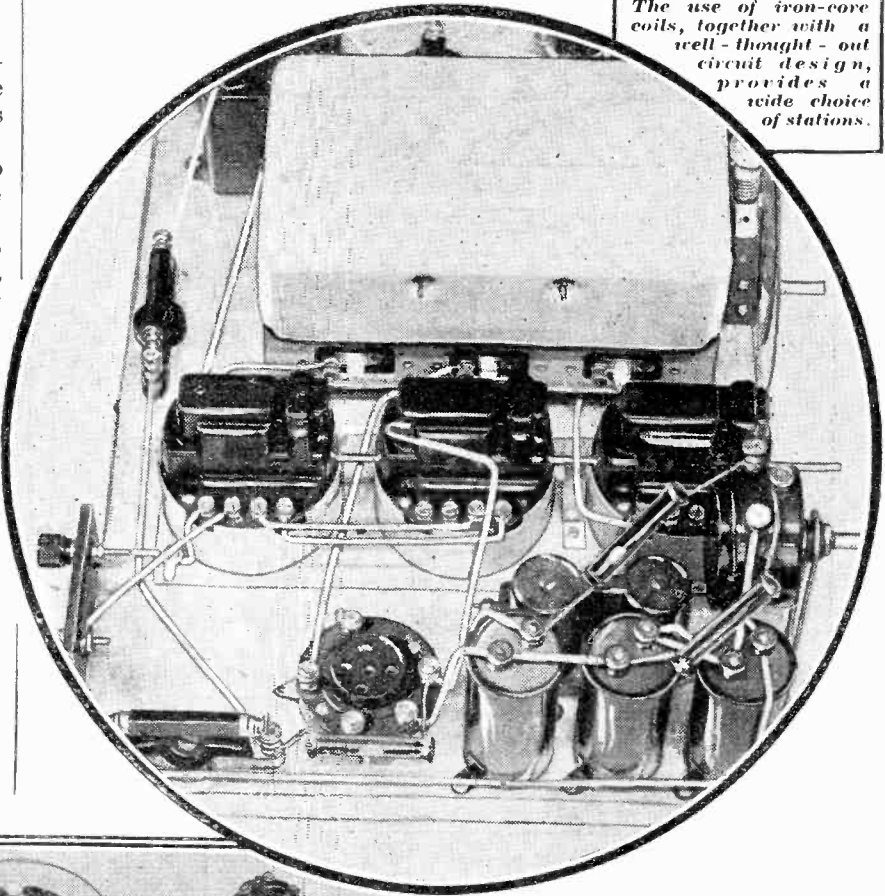
touch even in his most careless moments are not alive at all, but are separated by condensers from the "line" voltage. The risk, therefore, of shock is virtually a myth. The danger to apparatus, on the other hand, is perhaps a trifle greater than in the case of a battery circuit, although in most cases decoupling

resistances, etc., are more profuse and help towards minimising the effects of short-circuits through faulty connections.

The constructor should carefully check all wiring before switching-on the set. Fuses are provided, but these

EFFICIENCY

The use of iron-core coils, together with a well-thought-out circuit design, provides a wide choice of stations.



do not free the constructor of the responsibility for checking the wiring.

The use of electrolytic condensers is an additional safeguard as regards shocks because there is a certain leakage current through them and this will discharge any high voltages, even if the valves themselves did not do so.

Absence of Risk

Other designers of sets for home constructors have ceased even to comment on the risk of shock or rather the absence of risk. As, however, this radiogram will be made on a large scale by many with no previous experience of A.C. working, the above few words of reassurance will not be amiss.

The Ideal Set for the Home

Now for a number of miscellaneous notes which will help the constructor. They are random remarks and are not linked up necessarily with each other.

(1) The reaction lead is a length of No. 20 S.W.G. copper wire threaded through screened sleeve which has

face of the shelf and you should mark on it crosses representing positions of the spindles; this can be done from the panel drilling diagram.

The finished set, which is mounted on the baseboard (on the underside of which are two fillets—i.e. strips of wood to keep the baseboard a little

above the shelf), should be placed on a flat surface; check positions of the crosses against the positions of the actual controls. If necessary, correct the positions of the crosses.

Remove the baffle which is supplied with the cabinet, put the shelf in the top slots of the cabinet, back to front; put cardboard template in with the main three-gang condenser in middle of cabinet, mark position through with bradawl.

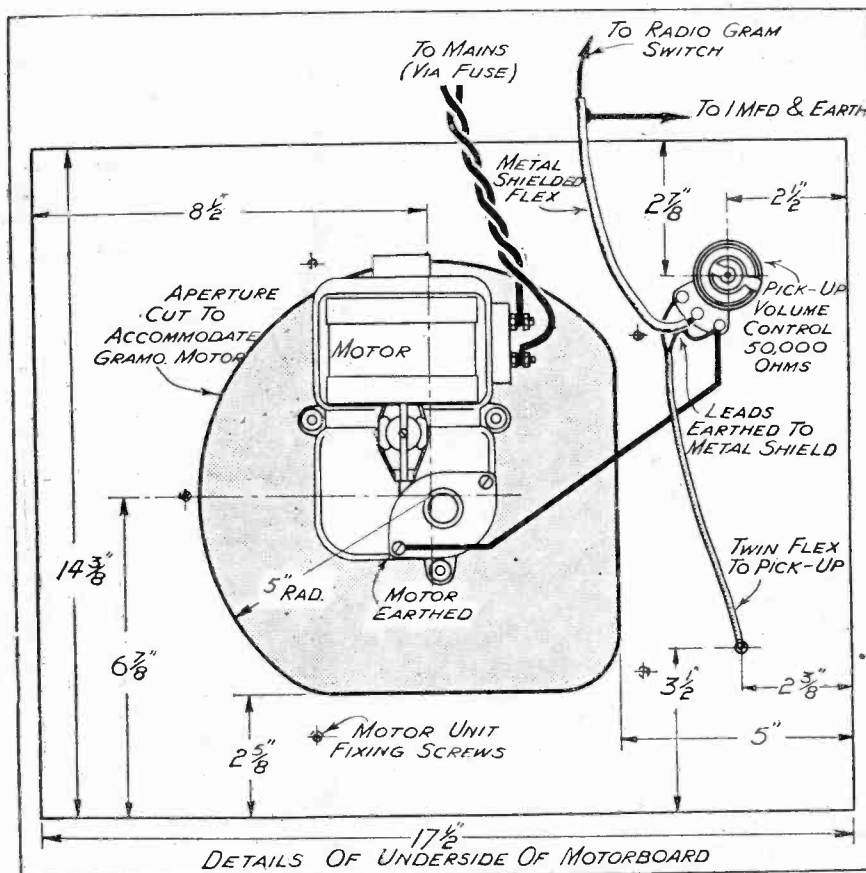
Drill from Front

Drill pilot holes; drill main holes from front, countersink holes to accommodate any bushes or nuts. All instructions under the above heading apply to the Camco cabinet, and the reader is offered the suggestions although he may find other ways of doing the same thing.

(4) The Graham Farish holders for "Ohmites" tend to earth to the foil on the baseboard as the two screw heads tend to approach the bottom level of the holders. This may be overcome by inserting a little strip of Empire cloth

WIRING THE PICK-UP

The diagram on the left gives the wiring and constructional details of the motor-board. The leads to the pick-up and radiogram switch are screened. In connection with the mains section (below), it should be remembered that the mains transformer must be "dialed" to the correct supply voltage before the component is finally wired-up.



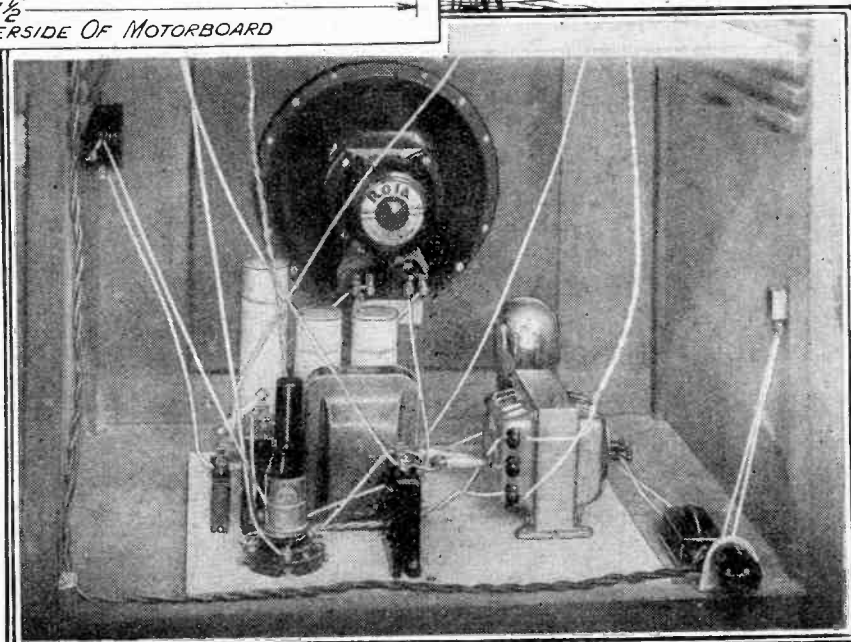
now become a standard product and is made by Lewcos, Goltone and others. The screened portion of the wire is earthed by means of a length of bare 20 S.W.G. wire; about 4 in. is used, a loop is made at one end, and the whole of the rest of the wire is wrapped round the screening or outer metal sheath.

(2) Note that a fibre bush is provided for the reaction condenser, so as to insulate the spindle from the supporting bracket.

Holes for Controls

(3) The making of the holes in the front of the cabinet for the reception of the spindles and the controls of the set is best done as follows:

A sheet of cardboard 12 in. by 4½ in. is cut out to act as a template. The bottom edge represents the top sur-



S.T.'s Olympia Radiogram—continued

under the holder, or the screw head may be loosened and filed down.

(5) In lifting motor-board of cabinet (after loosening the four screws), it is desirable to raise the back edge first.

(6) Do not mark motor plate fixing screw holes finally until the motor plate is in position.

Automatic Switch

(7) Note that the speed regulator is in the left-hand front corner, viewing the Radiogram from the front, so that the automatic switch must be fixed on the motor plate in the extreme clockwise position. This may require the lead to the auto switch to be passed through a different hole in the motor plate from the one in which it is found passing through.

Note that a different bias is used for Catkin valves. The M.H.4 requires 600 ohms if the valve is of the glass type and 700 ohms for the Catkin type.

THE HEATER LEADS

How the heater and pilot lamp leads run beneath the radio section baseboard. "a" and "b" go to the heater terminals on the V_1 valve holder, "f" and "g" are connected to the heater terminals on V_2 and "h" is joined to the two pilot lamp terminals. The close-up below shows the detector valve holder V_2 and its associated components, including the parallel-fed L.F. transformer.

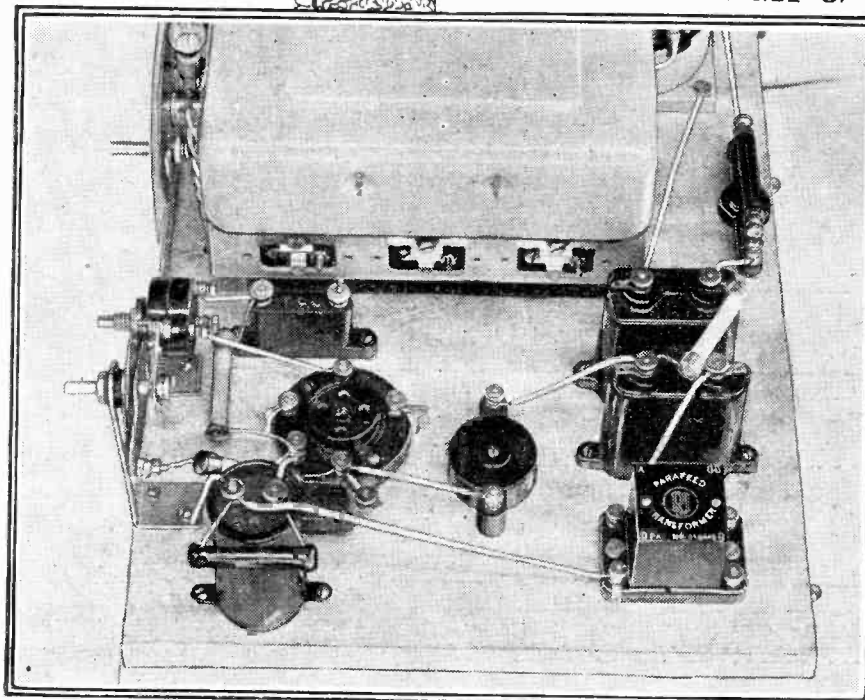
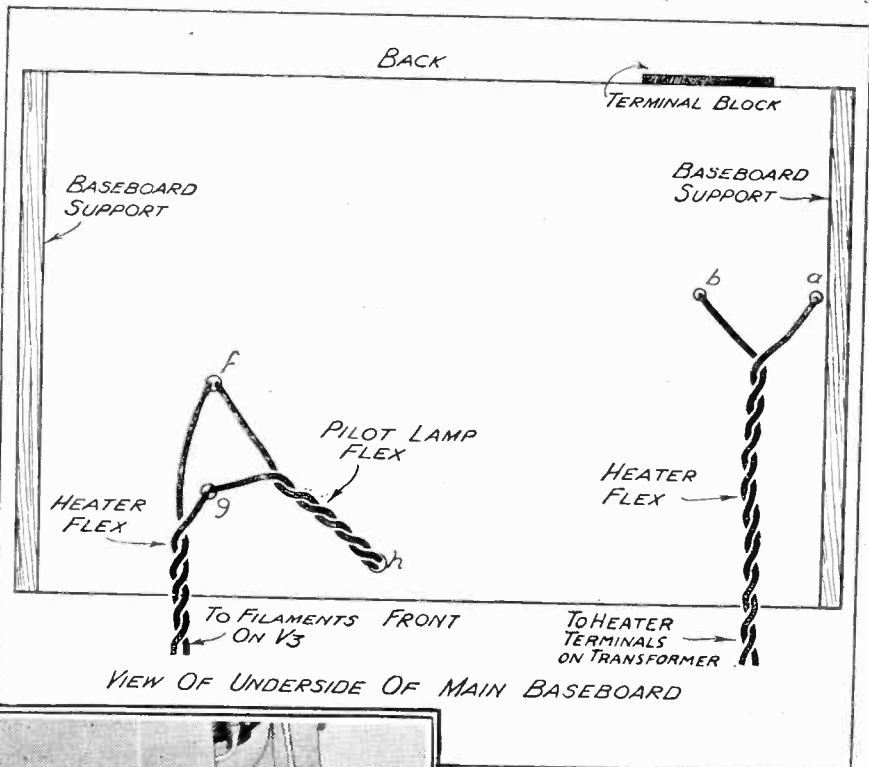


(8) Connect the wire from the S.G. choke to one-microfarad decoupling condenser before mounting radio volume control.

(9) Scrape cellulose paint where supporting pillars of three-gang condenser make contact with the condenser chassis; this is to ensure proper contact. Scrape away cellulose paint where earth contacts are made with the base-plate of Ferrocart coil.

(10) The fillets under the baseboard are $\frac{3}{8}$ -in.

(11) The wires to the pilot lamp which illuminates the dial are the only two soldered parts of the set, and I have asked the makers to supply the lamp with terminals on request. It is, however, a simple matter for the reader to arrange a nut and bolt connection if he prefers this to soldering. Before finally



fitting baseboard on the shelf, make sure pilot lamp supply wires are joined to detector heater terminals.

The wiring to detector and S.G. heaters is carried out as follows: Take a pair of leads of ample length, thread through holes in baseboard, and connect to heater terminals on valve holders. Then twist the remainder of the wires together and thread through hole in shelf. This is done in each case.

Detector Grid Lead

See that detector grid lead which passes under the three-gang condenser lies midway between the condenser frame and the baseboard; this is to avoid capacity to earth.

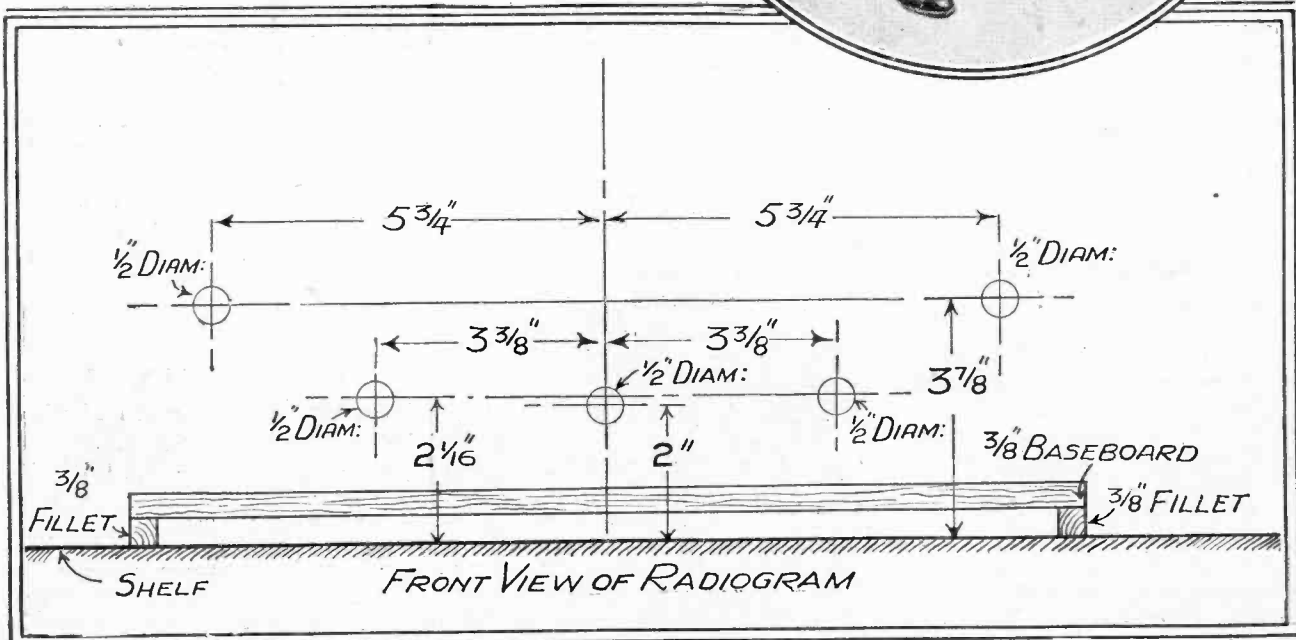
(12) The pilot lamp itself can be a 6-volt 0.3 amp. Osram, which when worked off the 4-volt mains supply

(Please turn to page 268)

**THE COMPONENTS TO USE FOR
S.T.'s OLYMPIA RADIOGRAM**

Component	Make used by Designer	Alternative makes of suitable specification recommended by Designer.
Coils	1 set Colvern Ferrocart	—
1 triple-gang tuning condenser.	British Radiophone	—
1 dial and light assembly	British Radiophone type 374	—
L.F. transformer	R.I. "Parafeed" (standard)	Varley
Mains transformer	Wearite T.21 A (new dial type)	—
Smoothing choke	Lissen General Purpose	Ferranti, R.I., Wearite, Varley
CONDENSERS:		
2 4-mfd. wet electrolytic	T.C.C.	Dubilier
1 8-mfd. do.	T.C.C. type 80	Dubilier
1 2-mfd. (decoupling auxiliary grid of pentode)	T.C.C. type 80	Ferranti, Telsen, Dubilier (400 volts working)
1 2-mfd.	Dubilier B.B.	Ferranti, T.C.C., Telsen, Igranic
4 1-mfd.	Dubilier 9200	—
1 1-mfd. (pentode grid-bias decoupling)	T.C.C. type 50	Telsen, Dubilier, Igranic
1 .02-mfd.	T.C.C. type 40	—
1 .5-mfd.	Dubilier B.B.	T.C.C., Telsen, Ferranti
1 .0005-mfd.	Dubilier 670	Dubilier, Graham Farish
1 .0001-mfd.	T.C.C. type 34	Telsen, Lissen
1 .0002-mfd.	Dubilier 670	—
Reaction condenser .0001-mfd. with insulated bushes fitted	Polar	—
RESISTORS :		
2 resistor holders	Graham Farish	—
1 5,000 ohms	Graham Farish	—
1 50,000 ohms	Graham Farish	—
1 100 ohms, 1 watt	Erie	Dubilier, Graham Farish
1 15,000 ohms, 1 watt	Erie	Dubilier, Graham Farish
1 20,000 ohms, 1 watt (screen potential divider circuit)	Erie	Dubilier, Graham Farish
1 250,000 ohms	Erie	Dubilier, Graham Farish
1 700 ohms (subject to M.H.A Catkin)	Erie	Dubilier, Graham Farish
1 500 ohms, 1 watt	Dubilier	Graham Farish, Erie
1 20,000 ohms, 1 watt (resistance-feed resistance)	Do.	Do. do.
1 300 ohms, 1 watt	Do.	Do. do.
1 50,000 ohms, 1 watt	Do.	Do. do.
1 8,000 ohms, 1 watt	Do.	Do. do.
POTENTIOMETERS :		
1 10,000 reverse log-law for variable-mu control	Igranic wirewound	—
1 50,000 linear for tone control	Igranic wirewound	Lewcos, Bulgin
1 50,000 log-law for gramophone volume control	Igranic "Megostat"	—
Radiogram switch	Bulgin S.86	Tunewell
On-off switch	Bulgin S.80	Igranic

Component	Make used by Designer	Alternative makes of suitable specification recommended by Designer
Mains plug and socket, baseboard mounting	Bulgin P.21	Belling-Lee, Goltone
Twin safety fuseholder	Belling-Lee type 1033	Bulgin
2 terminals A and E	Belling-Lee type R.	Igranic, Clix, Bulgin, Celex
Terminal strip 1 1/2 in. x 2 1/2 in. x 1/8 in.	B.R.G.	—
2 large component mounting brackets	B.R.G.	—
1 small component mounting bracket	B.R.G.	—
1 mounting bracket for 3 electrolytics	B.R.G.	—
4 five-pin valve holders	Benjamin	W.B. Telsen, Ferranti
1 S.G. choke	Telsen "Binocular"	McMichael binocular
1 reaction choke	Lewcos M.C.	Graham Farish, Telsen, Lissen, Wearite
1 gramophone motor	Garrard type A.C.4	McMichael binocular
1 pick-up	Marconiphone type 19	—
1 moving-coil loudspeaker (mains energised—fitted with pentode output transformer & terminals)	Rola F.6—S.T.R.G	—
Screened sleeving	Lewcos	—
Cabinet	Camco "Popular"	Peto-Scott "Adaptagram"
Baseboard 16 in. x 10 in. x 3/8 in. with aluminium foil (or Metaplex)	Peto-Scott	—
Baseboard 12 in. x 10 in. x 3/8 in. for power pack	Peto-Scott	—
Wire	Lewcos high voltage	—
Glazite, twin flex, etc.	—	—



The New

SUPER CIRCUITS

by
**VICTOR
KING**

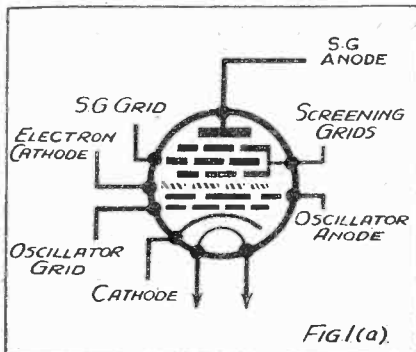


AFTER having been toyed with for years and years, it now looks very much as though superhets may eventually become as widely used in this country as in America.

Of course, over there the super has always been a firm favourite, and so has been subject to steady development.

We have tended to look askance at the superheterodyne receiver for two reasons. The first and foremost being that it has hitherto been an expensive type of instrument.

THE PENTAGRID



Acting as a combined 1st detector and oscillator, this valve employs electronic coupling instead of external coils.

But with the introduction of methods enabling fewer valves to be used, and a general lowering of patent and component costs, this objection has to a large extent been removed.

Difficulties Overcome

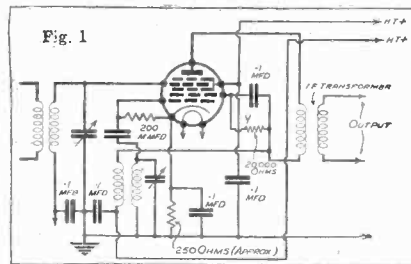
The second criticism, that superhets could not give good quality, also no longer holds good, for with properly applied tone adjustments first-rate quality can be achieved.

Incidentally, a number of minor snags, including such things as second-channel interference, have been successfully overcome.

On the definite credit side of the super must be placed knife-edge selectivity and great power with a simplicity of controls.

Superheterodyne receivers are likely to increase appreciably in popularity during the near future because of recent advances, including new valves, which considerably improve circuit design. These new advances are here explained by a popular contributor.

By far the most important superhet development of the past year is



This is a typical circuit in which the new superhet valve is used. It is called a Hexode in Germany and a Pentagrid in America.

the evolution, in Germany, of what has been styled the "Hexode" valve.

Hexodes are not yet available in Great Britain, but I imagine that it won't be long before they are, because they do appear to represent a considerable step forward.

The American equivalent is known as the Pentagrid Converter.

Its purpose is to combine the functions of the first detector and the oscillator in the one valve.

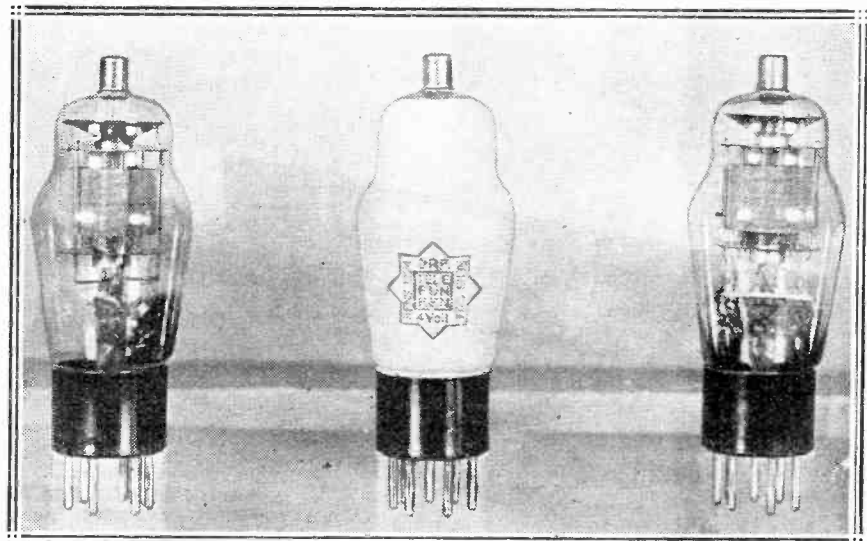
Electronic "Mixing"

Of course, this has been done before with existing valves, but with these it has been necessary to employ external coupling between the grid and oscillator circuits, and that introduced various difficulties such as the danger of re-radiation if an S.G. H.F. stage were not employed.

In the Pentagrid Converter the "mixing" is purely electronic and capacitive couplings in the valve are eliminated by the provision of screening grids.

This special valve can be regarded as a triode oscillator and a variable- μ

SOME OF THE HEXODE VALVES



These are specimens of the German version of the new combined valve. Although not at present available on the British market, it is expected that equivalent valves will soon make their appearance.

The New Super Circuits—continued

S.G. detector combined. A circuit showing how it is used appears in Fig. 1, and if you refer to Fig. 1a, you will not find it difficult to understand how the valve works.

The cathode, oscillator grid and oscillator anode are self-explanatory terms, and it is easy to appreciate that here you have the elements of the triode oscillator section.

But the electron stream does not stop at the oscillator anode, for this is of grid-like construction and its potential is made lower than that of the "S.G. anode" by means of the 20,000-ohm voltage-dropping resistance (Fig. 1).

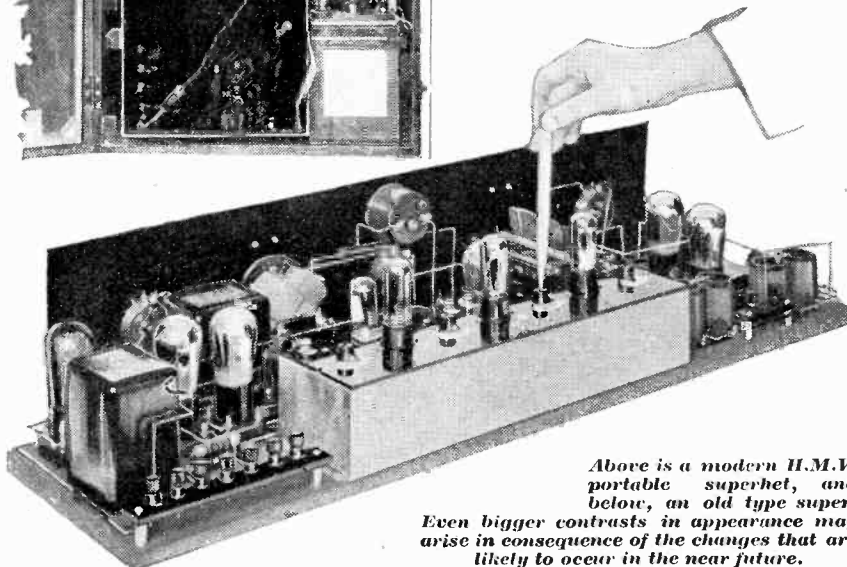
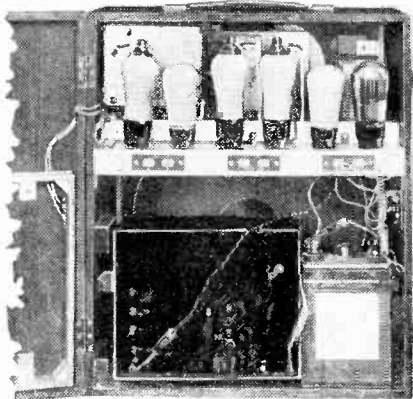
The "Electron Cathode"

Although the true cathode is common to both the triode and the S.G. sections, it is stated that a cloud of electrons forms between the oscillator anode and the first screening grid and constitutes an "electron cathode" for the S.G. section.

The "S.G. grid" can be made so that it has variable- μ characteristics in order that either manual or automatic volume control can be applied.

The way this is done is to fashion

CONTRASTING TYPES



Above is a modern H.M.V. portable superhet, and below, an old type super. Even bigger contrasts in appearance may arise in consequence of the changes that are likely to occur in the near future.

the grid so that it closes up in mesh towards one end.

It is this application of the A.V.C. principle, which can be drastically applied, that further adds to the valve's advantages.

S.G. or Pentode

Instead of an S.G., the detector portion can be a pentode, and I am inclined to think that the first "Hexode" placed on the market in this country will be of such construction.

In connection with A.V.C. it is interesting to note that a popular practice in the U.S.A. is to employ a separate valve to perform the duty.

I give a conventional circuit of the method at Fig. 2. The action of this circuit is as follows.

The V.C. valve (volume controlling valve) has its grid bias initially adjusted by varying the position of the potentiometer slider X.

Starting from this arbitrary adjustment, the greater the input to the grid of the V.C. valve, the greater will be the average anode current flow through the resistance R.

Effect of Voltage Drop

And the greater the current flowing through this the greater will be the voltage drop across it, and it is this which is applied to the grids of the H.F. and I.F. valves in order to reduce their amplifying powers.

So you see it is quite a straightforward, simple scheme, and, in use, it is most effective.

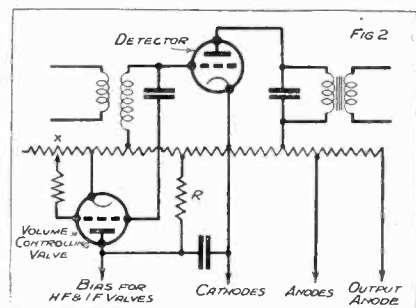
The circuits incorporating double-

duty valves are harder to follow, and the best way to "dig them out" is to separate the individual sections in the valves and get a firm understanding of their duties.

We did that with the "Hexode" in Fig. 1, and it might be a good idea for you to look at it in detail with that principle in mind.

(The .1-mfd. fixed condensers are all bypass condensers, so that you need take little notice of them.)

SEPARATE A.V.C. VALVE



A separate valve for automatic volume control is a scheme now popular on American superhets.

Some of the A.V.C. double-diode pentode circuits look horribly fearsome, but tackled on the same lines they "boil down" to comparatively straightforward affairs.

But you must first acquaint yourself with the principles underlying the operation of these circuits before you can hope to read them.

However, to return to the subject of superhets.

I learn that several firms are contemplating the application of the new iron-core idea to the intermediate transformers of supers.

A Midget Super

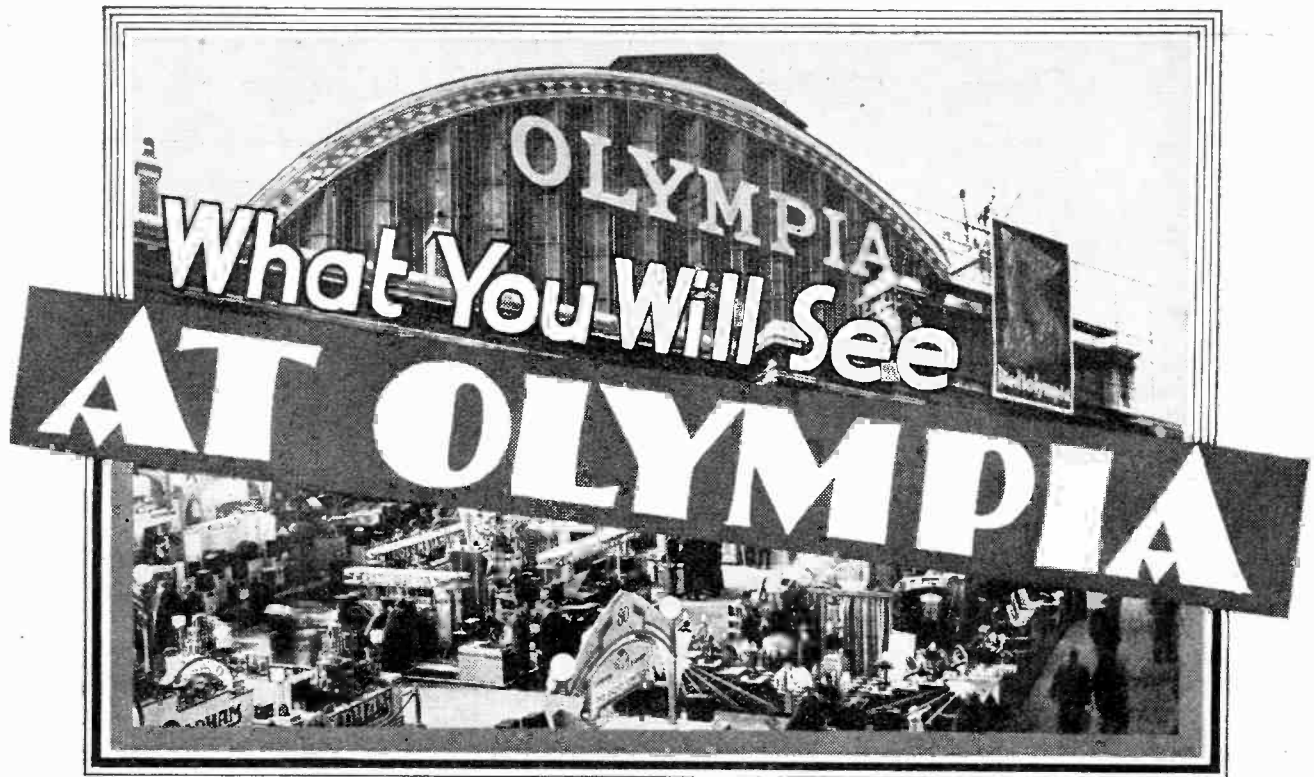
This should make for great efficiency and compactness. That last word reminds me of an American super I recently had the opportunity of testing.

It didn't use iron-core coils, but it employed the new midget mains valves that are now being marketed in the States, and was no larger than the average two-valver.

Yet its performance was most impressive. Its price is in the neighbourhood of ten pounds complete!

I wonder if we shall see permeability tuning applied to the super this season?

If we do, then the super is indeed
(Please turn to page 267)



THE NATIONAL RADIO EXHIBITION, AUGUST 15th—24th, 1933

AMALGAMATED PRESS, LTD.
Stand No. 11.

It is fitting that at the commencement of this, our Radio Exhibition review, we should introduce to readers our own stand and the various outstanding set designs for home constructors that we shall be showing. Also we take this opportunity of tendering to you all a hearty invitation to visit us at Olympia, to see what we have to show, and to talk over any features of radio interest in which the technical staff, always present, can be of assistance.

Naturally, the chief exhibit in the WIRELESS CONSTRUCTOR section is the Radiogram designed by Mr. J. Scott-Taggart, and described in this issue. At Olympia you will be able to examine it closely, to ask questions about it, and to clear up any point concerning this latest S.T. design that may occur to you.

This special section contains a comprehensive review of this year's Radio Exhibition, including full details of new components and accessories of particular interest to the constructor. Carefully compiled by our own staff technicians it provides an extraordinarily vivid and condensed account of the very latest radio progress.

Not only the visitor to Olympia, but also the provincial reader of the "Wireless Constructor" will find in this review a summary of the outstanding developments which will influence radio design and technique during the coming year.

In addition the original "S.T.300" and "S.T.400" receivers will be on view for your closest examination, and any questions you may wish to ask will be readily discussed by the special staff on duty all the time.

No one need hesitate to discuss the simplest or most complicated aspect of radio, while the stand is open to all-comers. Those of our readers who came to Olympia last year will find us in the same place this year; while those to whom the exhibition is fresh, or who have not visited it for some time, should look out for the WIRELESS CONSTRUCTOR illuminated sign, on the far side of the main hall as they enter the Hammersmith road entrance.

BAKER'S SELHURST RADIO.
Stand No. 35.

This year the number of types of loudspeakers has greatly increased owing to the rapidly growing popularity of the permanent magnet types, and the Q.P.P. and "Class B" models. A very full range of mains-energised, permanent magnet and the special "push-push" speakers is being shown by Bakers Selhurst, who, it will be remembered, are among the pioneers in loudspeaker design.

Both chassis and cabinet models can be obtained of practically all the types, and astounding quality has been obtained with remarkably low prices. This perhaps is not so surprising when it is considered that this firm have been making nothing but moving-coil speakers for more than eight years!

From 35 shillings to £15 run the prices of the range of Bakers' speakers, from the "Permag" minor chassis to the large A.C. model of the Super-Power Cinema type. All Bakers' speakers can be obtained on 14 days' approval, so that intending purchasers can test them on their own sets before coming to any decision. You cannot say fairer than that.

BELLING & LEE, LTD.
Stand No. 45.

"The beginning and end of all things radio" well describes the wide range of terminals, battery plugs, fuses and holders, and the scores of valuable odds and ends that are provided for the home constructor by Belling-Lee.

Should you wish to build a mains set with fuses, and detachable plugs, Belling-Lee can fill the bill; should you desire a battery set with the latest terminals, wander-fuses, plugs and sockets, again B. & L. are ready to accommodate you. In fact, no matter what the gadget you require, if it comes in the terminal or fuse category, the popular Ponders End firm can supply.

And they do not stop at that, for three new pick-ups have appeared during the last few months, and are to be seen at Olympia. These are the various models of the unit pick-up, with or without volume control, and also available in conjunction with an ingenious attachment for portable gramophones.

Another interesting device is the Disturbance Eliminator, which is designed to prevent H.F. from the mains getting into the radio receiver. It is a neat component and retails at 9s. 6d. Volume controls, battery cords, anode connectors, etc., for which the firm is well known, complete with the aforementioned a most interesting exhibit.

BENJAMIN ELECTRIC, LTD.
Stand No. 42.

A recent addition to the lines marketed by Benjamin Electric has widened their range of components to quite a different sphere. We refer to the fact that recently the marketing of the popular Magnavox loudspeakers has been passed over

to B.E., Ltd. The speakers have for a long time been made by the firm, so that the whole of the handling of the speakers from start to finish will be under one concern.

Among the latest component developments emanating from Tottenham are a driver transformer for "Class B" sets, and a Universal output choke for "Class B" valves. Both components are tapped to give the required ratios for proper matching of "B" stages, while the prices are remarkably reasonable, being 10s. 6d. and 11s. respectively.

Reduced prices mark an interesting step forward in valve-holder design, for which Benjamin have long been famous. The well-known "Vibroholder" can be obtained for 10d., while the "Clearer Tone" de-luxe holder is 1s. 6d.

The "Five-Pin" holder is 1s. 3d., and all are properly sprung to prevent valve vibration. In addition, there is of course the special 7-pin holder

OUR STAND AT THE EXHIBITION IS

No. 11

You and your friends are cordially invited to come and pay a visit to

THE WIRELESS CONSTRUCTOR

and have a chat about any radio difficulties you may be experiencing

for the new double-diode-triode and "Class B" valves.

We must not forget the "Transfeeda" in our brief review of the chief lines that are to be seen at this stand, for this is the original shunt-led transformer unit, and has justly earned an excellent reputation for efficiency and straight-line amplification.

BLOCK BATTERIES, LTD.
Stand No. 22.

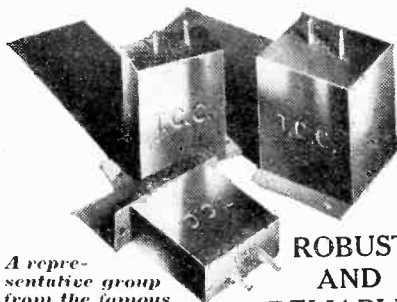
The main point of interest at this stand is the introduction of a plate-less H.T. accumulator in two sizes, 60 volts and 30 volts, each of 5,000 milliamperes-hour capacity. This is particularly

Olympia Offers a Wonderful Choice

interesting because the Block method of construction enables the batteries to be only half the size and weight of a corresponding ordinary accumulator.

A low-tension plate-less battery is also being exhibited, in which in place of the usual glass container a neat cylinder of mottled bakelite is used, while the cell has a capacity of almost double that of an ordinary cell of the same bulk.

Internally, it consists essentially of a thin lead cylinder, the bakelite forming a sort of skin, and it is pasted round its inside to obviate the need for grids. The cylinder is both the negative electrode and the container for the acid, and inside it is the positive lead core, separated from the negative by glass wool and soft ebonite.



A representative group from the famous condenser specialists.

ROBUST AND RELIABLE

It is claimed that the absence of the usual lead grids for holding the paste results in better charging, the lead grids detracting from the effects of the charging owing to their being such good conductors. The capacity of the Block two-volt cell is 80 ampere hours, and the price is 11s. 6d. Good going!

BOWYER LOWE AND A. E. D., LTD.
Stand No. 102.

Not many would consider that Brighton was other than a residential and holiday resort, and the idea that some of the most ingenious radio components emanated from the famous town would be foreign to most people. But it is a fact for tucked away in that noteworthy resort is the factory of Bowyer Lowe and A. E. D., Ltd., whence come some of the most attractive components we have seen.

Of chief interest, in our opinion, is the log-law volume control and the double fader, which are constructed on novel lines, as is the "Beta" pick-up which was introduced some little time ago, and which is still going strong.

An all-electric playing unit, complete with pick-up, is available, while a new departure is the P.E.T. unit, a parallel-feed transformer component that sells for 11s. 6d., and has a primary inductance of over 80 henries. There is no doubt that the ideas that come from "Diamond Works" are pretty bright.

BRITANNIA BATTERIES, LTD.
Stand No. 124.

Inexpensiveness in initial cost and economy in operation characterise the well-known Pertrix batteries, a goodly range of which are to be seen on the stand of their manufacturers, Britannia Batteries, Ltd. Let us have a brief look at them.

IT SAVES TROUBLE



An ingenious automatic changer for gramophone records by Garrard Engineering and Manufacturing Co., Ltd.

The H.T. types are the most interesting, especially as they are plainly listed as to their discharge capabilities. There are five main types, all obtainable in a variety of maximum voltages, and classified according to the work they are designed to carry out. The "smallest" is the yellow carton type, which is made for sets using less than 10 milliamperes.

Next we come to the Ultra-capacity maroon cartons containing batteries that will feed receivers using anything below 15 milliamperes. Following these are more maroon cartons, inside which are the Super-capacity, the Heavy Duty, and the Super Heavy Duty batteries. These deal with demands of up to 20, 30 and 45 milliamperes, respectively. A fine range carefully classified so that there shall be no doubt whether the user has the right type or not.

In addition there are special batteries for Q.P.P. circuits, while for "Class B" sets the makers recommend the Super-capacity types or the Ultra models.

H.T. batteries do not complete the range on view, of course, for all sorts of grid-bias and L.T. batteries are to be seen, the latter in most cases being fitted with tell-tale beads to show how the charge stands in the cell. All are in glass containers.

BRITISH BLUE SPOT, LTD.
Stand No. 97.

An important section in the loudspeakers made by the British Blue Spot Company is the range of moving-coils of the permanent magnet and energy types. The former can be obtained in either cabinet or chassis form, and range in price from 32s. 6d. for Model 29 P.M., to 59s. 6d. for the 99 P.M.

These are the chassis figures: the complete cabinet models cost 45s. and 87s. 6d. respectively for the two types mentioned, and in cabinet form they are known as the 22 P.M. and 32 P.M. In

DESIGNED FOR QUALITY



One of the outstanding models of the Blue Spot range—the 45 P.M. permanent magnet moving-coil. The built-in output transformer can be seen on the underside of the chassis.

between there is the Model 45 P.M., which costs 45s., and the 62 P.M., which is the same chassis in a handsome walnut or mahogany cabinet, and costs 67s. 6d.

In addition there is the entirely new and very attractive range of energised moving coils. Manufactured with the usual Blue Spot precision from high-grade materials, these speakers have an exceptionally fine performance and at 27/6 set a new standard of value. Windings are available to suit 60, 110, and 220 volt supplies.

The coming of the moving-coil speakers has not obliterated the popular balanced armature types and the various speaker units for which Blue Spot have been famous so long. The 60 K still sets a standard of effectiveness that is unbeaten at the price, while the 100 U is a name to juggle with where loudspeaker users are concerned.

A mains disturbance eliminator and a wavetrap are features worth close attention. Both sell for 10s. 6d., and are extremely neat components in attractive moulded cases. Wonderful effectiveness is claimed for the mains interference eliminator, and all who are in trouble with mains noises should pay close attention to this gadget.

The famous Blue Spot pick-up that has earned such laurels in the past is in evidence at Olympia at the same price as last season. It is a most effective unit, containing volume control in its

construction, and having a most pleasing reproduction characteristic.

BRITISH BROADCASTING CORPORATION.
National Hall.

The B.B.C., as befits our national disseminator of entertainment and instruction, is co-operating with the Exhibition authorities in a special "exhibit" at Olympia this year. It takes the form of a theatre seating 2,000 people (arranged in the National Hall), and twice daily the B.B.C. is providing hour-long shows of various types.

Vandeville will have a prominent place in the programmes arranged, and famous microphone stars will appear before the public on these occasions. Henry Hall and his band will be there,

HOLLINWOOD AGAIN



Ferranti's are showing many new transformers among which may be mentioned special designs for "Class B."

and we understand that some of the shows will actually be broadcast through the usual National and Regional stations.

Whether the theatre will be shut down during the rest of the time (being open for two hours only per day) is not at the moment of writing clear, but it is hoped that the B.B.C., or the R.M.A., will make every possible use of an idea that is bound to increase the popularity of the Exhibition.

BRITISH EBONITE CO., LTD.
Stand No. 207.

"Becon" is a name that needs no introduction to set builders, whether commercial or home constructors, for it typifies the best in ebonite.

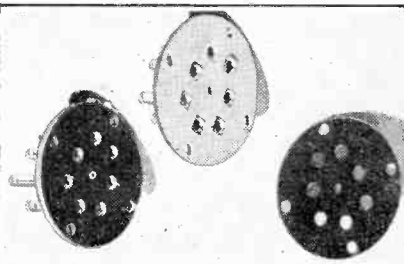
Practically anything that is required in the way of ebonite formers, of all sorts and sizes, can be obtained on demand from the tremendous stocks kept by this old established firm. Tubing, ribbed and plain, is ready for supply, and a wide range of the various types and sizes are to be seen on the stand at Olympia during the Exhibition.

Panels of mat, polished and grained finish are to be seen, and those who remember the radio panel of some years back will be surprised at the wonderful finish that can be obtained with modern processes.

BRITISH PIX CO., LTD.
Stand No. 204.

"Fix a Pix" is a slogan that must have rung throughout the whole of the radio world, so that no introduction is needed to the occupiers of Stand 204. But the Pix series aerial device is not the only thing to be seen here, the invisible aerial takes a prominent place, while outstanding

FOR THE NEW VALVES



These chassis-mounting valve holders for seven-pin valves are among the new Lectrolinx lines.

Well-made and Well-tried Lines

exhibits are groups of valves at amazingly low prices.

These valves are available in the majority of standard types in two- and four-volt battery ranges, and in the A.C. indirectly-heated range and mains rectifier classes.

BRITISH RADIOPHONE, LTD.

Stand No. 118.

Already noted for their excellent "Radiopaks," B. R., Ltd., have launched out into a number of new and enterprising lines during the last few months, and a most comprehensive range of their components is to be seen at the Radio Exhibition.

The Band-pass "Radiopaks" are there, of course, but backing them up in fine fashion is a selection of superhet "Radiopaks" of all descriptions, intermediate frequency coils, variable condensers, volume controls, pick-ups, "Class B" transformers, fixed condensers and other things, including the anti-static lead-in cable known as "Receptra."

The superhet "Radiopaks," to go back and take the various parts in more detail, is a new introduction, and can be obtained in a variety of types to suit all sorts of superhet circuits. All the models include the necessary variable condenser in the "pak," while the coil sections of the super "Radiopak" can be obtained separately if desired.

The I.F. units are screened in cans similar to those used in the "paks," while a valuable feature is that the units can be trimmed by means of the provision made in the top for adjustment of the small trimming condensers incorporated in the units. They are available for either 110 or 126 kc. and cost 10s. each.

The standard flat type of variable condensers are being continued, reinforced with a series of new designs that are worthy of special attention.

The "Class B" transformers are a new line which was but recently introduced, and these, too, should be carefully examined

Valves are better than ever this year and this is one of the latest S.G.'s from the Osram range.

during your visit to Olympia.

BRITISH ROLA, LTD.

Stand No. 52.

Loudspeakers for all sets, great and small, are provided by this firm of experienced moving-coil speaker manufacturers. We cannot possibly give an idea of the vastness of the number of types that are available. Matched dual speakers, special "Class B" reproducers, with or without the "Class B" amplifier incorporated in the speaker construction, and a long list of permanent and mains driven loudspeakers are to be found on view at Olympia.

The prices, too, are right, for chassis speakers can be obtained for as little as 27s. 6d. for D.C.-energised models, or 29s. 6d. for the permanent magnet model P.R.5-P.M. All models are supplied normally with universal tapped transformers, but they can be obtained without transformers for a matter of some 7s. 6d. less, so that the cheaper speaker mentioned above would cost but 21s. if it were purchased without its transformer.

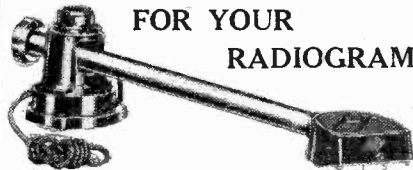
A. F. BULGIN & CO., LTD.

Stand No. 122.

If you want a radio valve it is no use going to A. F. Bulgin & Co. They do not make them. But if you want anything else in the way of components, they can almost certainly be obtained at

Barking. Looking through a Bulgin catalogue is a most enlightening experience, and an examination of the stand at Olympia is even more illuminating. It takes some time to do it thoroughly, too, for it contains an amazing array of parts of all sorts.

Here are some of the new lines that are to be found at the Exhibition, and these are only a fraction of the colossal selection at your disposal. The thermal delay switch introduced last year has been completely re-designed, and is now fitted with adjustable pressure and controllable time delay—two valuable features.



FOR YOUR RADIOGRAM

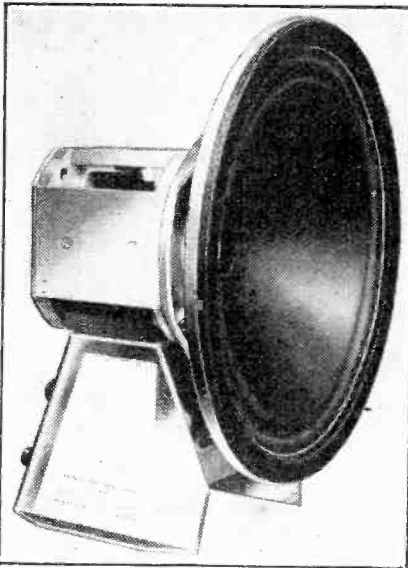
The Blue-Spot pick-up incorporates a volume control and its pleasing reproduction characteristics will delight the music lover.

Mains resistances for the new Mullard 18-amp. D.C. valves are available in three types, while improved methods of construction have been applied to the 5- and 20-watt power resistances.

The "Controltone" makes its official appearance at the show, while large selections of graded volume controls are to be seen. "Class B" has not been forgotten in the Bulgin range, and new driver transformers and an output choke are among the particularly interesting lines on view.

Of switches there are legion, for Bulgin has long specialised in various types of switch gear, with the inevitable result that the firm probably supplies a bigger variety of these invaluable parts

STURDY AND SENSITIVE



The Whiteley Electrical Radio Co., Ltd., who specialise in moving-coil loudspeakers, are showing an entirely new range to be known as the "Microlode" types.

than any other firm. Have a good look at them. An interesting feature of the display is the range of "skeletonised" components, listed as "manufacturers' models," and shorn of the ornamental outer cases. These include valve holders, L.F. chokes, H.F. chokes, terminal strips, and so forth, and they should appeal strongly to home constructors.

The rest of the hundred and one things to be seen at Stand No. 122 we must leave for you to ferret out for yourself: it will be an enjoyable process, and you will come away well pleased.

CARRINGTON MANUFACTURING CO., LTD.

Stand No. 83.

"It is no use spoiling the ship for a ha'porth of tar." So runs the old saying. And it is equally true when applied to radio receivers and cabinets. How many excellent set designs are spoiled by poor cabinets, or by having no container at all!

There is no need for it either, for good, handsome and low-priced radio cabinets of all sorts are available if the constructor will only take the trouble to have a look round.

Messrs. Carrington Manufacturing Co., renowned for their "Camco" cabinets, are among the leaders in the business of supplying attractive homes for constructor sets, and no matter how small or how large the receiver may be, a suitable cabinet can usually be found.

Take a look round the show and you will be surprised at what is being offered in the way of cabinet designs, and at the prices asked. Most attractive pieces of furniture are to be found, the cost varying from 10s. in the cheapest "Camco" cabinet for table sets, to 14 guineas for elaborate radiogram designs.

Loudspeakers, too, are well catered for, while the portable set builder also has been carefully considered.

CELESTION, LTD.

Stand No. 125.

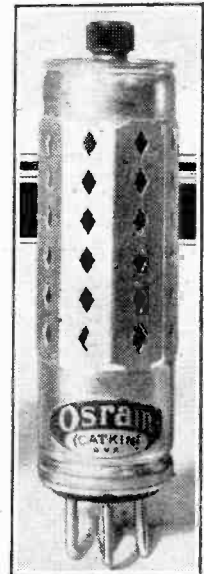
Looking back at the past years of radio it is difficult to remember when there was no Celestion loudspeaker on the market. For this successful firm has become a household word where loudspeaker designs are concerned, and their products have been in the forefront of radio for many years.

Now, in addition to the design of various models of moving-coil speakers, Celestion have been busy in the production of a really useful range of speaker input transformers so that the different types of Celestion speakers may be matched for any type of valve output. "Class B" Q.P.P., Dual Speaker matching, and various special tasks that may have to be undertaken, such as the running of a number of speakers from one output source, have all been carefully considered and catered for by a series of transformers to be seen on their stand at Olympia.

Thus, no matter which of the Celestion speakers you may be interested in, and there is a number to choose from, you may be sure of getting the best out of it, for your set can be most accurately matched, and the fullest details for so doing are gladly provided by the manufacturers.

All Celestion products are carefully examined and subjected to a number of tests before despatch, so that purchasers may be sure that nothing is not completely up to scratch when it leaves the factory at Kingston.

Of the actual speakers that are available this year we need say little, except to remark upon the wonderful variety that is available, not only in speaker design and price, but in the form of cabinets provided for most of the models.



One of the famous "Calkin" Valves which recently created a sensation as the first unbreakable valve.

STAND
85
PERMEABILITY
TUNING

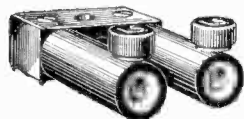
STAND
88
IRON-CORED
COILS

Just the Thing for Constructors

These are the 1067 at 10s., a 99-volt battery with 9 volts G.B. included; the 1068 at 12s 6d., which is a 123-volt battery with 9 volts G.B.; and the 1069 at 11s., which is a plain 126-volt battery.

These belong to the Red Triangle brand, but additions of importance have also been made to the Green triangle series, and to the Blue and Yellow triangle batteries for portable receivers.

There are also four main types of Exide wet cells on view, these being the celluloid and glass container range having capacities of 6 to 120 ampere hours (series C), the Mass type (series D), which include gravity bead indicators, type HZ for heavy discharge and, finally, the unspillable class for portable receivers.



Handy terminal connectors and winder plugs are among the popular Electro-tinx lines.

Exide H.T. batteries of all types are to be seen, including special heavy duty cells which will deal with loads such as are imposed by multi-valve sets, and have capacities of up to 10,000 milliampere hours.

H. CLARKE & CO., (M/CR), LTD.
Stand No. 81.

Wired from the mains, that is the Atlas ideal, and for a long time past this energetic Manchester firm have concentrated on the production of mains units of all sizes and types. Every class of receiver is brought into the scope covered by Atlas units, and the latest arrivals to the ranks are special "Class B" and Q.P.P. power packs, with good voltage regulation.

At Olympia are to be seen examples of the excellent work put in by this firm on this branch of radio reception, and a large number of new units are in evidence. One of the most interesting of these is the C.A.12, which is an A.C. unit designed for the supply of H.T. to all battery sets having up to three valves.

Another unit of note is the A.C.300, which is capable of supplying the anode power for "Class B" and Q.P.P. amplifiers with steady voltage regulation. Alternative outputs of 12, 18, or 25 milliamps, at 150 volts can be arranged by a simple tapping scheme on a panel at the back of the unit.

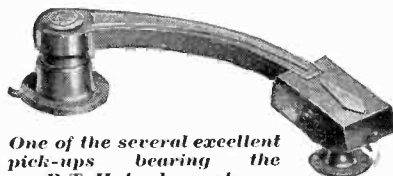
The unit contains a trickle charger, and also provides a number of grid-bias voltages from 1½ to 16 volts.

All the Atlas mains units are available on hire purchase terms, starting off with a payment of 10s. down and the rest arranged over monthly periods of varying sums.

COLUMBIA GRAPHOPHONE CO., LTD.
Stand No. 66.

Home constructors will be particularly interested in the New Columbia balanced armature loudspeaker that is to be seen on the stand of this noted gramophone concern. It is housed in a well-proportioned walnut cabinet and excellent quality is claimed for it.

The cobalt steel magnet, laminated silicon steel poles, and the damp-proof cone and adjustable balanced armature are interesting features of this new design, which is available for 30s.



One of the several excellent pick-ups bearing the B.T.H. trade mark.

Another attractive proposition is the Columbia's pick-up and carrying arm which costs 32s. 6d. It has an ingenious application of the "hum-bucking" coils to allow the pick-up to be perfectly safe from A.C. induction when used with synchronous turntables, while the arm can be "dicked" into a vertical position to facilitate needle changing.

The frequency range of response is said to be 30-5,000 cycles, while the weight of the needle on the record is ¼ ounces. With the instrument are provided three and a half feet of metal-screened flex, a carrying arm rest, and the necessary fixing screws.

A FAMOUS MAKE



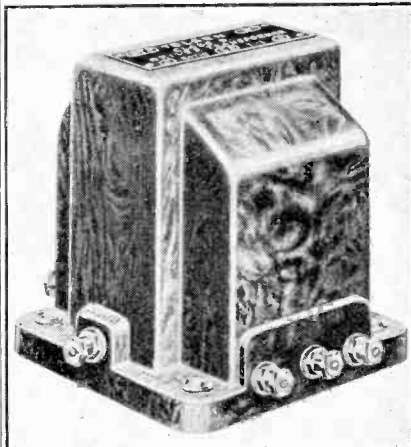
Siemens batteries are designed in types to suit every class of receiver, including special batteries for most well-known makes of portables.

COLVERN, LTD.
Stand No. 56.

It's not just "any old iron" that is the secret of its success. Ferrocart is the result of years of patient experiment, and now, from the Colvern factory, we are getting the reward of these in a wide range of the very latest things in iron-core inductances.

For the past months, since last show, we have been getting acclimatised to the wonderful results that were offered to users of the F1, F2, and F3 Ferrocart coils. Now a whole range of different varieties is released, with improved construction and smaller dimensions. Also special ganged packs are to be placed on the market in the near future so that the constructor can have a complete unit, containing coils, condenser and, if he wishes, volume control.

FOR "CLASS B" DRIVE



The re-designed Telson lines include special components for "Class B" such as transformers, chokes, and valve holders.

The wavechange switching of many of the coil units is of the multi-purpose sort, enabling the one knob to control not only wavelength, but on-off and radiogram switching as well.

And here are some of the many varieties of coil combinations that are available at the present moment for your use in home constructor sets, and more will surely follow in the future as need arises.

F5, aerial coil with reaction for detector I.F. receivers. F10, F3, aerial and H.F. coil for one S.G. H.F. receivers. F10, F11, F12, F13, tapped aerial coil with inter-valve band-pass coupling for 2 S.G. H.F. stage receivers. F10, F14, F13, suitable for 2 S.G. H.F. stage receivers without band-pass coupling. F1, F2, F8, band-pass and oscillator coil for single-dial, superhiet receivers.

F1, F2, F14, F8, band-pass preceding S.G. H.F. stage with H.F. and oscillator coil for superhiet receivers. F10, F14, F8, for single-dial superhets with one S.G. H.F. stage without band-pass filter. F1, F2, F3, band-pass filter and auto transformer with reaction.

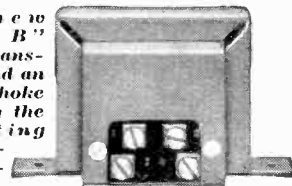
A. C. COSSOR, LTD.
Stand No. 89.

So much success has been achieved by Messrs. Cossor in both realms of radio that it is difficult to say now which are most noted, the Cossor kit sets or the famous Cossor valves. Not that it matters, for the two branches of activity on behalf of the firm link perfectly together and are fully on view in a fascinating, almost dazzling, display on stand 89.

Several kit sets are to be seen, covering practically every contingency in the needs of the home constructor, from small battery to powerful mains designs, while Cossor valves for any and every purpose are to be found among the colossal number of types exemplified at the show.

Always in the front of progress, Cossor were the first to bring out a 2-volt S.G. valve in the days

The new "Class B" driver transformers and an output choke are among the interesting lines offered by Benjamin Ltd.



gone by, and so we were not surprised recently when they led the way with "Class B" amplifiers, of which they have now two types available.

High efficiency is a motto that Cossor always live up to their fullest endeavour, and the success the Cossor valves have achieved in the hands of the home constructor is sure proof that no slipping from the high standards the factory sets itself has been tolerated.

We are not going to attempt to give even a bare idea of the number of valves to be seen here, we should need far more space than is available, but we are going to ask you very definitely to so arrange your time during your visit to Olympia that you will not have to hurry your examination of the Cossor stand and so miss much of the wonderful display.

But we must just mention the new D.C. valve range, appearing at Olympia for the first time. This is a range that is designed with 25-amp. heaters, and covers the usual types of valves, multi-mu S.G., H.L., and pentode, and the valves are known respectively as the D.V.S.G., D.H.L. and D.P. Pen.

Also, visitors to Olympia should look out for the now famous D.D. Pen, the double multi-mu pentode diode valve for automatic volume control circuits, and also for the new multi-mu battery valve, the 220V.S., and the "2-amp." "Class B" valve, the 220B., which becomes a slightly smaller brother of the original 240B.

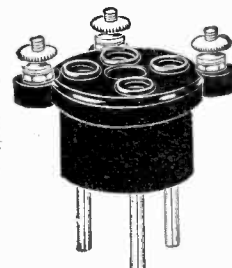
Those who cannot go to the Exhibition will lose a great deal though much can be made up by application to Cossor for details concerning their products, for it must not be forgotten that valves and kit sets do not complete the activities of the firm.

Moving-coil speakers are among the attractive lines offered to the radio public, and so are the various mains transformers, batteries and other parts and accessories that are available.

DUBILIER CONDENSER CO. (1925), LTD.
Stand No. 68.

During the coming season a very striking alteration in the paper condensers made by Dubilier

Any receiver can easily be converted into a radiogram with the aid of one of these ingenious Hartie adaptors.



Components You Can Rely On



will take place, and additional types of paper condensers are to be added. These latter will appear in rectangular metal containers, fitted with terminals, while a further range will be available with tags for connection purposes.

The alteration mentioned above concerns the already popular cylindrical condensers known as type 9200, which in future will be altered somewhat in design and will be available in more widely arranged voltages and capacities.

In connection with the electrolytic types, Dubilier are continuing the well-known types of 8- and 4-mid., while a range of low voltage electrolytics are appearing in cans similar to those already on the market.

Now that car radio has come so much to the fore in this country, suitable resistances for ignition interference suppression are essential, and Dubilier have turned out a special range of various values of specially designed suppressors packed in cartons according to the requirements of four- or six-cylinder cars.

Other resistances are being continued very much on the lines of last year, except that several important improvements have been made, and the method of marketing them is to be revised somewhat.

There is no alteration in the design or the prices of the Dubilier mica dielectric condensers, which are maintained in the same voltages and sizes as heretofore.

EDISON SWAN ELECTRIC CO., LTD. Stand No. 82.

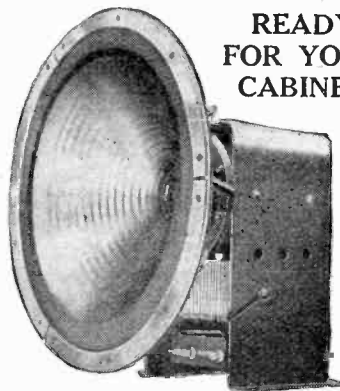
So many excellent things are turned out by Edison that it is an almost impossible task to give anything like a complete idea of what should be seen at their stand at the Radio Show. One thing is certain, however, that plenty of time should be allowed for examination of the various radio and electrical apparatus that is on view.

Naturally Mazda valves take a prominent place, for the Mazda A.C. valve was the first indirectly-heated valve on the market, and as leaders in this class of valve one can be sure of the most interesting developments being on view.

But mains valves are not the only types that should claim special attention. The "Class B" valve, the P.D.220, vacuum thermal delay switches, cathode ray television tubes, 1-amp. D.C. valves, all need careful examination if the full value of each is to be admired.

In another branch of radio and audio reproduction we find the large range of R.K. speakers and pick-ups. The former constitute a wonderful selection of types that meet the requirements of practically every listener. From the "Senior" A.C. chassis model at £7 5s. we come down in price through the D.C. "Senior" to the various permanent and smaller mains types.

The most expensive of these is the new Senior



READY FOR YOUR CABINET

Messrs. Edison Swan Electric Co., Ltd., are showing a large range of R.K. speakers and pick-ups. Among the former may be mentioned the A.C. Senior chassis model seen above.

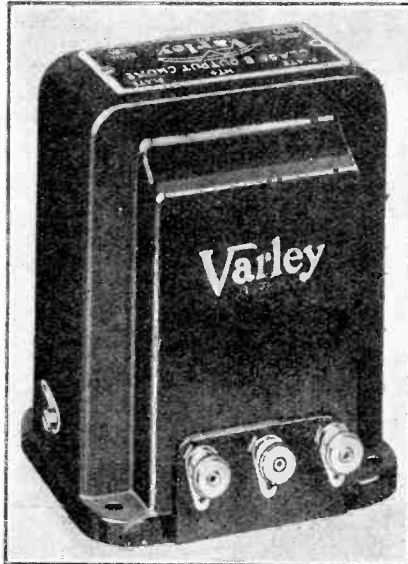
P.M., which costs £5, and the least is the Minor "Arundel" cabinet model, which ties in cost with the Major D.C. type at £2 17s. 6d.

There are also two more speakers, at £7 10s., known as the Windsor and Warwick models, which are cabinet versions of the Senior permanent magnet speaker.

Then there are the pick-ups, of which there are two types available, the Senior De-Luxe and the B.T.H. Minor. Both are complete with tone arm and rest, while the latter has a volume control incorporated in the design. The Senior has an output of 1 volt at 993 cycles, and provides 97 per cent accurate tracking. It costs, complete with flexible lead and separate 20,000-ohm volume control, the reasonable figure of 42s.

The Minor pick-up gives about half the output at 993 cycles, and has incorporated a volume control of 10,000 ohms. The price complete is 25s. Excellent value, both of them.

FOR THE NEW TECHNIQUE



A comprehensive array of "Class B" and Q.P.P. components will be found on the Varley stand, the various transformers and output chokes having ratios to suit different valve combinations.

We must not forget another aspect of radio that is well tackled by Ediswan, that of the L.T. and H.T. battery. From 5s. 6d for the 60-volt standard H.T. battery, we have a most comprehensive range covering all voltages likely to be required up to 150 volts, and several capacities. Special batteries are made for "Class B" and Q.P.P. sets, and a number of useful sizes are available for portable receivers.

Grid-bias batteries can be obtained from 9d. upwards, with voltages that range from 3 up to 16.5. These are sold in two types, standard and minor.

L.T. batteries are legion in their number, for besides radio, Ediswan cover the requirements of motor-cars, and a wonderful assortment of starter batteries is provided.

EPOCH RADIO MANUFACTURING CO. LTD. Stand No. 2

We wonder if there is any manufacturer who makes more types of loudspeakers than Epoch. If so, he must have a job to find anything in the way of types or sizes that are not covered by this enterprising firm. Matched pairs, permanent magnet models, mains- and battery-energized types, and so forth, are listed in abundance, while a goodly selection is to be seen at the Exhibition.

Among the latest models being introduced to the public for the first time this month is a "Super-Dwarf" speaker for motor-cars and portable sets. This is especially timely when all the trade and listeners are discussing car radio.

Another type that is making its bow is the re-designed A2, which carries various improvements, while there is also a new large Super P.M. model at a popular price. All the popular models are

available for "Class B," but in addition a special adaptor combination "Class B" speaker for attachment to ordinary battery sets is a particularly interesting new-comer.

The valve is placed in the back of the speaker, together with the necessary transformer coupling, so that in an instant an ordinary set is transformed to "Class B" with the speaker already attached. Very cute.

EVER READY CO. (GREAT BRITAIN), LTD. Stand No. 57.

Solid lumps of electricity! That is what this stand contains, for the Ever Ready Co. have packed it with batteries of all sorts and sizes. Do you want a special portable H.T. battery, or one to operate a "Class B" receiver? You will find one in the Ever Ready range. Or is it a 2-volt accumulator you are requiring? Here again the same firm can satisfy your needs.

Everything you are likely to want—even if you are deliberately awkward in demanding out-of-the-way types—in the battery line is ever ready for you from the giant factory in the north of London. Here there are some 850,000 square feet of floor space, with something like 9,700 people engaged in the turning out of first-class batteries for H.T., L.T., grid bias, motor cars, flash lamps, torches, fountain-pen lights, bicycle lights, and so on. If you cannot get to the show send to Hercules Place, Holloway, N.7, for full details and catalogue, you will have a real surprise at the variety of goods available.

FERRANTI, LTD. Stand No. 74.

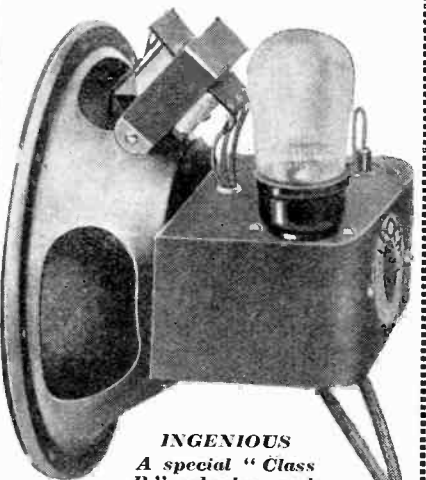
"Wake Up!" That is what Ferranti say to the radio world, not only with their new alarm electric synchronous clock, but in their various component and accessory designs. As we have mentioned it first we will discuss the alarm clock right away, for it is particularly ingenious.

It is fully automatic and the alarm is arranged on the 24-hour basis, so that it can be set to go off at night or in the morning, but it goes off only once in the 24 hours.

The alarm itself is of the buzzer type, being both gentle and persuasive instead of applying the nerve-racking strident command so often associated with alarm clocks.

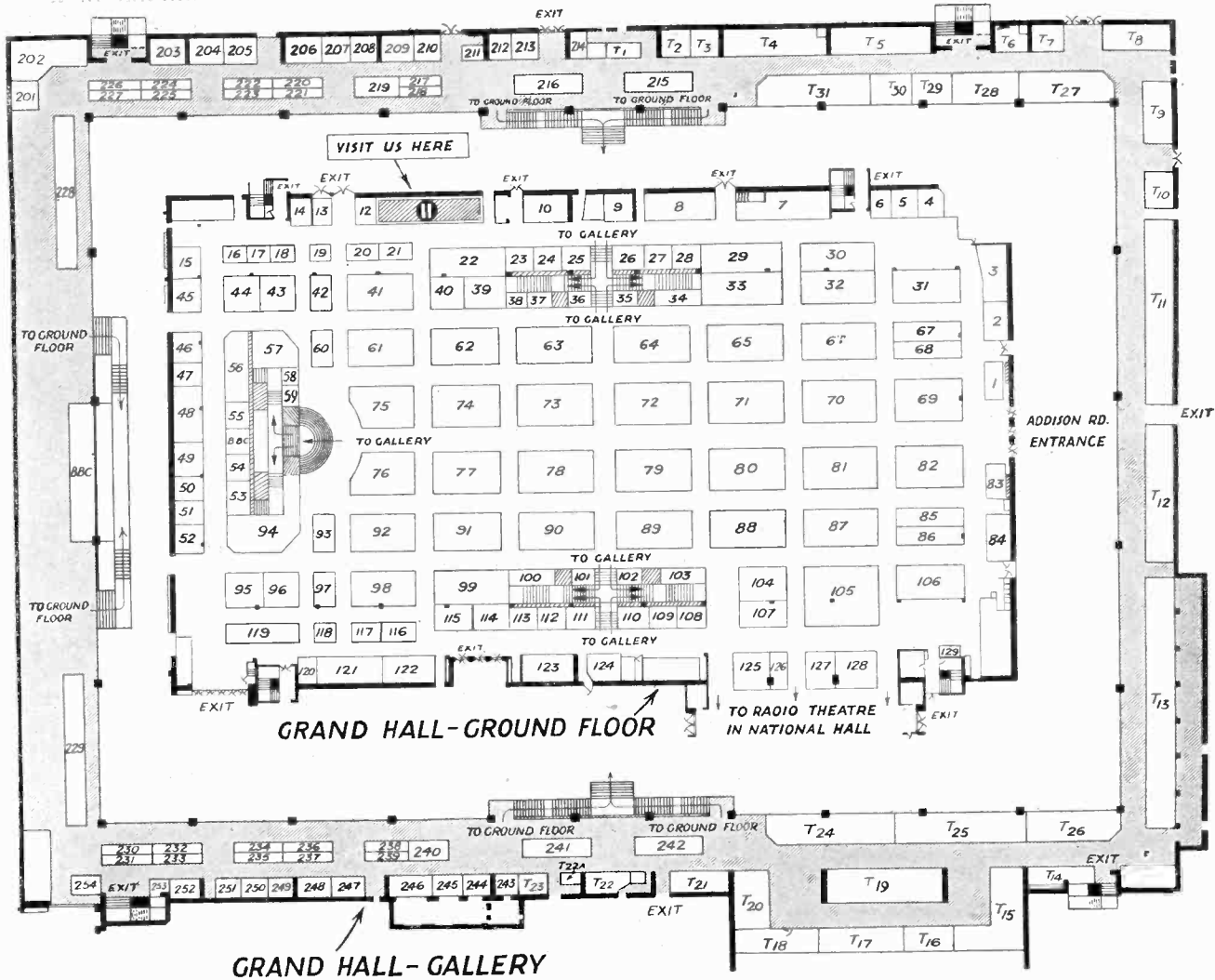
The alarm can be stopped by pressing a knob on the top of the clock, and it is so arranged that it will go off again 24 hours later without need for resetting. The price is 25s., and its possession should be a boon to many a household.

Coming more closely to radio, we find at Olympia a large selection of Ferranti resistances, condensers, band-pass packs and, of course, transformers, chokes and valves. These latter are not so well known so far as the L.F. components for which



INGENIOUS

A special "Class B" adaptor combination for attachment to ordinary battery sets is a newcomer to the Epoch range.



WHERE TO FIND THE FIRMS

An Abridged List Showing the Stand Numbers of the More Important Exhibitors.

Name of Firm.	Stand No.	Name of Firm.	Stand No.	Name of Firm.	Stand No.
Amalgamated Press, Ltd.	11	Fuller Accumulator Co. (1926), Ltd.	34	Loewe Radio Co., Ltd.	245
Automatic Coil Winder & Electrical Equipment Co., Ltd.	46	Garrard Engineering & Manufacturing Co., Ltd.	119	Marcomiphone Co., Ltd.	77
Bakers Selhurst Radio	35	General Electric Co., Ltd.	90	Mullard Radio Valve Co., Ltd.	71
Belling & Lee, Ltd.	45	Graham Farish, Ltd.	205	Multitone Electric Co., Ltd.	55
Benjamin Electric, Ltd.	42	Gramophone Co., Ltd.	80	New London Electron Works, Ltd.	107
Block Batteries, Ltd.	22	Grosvenor Electric Batteries, Ltd.	126	Oldham & Son, Ltd.	123
Bowyer-Lowe & A.E.D., Ltd.	102	Harlie, Ltd.	54	Ormond Engineering Co., Ltd.	99
Britannia Batteries, Ltd.	124	Hayberd & Co., F. C.	16	Osborn, Charles A.	202
British Blue Spot Co., Ltd.	97	Hellessens, Ltd.	106	Osram Valves	92
British Broadcasting Corporation	—	High Vacuum Valve Co., Ltd.	108	Philips Lamps, Ltd.	81
British Ebonite Co., Ltd.	207	Hustler, Simpson & Webb, Ltd.	62	Pye Radio, Ltd.	73
British General Mig. Co., Ltd.	38	Igranic Electric Co., Ltd.	86	Radio Gramophone Development Co., Ltd.	79
British Pix Co., Ltd.	204	Jackson Brothers (London), Ltd.	116	Radio Instruments, Ltd.	41
British Radiophone, Ltd.	118	Lamplugh Radio, Ltd.	219	Reproducers & Amplifiers, Ltd.	44
British Rola Co., Ltd.	52	Lectro-Linx, Ltd.	37	Siemens Electric Lamps & Supplies, Ltd.	31
British Thomson-Houston Co., Ltd.	209	Lissen, Ltd.	72	Six-Sixty Radio Co.	95
Bulgin & Co., Ltd., A. F.	122			Slektun Products	47
Carrington Manufacturing Co., Ltd.	83			Sound Sales, Ltd.	213
Celestion, Ltd.	125			Sovereign Products, Ltd.	101
Chloride Electrical Storage Co., Ltd.	241			Standard Telephones & Cables, Ltd.	96
Clarke & Co. (M/cr.), Ltd., H.	91			Telegraph Condenser Co., Ltd.	98
Chimax Radio Electric, Ltd.	84			Telsen Electric Co., Ltd.	88
Cole, Ltd., E. K.	70			Vandervell, Ltd., C. A.	228
Columbia Graphophone Co., Ltd.	68			Varley (Oliver Pell Control), Ltd.	85
Colvern, Ltd.	56			Westinghouse Brake & Saxby Signal Co., Ltd.	32
Cossor, Ltd., A. C.	89			Whiteley Electrical Radio Co., Ltd.	128 & 129
Dubilier Condenser Co. (1925), Ltd.	68			Wilkins & Wright, Ltd.	20
Edison Swan Electric Co., Ltd.	82			Wingrove & Rogers, Ltd.	93
Electro Dynamic Construction Co., Ltd.	240			Wright & Weaire, Ltd.	1
Epoch Radio Mig. Co., Ltd.	2				
Ever Ready Co. (G.B.), Ltd.	57				
Ferranti, Ltd.	74				

THE WIRELESS CONSTRUCTOR
welcomes you to
STAND 11

Visit Us at Stand No. 11

STARTED AT OLYMPIA '29

STAND 91

MAINS UNITS

The firm has rightly been famous for many years, but they are rapidly making their way in the radio world, and should be granted special attention by all visitors to the stand.

Those valves which we would place specially before your notice are the new "Class B" type, the double-diode triode, which was, we believe, the first of its kind to be placed on the British market, and the new output valve, the P.4.

Of unusual interest, too, are the various loud-speakers that have been made by this enterprising



SOVEREIGN VALUE

A full range of inexpensive components is manufactured by the old-established firm of Sovereign Products, Ltd. Screened and un-screened coils, switches, volume controls and H.F. chokes are among the items listed.

firm. These include permanent magnet types as well as mains-energised models, new arrivals being the M.5T. P.M. speaker, and the D.4.T. and D.5T. D.C. mains-energised types.

In addition, there is a special "Class B" speaker amplifier, type B.M.5, which has been designed to enable ordinary battery sets to be turned easily into "Class B" receivers with the required speaker already attached. It retails without the "B" valve at 4 guineas.

"Class B" and Q.P.P. have been types of L.F. amplification in which Ferranti have fairly revelled. They have gone tremendously deeply into the subject of the special components required by the two systems, and have placed on the market parts that are unbeaten in efficiency and most reasonable in price.

Every contingency has been covered carefully and thoroughly, and sets that are built with Ferranti "Class B" or other L.F. components are based on sound apparatus, which itself is turned out by sound radio engineers.

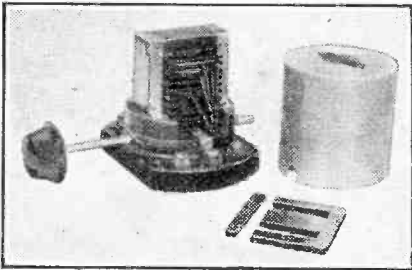
FULLER ACCUMULATOR CO. (1926), LTD. Stand No. 34.

Fuller accumulators have long enjoyed a reputation for reliable and lengthy service, and the makers are determined not to let a vestige of grass grow under their feet in their endeavours to keep that reputation unswerving.

Special attention has been directed of late to several important features in the Fuller accumulators, and the new arrivals in the camp incorporate some excellent ideas. Among these must be mentioned the patent grease cup terminals which prevent any corrosion taking place on the metal parts. This is a fine idea, and one that will appeal to every wet cell user.

An exclusive device to Fuller batteries is a

IRON-CORED EFFICIENCY



In the "Igranitor" coil of the Igranite Electric Co., Ltd., the ferrous core is built up of thin laminations in the same manner as an L.F. transformer, these laminations consisting of finely divided iron mixed with other materials which insulate the particles from one another.

special slotted connector grip which prevents strands of flexible wire jamming in the terminal threads when the terminals are tightened, and also stops connecting wires being pushed aside under the same conditions.

But the activities of Fullers are not confined to wet cells, a large range of dry batteries, H.T. and G.B. and torch types is available for the home constructor and radio listener, and he will find stand No. 34 of absorbing interest in this regard.

GARRARD ENGINEERING AND MANUFACTURING CO., LTD.

Stand No. 119.

One of the latest—and probably the most fascinating—additions to the Garrard gramophone motor range available to the general public is the automatic record changer. This has comparatively recently been released in two forms, the universal type, which will operate from A.C. or D.C. mains, and the A.C. model which is driven by an induction motor.

The device incorporates a pick-up on board, and is mounted on a stout sheet of steel, enabling it to be dropped into a radio-gram cabinet with the greatest of ease. It is ideal for home constructors of radiogramophones.

Other motors, including radiogram conversion units, are to be seen here, and the variety and prices of the different models will probably be an agreeable surprise to a large number of visitors.

GRAHAM FARISH, LTD. Stand No. 205.

The growth of the firm now famous as Graham Farish has been one of the most interesting in the

FOR GRID BIAS



The new Hellesens "Hi-Life" batteries are available in a wide range of types and their prices are attractively low.

radio trade, and every year we expect, and get, a display of parts whose attraction to the public is well mirrored by the crowds that visit the stand.

The products of this old-established company have always been in great demand by constructors, and this is well witnessed by the oft-repeated enlargements that have had to be made in the factory space at Brouley.

The factory has just been enlarged for the fifth time, during the summer, when additional space to the amount of a fifty per cent increase in accommodation has been obtained. Plans have been formulated based on the extended facilities that are now available, though we are unable to

STARTED AT OLYMPIA '29

STAND 97

ENERGISED SPEAKERS

disclose what they are until after the radio exhibition.

GROSVENOR ELECTRIC BATTERIES, LTD. Stand No. 126.

Grosvenor mercury H.T. and G.B. batteries need no introduction to radio set users, but many new types are being shown for the first time at Olympia at prices that will be bound to attract much attention. The prices have been reduced, so those who remember their reasonable nature before will be more than gratified at the new figures.

Six different lines are available in a series of maximum voltages ranging from 36 to 120 volts, and arranged with tappings at convenient intervals from 3 up to 15 volts.

HARLIE, LTD. Stand No. 54.

The Harlie exhibit is almost entirely devoted to a comprehensive display of apparatus for the "L.F. amplifier enthusiast."

This firm has already established an enviable reputation as makers of high-class pick-ups

HERMETICALLY SEALED



One of the Loewe vacuum resistances for convenient holder mounting, designed for a long life, and sealed from atmospheric disturbances.

which, while equal to the best in performance, have been marketed at popular prices.

Home constructors will discover at the Harlie stand that they can do justice to their straightest of "straight-line" amplifiers with a pick-up costing (with volume control) 27s. 6d.

Another attraction for the electric sound reproduction enthusiast is a particularly neat playing desk fitted with either an electric or spring motor.

A tone selector and scratch filter, new types of microphone, an automatic electric gramophone stop, and a pick-up adapter are among the many accessories to delight the eye and arouse the acquisitive passions of home-constructors of electric sound reproducers.

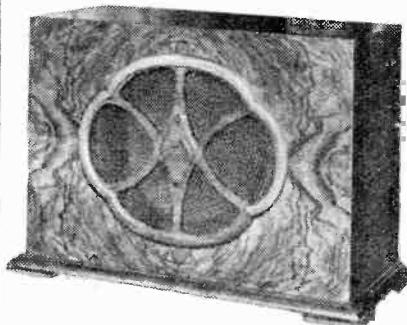
HEYBERD & CO. Stand No. 16.

Home constructors will not need to be informed of the nature of this exhibit. The firm of Heyberd achieved fame as makers of the highest quality mains apparatus in the days when most of the trade were avowing that the mains-driven receiver was impracticable.

The reputation which Heyberd's built as pioneers has been maintained ever since, so that the contemplating mains set constructor almost instinctively refers to a Heyberd catalogue when choosing transformers, chokes, etc.

This year there is the usual range of complete mains units and assembled kits. Detail improvements have been effected in the mains trans-

PLEASES EYE AND EAR



One of the pleasing cabinet loudspeaker designs displayed by The Gramophone Co., Ltd.

Bargains for Every Wireless Constructor

formers which are now fitted with special plugs and sockets to render them free from accidental wrong connection.

Trickle chargers have been greatly improved and redesigned, and visitors to this stand should not fail to inspect the models AO.2 and AO.3.

The home-constructor who still believes that

HIGH VACUUM VALVE CO., LTD. Stand No. 108.

The chief charm and probably the main attraction of home construction as a hobby is the fact that, having once acquired a stock of components, it is possible to design a number of circuit variations with them without having to purchase additionally more than an occasional new "gadget."

with ambitious plans for the winter. Here he will see a range of *British* valves with familiar characteristics, but selling at prices he only previously believed applicable to cheap foreign "junk."

A particularly interesting valve marketed by Hivac is the Z.220, which is a multi-grid pentode particularly well-suited for working moving-coil loudspeakers in circuits employing quiescent push-pull. It costs 12s. 6d. So Q.P.P. aspirants can indulge their ambitions for an expenditure of only 25s. for the pair of output pentodes.

The Hivac range includes all representative types of battery and A.C. valves at similarly low prices.

IGRANIC ELECTRIC CO., LTD. Stand No. 86.

The man who has to tear himself away from his soldering-iron and pliers to perform the *duty* of visiting Olympia will find compensation in the Igranic stand. Igranic's never let the real constructor down.

Here is an array of components to fulfill the reasonable (and unreasonable!) requirements of the "new-set-a-week" man.

Igranics "do" everything, and do it well. From aerial to loudspeaker terminals of the most super of super-sets, Igranic have a component for every position. Who can challenge their range of L.F. transformers? And what constructor will observe unmoved the fact that it now includes a "Class B" driver of Igranic quality?

An Igranic accessory of outstanding interest is a new permanent-magnet moving-coil loudspeaker employing a magnet system of unique design.

Sound output is roughly proportional to electrical input, so that doubling the input gives roughly double the volume, which is *not* the case with more conventional magnet designs.

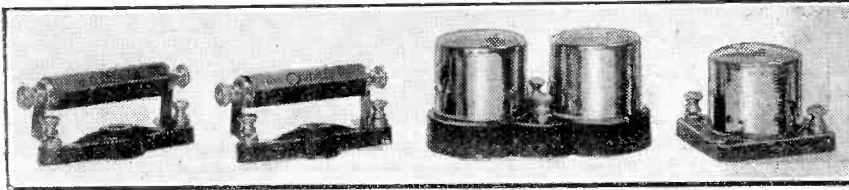
Much research has gone into the development of this speaker. It solves a problem to which Igranic's long ago called attention, and about which their engineers have been concerned ever since.

An innovation which every constructor should investigate. Its name is just D.9 and models are available for "Class A" Q.P.P. and "Class B" output arrangements. It's not dear—the Standard is only 32s. 6d. and for Q.P.P. or "Class B" an additional half-crown.

JACKSON BROS. (LONDON), LTD. Stand No. 116.

No lover of mechanical perfection and "beauty in fitness for purpose" should omit visiting the Jackson stand in the Main Hall.

The latest "J.B." products deserve careful inspection including, as they do, variable condensers of every type and description, all of superbly rigid construction and workmanlike appearance.



SET BUILDERS will recognise the Graham Farish touch in the components above, the Power "Olmutes" (left) being well known to all constructors. The increase in component screening is typified by the Graham Farish H.F. Chokes illustrated.

an L.F. transformer should exceed the dimensions of a matchbox to do justice to a "perfect" circuit will be glad to know that Heayberd's share his conviction and have employed their incomparable knowledge of iron-circuit technique in the design of an L.F. transformer of massive construction and immaculate performance.

HELLESENS, LTD. Stand No. 106.

The casual visitor to Olympia might be forgiven if he left with the impression that the number of households unequipped with electric mains was an insignificant minority.

Actually the reverse is the case, and owners of sets who have perforce to draw their power supplies from batteries are far greater in number than the fortunate possessors of electric power sources.

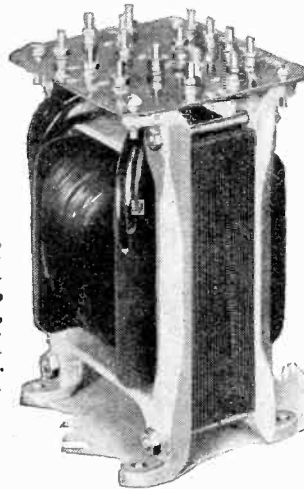
In point of fact, this circumstance has this year been realised by manufacturers as the prevalence of "Class B" and "Q.P.P." equipment amply demonstrates.

The demand for good dry batteries is, in consequence, greatly increased, and a visit to the Hellelsen stand will convince battery-users that not only valve-makers are keeping their special requirements in mind.

The new Hellelsen "Hi-Life" range of batteries are particularly interesting, as they are of a type which previously were included among the firm's higher-priced products, but now are presented in new and colourful cartons at attractively low prices.

The place of the more expensive range which the Hi-Life supplants is now taken by an entirely new series of "Super" batteries.

FOR THE MAINS



Sound Sales, the makers of the transformer to the right, are specialists in apparatus for mains working.

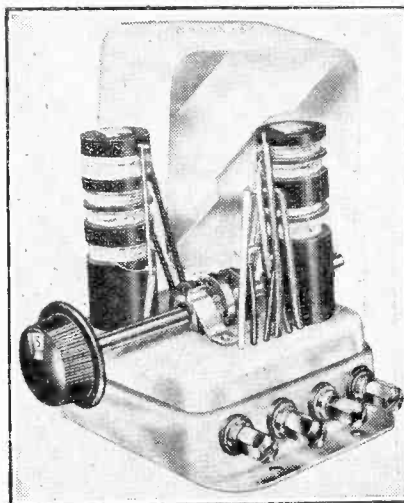
The exception to this truism, perhaps, is the valve. Experienced constructors realise how often a new circuit which "fits" all their components calls for a new valve—and valves aren't cheap.

A visit to the Hivac stand will act as a tonic to the impecunious but enthusiastic constructor

GIVES QUALITY AND VOLUME



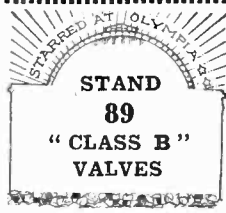
Fuller accumulators are a long recognised source of reliable power. And power with purity are featured by the Ormond mains driven speaker.



COMPLETE SCREENING is a feature of this interesting new Wearite coil unit.



Now Showing at Olympia



A special straight-line dial is "J.B.'s" Olympia contribution to easier tuning on the medium and long-wave bands, and on the short-wave simpler station selection is made possible with a new twin-ratio dial geared to either 8 to 1 or 150 to 1 at

the user's choice. New high standards of matching accuracy in gang condensers have recently been made necessary by the introduction of low-loss resistance iron-cored tuning coils. It is interesting to note that "J.B." gang condensers have been found more than capable of satisfying the accuracy demands of the latest coils without radical alteration of design.

"J.B." has, in fact, been previously maintaining a standard of excellence in advance of current requirements so that only detail refinements have been applied to cope successfully with the latest coil developments.

Constructors who set store on good "panel appearance" will be attracted by the improved pattern Vizor, with large aperture now forming part of the "J.B." Nugang type A assembly.

A beautiful piece of work is the 4-gang superhet condenser with its specially-shaped vanes for tuning an oscillator circuit to a frequency always 110 kc. greater than the circuits tuned by the remaining three sections.

Solid dielectric variable condensers of special construction are a further useful new introduction

CLASSIFIED BY COLOUR



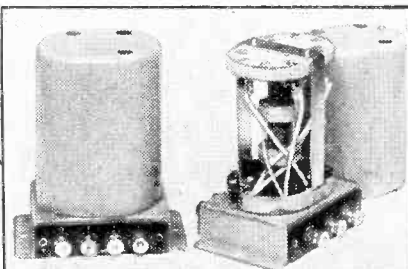
Pertrix H.T. batteries are made in five main types, different coloured cartons being used to indicate the various sizes. For instance, the "smallest" capacity for sets using up to 10 ma. has a yellow carton, the ultra capacity type maroon, and so on.

LAMPLUGH RADIO LTD. Stand No. 219.

This firm specialises in the manufacture of loud-speakers and, as one of the first to exploit the inductor dynamic principle, can be relied upon to furnish innovations of exceptional merit.

This year the whole range of "Silver Ghost" products is entirely new, and comprises a large selection of moving-coil loud-speakers of various types—all of them possessing unique design features.

FULLY SCREENED



Superhet intermediate frequency coils and "Radiopaks" are among the new and enterprising lines shown by the British Radiophone Co. The I.F. units are fully screened and provision is made for trimming.



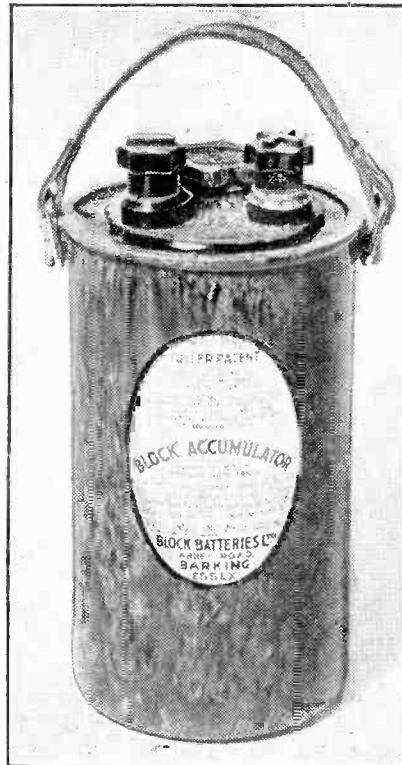
Voltages and outputs for every purpose are available in the well-known Grosvenor series of dry batteries. The two examples shown above are the red and blue line types.

Something entirely new in loud-speaker baffles is on view at this stand, known as the "Timpani Tone" baffle. It is intended for use with any type of speaker.

Apart from loudspeakers, there is an "Antistat" aerial unit which minimises interference from "man-made static," while enhancing the selectivity of the set.

Also on show is an extension kit produced to facilitate and give a professional appearance to loud-speaker extension wiring.

IT HAS NO PLATES



A particularly valuable accumulator development, the Block battery, contains no plates, and is only about half the size of an accumulator of similar capacity.

LECTRO-LINK, LTD. Stand No. 37.

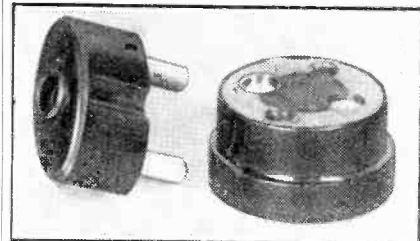
When it comes to "a matter of connection," the unique range of products to which the approximate name Clix has been given stand supreme.

For the constructor it is just as well that Clix products are shown at Olympia, since it would be difficult for him to become aware (except by actual examination) of the number and variety of connecting devices which this enterprising manufacturer offers, to remove exasperation from the set-builder's life.

This is a stand which merits leisurely inspection and must not be left without collecting a catalogue. The present tendency to build compact all-in receivers with a powerful moving-coil loud-speaker a matter of mere inches from the valves has recreated the old problem of microphonic howling. The new Clix antimicrophonic valve holder is



FOR THE MAINS USER



A neat wall-plug and socket for the mains user—one of many practical components to be seen on the British General stand.

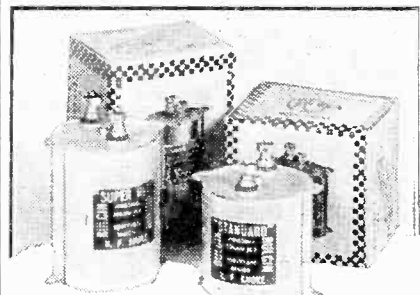
therefore of more than passing interest and should be examined when visiting the Lectro-Link stand.

It is, moreover, a real "general purpose" component, as its antimicrophonic features have not occasioned any departure from the "low-loss" qualities for which Clix valve-holders have long been famous. It is, in fact, particularly suitable for incorporation in ultra-short-wave sets—a point which will appeal to constructors who contemplate a spot of 5-metre investigation.

LISSEN, LTD. Stand No. 72.

Most home-constructors go to Olympia to see for themselves the latest developments in radio technique about which they have only read during the past year. It might be thought that anyone with only an hour to spend at Olympia would find it impossible in that time to inspect the latest in components, the newest valve developments, the products of a new battery manufacturing process and the most recent circuit progress incorporated in constructor's kits.

DESIGNED FOR EFFICIENCY



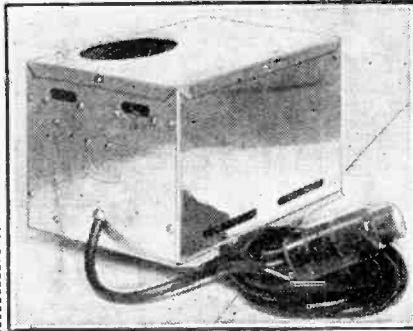
Two of the latest Bulgin screened H.F. chokes, the one on the left being designed for superhets and that on the right for use on the normal broadcast wavebands.

The Latest Components Reviewed

Yet all that can be done by visiting the Lissen stand. It is the proud boast of the exhibitors at this stand that "there is a Lissen part for every radio use," and it would not take an hour of anyone's time to be convinced of the slogan's truth.

Every one of the recent developments in radio which calls for special apparatus has found

A LISSEN EXHIBIT



Seen on the Lissen stand—a neat A.C. mains unit completely enclosed in a metal case. On this stand are also examples of the latest practice in screened coils, condensers, and components for "Class B" and Q.P.P. amplification.

Lissen ready, and at their stand you will see examples of screened coils, rigid condensers for ganging, special components for Q.P.P. and "Class B" amplification.

In addition, there is a display of standard components which must surely be as comprehensive as any in the show. In fact, the impression gathered by a visit to Lissen's stand is that a discerning constructor with a trend towards single-mindedness could quite easily appoint Lissen his sole suppliers of radio gear and always be up-to-date and considerably in pocket.

Then, too, the not-so-expert home-constructor finds a friend in Lissen, since their Q.P.P. kit is the simplest thing on earth to construct, and with its S.G. detector is representative of the last word in radio receivers.

Lissen, too, incorporate in their valves the new extended grid principle which places them among the most efficient obtainable. See this stand. Get blue-prints, literature and an impression of honest endeavour to serve the greatest hobby on earth as completely as can be done.

LOEWE RADIO CO., LTD. Stand No. 245.

In these days of rapid valve development the set-building enthusiast is disappointed if his favourite radio journal does not contain in each issue news of still another electrode having been crowded into the latest "magic bottle."

There might, perhaps, be a tendency to regard this as a completely new trend of design, but the fact is Loewe Radio were doing it years ago.



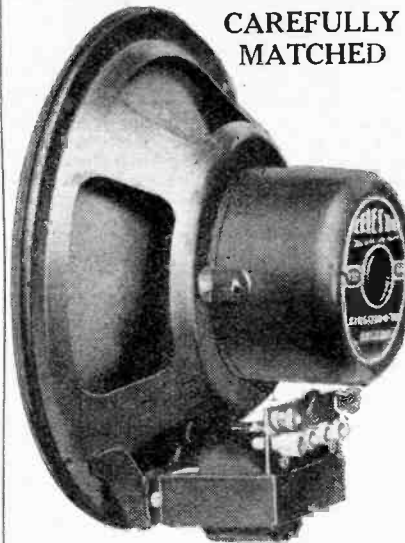
In addition to their series aerial device and invisible aerial, the Pix firm has now entered the field of valves with a range of battery and indirectly-heated types.

With Loewe, too, it is not merely a matter of getting a multiplicity of electrodes into the valve, but the coupling components as well! You should see and marvel at the Loewe valves which are now available for A.C. operation and in "metallised" form.

Other products to be seen at the Loewe stand include a pick-up of proved performance, and fixed resistances and condensers of unusual design.

THE MARCONIPHONE CO., LTD. Stand No. 77.

The outstanding exhibit at this stand will rank in many constructors' estimation as one of the most important in the show. Not since the valve supplanted the crystal has amateur radio seen so revolutionary a development in reception technique as is given to the hobby by Marconiphone in the shape of the all-metal Catkins.

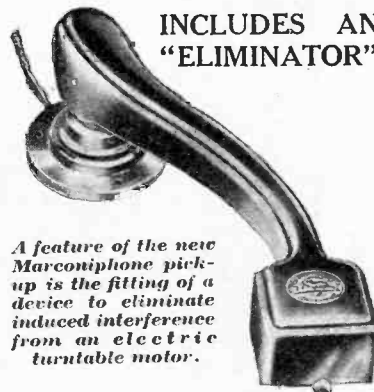


CAREFULLY MATCHED

The wide range of Celestion loudspeakers on view includes types specially suitable for "Class B" and Q.P.P. Input transformers are available for matching up with all classes of valves.

The Catkin valve is not "just another new stunt" in radio. The move from glass to metal in valve construction definitely marks a fundamental change in valve design which must have significant consequences.

It behoves every radio enthusiast, therefore, to make a special point of visiting the Marconiphone



INCLUDES AN "ELIMINATOR"

A feature of the new Marconiphone pick-up is the fitting of a device to eliminate induced interference from an electric turntable motor.

stand. Here you will see Catkins displayed so that their intimate relationship with the powerful transmitting valve is made manifest.

The immaculate valve technique which has made the modern broadcast transmitter a criterion of engineering reliability has now been translated into reception practice, and on the Marconiphone

stand this important association is demonstrated by models and other illustrative means.

There are, of course, many other things to be seen on the Marconiphone stand. In addition to one of the most comprehensive ranges of valves ever shown under one manufacturer's insignia, an item which will interest record lovers is the new Marconiphone pick-up.

FROM THE OLDHAM RANGE



Oldham batteries are known the world over. Dry cell H.T. units and H.T. and L.T. accumulators of every conceivable type are obtainable from this famous firm. A feature of the Oldham H.T. battery is the special precautions that have been taken to ensure a long, useful life.

The Marconiphone pick-up has long enjoyed the reputation of being among the first of the connoisseur's choice, and the present improved model has merits which it would be difficult to improve upon. An exclusive feature is the fitting of a "hum-bucking" winding which eliminates induced interference from an electrically-driven turntable.

MULLARD WIRELESS SERVICE CO., LTD. Stand No. 71.

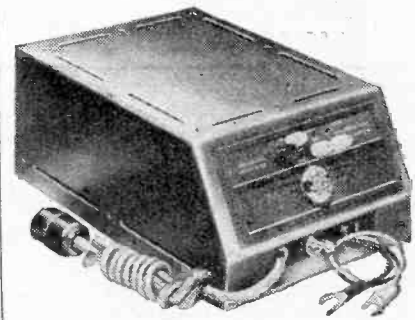
The Mullard exhibit is designed to display in an attractive manner the complete range of Mullard valves.

Since Mullards make valves for every conceivable purpose, from ordinary two-voiters to oscillators and modulators for transmitters, it can be well imagined that their stand is of outstanding interest.

Moreover, there have recently been such advances in valve technique, and Mullards are so well known as having been the instigators of much of the present progress, that the constructor will regard this stand as one which must be visited.

In the range of battery valves the most important new type is, of course, the "Class B" output valve, the P.M.2B. This is a pioneer valve in an important new branch of amplification. The merits of "Class B" amplification are

TROUBLE-FREE



One of the Clarke's Atlas combined H.T. and trickle-charger mains units. This particular model, which is designed for A.C. mains, includes a Westinghouse rectifier and variable voltage tappings.

Ample Choice for Every Constructor

now well known, but the Mullard P.M.2B was one of the first to give the amateur full opportunity to exploit the economics of "Class B" by reason of it only requiring a low consumption "driver" valve before it.

Entirely new in the technique of A.C. mains valve is the introduction of the pentode principle into H.F. amplification. Mullard have two interesting valves in this class—one, the V.P.4, having multi- μ characteristics.

THE "COLD VALVE"



A miniature version of the popular Westinghouse metal rectifier, the "Westector," makes an excellent second detector for superhets. The model above is for full-wave rectification.

The exhibit includes, of course, the full range of Mullard rectifying valves, and this has been augmented by a series of rectifiers equipped with indirectly-heated cathodes.

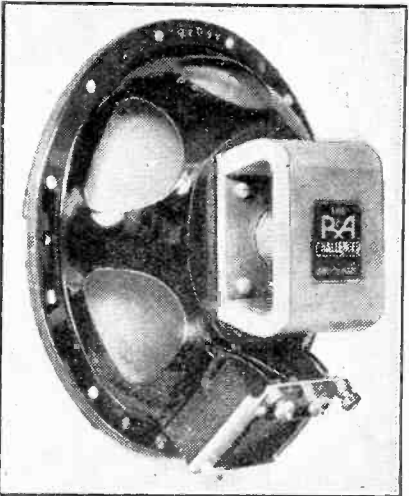
The economical operation of D.C. sets has long been a problem which has now had to bow to Mullard supremacy. All whose supply of electricity is D.C. should inspect the new indirectly-heated low-heater-consumption Mullard range of D.C. valves which includes two types of H.F. pentodes, a triode detector, a double-diode-triode, and an output pentode.

Apart from its intrinsic interest to the constructor, this stand commands his attention as representing a concentration of supreme enterprise and executive skill in a sphere which is the very foundation of his hobby.

MULTITONE ELECTRIC CO., LTD. Stand No. 55.

If asked which of the many recent radio developments most inspired his interest, the average constructor would surely vote for tone-control. It is, in fact, a matter of the greatest possible importance, and as the first commercial organisation to give the constructor a satisfactory tone-control

A CHALLENGER



Good quality and sound workmanship are features of the R. & A. reproducers. The above is one of the firm's permanent-magnet moving coils, with the output transformer built on to the chassis.

transformer, the Multitone stand merits careful attention.

Nor will the visitor be disappointed. Having established themselves among the premier purveyors of apparatus for high-quality reproduction, Multitone intend to maintain their enviable reputation.

That there is every prospect of them being successful in this ambition will be readily apparent to you when you examine their Olympia stand.

In addition to their now famous standard tone-control transformer, models are now available for

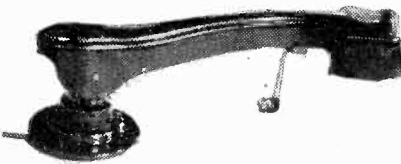


Always in the forefront of progress, Messrs. Radio Instruments, Ltd., have brought out an auto-parafed transformer having a remarkably even response over a very wide range of frequencies.

employment in Q.P.P. amplifiers, and possess characteristics which ensure the best possible reproduction with this economical method of obtaining "mains quality" with battery sets.

"Class B" enthusiasts are also catered for by a particularly good driver transformer—the type BEPU. There is also on show the Multitone

FOR YOUR RADIOGRAM



The new Columbia pick-up is provided with a vertical movement to facilitate needle changing, and is supplied in moulded bakelite complete with rest and connecting lead for 32s. 6d.

"Class B" converter which enables an existing battery receiver to be converted to "Class B" output with the minimum of trouble and expense.

Apart from the satisfaction of actually seeing their products, a visit to the Multitone stand will bring recompense in the shape of some excellent booklets dealing comprehensively with the technicalities of such topics dear to the heart of the home-constructor as "push-push amplification" and "true tone control."

THE NEW LONDON ELECTRON WORKS, LTD. Stand No. 107.

It is a truism of wireless that the erection of a really good aerial is the gift of a valve. An efficient aerial adds sensitivity to a set to at least the extent of a good H.F. stage.

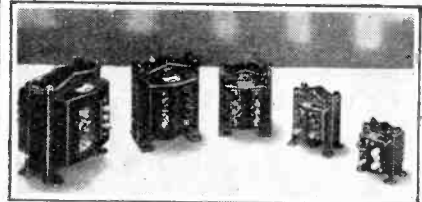
There are few radio enthusiasts to whom a prospect of "something for nothing" has no appeal, and a steady stream of visitors to the Electron stand may be confidently anticipated.

Nor will they go unrewarded. Everything to make an aerial really efficient is displayed. The

famous "Superial" is, of course, on show, and the Electron people now offer 100 per cent copper aerials at attractively low prices.

A reliable earth is an essential complement to an efficient aerial, and the Electron copper earth wire is a worthy companion to any of the Electron aerials.

An entirely new feature is the "Varial," an ingenious aerial possessing characteristics which are under the complete control of the user, so that



Heagberd mains transformers are manufactured in many various types. Here you see some of their latest models.

conditions of locality and set may be exploited to best advantage in all individual circumstances.

OLDHAM & SON, LTD. Stand No. 123.

Batteries of all types and description are the feature of the Oldham stand.

Both "wet" and dry batteries are marketed by the Oldham concern, and the thousands of amateurs who have no mains from which to power their sets have cause to be thankful to Oldham enterprise in catering so comprehensively for the battery-users' needs. The "mains-less" visitor to Olympia should certainly examine Stand No. 123.

As is well known, one of the shortcomings of H.T. accumulators in the past has been electrical leakage between the component cells of the battery, resulting in a mysterious failure to hold a charge. This defect is completely removed in the Oldham H.T. accumulators by so arranging the cells that no one of any unit is in physical contact with its neighbour except, of course, by the medium of the connecting lug.

The type C.L.G. range of low-tension cells incorporates a newly-designed plate construction and, as they are built up in strong, clean glass containers, the plate assemblies may be readily examined on the stand. Even a casual inspection will reveal how expertly have Oldhams overcome every known "snag" in the lead-acid accumulator.

For small sets an L.T. battery which holds its charge for long periods is essential and this need is catered for by the happily-named "Lively O" series of slow discharge cells which have been subjected to still further improvements.

For portable sets the diminution of weight

"CLASS B" OUTPUT

The latest addition to the Mazda range is the P.D.220, a 2-volt "Class B" output valve for battery receivers. This valve, while being very economical in H.T. current consumption, has a power output of 2 to 2½ watts. Used in conjunction with a driver valve of the P.220 type, the P.D.220 will give a very excellent performance.



Don't Forget to Visit Stand 11

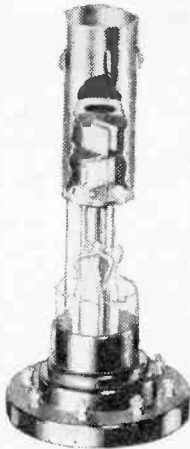
occasioned by employing celluloid containers for the L.T. battery is an asset, and constructors of portables will be interested in the C.L. series, which includes unspillable types with either liquid electrolyte or jelly acid.

Green Band H.T. dry batteries are also shown for portable enthusiasts and others who cannot conveniently utilise H.T. accumulators.

ORMOND ENGINEERING CO., LTD. Stand No. 99.

The reputation of the Ormond Engineering Co., Ltd., as makers of high-grade variable condensers is maintained by their new screened gang condenser.

Two new permanent-magnet moving-coil loudspeakers are also on show, together with a brace of moving-iron units of recently improved design. The latter are also available with a centre tap to the coil windings.



Here is one of the *Cossor cathode-ray oscillograph tubes, cut away so as to show the internal construction.*

All the new loudspeakers may be obtained as separate units for inclusion in one's own set or cabinet, or may be had complete in attractive and acoustically adjusted cabinets.

A new L.F. transformer merits attention.

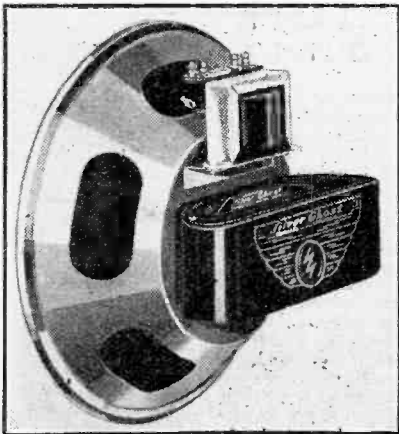
A large variety of illuminated slow-motion dials both for behind-the-panel fixing and for panel-mounting will find many admirers. Some of the designs are exceedingly attractive and possess the supreme merit of requiring the very minimum of panel cutting when fixing.

Switches are a speciality of the Ormond Co., and those in search of more certain switch contact than they have enjoyed hitherto will be rewarded by some excellent examples of precision switch manufacture at the Ormond stand.

OSRAM VALVES, Stand No. 92.

Radiolympia always has in store for its patrons innovations, but not since the idea of an exhibition was first mooted has there been so radical a change

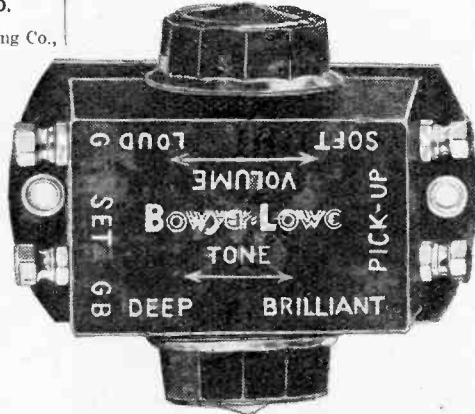
ENTIRELY NEW



This year the *Lamplugh range of loudspeakers has been entirely modernised, and this is one of the very attractive models on display at Stand 219.*

in manufacturing technique as can be seen this year on the Osram stand.

Although many constructors can recall the event, the first introduction of the valve to the public was not made at any radio show. It does, however, fall to the lot of this year's show to present the first valves of all-metal construction, and for this development (as important as was the

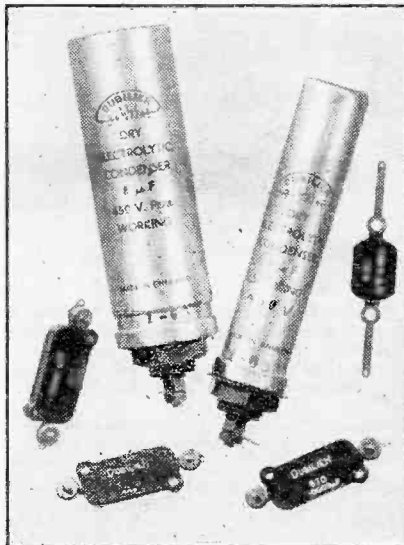


Radiogram enthusiasts will be interested in this combined pick-up volume and tone control, which is conveniently arranged so that only four connections are required. It is a product of the Bower-Lowe factory.

change from crystal to valve) we have to thank the painstaking research of Osram designers.

Everyone will want to see and handle these wonderful new Catkin valves at the Osram stand. Of course, the Osram stand is not devoted entirely to a display of Catkin valves. So far, Catkins are only available for mains sets, but the needs of battery set owners are, as usual, more

COMPRESSED CAPACITY



Electrolytic and fixed condensers of all capacities, together with grid leaks and "suppressor" resistances for car receivers, are to be found on the Dubilier stand.

than amply catered for by the amazingly comprehensive range of Osram battery valves, all of which will be on show at the Osram stand.

No one should miss visiting Osram's exhibit. It is not merely a matter of technical interest to do so. The visit affords one the opportunity of being among those privileged to witness a development of far-reaching importance.

RADIO INSTRUMENTS, LTD. Stand No. 41.

The R.I. stand will, no doubt, attract a large number of visitors, for on it is to be seen a large range of really first-grade components of all types. Mains transformers, L.F. chokes, tuning coils, H.F. chokes, together with a number of highly efficient inter-valve transformers are on show.

One of the most interesting exhibits is their new "Auto Parafec" transformer, which, as its name implies, is designed specially for parallel-fed L.F. circuits. This component is fitted in a neat bakelite case, and is suitable for auto connection only.

R.I. mains transformers have always been in great demand, and for the new season there is a complete new range suitable for Westinghouse metal rectifiers. These transformers are very soundly constructed and can be relied upon for really efficient service.

Four new L.F. smoothing and output filter chokes have also been introduced. The D.Y.50,

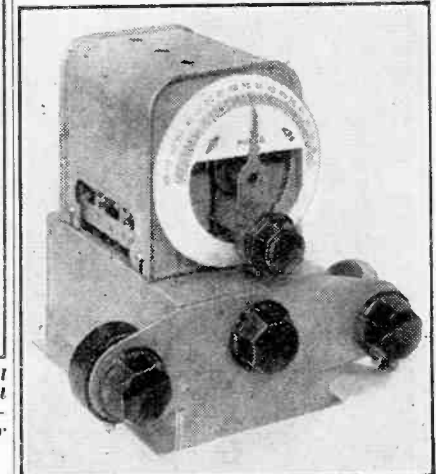
FOR GRID BIAS



The name Ever-Ready is familiar to every constructor, and this grid-bias battery is only one example of the firm's activities in the manufacture of dry-cell units.

which is suitable for carrying currents up to 50 milliamps, has an inductance of 40 henries when carrying 30 milliamps, and a D.C. resistance of 1,100 ohms. Then follows the D.Y.51 with a maximum capacity of 75 milliamps, and another good choke known as the D.Y.42, which will carry up to 250 milliamps. Finally, there is the D.Y.41 "Audi rad" choke, the D.C. resistance of which has been reduced to 500 ohms—this, together with its ability to cut out H.F. interference, a patented feature of this model, makes

READY WIRED!



Coleman's are showing this compact and efficient ganged tuning pack in addition to the wide range of coil assemblies which might be expected from this famous firm who have long specialised in simplified tuning.



A PRACTICAL MAN'S CORNER

By R. W. HALLOWS, M.A.

A GOOD way of raising a valve holder above the surface of a metal-covered baseboard or metal chassis is illustrated in Fig. 1. This is particularly useful in short-wave sets and in sensitive circuits intended for longer wave reception in which it is desirable to keep stray capacities as low as possible.

Instead of being screwed straight down to the baseboard, the valve holder is raised on a pair of small-distance pieces which may be cut from a length of ebonite tubing whose internal diameter is sufficient to take a No. 4 wood screw or a 4 B.A. bolt.

RAISING A VALVE HOLDER

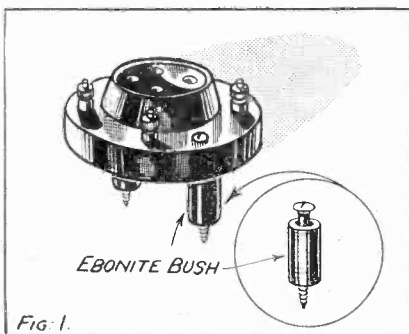


FIG. 1.
This scheme often has marked advantages in avoiding unwanted capacity effects.

In place of the tubing, small wooden blocks, suitably drilled, may be employed; or it is quite likely that the odds and ends box contains a number of the insulated sleeves from old wander plugs. These answer admirably for the purpose.

The method is also applicable to short-wave coils of the 4-pin type using valve holders, or to the 6-pin plug-in coils which are still sometimes used for long and medium-wave reception.

The hints and tips on constructional work which are contained in this section each month, will be found extremely helpful by the set-builder. Among other items he will find information on the correct use of tools and details of how to make many useful gadgets. This month our contributor deals with the raising of valve holders, wiring volume controls, neat connecting leads and making a slotted screwdriver.

For the detector valve of the short-wave set, if it is at all inclined to be microphonic, the distance pieces may be made from rubber sponge or solid rubber of the very soft, gummy kind, long screws being used and other pieces of rubber being placed between their heads and the valve holder.

Clockwise Controls

Many people find when they have connected up a potentiometer for use as a volume control that it works, so to speak, backwards. The volume should increase as the knob is turned clockwise, since all the other knobs of the wireless set work in this way.

You increase the wavelength, for instance, by a clockwise movement of the condenser knob, and you increase the reaction coupling by moving the reaction knob in the

same direction. If the volume control works in the opposite way, one has a feeling that there is something wrong with the set.

In Fig. 2 are seen the right ways of connecting two commonly-used volume-control potentiometers, that for the variable- μ screened-grid valve and that for the gramophone pick-up. Look, first of all, at A in the drawing.

The variable- μ valve gives its greatest volume when the grid is at or near zero bias, and its least when a strong negative bias is applied. When the wiring is carried out as indicated, a clockwise movement of the knob brings the slider nearer and nearer to the end of the windings connected to the left-hand terminal marked A. Since this terminal is connected to the positive of the grid battery, such a movement increases the volume.

On the other hand, a counter-clockwise movement makes the slider approach the end of the winding connected to terminal C and to the negative pole of the grid battery. The bias is therefore progressively increased, with a corresponding reduction in the volume.

The rule in this case is therefore to connect the grid return to the middle terminal of the potentiometer,

VOLUME CONTROL

To get the turn-to-the-right-to-increase effect, for S.G. and pick-up work, the respective potentiometers should be connected as shown in this diagram.

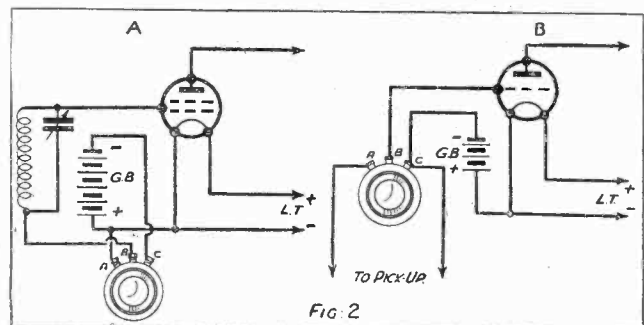


FIG. 2

A Practical Man's Corner—continued

grid-battery positive (and, of course, L.T. negative) to the left-hand terminal as viewed from the front of the potentiometer, and grid-battery negative to the right-hand terminal.

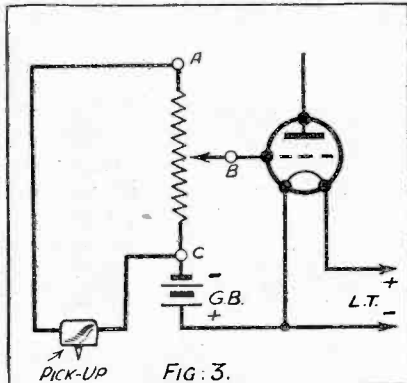
For the Pick-Up

Now for the gramophone pick-up. The wiring as seen in Fig. 2 B and the action of the volume-control potentiometer will be clearly understood if Fig. 3 is examined.

It will be seen from the latter drawing that the volume is at its greatest when the slider is at the end of the winding connected to terminal A, for there is then no intervening resistance between the pick-up and the grid of the valve. The full potentials developed in the pick-up windings and the whole resistance of the potentiometer winding in shunt are delivered to the grid.

As the slider is moved towards C more and more resistance intervenes

DIVIDING THE POTENTIAL



Volume is at maximum when the slider is at A, and at zero in the C position.

and a smaller and smaller proportion of the pick-up potential reaches the grid. To obtain an increase in volume by a clockwise movement of the knob the wiring must be carried out as shown in Fig. 2 B, for then the grid is connected straight through to the A end of the windings by moving the knob as far as it will go to the right.

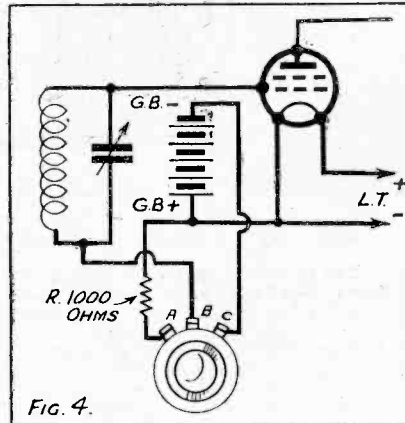
A Multi-Mu Tip

Some readers may have been puzzled and probably annoyed at finding that in sensitive sets incorporating the variable-mu valve, oscillation is apt to set in if the volume-control potentiometer is turned clockwise to the extreme end of its travel. This happens because the valve is inclined

to become unstable unless it has a small amount of negative grid bias.

Sometimes the valve goes merely into mild oscillation if the grid bias is made zero, and the only noticeable

SIMPLE SAFETY DEVICE



The 1,000-ohm resistance prevents the bias from becoming zero.

effect is that the quality deteriorates when the potentiometer is turned to the full-on position. A safety device which will prevent oscillation is illustrated in Fig. 4.

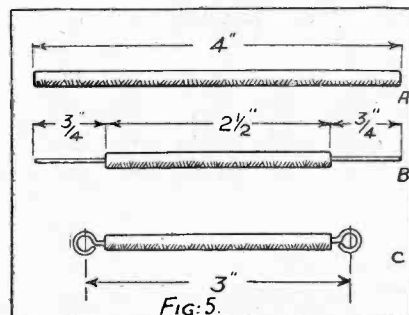
It consists in connecting between G.B. + and terminal A a fixed resistance, which may conveniently be one of the spaghetti type, with a value of 1,000 ohms. When this is done the grid-bias can never be reduced to zero and the risk of oscillation is removed.

Preparing for Wiring

One reason why even the simplest of sets seems to take a long time to wire up is that you have to make so many leads, baring both ends of each and forming the necessary loops with round-nosed pliers.

If you want to equip yourself with something outstanding in the way of

HANDY LEADS



Anyone can make a stock of these useful leads as explained by Mr. Hallows.

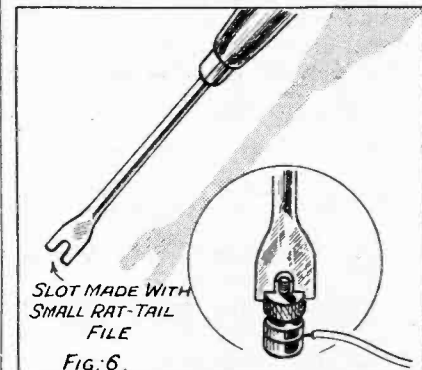
time-savers, I can strongly recommend you to devote the next hour when you have nothing particular to do, to the making of a stock of prepared leads. If you are doing nothing else the number of these that you can turn out in an hour is quite surprising.

Using single rubber-covered wire of No. 22 gauge (one of the most convenient kinds of wire for set-making), I find that I can turn out about three dozen an hour.

The most useful lengths are 2 in., 3 in., 4 in., 6 in., 8 in. and 10 in. If you have a stock of these ready made you will find that they will serve for nearly all the connections required in the average receiving set.

My own method is to keep leads of each length in their own special envelope, the length of the wires that each contains being marked on the outside of the envelopes with blue pencil. Just try making up a supply of leads of the lengths mentioned

MAKE IT YOURSELF



You can improvise this useful screw-driver from an old or cheap one.

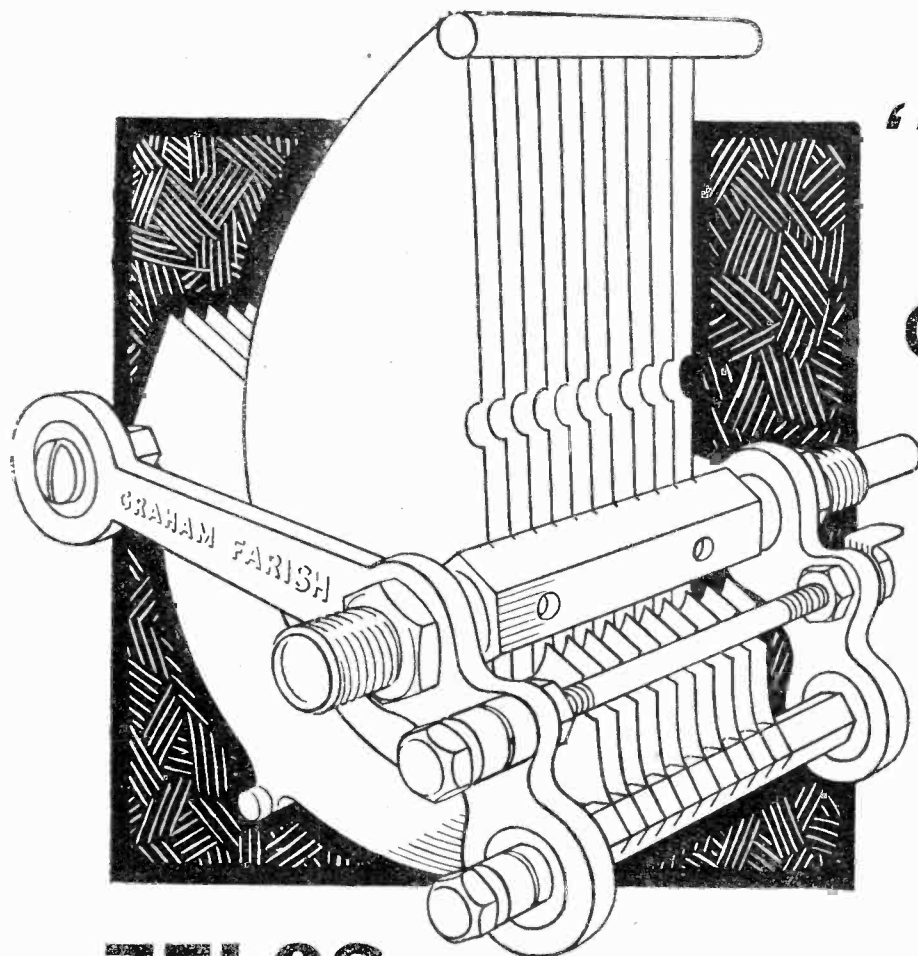
and I am sure that you will find them the greatest of boons.

Quick Work

The quickest way of turning out a stock of the suggested leads is not to deal with each singly from start to finish. Here, for instance, is the rapid method of making up, say, a dozen 3-in. leads.

If the finished leads are to be approximately 3 in. over all between the centres of the loops, you will have to allow an extra 1/2 in. at each end, making 4 in. in all. Begin by cutting twelve 4-in. pieces of insulated wire. Fig. 5 shows the stages in the making of a 3-in. lead.

(Please turn to page 259)



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Condensers
are
possible
I’ll
build
them”**

Graham Farish.

ZELOS VARIABLE CONDENSER

A superb component, possessing extreme rigidity of construction, mechanical perfection of moving parts and high electrical efficiency.

Negligible H.F. loss, large accessible terminals, shaft provides easy ganging. Capacity .0005. EACH

5/-

GRAHAM FARISH

PRODUCTS



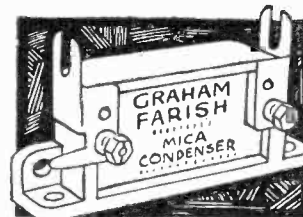
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LITLOS VARIABLE CONDENSER

Compact and efficient. Accurately gauged bakelite dielectrics and solid brass pigtail connections to moving vanes. All capacities up to .0005 mfd. in tuning straight-line capacity and differential types.

Each **2/-**



FIXED CONDENSER

In a complete range of capacities, upright or flat mounting. Every condenser is tested on 750 volts D.C. Capacities accurate within fine limits.

.00005 mfd. to .004 mfd. **1/-**

.005 mfd. to .01 mfd. **1/6**

Scott-Taggart's Choice

from **RADIOPHONE'S**
"MATCHED PERFECTION"
Series

YOU MUST use ganged condensers matched to the nth degree when tuning Iron-Cored Coils. That is why Mr. John Scott-Taggart has chosen a Radiophone 3-gang condenser for his new Radiogram. Radiophone Condensers are *guaranteed* to be matched within $\frac{1}{2}$ of 1%; each product passes sixteen different tests before despatch. The all-steel frame and girder construction ensures freedom from mechanical distortion and so gives you permanent matched performance. You can use any Radiophone products with the greatest confidence. To be sure of satisfaction **INSIST** on British Radiophone.

BRITISH RADIOPHONE LTD., ALDWYCH HOUSE, ALDWYCH, W.C.2

OLYMPIA
STAND 118

Specified for the
**S.T. OLYMPIA
RADIOGRAM**

British Radiophone 3-gang condenser Type 344J complete with cover and disc drive (Type 374).

Price **33/-**



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THE
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MUST NOT MISS
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**SPECIAL
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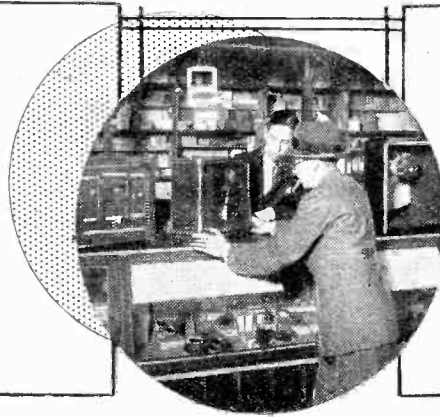
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FIND
THEM**



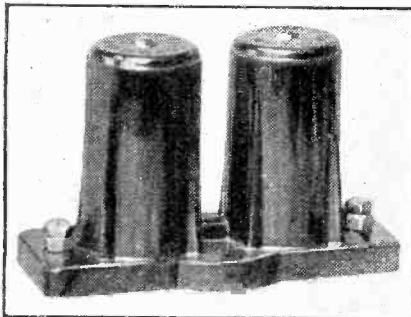
**NEW
APPARATUS
TESTED**

The "Auto-Parafeed"

A NEW intervalve L.F. transformer has been placed on the market by Messrs. Radio Instruments, Ltd., of Croydon, Surrey. Known as the "Auto-Parafeed," the instrument follows the compact dimensions of the existing "Parafeed," employing a nickel-iron core of high permeability, and internal shielding to eliminate interaction with other components.

The "Auto-Parafeed" has only three terminals as distinct from the four generally associated with L.F.

FOR BROADCAST WAVES



The new Amplion H.F. choke is designed for broadcast wavelengths, particular attention having been given to the retention of high efficiency on the long waves.

transformers, and the voltage step-up is 1 : 4.

The response curves for the instrument when used under the conditions recommended by the makers are remarkably good. For example, with battery valves and a resistance-capacity shunt-feed circuit, the response is level from 100 to 2,000 cycles, showing a loss of a shade over 1 D.B. at 25 cycles and a gain of 1 D.B. at 8,000 cycles (as compared with a constant 800-cycle note).

Similarly with mains valves and a choke-feed circuit, the total loss at 50 cycles is only 2.5 D.B. and at 8,000 cycles .5 D.B. The primary inductance is 85 henries (zero D.C.), and selling as it does at the extremely moderate price of 6s. 9d. we prophesy a

Interesting reviews of newly introduced apparatus submitted by radio manufacturers and traders for examination and test in "The Wireless Constructor" laboratories.

very large demand for this instrument during the coming season.

Amplion H.F. Choke

We have recently received one of the latest Amplion Binocular type H.F. chokes. This component is enclosed in a particularly neat bakelite moulding, and has a wavelength range of 200-2,000 metres, the impedance at 1,000 metres rising to between 2 and 3 megohms and maintaining a high value up to 2,000 metres. It is a very satisfactory general purpose choke for use on broadcast wavelengths, and is priced at 4s. 6d.

"Class B" Moving Coil

The Baker's "Sellhurst" Perm. moving-coil loudspeaker is a very fine example of its type. Retailing at 41s., this speaker can be obtained with either the normal 3-ratio output transformer for power or pentode working or with a special Q.P.P. or "Class B" transformer.

This is a definite advantage, since it means that the "Class B" enthusiast does not require to incorporate a special choke or transformer in the set. The model submitted included the "Class B" output transformer, and on test we found the results to be fully up to the high standard one associates with the products of this firm, the freely moving cone giving an excellent bass response, coupled with an adequate rendering of the middle and high frequencies. Moreover, there was a noticeable absence of peaks over the whole musical range.

The sensitivity of the speaker is well above the average and the workmanship throughout bears the hall-mark of quality.

Ferranti Transformers

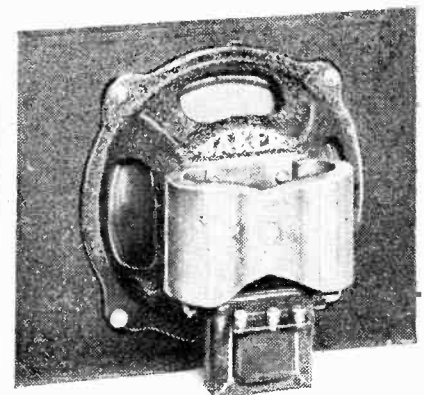
The name of Ferranti is synonymous with quality, and probably no firm in this country has had greater experience or conducted more research into transformer design than this well-known concern.

We have employed Ferranti transformers of various types over a number of years with complete satisfaction. With the advent of "Class B" the firm was amongst the first in the field with special components for this class of circuit.

There is, for example, the A.F.15c—a driver transformer having a 1 : 1 ratio, and a primary inductance of 62/17 henries. The secondary D.C. resistance is only 80 ohms for each half. In addition, there are the O.P.M.15c and O.P.M.16c output transformers, the former being designed for high- or low-resistance speakers and the latter for the low-resistance types.

The O.P.M.15c has three ratios—1 : 1, 1.6 : 1 and 2.7 : 1, and a primary inductance of 35/10 henries; while the O.P.M.16c has ratios of 15 : 1, 22.5 : 1, and 45 : 1. The primary inductance in this case is also 35/10 henries.

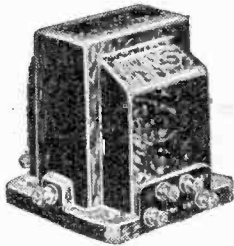
GOOD RESPONSE



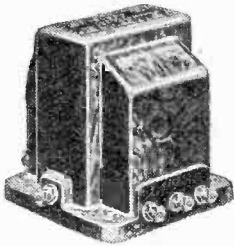
This is the special Baker's "Sellhurst" permanent-magnet moving-coil loudspeaker, incorporating an output transformer suitable for "Class B" working.

IRON CORED COILS
MAINS UNITS!
RESISTORS
ELECTROLYTIC CONDENSERS
BATTERY SETS!
ALL MAINS SETS!

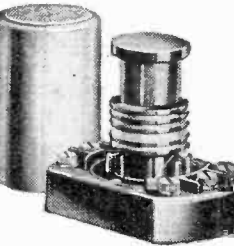
Outstanding to the TELSEN



TELSEN "CLASS B" OUTPUT CHOKES
 For matching to any M.C. speaker having either a high resistance speech coil or a low resistance coil and input transformer. D.C. resistance, 220 ohms per half winding. Total inductance 18 henries
 Price - 8/6

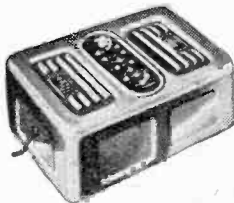


TELSEN "CLASS B" OUTPUT TRANSFORMERS
 For matching to M.C. speakers having low resistance speech coils. Primary resistance 200 ohms per half winding.
 Price - 8/6



TELSEN "CLASS B" DRIVER TRANSFORMERS
 Made in two ratios covering the requirements of all the "Class B" valves available at present. Supplied with comprehensive instructions.

Ratio: (Overall) 1-1 (Primary to Half-Secondary) 2-1 Price 8/6
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TELSEN IRON-CORED SCREENED COILS
 The smallest and most efficient tuning coils ever designed. Excellent magnification and selectivity. Can be used either as aerial tuning coils or H.F. transformers.

Single Coil - Price 8/6
 Twin Matched Coils - Price 17/-
 Triple Matched Coils - Price 25/6

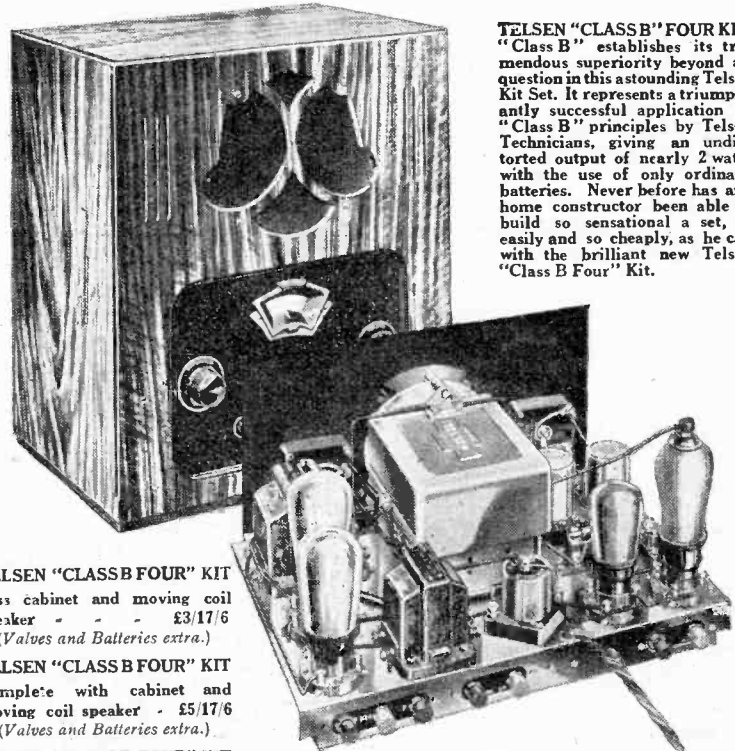


H.T. UNIT AND L.T. CHARGER FOR A.C. MAINS

For input voltages between 200 and 250 at 40 to 100 cycles. Charges 2, 4 or 6 volt accumulators at 0.5 ampere - Price 97/6

H.T. AND L.T. UNIT FOR A.C. MAINS
 Similar to above but with the L.T. charger replaced by a centre tapped transformer winding capable of supplying 2.5 amps. at 4 volts - Price 67/6

H.T. UNIT FOR D.C. MAINS
 For input voltages of 200 to 250 volts.
 Price 35/-

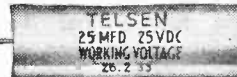


TELSEN "CLASS B" FOUR KIT.
 "Class B" establishes its tremendous superiority beyond all question in this astounding Telsen Kit Set. It represents a triumphantly successful application of "Class B" principles by Telsen Technicians, giving an undistorted output of nearly 2 watts with the use of only ordinary batteries. Never before has any home constructor been able to build so sensational a set, so easily and so cheaply, as he can with the brilliant new Telsen "Class B Four" Kit.

TELSEN "CLASS B FOUR" KIT
 Less cabinet and moving coil speaker - - - £3/17/6
 (Valves and Batteries extra.)

TELSEN "CLASS B FOUR" KIT
 Complete with cabinet and moving coil speaker - £5/17/6
 (Valves and Batteries extra.)

TELSEN "CLASS B FOUR" KIT
 Constructor's Outfit - Price 5/6



TELSEN LOW VOLTAGE ELECTROLYTIC CONDENSERS.

Ideal where a very high capacity with a fairly low voltage is required. Very compact, with wired ends for easy suspension in the wiring.

25 mfd. at 25 volts	- - -	2/6
50 mfd. at 25 volts	- - -	3/-
25 mfd. at 50 volts	- - -	3/-



TELSEN SMALL TUBULAR CONDENSERS.

Very small, yet quite as efficient as the larger types. Tested up to 1,500 volts. Wired ends make them very suitable for suspension in the wiring.

Capacity	Price
.0001 mfd./006 mfd.	- - - 1/-
.01 mfd.	- - - 1/3
.1 mfd.	- - - 1/6

TELSEN HIGH VOLTAGE ELECTROLYTIC CONDENSERS

Supplied with special bracket and terminal for mounting on any type of baseboard or chassis.

275 working peak voltage

Capacity	Price
4 mfd.	- - 3/6
6 mfd.	- - 3/9
8 mfd.	- - 4/-

500 working peak voltage

Capacity	Price
4 mfd.	- - 4/6
6 mfd.	- - 5/-
8 mfd.	- - 5/6



TELSEN 7-PIN VALVE HOLDERS

Accommodate the latest types of valve, such as "Class B" valve. Terminals numbered according to standard R.M.A. system.
 7-pin Solid Type 1/6
 7-pin Anti-Microphonic Type - 1/9



TELSEN FOR EVERYTHING IN RADIO

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

Additions great RANGE!

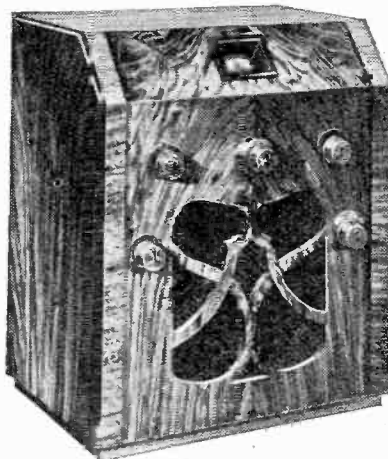
**CLASS 'B'
COMPONENTS
& KITS!**

**and
amazing
REDUCED
PRICES!**

TELSEN "464" A.C. MAINS RECEIVER

Telsen's previous experience in the all-mains field has been an invaluable aid in the production of this superb new all-electric receiver. It has that lasting perfection which means the practical elimination of the "servicing" bugbear. Its brilliant circuit incorporates every conceivable ultra-modern refinement, including the new Telsen Iron-Cored Coils, Variable Tone Control, New Type Moving Coil Speaker, Single Knob Tuning, Wave-length Calibration etc., in a beautiful Walnut-finished cabinet providing really astounding selectivity with amazing sensitivity, exceptional volume and wonderful tone.

Price £9.9.0. Or can be had for 15/6 down and 12 equal payments of 16/9.

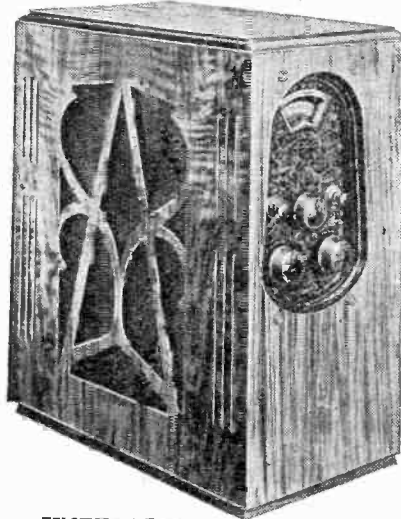


TELSEN "AIR MARSHAL"

The ultra-selective, ultra-modern circuit of this wonderful Telsen three-valver makes it the most efficient set of its type ever produced—yet it is simpler to operate, cheaper to run and costs less to buy. It is absolutely self-contained in a beautiful cabinet of modern design, finished in either Walnut or Oak and is supplied complete with valves, batteries and either Moving Iron or Moving Coil loud-speaker.

With Moving Iron loudspeaker £4.17.6. Or can be had for 9/6 down and 12 equal payments of 9/6.

With Moving Coil loudspeaker. . £5.5.0. Or can be had for 10/- down and 12 equal payments of 10/-.



TELSEN BAKELITE DIELECTRIC REACTION CONDENSERS
Entirely re-designed. Now incorporate several valuable improvements with no increase in price, the whole unit being also now enclosed in a strong dust-proof bakelite case.

'0003 mfd. and	
'00015 mfd. - 1/9	
'0001 mfd. - 1/9	
'00075 and '0005 mfd. - 2/-	



TELSEN AERIAL SERIES CONDENSER WITH SWITCH
Built on similar lines to the new reaction condensers, providing an ideal selectivity and volume control.

'0003	'00015 mfd. - 2/-
	'0001 mfd. - 2/-
	'0001 mfd. - 2/-

TELSEN DIFFERENTIAL CONDENSERS
Similar in design and construction to the reaction condensers.

'0003 mfd. - 2/-
'00015 mfd. - 2/-
'0001 mfd. - 2/-

TELSEN RESISTORS WITH WIRED ENDS

Negligible self-capacity and inductance. Noiseless in use. Value remains unchanged under all circumstances. Power rating of 1/2 watt and 1 watt: 250, 500, 1,000, 1,250, 5,000, 10,000, 20,000, 25,000, 50,000, 100,000, 250,000, 500,000 ohms resistance. Price 1/- Power rating of 2 watts: 250,100,000 ohms resistance. Price - - 2/-



3 and 6 watt types can be supplied on demand.

No.	Reduced	No.	Reduced
CHOKES			
W.74 Binocular H.F. Choke - 3/6	to	W.226 2 mfd. 500 volt test - 2/6	
W.75 Standard H.F. Choke - 1/6		W.237 '01 mfd. 1,000 volt test - 1/9	
W.221 Short Wave H.F. Choke - 2/6		W.237 '04 mfd. 1,000 volt test - 1/9	
W.68 40 by. L.F. Choke - 4/9		W.238 '1 mfd. 1,000 volt test - 2/-	
W.69 100 by. L.F. Choke - 4/9		W.236 '25 mfd. 1,000 volt test - 2/-	
W.71 Output Choke - 6/3		W.235 '5 mfd. 1,000 volt test - 2/-	
W.72 Tapped Pentode Output Choke - 6/9		W.234 1 mfd. 1,000 volt test - 2/6	
W.172 Power Pentode Output Choke - 9/6		W.233 2 mfd. 1,000 volt test - 3/6	
W.302 Smoothing Choke 28 by. - 12/6		SELF-SEALING BLOCK CONDENSERS	
COILS			
W.76 Dual Range Aerial Coil - 5/6		W.175 4 mfd. 500 volt test - 4/9	
W.154 H.F. Transformer Coil - 4/6		W.176 6 mfd. 500 volt test - 7/-	
W.216 Screened Coil - 7/-		W.177 8 mfd. 500-volt test - 9/6	
W.287 Twin Matched Screened Coils - 14/6		W.178 4 mfd. 1,000 volt test - 6/6	
W.288 Triple Matched Screened Coils - 21/6		W.179 6 mfd. 1,000 volt test - 9/6	
W.290 Band Pass Coil Unit - 14/6		DIALS	
W.292 Band Pass & Oscillator Coil Unit - 21/6		W.141 Slow motion, Black - 1/6	
W.293 Oscillator Coil - 7/6		W.141A Slow Motion, Brown - 1/6	
W.294 Intermediate Frequency Transformer Coil - 7/6		W.184 Illuminated Disc Drive - 2/6	
S.330 Superhet Coils - 21/6		W.257 Small Disc Drive - 2/-	
TUNING CONDENSERS			
W.130 '00025 mfd. - 2/6		W.313 "313" Disc Drive - 3/6	
W.131 '00035 mfd. - 3/6		SWITCHES	
W.132 '0005 mfd. - 3/6		W.107 2-pt. Push-Pull 8d.	
W.339 Single condenser Unit - 7/6		W.108 3-pt. Push-Pull 1/-	
W.306 Twin Ganged - 12/6		W.153 4-pt. Push-Pull 1/3	
With dust cover, 2/- extra		W.297 Mains Type - 1/6	
W.307 Triple Ganged 17/6		TONE CORRECTORS	
With dust cover, 2/6 extra		W.308 Pentode Tone Corrector - 2/6	
PRESET CONDENSERS			
W.152 '0001 mfd. - 1/3		W.314 Variable Tone Corrector - 4/6	
W.151 '0003 mfd. - 1/3		TRANSFORMERS	
W.150 '001 mfd. - 1/3		-Intervalve	
W.149 '002 mfd. - 1/3		W.61 1'75-1 "Radiogrand" - 9/6	
FIXED CONDENSERS—Mica			
W.310 '01 mfd. - 2/-		W.59 3-1 " " - 6/9	
W.311 '02 mfd. - 2/6		W.58 5-1 " " - 6/9	
W.316 '05 mfd. - 4/6		W.60 7-1 " " - 9/6	
VARIABLE RESISTANCES			
W.299 Hum Adjuster - 2/6		W.66 3-1 "Ace" - 4/9	
SELF-SEALING CONDENSERS			
W.232 '01 mfd. 500 volt test - 1/3		W.65 5-1 " " - 4/9	
W.230 '04 mfd. 500 volt test - 1/3		OUTPUT TRANSFORMERS	
W.231 '1 mfd. 500 volt test - 1/6		W.62 1-1 "Radiogrand" - 9/6	
W.229 '25 mfd. 500 volt test - 1/6		W.63 Multi-Ratio "Radiogrand" - 9/6	
W.228 '5 mfd. 500 volt test - 1/6		W.296 50,000 ohms with Mains Switch Combined - 4/6	
W.227 1 mfd. 500 volt test - 1/9		LOUDSPEAKERS, UNITS AND CHASSIS	
		W.54 Loudspeaker Unit - 3/6	
		W.159 "Peppular" Chassis - 5/6	
		W.170 "Major" Chassis - 7/6	
		W.181 Loudspeaker 8/6	
		W.182 Loudspeaker 11/6	
		W.183 Loudspeaker 12/6	

For full details, prices and catalogue numbers of the complete Telsen range (over 500 component parts, many of which have been improved in design at no increase in price) see the new Telsen Radiomag. Issue No. 5, Price 3d.

TELSEN FOR EVERYTHING IN RADIO
ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM



ALTHOUGH a good many annual holidays are still in prospect, thoughts of the forthcoming long evenings are beginning to crystallise, and minds are turning to the radio fare which will be available.

Never before in the whole bright history of radio has there been such an attractive prospect in front of the listener.

In Europe alone there are now some two hundred stations, and within the next couple of years there will be almost, if not quite, two hundred and fifty. Even now, in summer, reception is marvellously good. But we are to have many new stations in action, and when we remember that many will be of really high power, and easily receivable on simple sets, we realise that radio is going ahead amazingly. Already the best hobby and entertainer in the world, it is now entering upon its most worthwhile phase.

Let us take a quick look round at some of the high-lights. A com-

Practical notes on what stations to look for and how to get the foreigners that are coming over well.

prehensive survey is out of the question, for space prohibits, but here are some of the outstanding points.

In Britain we have the new West Regional and National, with the promise of an entirely new long-waver. Daventry 5XX is to go, and in its place we are to have Droitwich, on 1,500 metres, which the B.B.C. aims at making the best long-waver in Europe.

We already have the Daventry Empire station in full swing on short-waves, and the promise of a new and better Belfast.

There is also talk of a worthy North-Eastern station, and of Scottish improvements.

These latter are near at home but comparatively distant in time, for some of the other improved services are already working, or on the brink of action.

Improved S.G. Valves

ALL Mullard indirectly-heated valves are now being turned out with an interesting mechanical modification.

Hitherto the anode terminals for S.G. valves comprised a metal body with projecting screwed thread, surmounted by the black insulating dome. Being dissatisfied with the serviceability of this, the Mullard Co. determined to obtain greater strength at this point.

In the new valves the metal portion is secured very firmly to the top of the bulb, the insulating dome is slipped into position, and then the top of the metal portion is turned over like an eyelet to prevent removal of the cap.

This has proved so satisfactory that the new caps have been standardised for all Mullard indirectly-heated S.G. valves, as well as for their new double-diode triodes.

POINTS FOR PURCHASERS
Outstanding items from manufacturers about recent trade activities.

Television & Delayed Switching

The Edison Swan Electric Co. are continually adding to their attractive lines, and the latest additions comprise two especially interesting items. We refer to the new Thermal Delay Switches, and to the Ediswan Cathode Ray Oscillograph.

The latter has innumerable scientific applications. The Thermal Delay Switches are enclosed in evacuated glass bulbs and therefore resemble valves rather than switches in appearance. The action is that of a bi-metal strip heated by radiation, which bends with temperature rise, makes contact, and thus closes the H.T. circuit.

The new Kalundborg station, for instance, has been testing. It will employ 60 kilowatts instead of a meagre 7.5.

Another attraction is the new Moscow, which is to have far and away the highest power in Europe, its aerial being gingered up to the tune of 500 kilowatts—the highest powered station in the world!

Other super stations in being or in prospect are Budapest, Vienna, Leipzig, Paris (Poste Parisien), Prague, Rennes (France), and the new Toulouse.

Each of these has a special permit to try out 120 kilowatts.

The Brussels stations have recently increased their powers by 50 per cent, a numerous band of powerful Russians is to be released on the air, and to cap it all and make the best of it the Lucerne Wavelength Plan is to come into force on January 15th, enabling listeners to get maximum value for our ether space.

Finally there are the hordes of quite new stations in new districts, due so soon that they had to be given a place in the aforementioned Plan.

Amongst these we have Cairo, Slovakia (a new Czechoslovakian), Tunis, Athens, Innsbruck, Lisbon, Jerusalem, Salonica, Rumania, Sofia, Syria, South Portugal, Oran, Alexandria, and Malta. Add these to the present excellent alternative fare and one visualises a coming Radio Utopia.

Such devices are invaluable in indirectly-heated valve and other receivers, where the rectifiers, condensers, etc., are often damaged by H.T. applied before the valve cathodes have time to reach their correct operating temperatures.

For the Short Waves

As the question is often raised, it may be as well to state that the success of short-wave adapters has proved again and again that the remarkable simplicity of these ingenious instruments is no bar to world-wide reception with them—a fact which is now universally admitted.

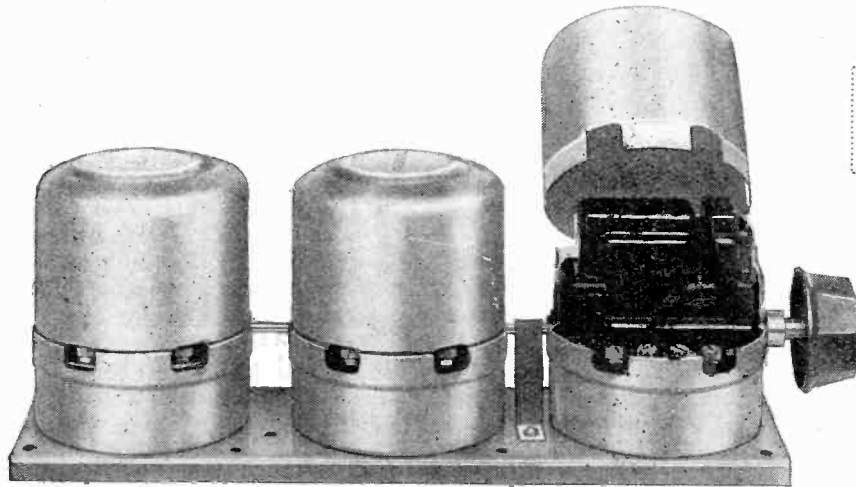
Purchasers who are wondering about the respective merits of these devices can readily obtain particulars (on mentioning THE WIRELESS CONSTRUCTOR) from the following firms:

Burne-Jones & Co., Ltd., J. J. Eastick and Sons, Igranic Electric Co., Ltd., Peto-Scott Co., Ltd., and Radio Instruments, Ltd.

Why Ferrocarts?

There is now a Ferrocarts Coil for practically every modern radio receiver from modest straight sets to the multi-valve superhet.

Ferrocarts coils are the result of years of experiment and intensive research into problems associated with the design of radio frequency coils with iron cores



Made under licence from the patentee Hans Vogt.

WE ARE EXHIBITING AT

THE NATIONAL RADIO EXHIBITION
AUG. 15-24, 1933
1/6 DAILY
OLYMPIA
STAND NO 56

Designers of long experience know Mr. J. Scott-Taggart has selected Ferrocarts Coils for the "Olympia Radiogram."

Fit Ferrocarts Coils in your receiver note the difference the high selectivity and improved performance

FOR S.T.'s "OLYMPIA RADIOGRAM."

1 set Ferrocarts Coils.
Types F1, F2, F3. 37/6d. set.

Send for the Colvern Ferrocarts Booklet, R.L.12.

COLVERN

COLVERN LIMITED — ROMFORD — ESSEX

London Wholesale Depot, 150, King's Cross Road, W.C.1
241



THE occasion arose the other day for me to find out what was wrong with a portable set that would not work at all. I suspected the H.T. battery, but how to test it without a meter was the difficulty.

Actually, I managed quite well, and pass the tip on for anyone else who likes to try it when occasion arises.

Most people who wet their fingers and put them across the negative and maximum positive sockets of a 100-volt H.T. battery will feel a slight shock. If nothing is felt at all it is pretty safe to assume the battery is "done for."

However, a further verification for the brave is to connect two wires across any two sockets giving, say, 9 volts, and put them on the tongue. If the electricity felt does not make one remove the wires in somewhat

of a hurry, the battery is certainly of no more use.

Ignition Interference

Motor-car radio is on the up grade, and those of you who have experimented with it will appreciate something of the difficulties that have had to be overcome in aircraft radio. I refer, of course, to the elimination of interference from the ignition.

With a car it is simply a matter of fitting specially made resistances in series with the leads to the sparking plugs. On an aeroplane, where engine failure is so vital a factor, this method is not adopted.

Instead, the whole ignition system is screened. Screened wire is used for the leads and special metal covers are fitted round magnetos and sparking plugs. And as dual ignition is used on

aero engines, all this has to be duplicated.

Clockwork Turntables

Just recently I wanted a non-electric record-playing unit. Simply a turntable with clockwork motor and pick-up in a case with a lid that was sound-proof.

But do you think I could find any firm that markets one? I could not. Electric models were almost plentiful, but not clockwork ones.

Maybe my search was not as wide as it should have been. And quite likely someone will write and say they cannot understand my not knowing of such-and-such a make.

Be that as it may, surely there is a demand for these as much as for all-electric ones, and it would pay firms to produce them.

Price Reductions

Although we hear a lot about the prices of things going up, reductions are quite plentiful at the Radio Show this year.

I do not suggest that the forecast of higher prices is wrong. But if radio prices are coming down when the cost of other things is going up—well, surely that is a good omen. We shall all benefit by cheaper listening.

A. S. C.

ONE of the most interesting broadcasts that I have heard on the short waves for a long time was the relay through the usual American "punch merchants" of the scenes at the arrival of the Italian Air Armada on Lake Michigan.

I first stumbled across it on W 2 X A F, although I subsequently discovered that the relay was being put out by almost all of the important American short-wave stations. I heard snatches of it from W 1 X A L, W 3 X A L, W 8 X K and W 2 X A D, but for once W 2 X A F was easily the star turn, and it was through this station that I heard the best part of the broadcast.

Increased Power?

It is quite a long while since I have been able to report R8-9 on the loudspeaker from W 2 X A F, which prompts me to wonder whether on this particular occasion an increase in power was made for the benefit of listeners in Italy. I should hardly think it likely; all the same, the transmission was remarkably good, and moreover there was very little fading.

I have had several letters from

 * THE MONTH ON *
 * SHORT WAVES *
 * The latest happenings in this *
 * fascinating waveband *

readers on the subject, but only one—E. S. (of Locher, Dundee, Scotland)—reports W 2 X A F as the star turn of the evening. Of the others, the majority seem to have got on best on the 20-metre band.

I have been spending quite a lot of my time during the past month in trying to throw some light on a very dark subject. What is the effective range of the direct or ground ray of a powerful 30-metre short-waver?

Well, that was what I set out to discover—but, alas, I am afraid that after hours of listening I am still very much in the twilight. The trouble all arose through Zeesen, whose transmission for weeks on end was so dead constant that I could not possibly reconcile it with reception via the indirect ray.

But apparently I was wrong, for as soon as I started to make proper observations Zeesen's transmissions were worse from the point of view of

fading than some of the American stations! I realised, of course, that on theoretical considerations alone it should not be possible to hear Zeesen's direct ray in this country, but theory and practice, on short waves particularly, are two different things. All the same, I should like to know why Zeesen suddenly changed its habits.

Incidentally, while on the subject of tests, I wonder how many CONSTRUCTOR readers heard the "Popular Wireless" International Frequency Tests from Lisbon recently?

Excellent Reception

I heard the test from beginning to end, and CT 1 A A was coming over remarkably well. There was slight over-modulation in one or two instances, but the general level was excellent and the frequency tests themselves were most illuminating.

Reference to the CT zone prompts me to tell you that CT 3 A Q, in Funchal, Madeira, is often a signal worth listening to these days. I have heard him once or twice lately, and although at times his transmission is inclined to fade rather badly, when he is good—well, he is good!

G. T. K.



READERS who have kept in touch with the history of the silver inkstrain from Portugal will be sorry, perhaps, to hear the anticlimax.

Those who declined to bid for it when it was unsuccessfully put up for auction will now be glad.

As for myself, I am sorry about it. Carlos of Setubal is such a good sort. In spite of the sniff that the Oxford Street silversmith gave the inkstrain, I have always felt secretly that it might be of great "antique valuer."

Experts Report

But Christie's, the famous valuers, have now reported that the inkstrain is "valueless." Sic transit gloria!

Indignation at Papplewick. I reported this keen-scented community as consisting of five hundred souls. Apparently it numbers five hundred and seventy.

That means another seventy souls to smell the next rat I design.

W. L., of Sunderland, wants me to stop the unbearable oscillation in the Westburn-terrace district. Will the culprit take note? Also, the reaction-hound at Nottingham who is a nuisance to the King's Meadow-road district. Be British, boys, and don't let down the old school and flag. Play for the team!

Mention of the old school reminds me that in those awful old days (how I loathed school!) we had aerials that

were aerials. None of your mean hundred-foot pigmies. I fitted one up at school which was about 90 foot high and certainly 500 feet long.

There were then only two aerials in a town of 200,000 inhabitants.

A reader sends me a cutting from the local paper which asks: "Why does not the native of this town who has become a national figure in the

WHAT IS HELL?

How you can find out; the value of the inkstrain; indignation at Papplewick; a 500-foot aerial; radio engineering or chicken-farming as a profession; the Cistercian monk again; the danger of piccolo players when roused; exclusive revelations about the mickle-muckle scandal; and the very latest details of THE ANTI-DECIBEL LEAGUE.

world of wireless return to establish a factory for building wireless sets?"

At one time, when I retired from radio journalism, I had rather half-hearted ideas of something of the kind. But I had great ambitions to become a barrister, and I was firmly told by the authorities that a wig and gown would never be mine unless I abandoned every vestige of a business taint. Since being called to the Bar I have trodden the professional path.

Actually, I have a great respect for those who are in the radio business.

One needs courage and ability. Neither ensures success. The constructor imagines that the trade make a fortune. It is not so.

I suppose I have seen more firms go broke in the radio business than in any other. Even in the boomiest period there were many excellent firms which failed.

Competition is very fierce. Fashions change. New models are needed every year. Public taste is hard to gauge.

A Bright Future

Meanwhile, the public in general thinks: What fortunes must be made out of this new invention which is going into every home!

I think that the future is quite bright for the radio industry. Why? Because, in my opinion, the last million sets sold are inadequate to meet modern conditions. There are exceptions, but the ordinary "three" which has proved so popular is doomed sooner or later. And then there should be plenty of business in better sets.

I get many letters from readers who want to enter the wireless profession and seek advice.

My recommendation is to take a B.Sc. engineering degree (specialising in electrical engineering) at the City and Guilds Engineering College, London. Then stay on for an extra year for research. Then get into the labs. of one of the biggest radio and electrical concerns.

If you get £5 per week you will be doing well. The Marconi Company comes in a separate category, as does

*Latin proverb meaning: Thus do inktrains lose their reputations.

Aerials that WERE Aerials, at the Old School!

the B.B.C. The former might send you abroad. I should advise a company engaged in the manufacture of broadcast apparatus.

I have never advised anyone to enter radio as a profession. I have myself paid in the past the following annual salaries to the senior four of my staff: £2,500, £1,700, £1,000, £950. These figures are, however, definitely high, especially as there were opportunities for exceeding these figures.

As far as I know, £500 per annum is considered (by employers) a very pleasing salary in the radio industry. There is usually room for the very able. Unless you feel you will become one of these, I would advise keeping out of radio.

The four years I mention is totally inadequate as a training. Two further years in a first-class commercial laboratory will be necessary before you can possibly claim even to be a wireless man.

Starting Young

This means starting young. It means terrifically hard work and calls for real ability. In addition, you will need either design or inventive or administrative ability to qualify for the top rung of the ladder. To get there you will also require a certain amount of luck.

The annoying thing is to find after your six years' technical training, that the man who sells grid leaks for your firm makes more money than you.

On the whole, I advise chicken-farming.

* * *

Some facts about B.B.C. finance:
Licence money received, £1,306,453.
Cost of programmes, £663,424.
Cost of running the stations, £252,260.
Rent, heating, lighting, etc., £154,763.

Buildings and land owned by the B.B.C. are worth nearly one million pounds, Broadcasting House accounting for £750,000. The actual transmitting plant amounts to £330,000.

Musical instruments, music, etc., are worth £33,000.

Sets with 16 Valves

Figures for sets sold last year: 400,000 3-valve mains sets, 320,000 battery 3-valve sets, 300,000 2 valvers. In America they sell many sets with 16 valves.

From the newspapers: "One of the world's greatest wireless experts predicts that in two years' time everybody will be able to carry in his vest pocket a miniature radio set which will enable its possessor to hold private wireless conversation with a friend hundreds of miles away."

Who is this great expert? He has been dribbling and drivelling like this for thirty years. It is probably our old friend the Cistercian monk, last heard of building a wireless set in a plover's egg-shell.

"Who Wants To?"

In any case, who wants to talk to his friends hundreds of miles away? Let well alone, and be thankful.

"What do you want listening to that stuff for? Radio Paris, indeed!" and so on, only to end up with the surprising advice: "What you want to listen to is Radio Normandie to-night."

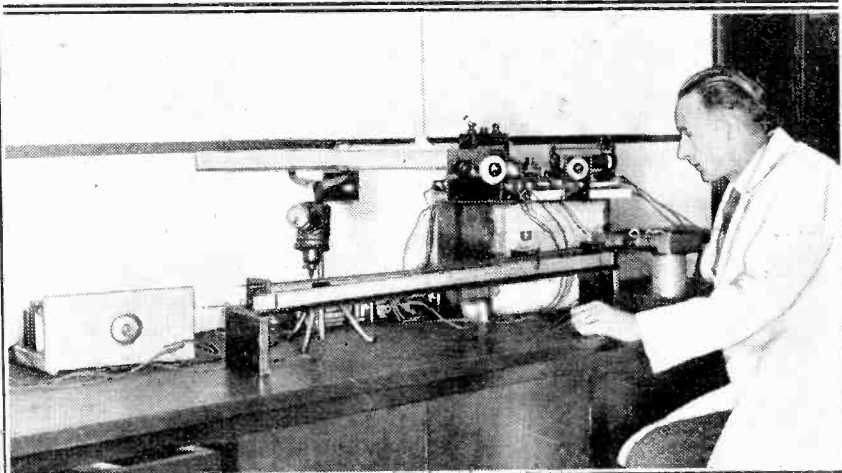
"Her Congregation"

Apparently, the religious broadcast from that station was the programme sponsored by the good lady's organisation. She thrust the booklet into the hands of her "congregation," who passed it on to me. Copies may be obtained by readers from the I.B.S.A., Brooklyn, New York, U.S.A.

* * *

Just a brief acknowledgement of

RADIO AS A PROFESSION



In the diversity of "Armchair" subjects with which he deals, Mr. Scott-Taggart this month includes the vexed topic of radio as a profession. He tells of the necessity for experience in research laboratories, one of the latest of which—recently opened by King's College, London—provided the subject of this photograph.

You may recall that at one house I called at during my now almost forgotten aerial tour I was given a booklet on the cover of which was:

HELL

What is it?

Who are there?

Can they get out?

I have had one or two inquiries about this work and am pleased to supply details.

Apparently my Birmingham demonstratee was listening with relish to the profane programmes from Paris one Sunday afternoon when there was a knock at the door. Putting down his pork pie, he was a moment later confronted by a vigorous old lady who launched a tirade against the astonished listener.

R. L.'s letter of protest at Indignant Spinster's protest against my protest against those who protest against more than one knob.

He says: "Indignant Spinster says that any organist would find working the 'S.T.400' as easy as Paderewski's playing of a tin whistle? Has Indignant Spinster ever tried playing a tin whistle? She obviously hasn't or she would not sneer at what is a true art. Paderewski could no more manage to play a tin whistle—unless he had years of practice—than count the turns on a spaghetti. People seem to think that playing a tin whistle is as easy as the piccolo . . ."

This correspondence must really cease. I hate to think what a piccolo player might do if properly roused.

ROLA

the World's Finest Reproducers

ROLA Model F6-STRG (Price 35/-)

is Solely Used and Specified by

Mr. John Scott-Taggart F.Inst.P., A.M.I.E.E.

for his

S.T.'s OLYMPIA RADIOGRAM

An outstanding set needs an outstanding speaker, and once again the eminent designer, whose run of unbroken successes is unique in Radio history, has placed his trust in Rola—the World's Finest Reproducers. Rola Speakers combine tonal fidelity with impressive volume to a degree never before attained. They are produced at the finest and most modern speaker factory in Europe . . . made by a firm that has concentrated on speaker manufacture alone for ten years.

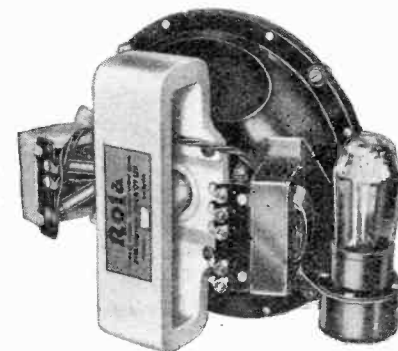
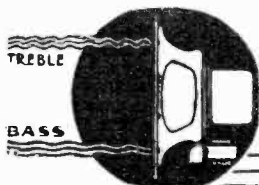
● EXTENSION SPEAKERS

There is a correct Rola Extension Speaker for practically all British radio receivers. Write for list.

The British Rola Co., Ltd.
Minerva Road, Park Royal, N.W.10

Phone: Willesden 4322-3-4-5.

ROLA
SPEAKERS
for better
Radio Reception



Convert
your Battery
Set to
CLASS B
OUTPUT

Without Alteration

By connecting the Rola Class B Speaker Amplifier Unit to any battery set the receiver is instantly converted to Class B output. You get all the richness of tone and mighty volume of a high grade All Mains set plus the inherent economy in battery consumption of the original receiver.

Model A—for MULLARD P.M.2B, B.T.H. P.D.220, COSSOR 220B and STANDARD 13B1 Valves.

Model B—for COSSOR 240B or FERRANTI H.P.2 Valves
Price (both models) complete with Valve - - **£3:11:0**
without Valve - - - **£2:17:0**

"Many a Mickle Makes a Muckle"

Anti-decibel Crusade: Latest Bulletin.

I find considerable support coming from north of the Tay or the Forth.

Crusaders are rallying to the banner everywhere. The Anti-decibel League has founded a branch in the Kyles of Ben Whimmitie, and the skirl of the pibroch—with an undistorted output of at least 20 muckles (corresponding to 10,000 mickles)—can be heard resounding over the gorse-clad highlands of the Cairn Gorms.

Broadcast Cries

Fierce cries of our slogan, "Down with the decibel and no more pandering to the pundits of the I.E.E., the N.P.L. and the Inst.P." may be heard from every hill-top, and the special Anti-decibel tartan is as common on Prince's Street as it is on the Souchiehall highway.

The Islands of Eigg and Rum (I need not tell fellow countrymen north of the Caledonian canal that these are in the Hebrides) are mad about the mickle. No more imported foreign units. National feeling has been aroused. "Scottish units for Scottish radio" is the cry.

Our Lancashire branch is, however, less enthusiastic. The "sight" maintains its popularity. Such phrases as "Ee, lad, thy loud-speaker's five sights louder than mine" can be heard in Bradshawgate, Bolton, almost any lunch-hour.

Definition Difficulties

Some difficulty was experienced in defining the relationship between a mickle and a muckle. The Committee of the League (which believes in constructive work as well as iconoclasticism) found that Scottish scientists had been less precise than one might desire. The only extent to which they had been prepared to commit themselves was the reluctant dour admission that "many a mickle makes a muckle."

It was felt that this definition was a little elastic and, while useful to first-year students, hardly conformed to scientific standards subsisting South of the Paisley tram-route.

There was rather a flurry in the committee room at this Sassenach suggestion, and the Glasgow representative (Prof. MacHowe), obviously nettled at the disparagement of scientists north of the Cheviots, threatened to resign from the League. He was about to take off the pink

and white kilt of the Crusaders and throw it on the table, when wiser counsels prevailed.

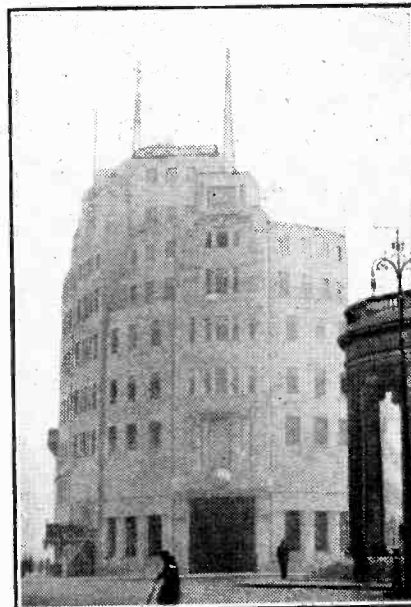
The upshot and outcome was that the rate of exchange between the mickle and muckle was stabilised at 500. Five hundred mickles will therefore, in future, make a muckle.

It is fortunate that all this was decided before I received a letter (without a stamp) from an Aberdonian reader. He says that we cannot use the mickle (and still less the muckle) as a substitute for the decibel in Scotland. It has been used for other purposes.

He writes:

The muckle was an ancient Scottish coin, and its relation to the mickle is given in the following table taken from the back of an old

A COSTLY ITEM



"Buildings and land owned by the B.B.C. are worth nearly one million pounds, Broadcasting House accounting for £750,000."

school exercise book in the Aberdeen Free Museum.

480 mickles = 1 muckle.

12 muckles = 1 bawbee.

4 bawbees = 1 penny.

For Tipping

From this it would appear that the mickle was probably specially minted for tipping purposes.

There has been quite a bit of correspondence about the new unit. One reader (Blair Atholl) says that

the true Scottish proverb is wrongly given, and that it should be:

Many a little makes a mickle.

He quotes the Oxford Dictionary in support, and says that this proverb was corrupted to:

Many a pickle makes a mickle.

There is no mention of muckle at all, you see. In fact, this reader says that muckle is a corruption of mickle and that pickle is a corruption of little.

Other Versions

Opinion varies, however, and from several other letters I gather that the following forms of the proverb are extant in different parts north of the Pentlands.

1. *Many a mackle makes a puckle.*
2. *Many a prickle makes a pruckle.*
3. *Many a stickle make a stackle.*
4. *Many a trickle makes a truckle.*
5. *Many a puckle makes a pickle.*
6. *Many a dickle makes a duckle.*
7. *Many a muckle makes a prickle.*
8. *Many a prickle makes a tickle.*

However, none of them is a sight better than the others.* They all mean the same thing, and I give a translation below:

Many bits make up a lot.

This profound truth, for which we are indebted to Scotland, is probably an anticipation of the Quantum Theory and forms one of the planks of the Anti-decibel platform. I am not at all sure it is not also an anticipation of the electron theory.

Accumulated Wisdom

It has been said that a proverb is the "accumulated wisdom of the ages."

I take off my glengarry to the Scots who have gone on accumulating until they have handed us this pearl of great price, this gem of intellect.

* Since writing the above a letter has come in suggesting that a very old form of the proverb is: *Many a puckle makes a tickle.*

There seems, however, no reliable evidence of a wide usage of this form, and I advise readers to avoid it.—J. S. T.

A POPULAR FEATURE

The idea of these "Armchair Notes" came from Mr. John Scott-Taggart himself. They are really just informal chats, intimate and informative, between "S.T." in his armchair and you in yours.

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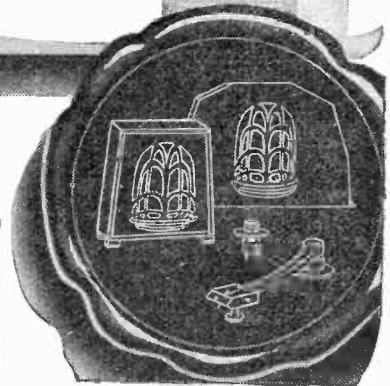


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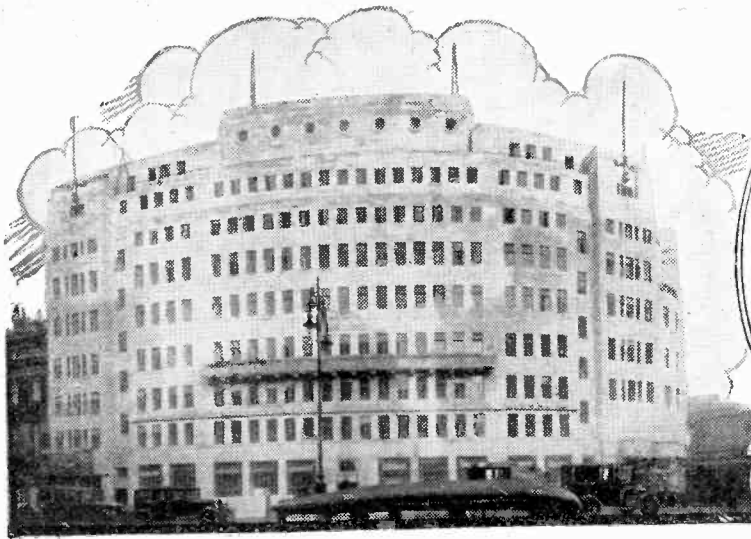


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B.B.C. NEWS

A "Prom." Sensation—The Future of Alternatives—Religious Broadcasting, etc., etc., etc.

By Our
Special Correspondent

Dr. Harold Rhodes for London

DR. HAROLD RHODES, through his regular organ broadcasts from Coventry Cathedral, is well known to and popular among Midland listeners. Dr. Rhodes has come to London, and the B.B.C. have put him on the short list of distinguished organists for London performances.

A Prom. Sensation

It has been known for some time that the plans for the Proms. this year included the Tchaikovsky Concerto, and music-lovers naturally concluded that Albert Sammons would take this on. It is understood, however, that Arthur Catterall will perform instead.

The reasons for the change are not quite clear. If it is true that Mr. Sammons was not prepared to refresh himself on the Concerto at short notice, then all is well.

Future of Alternatives

Alternative programmes have been languishing for some time, and their future is uncertain. One of the arguments the B.B.C. representatives had to face, both at the Madrid Conference and at the subsequent Lucerne Conference, was that they were not making use of their channels.

It was pointed out, for instance, that the London National wave, 261 metres, was practically relaying Daventry National all the time. And then came the summer experiment of still further reducing the contrasted programmes, on the ground that listeners in the hot weather would need only light entertainment.

The latter experiment has hardly been successful. Listeners, while agreeing that a lightening of fare was desirable both for summer and winter, still feel that they should have

reasonable alternatives of light fare. Not everyone wants vaudeville; many people would be glad to turn over to Gilbert and Sullivan.

I cannot help thinking the B.B.C. is running risks in departing so far from the original idea of the Regional scheme. It is not necessary, of course, to create a mass of separate programmes; but, clearly, there should be a choice of at least four good British programmes nightly.

Welsh Gain Ground

Two years or so ago, the B.B.C. was washing its hands of the Welsh and their claims for a place in the ether. The battle about broadcasting the annual message of goodwill from the children of Wales to the children of the rest of the world was believed

concluded with the Welsh in headlong flight and confusion.

But the Welsh nationalists kept at it, and then Mr. Lloyd George and Miss Megan took hands; this was decisive, and the cohorts of the Principality can now sanctify their battle honours without danger. Welsh is breaking out, on North Regional and on Midland. Whole evenings of Welsh are appearing in the arrangements for West Regional.

The children's message is now radiated by all B.B.C. transmitters. Meanwhile, there are reactions in two quarters.

First of all, the far north of Scotland feels itself once more aggrieved, and I confidently prophesy that before long Provost Murray of Dingwall will besiege Edinburgh in the hope of

A SET FOR A LAZY MAN!

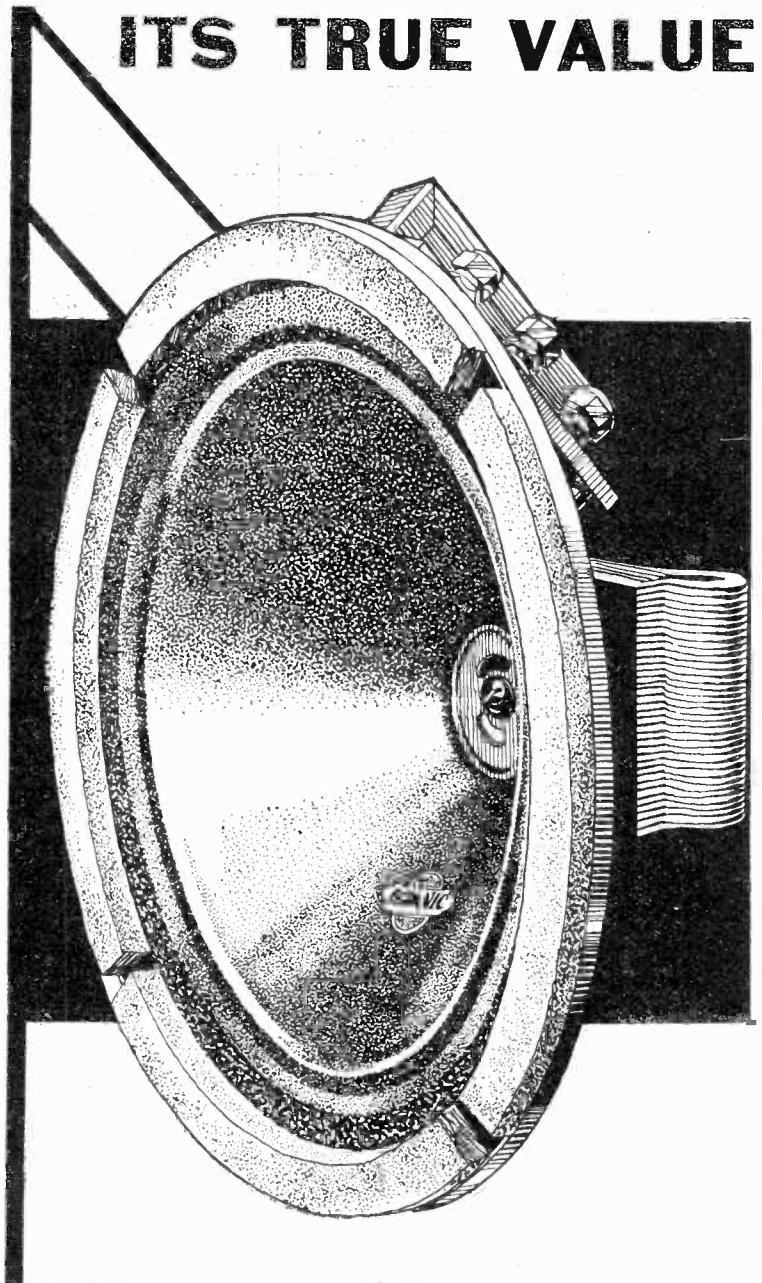


It is entirely contained in the arm of the chair, so it can be tuned and adjusted whilst lying back at full ease.

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CVS-33

B.B.C. News—continued

securing the active adhesion of the new Scottish Regional Director, Mr. Melville Dinwiddie of Aberdeen.

And the second reaction is a growing murmur from the non-Welsh part of the West Country, from Bristol to Land's End, peopled mainly by Anglo-Saxons and English-speaking Celts. In satisfying Wales the B.B.C. should be careful not to alienate the West Country, and be equally careful to avoid creating awkward precedents.

Anyway, it is a foregone conclusion that something will be done for Inverness; whether this will bring programmes to the valleys of the Highlands is another matter.

Anyway, I think I have done fairly well; and now give my results:

The Board of Governors

(1) The Chairman, The Rt. Hon J. H. Whitley, ex-Speaker of the House of Commons: by training, career, and inclination, interested chiefly in political broadcasting, adult education, Children's Hour, serious talks, and the Empire Service.

(2) The Vice-Chairman, Mr. Norman: finance, economics and business administration.

(3) Lord Bridgeman, solid Conservatism, interested in purging Left influence; follows sports.

Catholics, that is represented by the Religious Advisory Committees of the B.B.C., has managed to keep religious broadcasting in its own hands—that is, theologically. Zealous advocates of numerous minor sects have had no chance; nor have the free thinkers made progress in their claim to combat religious teaching.

Now, however, Christian Science seeks admission, and with great influence and weight behind it. I do not know whether this is true or not, but for years gossip has had it that Sir John Reith is very strongly opposed to the admission of Christian Science. Anyway, some interesting developments can be promised in this direction.

WHAT WILL THE SEA-LION SAY?



Engineers of the B.B.C. experimenting at the Zoo to find the best way of inducing the sea-lion to "do his stuff" for the Children's Hour.

Sir John Reith's Future

I believe there is nothing in the recent spate of rumours that Sir John Reith is about to leave the B.B.C. to take up some other big job outside. Those who are in a position to know by their intimate friendship with Sir John tell me that he looks forward to completing the licence of the B.B.C. as Director-General—that is, until December 31st, 1936.

What will happen after that, in his case, will depend partly, of course, on the report of the Parliamentary Committee of 1935, and on the attitude of the Government of the day to the future constitution of broadcasting.

If the powers of broadcasting are in any way curtailed, or if the monopoly is ended, Sir John will not stay. If, however, the B.B.C. is given a vote of confidence and another lease of life, with powers as great as, or greater than those already exercised, Sir John would look with favour on the Chairmanship which will become vacant with the expiry of Mr. Whitley's five years of office.

There is a suggestion, also, that Sir John might accept a peerage, so on the whole I do not see him leaving Broadcasting House at this juncture.

Back to Original Critics

Mr. Archibald Haddon, who was the first B.B.C. Dramatic Critic in the old days, returns to the microphone on the same job this autumn. There is speculation as to whether this is part of a new policy. If so, it should not be long before we have Mr. George Atkinson, the first film critic, who undoubtedly had very wide following throughout the country.

What They Stand For

An enterprising contemporary has been trying to elicit from B.B.C. governors and head officials what they stand for mainly in broadcasting. There was so little indication in the few replies received that my friend gave it up as a bad job, and, with his permission, I am taking over the idea. But I know too much about the working of Broadcasting House to entertain any illusions about the satisfactoriness of the written question-and-answer method.

They just won't open up. The inquirer must dig for his stuff from public pronouncements and from what is known of the individuals.

(4) Mr. Harold Brown; as a great financial authority, watches accountancy.

(5) Mrs. Agnes Hamilton: a zealous social reformer, interested in adult and political education.

And what about the Senior Staff? Sir John Reith, the Director-General, stands for high ideals, a guarded Sabbath and the principal of dictatorship. It is not until you get down to departmental officers that you find anyone that really knows about and is keen on entertainment.

Religious Broadcasting

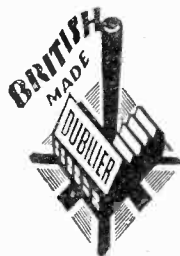
So far, the alliance of Church of England, Free Churches and Roman



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1933-4

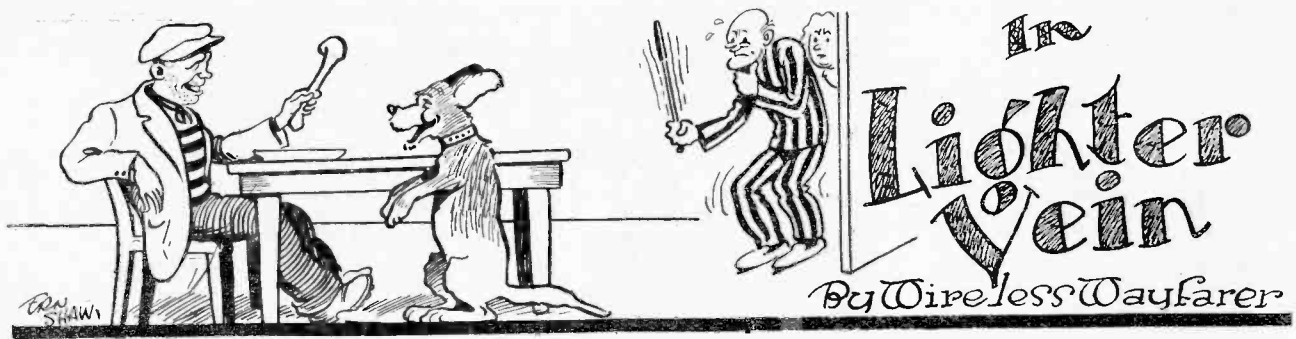
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THESE have been quite a number of burglaries in Mudbury Wallow of late.

["Yes, I seem to remember Sir K. N. Pepper's superhet, Primpleson's tennis racket, Captain Bucket's valves, and Miss Worples' loud-speaker, and——"—ED.]

"No, no; those were just borrowings. It was pure accidents that made it impossible to return the things."—W. W.

"Accidents is good. However, get on."—ED.]

Genuine Burglaries

There have been, I was saying when the interruption took place, a considerable number of genuine burglaries in Mudbury Wallow of late. Tootle's flat, for instance, was broken into whilst he slept, and so completely was his wardrobe cleared that he had to make his way to the local suit foundry in search of further supplies, wearing garments extemporised from two antimacassars, a hearthrug and a bath mat. Primpleson complained that he had lost the whole of the family silver, though most of us believe that this consisted of a single teaspoon of that metal.

Miss Worples' ten-valve radiogram with automatic volume control, automatic topical talk suppressor and two speeds forward and reverse for the gram table—in fact, with every modern improvement—was stolen. Sir K. N. Pepper was robbed of the cup won in '85 at Gumblepore in the *chota hazri* championship. I think it was *chota hazri*; anyhow, it was some particularly hazardous Indian sport.

A Rude Awakening

In fact, as Mrs. Goop put it, people could not sleep safely in their beds.

"My dear," she twittered, "if you don't invent a burglar alarm for me I shall die of fright."

"You'll probably die of that if he does," sniggered Primpleson; but the Professor quelled him with a look.

Fired with this idea, the Professor

An epidemic of burglaries in Mudbury Wallow gave Professor Goop a chance of inventing a really good burglar alarm. How he took the opportunity is amusingly set out below.

spent the next few days in inventing what was probably the finest burglar alarm ever devised by the fertile mind of man. The idea, roughly, was a combination of the invisible ray, the death ray, and interlocking doors operated by a system of relays. The instant an intruder passed in between the source of an infra-red ray and a photo-electric cell he released a beam of googly electrons, projected in the most ingenious way by a simple cata-bombastic rumbulator. Paralysed by this, the interloper was certain to fall inert upon the floor. At the same instant relays caused electric bells to ring everywhere and automatically shut and locked every door and window in the house. All, therefore, that the Professor had to do was to

ALL DRESSED UP—



"Wearing garments extemporised from two antimacassars, a hearthrug and a bath mat."

telephone for the police, who could come along at their leisure and waft the criminal into a waiting black maria.

The very first night that the alarm had been installed the Professor and Mrs. Goop found themselves rudely awakened by a clangour of bells. "Right into the spider's web," smiled the Professor. "All that now remains is the telephoning of the police."

There was some difficulty about

this since the locking included the windows and the door of his own bedroom, a fact which had been overlooked by the Professor. Both the telephone and the switch stopping the bells were in his distant den. Mrs. Goop and he had to remain incarcerated in their room, deafened by the incessant din of the bells, until nine o'clock next morning, when Police-constable Mugglewump, hearing the din within, sent round the fire brigade which, with the utmost enthusiasm, smashed all the windows and broke down all the doors. The pathetic corpse of Tiddlums, Mrs. Goop's ginger tom, was then found in the path of the death ray.

Pride of Ancestry

Perhaps understandably, Mrs. Goop expressed herself as being fed-up with inventions.

"It is my birthday on the fifteenth," she said. "You'd better give me a good watchdog as a birthday present."

Two or three days later the Professor and Mrs. Goop paid a visit to Captain Fitzstartz, the world-famed breeder, and came away minus a couple of fivers but plus Rupert. Rupert, the rest of us decided, was an almost perfect example of the heinz-hound, every one of the fifty-seven varieties being strongly marked. Anyhow, he was guaranteed to be in the very top class as a watchdog.

"Just let him see a burglar," said Captain Fitzstartz, "and you'll want a vacuum cleaner to pick up the pieces."

Making Friends

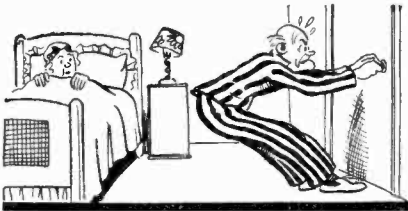
The worst of Rupert was that he was always seeing burglars. Anybody not being a member of the household who came up the drive of the "Microfarads" was a burglar to Rupert. Within a week the Professor had had to supply new trousers to two postmen, seventeen errand boys, the Vicar and Dr. Miggles.

Dogs always like me, and Rupert and I seemed to be getting on like a house on fire at first. That dog,

In Lighter Vein—continued

though, had a positive burglar complex. One afternoon I strolled up to "Microfarads" and, finding the Professor out, took a look round the wireless apparatus in his den. Rupert was delighted to see me and stropped his backbone against my legs as I wandered round the room. But when I slipped into my pocket a "Catkin" which I was sure the Professor would be delighted to lend me, the hound uttered a positively menacing growl.

TOO THOROUGH



"The locking included the windows and door of his own bedroom!"

"All right, old fellow," I said, "all right. The Professor and I are old friends and I am only borrowing this funny little thing."

Lacking in Discrimination

When a milliammeter and a driver transformer followed the Catkin into my pocket, Rupert's growls became blood-curdling, but I explained to him in every case just what was happening. I thought that he had understood until I prepared to make my departure. Then Rupert grabbed me gently but quite firmly by the calf of the left leg. Nor would he let go until I had replaced first the Catkin, then the milliammeter, then the driver transformer. Clearly a good dog but lacking in discrimination.

It was a few nights after that that the Professor and Mrs. Goop were once more awakened from their beauty sleep by what the dramatists call noises off. Something was clearly happening in the lower regions of the house.

Ladies First

"It's a genuine burglar this time," said Mrs. Goop, "and Rupert has him cornered. Now, down you go, my dear, and complete the capture."

"Nnnnnno. Yyyyou go," stammered the Professor. "There is no danger since Rupert has him where he wants him. And the police will come much quicker if they hear the voice of lovely woman in distress on the telephone."

"You are going down," said Mrs. Goop sternly. "You see to the burglar and I'll do the lovely-woman-in-distress business on the 'phone."

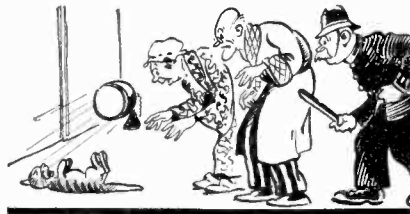
Seeing that there was nothing for it, the Professor agreed, though he stipulated that Mrs. Goop should accompany him to the scene of action before going to the 'phone.

Canine Enjoyment

The Professor armed himself with the poker, Mrs. Goop with the tongs, and the pair of them sallied forth, prepared to do or die. Meantime, barks which revealed the ecstasy of Rupert resounded from the lower regions. Making as little noise as they could they crept down the stairs. The Professor, whose innate good breeding rose superior to his agitation, was insistent upon the principle of ladies first, but Mrs. Goop expressed her more than willingness to forgo the privileges of her sex in the circumstances.

They arrived at the foot of the stairs, scoring a conjugal dead-heat.

THE DEATH RAY



"The pathetic corpse of Tiddlums, Mrs. Goop's ginger tom, was found in the path of the death ray."

Side by side they advanced towards the door of the kitchen, behind which Rupert was giving tongue. "Those barks don't sound very threatening," hissed the Professor.

Midnight Revels

"Of course not," cooed Mrs. Goop. "The dear dog's enjoying himself. He is in his element and he cannot help showing it."

There was a pause outside the kitchen door, for the Professor was leading willy-nilly, and as Macaulay has it in the "Lays of Ancient Rome" (or, at any rate, I think he has):

*Those behind cried "Forward,"
And those in front cried "Back."*

The Professor, of course, represented the "those in front" and Mrs. Goop the "those behind."

"Open the door and walk in," snarled Mrs. Goop.

"Surely it's more polite to knock first," bleated the Professor.

"GET ON," bellowed Mrs. Goop.

"Ssssssh," said the Professor.

He tapped on the door.

"Walk roight in," cried a raucous voice from within.

They walked roight in.

Sitting at the kitchen table with nothing but the bone of a cold sirloin and a large bottle before him was a gigantic man with the kind of face that you see in the bulldog class at Cruft's and the sort of physique that is to be found chiefly in the prize cattle class at Islington.

"Hhhhands uuuup," quavered the Professor, brandishing a tremulous poker.

Rupert's Owner

"The same to you, wiv knobs on," said the intruder genially, inserting the last remaining chunk from his plate into a capacious mouth.

And what of Rupert? Rupert was sitting on his sitting place, raising his muzzle aloft and giving vent every now and then to barks demonstrative of the sheepest joy.

It was clear that whatever else he might have done or was doing, Rupert had made no corner in burglars.

The he-man put forth a hand and patted Rupert on the head. Rupert squirmed in an access of the purest joy.

"Look here," said the Professor, "this isn't fair. You are a burglar, aren't you?"

"Well, you can put it that way."

"And Rupert was sold to me as the world's finest watch-dog."

WHAT WAS BEHIND IT?



"They advanced towards the door of the kitchen."

"'E ain't Rupert," said the he-man, as well as his gigantic mouthful would allow. "Is name's Bob."

"Bob ? ? ? ?"

"Yus. One of the best pals Oi ever 'ad. Lorst 'im six months ago."

(Please turn to page 287.)

THAT FIRST CHARGE

It is the most important charge of all, a fact well proved by the reader's experience described here. If the first charge does not receive proper attention, the whole life of an accumulator may be adversely affected.

WHEN buying an accumulator, if possible secure it ready charged. Failing this, be sure that the instructions are carried out to the letter; there is no remedy for an inefficient first charge.

We fell down badly in this respect through attempting a first charge at home of a 100-volt H.T. accumulator wired up as a 2-volt unit. The system was a very lame-dog affair, the source of current being a 4-volt accumulator with a suitable bulb attached to cut down the amps. Unfortunately, the accumulator was in a somewhat feeble state of health. To be quite candid, it was on its last legs.

Consequently, it could only stand up to the job for a few hours; it was then removed and recharged by a little dynamo, the process being repeated ad lib till we judged the plates of the H.T. battery looked nicely "baked." I think you will agree that we should have known better.

Fading Volts

However, an extreme case is as good as any to point a moral. That H.T. battery was very parsimonious. It reluctantly showed a bare 100 volts

after the charge. In the first week it lost 10 volts, and from then it kept us pretty busy shifting the + leads upwards to cope with the shrinking voltage.

At this point we certainly had misgivings, but failed to foresee the collapse that was to follow. We charged it up again, this time direct off the dynamo. It gassed madly after a ridiculously short spell, but we left it to it.

Final Collapse

It returned to service showing its 100 volts; in a few hours first one cell and then another read zero. We whipped out the offenders, and in a day or so the battery looked as if it had returned from a visit to the dentist! Altogether ten cells went west before the remainder decided to carry on with fortnightly recharges.

For three or four months it struggled along, till at last it got so feeble that we had to buy it a "reviver." Like brandy or any other stimulant, the dope set the poor old crock on its feet for a day or so, but a fatal relapse occurred, calling for the withdrawal

of more plates. We went the whole hog and bought a complete new set of them.

Chemically Inert

This was our first experience of an undercharge, so out of curiosity we set the plates up in the discarded jars of an old wet H.T. battery and tried every legitimate means we could think of to shake them out of their lethargy.

The "dud" plates looked quite sound, except that the positives had the pallid appearance usually associated with a spell of overwork. We charged them and discharged them many times. To the naked eye the colour of the plates remained unchanged. They were chemically inert.

I am not going to suggest that even the world's worst charging stations will treat your battery in this fashion. If anything, they will go to the other extreme and knock some of the paste out of the plates through overcharging. Although the result may not seriously affect its holding qualities it may take six or twelve months from the life of the battery.

Avoid This

Once the first charge has been well done, batteries will stand up to considerable abuse without hitting back.

The one thing to avoid is leaving the cells standing in a discharged condition for any length of time. This is the surest way of destroying them yet devised.

E. O'M.

AN EXPERIMENTER'S KIT

Details of all the tools that the home constructor is likely to need for his set-building and testing work.

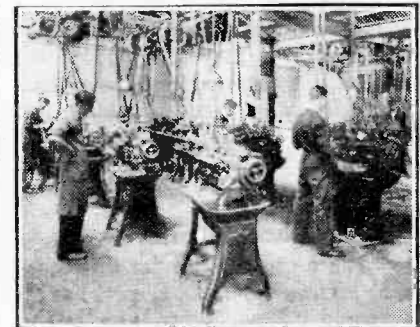
THE following list is the result of several years' set building and repairing. It contains practically everything the average wireless man will find necessary, and nothing in the nature of a luxury has been included. The figures in brackets are the approximate costs of the various articles at a large store.

- 2 pairs 6-in. combination pliers (1s. each) for tightening large bolts and terminals.
- 1 pair 2½-in. flat-nosed pliers (6d.) for tightening terminals on components.
- 1 pair round-nosed pliers (6d.) for shaping wire.

- 1 set wireless spanners (3d.).
- 1 flat file (8d.) for dressing ebonite.
- 1 scriber or graver for marking position of components on ebonite.
- 1 screwdriver 3-in. (9d.) for small brass screws.
- 1 long-bladed wireless screwdriver.
- 1 12-in. rule (1d.).
- 1 hand drill taking up to ¼-in. drills (3s. 11d.).
- 1 card of drills for same (1s.).
- 1 carpenter's brace (household pattern), (2s. 6d.).
- 3 engineers' bit stock drills for brace, ¼-in. (10d.), ⅝-in. (1s. 3d.), ¾-in. (1s. 6d.), for spindles of panel components, also counter-sinking screws. One or other of these will take the spindle of practically every standard component on the market.
- 1 hacksaw frame (1s.).
Hacksaw blades (3d. each).
- 1 small soldering set (1s.).

- 1 soldering bolt (1s.).
- 1 multi-meter reading volts and milli-amps. (8s. 6d. to 12s. 6d.).

FACTORY TOOLS



Even factories cannot be conducted successfully without regular attention to the tools. Here we see a corner of the Belling-Lee tool-making shop, with the operatives engaged on maintenance work.

Headphones and flashlamp battery with testing prods for testing for faults.



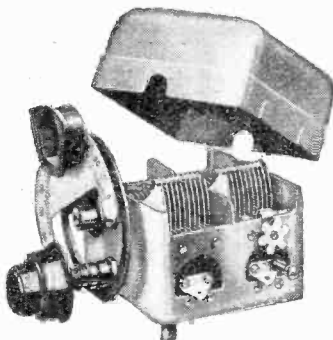
JUST ANOTHER WAY OF SAYING -

Whatever the circuit, the experienced constructor will always choose "J.B." whether he needs a simple tuning condenser or a modern multi-stage Gang. For tuning iron-cored coils, in particular, the accurate matching found in J.B. Gangs becomes imperative, and the mechanical rigidity of "J.B." ensures the permanence of this matching. In fact, the J.B. Gangs have proved so satisfactory with these new coils that their general design will remain unchanged.



the accurate matching found in J.B.

Gangs becomes imperative, and the mechanical rigidity of "J.B." ensures the permanence of this matching. In fact, the J.B. Gangs have proved so satisfactory with these new coils that their general design will remain unchanged.



J.B. UNITUNE

With one trimmer panel operated by a knob concentric with main tuning control. Rigid one-piece chassis. Trimmers to each stage. Slow motion dial.

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RADIO CATALOGUE
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QUESTIONS I Am Asked

by **JOHN
SCOTT-
TAGGART**

Q. 41. Are tone-control methods applicable to "Class B" amplification?

A. Yes. It is advisable to do the controlling, if possible, on the input side of the output valve, or on the input or output of the "driver" valve.

High voltages (e.g. those produced by heterodyne whistles) will waste H.T. if they are suppressed *after* the final valve; if this is done before they can produce any output, H.T. current is saved.

Q. 42. I am using a Ferranti A.F.5 transformer and get motor-boating on my set. How can this be stopped?

A. You can try reversing the leads to the primary. This old grandmother's recipe was always advised at one time. It is better to avoid interaction between the circuits concerned, because although by reversing a winding you may stop L.F. oscillation (motor-boating), you will get distortion by *reverse* L.F. reaction.

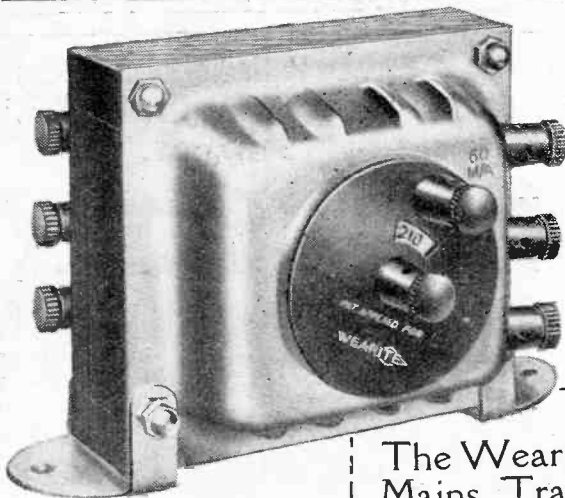
Proper decoupling is necessary, especially in the detector anode circuit, and 20,000 or 30,000 ohms and 3 or 4 mfd. may be necessary when a mains unit is employed.

Q. 43. I have heard it said that perfect selectivity is unobtainable.

Do you agree, and, if so, will you explain why?

A. Interference can take different forms, but the commonest is direct interference, where one programme can be heard through another, both programmes being recognisable as music or speech. This form of interference can be remedied, but "side-band splash" interference, which remains, appears to be incurable. I have heard the latest Stenode receiver in London, and Mühlacker was jammed by London Regional.

(Continued on page 258)



John Scott Taggart

Regd. Trade Mark.

says ...

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for

"S.T.'s" OLYMPIA RADIOGRAM

With a record of many past successes—including its use in the famous "S.T. A.C. 400"—the Wearite T.21A Mains Transformer has again been specified in a "star" receiver. One of the most elaborate of the "S.T." series the "Olympia Radiogram" employs only those parts which assure a successful whole—and Wearite have again been chosen. Be guided—follow the designer's recommendation.

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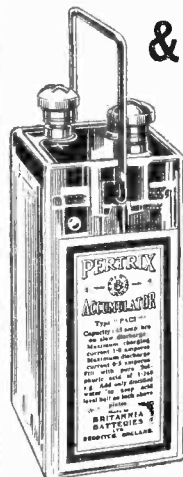
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QUESTIONS I AM ASKED

—continued from page 256

The interference is not recognisable as music or speech. It is noticed most when speech is being radiated by the interfering station, but the sound heard is not speech, but intermittent "slushing."

The waves from a station consist of the carrier-wave and groups of waves differing from the carrier by the frequency of the speech sound, which may be several hundred or several thousand. These side-band waves overlap the group of waves coming from the desired station. Heterodyning occurs with the desired stations carrier, and produce inverted speech or music.

The higher notes of the interfering station cause most trouble, because they barge further into the desired station's waveband. The higher the interfering "note," the closer will its corresponding wave approach the desired station's carrier; the result will be a lower heterodyne note.

Interference is worst during speech, because brief but powerful high notes

are radiated; modulation from the B.B.C. is always deeper when, say, news is being broadcast.

Interfering side-bands may be cut down by extreme selectivity of the receiver, but the desired side-bands are also cut down, with resultant deterioration of quality. Subsequent tone correction will not be of help against this type of interference.

To preserve quality, it would appear to be necessary to shift the stations farther apart, preferably to 24 kilocycles. This is an ideal, and in

of a medium-wave station on a long-wave adjustment, is often experienced by amateurs. It is usually noticed by those living close to the B.B.C.

The tuning is flat, and break-through increases as the condenser is reduced to zero. The use of reaction will often eliminate break-through, and leave the station desired—e.g. Leningrad or Oslo.

Yours is probably not a case of "break-through" at all, but the creation of an artificial "station" due to the mutual heterodyning of the

two London stations. Their frequencies are 843 kcs. (Regional) and 1,147 kcs. (National). These will mix and produce a programme having a frequency of 1,147—843 = 304 kcs.

This "station" of 304 kcs. corresponds to about 1,000 metres—i.e. at the bottom of the long waves. You will be able to tune it in like an ordinary station, signals being weaker on either side of the tuning point; the programme will be a jumble of the two London stations.

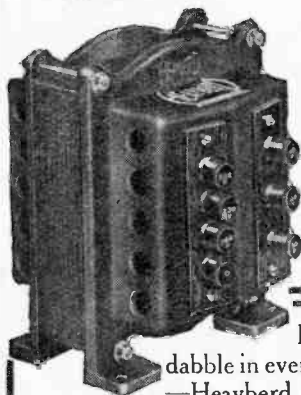
Break-through, which gives a clear programme, of course, is not tunable, and is thus distinguishable from the above effect.

A further batch of likely queries is tackled this month by Mr. John Scott-Taggart. Typical questions are selected with a view to their being of interest to the largest number of our readers.

practice most people can be satisfied with a musical band which only goes up to 4,500 cycles instead of about 12,000 cycles.

Q. 44. I live five miles from Brookmans Park. I receive a garbled English-sounding station at the bottom of the condenser on the long waves. Please explain.

A. Break-through, or the reception



MAINS POWER for your Radio! on Stand 16

Knowing full well that those who dabble in everything usually succeed in nothing—Heayberd have always made it their policy to SPECIALISE in one important branch of Radio apparatus. All their resources, and the brains of their engineers, have been concentrated on producing the finest mains equipment; that is why their Mains Units and Power Transformers are being constantly specified by the Radio press. At Stand 16, Olympia, you will see the result of many years of Specialisation; you will see the latest type Mains Units, Kits, Transformers, Chokes, Battery Chargers and Amplifiers—built by British people in a British Factory from British Materials.

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A PRACTICAL MAN'S CORNER

—continued from page 234

The second step is to bare $\frac{3}{4}$ in. at both ends of each piece. Lastly, make the two dozen loops of the required size with round-nosed pliers. To begin with you will have to measure the $\frac{3}{4}$ in. for baring at the ends of the leads, but it is surprising how quickly you become able to guess it accurately. Whatever the length required for the lead, the rule is, cut off a piece 1 in. longer and bare $\frac{3}{4}$ in. at either end.

For Slotted Terminal Nuts

One of the best things that component manufacturers have done for us for a long time is their fairly general provision of terminal nuts provided with slots for a screwdriver. The round, milled-headed terminal nut which was almost universal until a short time ago had two disadvantages.

It was difficult to tighten it down properly with the fingers, and the process of dealing with a good many of them during the construction of a receiving set was distinctly "ache-making," as bright young things might say. Then came the hexagonal terminal nut which was fine so long as you had a box spanner to fit it.

Not everybody has such a tool, but everyone possesses a screwdriver—hence the slotted terminal of to-day. The slotted terminal has one large-sized bugbear. Sometimes we want to put two or even three leads beneath its nut; sometimes but a single one.

Simple to Make

The manufacturer must, therefore, leave room for several connections if need be, and the result is that if there is only one the shank of the terminal is often so long that it protrudes through the nut and makes the ordinary screwdriver useless for tightening down purposes. A special screwdriver is required and it is well worth while to make one.

You can turn it out either from an old tool or from a new one bought at a cost of sixpence or so. The basis of the tool is a screwdriver with a blade about a quarter of an inch in width.

With a small rat-tailed file, cut in the middle of the business end of this a deep notch, as illustrated in Fig. 6. This tool does not take ten minutes to make and constructors will find that it is well worth while.

Build Mr. John Scott-Taggart's A.C. OLYMPIA RADIOGRAM with a PILOT AUTHOR KIT

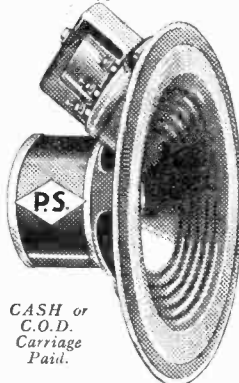
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KIT-BITS You pay the postman. We pay post charges on orders value over 10/-.

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METAPLEX new type metallised base-board, 16" x 10"		1	9
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1 Set of 4 specified valves	3	2	0
1 Camco "Popular" cabinet	3	15	0
1 Rola F.6 2,000-ohm field mains-energised speaker, complete with pentode output transformer	1	15	0
1 Garrard type A.C.4 Motor	3	15	0
1 Marconiphone type 19 Pick-up	1	12	6
1 Set of Colvern Ferrocart coils, type F1, F2, F3	1	17	6
1 British Radiophone type 424A 3-gang condenser, complete with type 374 dial assembly	1	15	0
1 Wearite type T.21A mains transformer	1	5	0



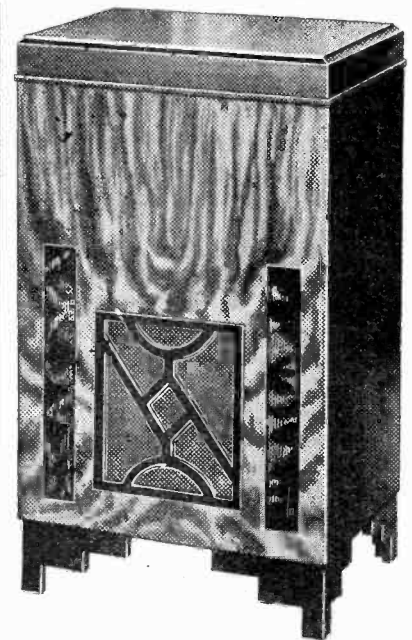
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PETO-SCOTT Moving-Coil SPEAKER. Specially recommended for S.T. Olympia Radiogram. Mains Energised Field. With Power or Pentode Output. Extremely Sensitive. Perfect Tone. Made by Mullards. Permanent Magnet Type also available. Price 15/-.

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WITH INLAID WALNUT VENEERS DIRECT FROM FACTORY. No MIDDLE-MAN'S PROFITS. Built by master craftsmen of the piano trade. Real inlaid walnut, mortised, tenoned, french-polished. With screened motor-board by the new METAPLEX PROCESS. Front ready drilled to take set portion, speaker and power equipments of the new S.T. Radiogram. Size 38" high, 22" wide, 15 1/2" deep. Speaker compartment, 17" x 19" x 14". Plain front or vignette panels, 14" x 7", 16" x 7", 18" x 8". Baffleboard 3/6 extra. **Balance in 11 monthly payments of 5/9, Carriage Paid.** CASH or C.O.D. 63/- CARRIAGE 2/6 EXTRA. In Oak or Mahogany, no extra.

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Convert your S.T.400 to "CLASS B" with the PILOT "CLASS B" CONVERSION KIT. Cash or C.O.D. including Valves and Diagrams, **37/6**

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It's a funny thing, but in this country it is not an easy matter to get the law to help you enjoy peace and quiet.

The other day the writer of these notes was driven nearly insane by a street pianist who kept playing "The Blue Danube" waltz time after time for over an hour.

The Only Remedy

A policeman was questioned, and his advice sought.

"There's only one thing you can do, sir," he said. "Warn the man who is playing the piano to move on, which he will probably do—for about six

yards—and then, if he still causes annoyance to you, you must call me up and give him in charge. And then you must come along to the police station and actually charge him with causing annoyance."

Other Offenders, too!

Well, of course, none of us cares to go to that extent. But street musicians are not the only people who cause a nuisance these days, as was clearly revealed in a case at Willesden Police Court. A woman stated there that a neighbour who had bought a fifty-guinea wireless set had installed it in her front room and that, ever since it arrived, it had been going at "full blast" from 7 a.m. until 2 a.m.

So even a fifty-guinea set can cause annoyance if it is kept braying away like a jackass.

The result was that a deputation of neighbours visited the police station. But, of course, they could get no satisfaction, for the law is a mass of red tape, and the police—much as they are willing to help you—simply have to obey rules and regulations.

Organising a Petition

Anyway, the plaintiff at the police court said that an ultimatum was served on the offending party, the owner of the fifty-guinea set; but the only result was that the wireless set was shut down at 11 p.m. and then removed to a back room, where it was again used until 2 a.m.

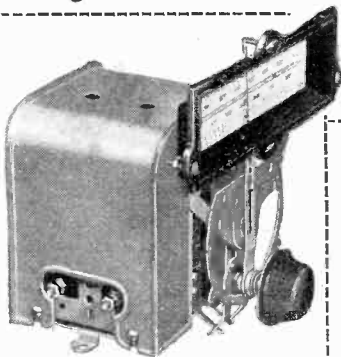
That brought in another collection of neighbours, and quite a big petition was then organised. But a woman at the police court stated that she did not know what to do with the petition, and whom to send it to!

One would have thought this was a case where a magistrate might have been granted power to deal with the matter there and then; but no, the law is the law, and the magistrate's answer was that the only possible step for the plaintiff was to seek an injunction in the High Court!

So all you poor people who are worried and kept awake at night by

(Continued on page 261)

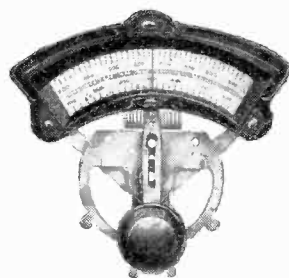
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POLAR STAR MINOR TWO-GANG CONDENSER

Cadmium plated steel frame. Trimmers operated from top. Matched within 1/2% or 1 mfd. (whichever is the greater.)

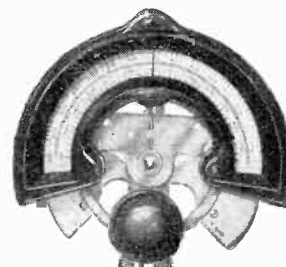
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Slow-motion drive. Bevelled scale in wavelengths and 0-100 degrees. Moulded escutcheon. Lampholder. **5/9**

Fitted with air-dielectric trimmer as "Uniknob" design, **7/9**



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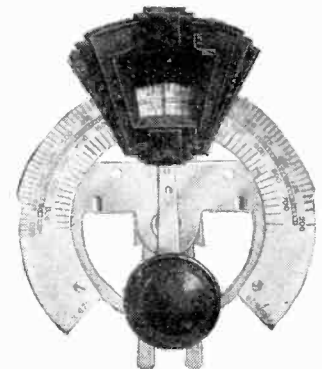
Slow-motion drive. Bevelled scale in wavelengths and 0-180 degrees. Moulded escutcheon. Lampholder. **5/9**

Fitted with air-dielectric trimmer as "Uniknob" design, **7/9**

POLAR 'MOVING SCALE' DISC DRIVE

Slow-motion drive. Bevelled scale in wavelengths, and degrees 0-180. Moulded escutcheon. Lampholder. **4/6**

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OUR NEWS BULLETIN

—continued from page 260

radio fiends who simply won't switch off at a reasonable hour, know exactly what to do!

How Many are There?

We have often asked in these columns how many people there are in this country with television sets. No official figures have ever been issued—at least, as far as our knowledge goes—by the Baird Company, the Post Office, or even by the B.B.C.

Recently, however, the "Sunday Express" stated that there are 14,000 people using television sets in Britain to-day against hardly any six years ago.

Interesting. But we should like to know the source of this information.

New Royalty Fees

A prophecy has been made by a radio manufacturer that multi-valve sets may soon be as popular in this country as they are in the United States.

All this prophesying is because manufacturers have just received notice of a new scale of royalties which the big patent-owning pool propose to bring into force.

These new royalties provide for payment of 2s. 6d. on each valve used in a set instead of 5s. Rectifier valves incorporated in wireless sets will in future be exempt from royalty charges. So the manufacturer of a battery set liable to pay patent royalties will only be charged 10s. royalty on a four-valve set instead of the present figure of £1, and manufacturers will be able to put twice as many valves into their receivers for the same royalty payment.

Hence the distinct possibility that superhets will be a big feature of the radio industry's output in the near future.

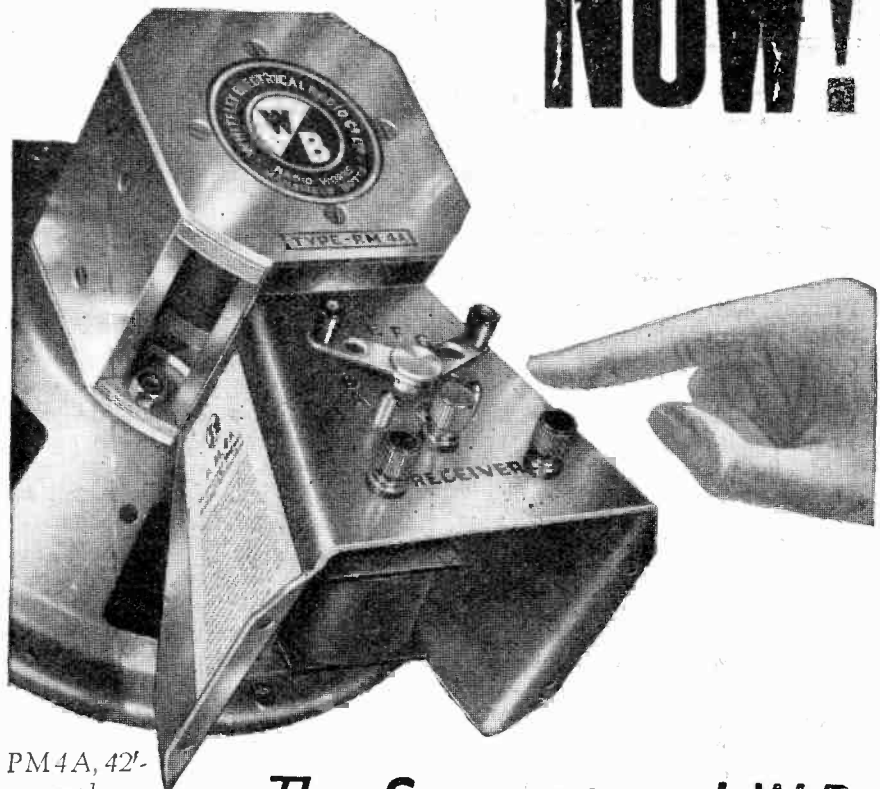
Subsidised Programmes

People in France have been fed up for some time past at the way in which their stations have been used for the propagation of subsidised English-speaking programmes.

After the Lucerne Radio Conference, representations were made to the French Government, with the result that an official communique was sent to all French stations requesting that the broadcasting of English-speaking commercial programmes should be considerably curtailed.

And now comes the news that Radio

(Continued on page 262)



PM4A, 42' complete

The Sensational W.B. MICROLODE

A development in permanent magnet moving-coil speaker technique that is making history. Seventeen ratios for power and pentode. Four ratios each for Class B or QPP without alteration. Accurate adjustment instantly to the correct optimum load for any output under any working conditions.

Learn all about it in our new list post free.



Perfect matching for ANY receiver

Whiteley Electrical Radio Co., Ltd., Mansfield, Notts.

Irish Free State Distributors: Kelly and Shiel, Ltd., 47, Fleet Street, Dublin

OUR NEWS BULLETIN

—continued from page 261

Paris is to be absorbed into the State Radio Group, which means, of course, that the station will not be available to English commercial interests who consider it worth their while to pay fees for English programmes to be broadcast.

Under the new Lucerne Plan, France loses certain wavelengths which, in conjunction with the move to curtail English broadcasts, will probably mean that by the autumn there will only be two small-powered French stations capable of being used for broadcasting sponsored programmes.

A People's Receiver

The German Government recently set about popularising wireless, and instructed the Heinrich Hertz Institute to design a People's Receiver.

This has now been designed, tested, and put on the market, and carries with it—by implication, at any rate—a Government official recommendation.

When the Institute was instructed to design the set, the Government pointed out that the receiver should have a high degree of selectivity, should be sensitive enough to receive the National long-wave transmitter in Germany, and at least one other German station by day and by night anywhere in Germany.

It was also stipulated that the set should have reasonable quality of reproduction, and should be sold at a low price.

The result is an instrument with loudspeaker and valves costing 76 marks, which is roughly about £5 at the present rate of exchange.

According to a technical correspondent, reaction is directly in the aerial, which, of course, is asking for the revival of an Eckersley "Don't Do It" campaign.

Real Mass Production

Some twenty-eight different radio manufacturers will deal with the set on mass production lines, and already the first order for 75,000 of these receivers for use on alternating current has been placed, as well as an order for 15,000 for direct current, and 10,000 for battery supply.

This is certainly standardisation of a Government set with a vengeance.

About the set itself, little is known at the moment except that it has two valves—a screened-grid detector, followed by a pentode. Both are indirectly heated in the D.C. type of set, the pentode being directly and the detector indirectly heated in the A.C. types.

The battery receiver model uses three valves, and special batteries at low prices have been designed to go with the set.

Political Broadcasts

Beginning in the autumn, the B.B.C. has arranged for nine political broadcasts.

Nothing very exciting in this, except that the B.B.C. has agreed not to censor the speeches prepared by the nine politicians who will air their views over the microphone.

The speakers will include five Government speakers, three Labour, and one Liberal; while speakers and speakers' subjects will be chosen by the three political parties.

It is quite likely that the three Labour speakers will be Mr. George Lansbury, Mr. Arthur Greenwood, and Sir Stafford Cripps.

The New Woman Announcer

The B.B.C. has made a lot of fuss in trying to keep secret details about their new woman announcer, Mrs. Borrett.

But, of course, Fleet Street soon got hot on the trail, and found out all they wanted to know, viz. that Mrs. Borrett is the wife of Mr. Charles Borrett, a retired naval officer. Mrs. Borrett has really been heard quite a lot on the wireless, for her stage name is Sheila Stewart. She is said to be young, tall, and slender, elegant in manner and in speech.

By the time this issue is in your hands, you will probably have heard her, and so you will be able to judge whether the Fleet Street pundits are right in describing her voice as being beautifully modulated, charming and soothing, and suggestive of a mystery woman.

Clever Publicity

The B.B.C., I think, are really cleverer than we give them credit for, because whenever they try to hide up any news, they excite all the news hounds in Fleet Street to such a degree that the person or subject concerned gets far, far more publicity than would be the case if the B.B.C. came into the open and told the simple facts.

TAP WRENCHES AND DRILLS
Details of an interesting change-over of tools that often proves helpful for practical work.

MANY constructors will be familiar with the tip of using an ordinary hand-drill for tapping small holes in ebonite and other soft materials. The tap is placed in the chuck of the drill, and if you crank at moderate speed you can thread holes far more quickly than if you use the ordinary tap wrench. But I don't think that I have seen mentioned what may be called the converse of this tip, that is, using the tap wrench as a drill holder for certain kinds of jobs.

It is far better than the hand-drill if you want to enlarge by a size or two a hole that has been made in a piece of ebonite. Suppose, for instance, that you have a 6 B.A. clearance hole which you want to enlarge to take a 4 B.A. screw.

Avoids Cracking

If the ebonite is at all brittle and the hole near the edge of the work, the material may crack if you attempt the job with the hand-drill. Fix your drill into a tap wrench and you will find that you can turn it in—provided, of course, that it is reasonably sharp—quite easily.

You can feel your way far better than you can with the more clumsy hand-drill. Should the job be rather a delicate one owing to the thinness and brittleness of the ebonite, I would not use a No. 26 drill straight away for the enlargement. Instead, I would do the work in two steps, taking the hole out first to No. 30 size, and finally putting the No. 26 drill through.

An ordinary "T" wrench can be used perfectly well for jobs of this kind; but for such purposes, as well as for tapping small holes, I prefer the wrench shaped like the handle of a screwdriver. This pattern is obtainable from most toolshops. It is not expensive and is very handy to use.

R. W. H.

Arrangements have been made for the original model of
S.T.'s OLYMPIA RADIOGRAM
 to be ON SHOW DAILY
 in the Peto-Scott Showrooms at 82, High Holborn, London, W.C.
 Every constructor who is able to do so should make a point of seeing this outstanding design.

OUTPUT EFFICIENCY
Some practical notes.
 By H. CROSS.

THE conversion of electric power into sound in a speaker is a lamentably inefficient process, and probably in most reproducers is never more than about 10 per cent. Thus, the sound energy which eventually travels the breadth of a room and vibrates the ear diaphragm is trifling in comparison with the power expended in the receiver in producing the waves.

A Limitation

This, unfortunately, is only part of the tale. In the detector and H.F. stages and in the intermediate L.F. stages the energy is expended purely in amplifying the signal and there is no excessive loss.

In the output stage, however, a different state of affairs exists, and owing to the peculiar shape of a triode valve's characteristic curve, second harmonic distortion occurs. In practice the proportion of second harmonic to fundamental must not exceed roughly five per cent.

Above this figure noticeable distortion occurs. This limits the undistorted power available from a triode to about 1/3th of its actual anode dissipation.

Only a Fraction

So if you have an output valve rated to give 150 milliwatts undistorted A.C. power, it will only give this usually at a maximum voltage of 150, when the anode current will be about 8 milliamps. and the anode dissipation 1,200 milliwatts.

With a lower anode voltage and anode current, naturally the undistorted output will decrease.

We have, then, in the output stage achieved only about 1.25 per cent. efficiency. This is without accounting for the wattage loss of the filament circuits.

Pentodes Better

With a pentode the percentage efficiency is somewhat higher. There is, however, third harmonic distortion with this type of valve which limits the output.

Output valves used in push-pull permit an even higher efficiency since the harmonic distortion is to some extent balanced out. "Class B" and Q.P.P. arrangements actually get round the difficulty indirectly by using up power only when the station carrier is modulated.

The efficiency of the output stage certainly leaves much to be desired.

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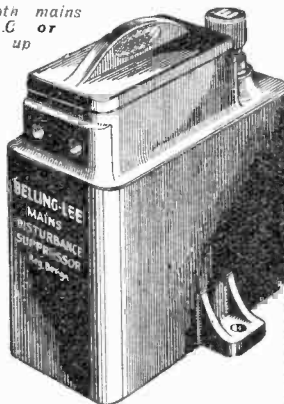
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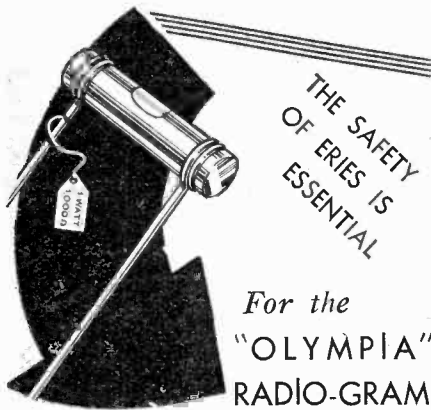
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MODERN BOY

Every Saturday **2d.**

WHAT YOU WILL SEE AT OLYMPIA

—continued from page 232

it a very attractive proposition to home constructors.

The versatility of this ingenious device is at once evident when it is remembered that the component can be used separately as an L.F. or H.F. choke or alternatively as a combined smoothing choke and H.F. suppressor for mains circuits. Retaining, as it does, for a mere 8s. 6d. the "Audrad" can justly be considered a bargain, and cannot fail to achieve success.

The above are but a few of the lines offered by Messrs R.I. for the new season, but unfortunately space will not permit us to run through the complete list.

REPRODUCERS AND AMPLIFIERS, LTD. Stand No. 44.

Are you looking for a good loudspeaker? Messrs. Reproducers and Amplifiers, Ltd., turn out a very comprehensive range, at various prices up to 70s. They include one differential armature model, No. R. & A. "50"; this is their lowest-priced instrument, and three permanent-magnet moving-coil types. They are the famous R. & A. "Bantam" at 27s. 6d., the R. & A. "Challenger" which can be had for 35s., and finally the larger R. & A. "Victor" priced at 70s.

In the cases of the moving-coil models the price includes a well-designed input transformer, having several ratios giving sufficient variation to match up to any output circuit. The differential armature reproducer is of the high resistance type, which, therefore, does not require a special transformer.

For the price asked the "50" model is very good value and will give splendid service on small sets, or cases where large volume is not required. On the other hand, the moving-coil models will handle all the volume that is likely to be required by the average listener, and the quality of reproduction is all that can be desired.

The "Bantam" is ideal for portable receivers and all-in sets where space is limited, while the other two models, the "Challenger" and "Victor" are intended for listeners who have a little more money to spend, and they can be relied upon to give very good service. The "Victor" is a particularly fine loudspeaker and is a real reproducer de-luxe.

All the foregoing models can be supplied in a cabinet if desired. These are produced in two styles, the "Standard," finished in matt walnut for an extra charge of 25s., and the "De-Luxe" cabinet in best selected hand-polished walnut for the modest figure of 45s.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD. Stand No. 31.

One of the pioneer battery manufacturers, this firm is making a very imposing display of the famous "Full O'Power" H.T. batteries. A range of grid-bias batteries is also on show.

The H.T. batteries are made in four types—the Cadet series, for small sets requiring 6-7 milliamps; the Standard, for receivers taking up to about 10 milliamps; the Power type, for comparatively large sets with which the H.T. current is between 10 and 20 milliamps; and finally, the Super-Radio, which will stand anything up to 30 milliamps.

These batteries are exceptionally well made and, coming from a firm of such repute, they can be relied upon to give long and satisfactory service. They are available in all the standard voltages, and the prices range from 5s. 6d. for a 60-volt Cadet to 24s. for a 120-volt Power type. The largest Super-Radio model is the 50-volt size, the price of which is 23s.

In addition to the above, a number of special batteries are made for most well-known makes of portable receivers.

Grid-bias batteries are available in two capacities, the Cadet which is produced at a competitive price, and the Standard which costs slightly more. They are made up in various sizes from 4½ to 18 volts.

SIX-SIXTY RADIO CO., LTD. Stand No. 95.

This firm, who are well known as valve manufacturers, are offering a full range of radio receiving and rectifying valves for both battery and mains sets.

Many new types will be seen on their stand this year. These include two interesting S.G. valves, one of the ordinary type and another which is a variable-mu valve.

Another valve that will interest readers is the "Class B" model. The average consumption of this valve is extremely low, and yet it is capable of an output in excess of many mains valves.

In the A.C. range a pair of H.F. pentodes are to be found, one with a straight and the other with a variable-mu characteristic. A double-diode-

triode is also listed—this valve is very useful when it is desired to incorporate automatic volume control in a set.

The range is completed with a pair of indirectly heated rectifiers and a number of general purpose and output triodes, together with pentodes to cover every possible requirement.

SOUND SALES, LTD. Stand No. 213.

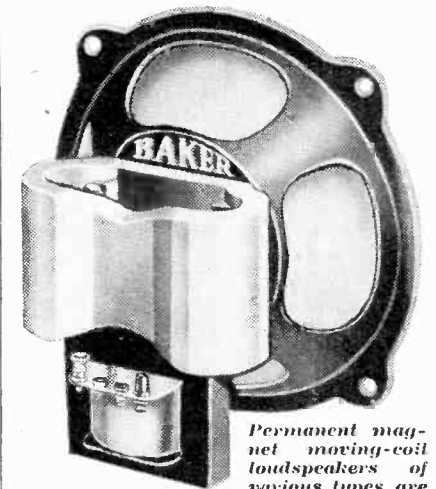
As manufacturers of high-class transformers, Messrs. Sound Sales are exhibiting a very complete range on their stand. A complete series ranging from the smallest B.T.5 Westinghouse model at 12s. 6d. to real high voltage models giving 1,000-0-1,000 volts at 250 milliamps. for use with G.U.1 rectifier valves will be seen.

It is interesting to note that this firm have developed a special transformer for use with Cathode-Ray Television equipment. A transformer for this class of work has to be very exacting indeed, and it is a great credit to the firm that they have succeeded in producing a satisfactory article.

In addition to these lines the new "Class B" conversion unit will be displayed. The new model suits all types of "Class B" valves, and the price is 35s.

Special "Class B" components of all types are also manufactured, included among these is a variable ratio driver transformer giving ratios

SOUND THROUGHOUT



Permanent magnet moving-coil loudspeakers of various types are to be seen on the stand of Messrs. Baker's Selthurst Radio.

of 1:1 and 2:1. The price of this model is 10s. Another interesting "B" component is a special output transformer which has a tapped secondary winding giving ratios of 66:1, 40:1 and 25:1.

In the intervalve class, there are several models to be seen, including a new 7:1 all-metal high-permeability core model, with an inductance of 90 henries. Price, 10s.

The "Westkit" eliminator kit is a particularly interesting departure from standard lines. It comprises a highly efficient mains transformer and Westinghouse metal rectifier, which makes the conversion of D.C. mains units to A.C. a simple matter.

SOVEREIGN PRODUCTS, LTD. Stand No. 101.

A remarkably full range of inexpensive components is manufactured by this old-established firm. That quality has not been sacrificed in favour of low price is evident in the tremendous popularity of their products.

Universal dual range screened coils, unscreened coils, volume control coils, switches and fixed condensers, are but a few of the components turned out by this firm. In mentioning these we must not forget Sovereign chokes and intervalve transformers, which possess many good points.

Talking of transformers, this firm has recently brought out a range of "Class B" components, and visitors to their stand at Olympia should not fail to take a look at these models. In the driver class of transformer there are two models, one with a fixed ratio of 1:1 and another having three ratios of 1:1, 1.5:1, and 2:1. The price of the former is 7s., and the latter 9s.

In addition to the above there is a very nice variable ratio output choke available, having ratios of 1:1, 1.5:1 and 2:1. The price of this model is 7s.

THE TELEGRAPH CONDENSER COMPANY, LTD. Stand No. 98.

There must be very few people indeed who have not heard of T.C.C. condensers. These little marvels in green boxes have been on the market.

(Continued on page 265)

WHAT YOU WILL SEE AT OLYMPIA

—continued from page 264

ever since radio first started, and their high quality and freedom from breakdown is well known.

All types of fixed condensers will be on show on their stand this year, right from the smallest mica model, having a capacity of .00005-mfd. to huge transmitting condensers having capacities of several microfarads, and tested to many thousands of volts. There will also be a complete range of dry and aqueous electrolytic condensers. The latter will include a small tubular dry electrolytic for grid bias filter purposes.

This firm are now turning their attention to anti-interference devices, and for the new season they are manufacturing a very useful unit which connects directly across the mains. This unit should do a great deal to eliminate man-made static.

The whole unit is contained in a moulded green bakelite case, and complies with the supply companies' regulations in every respect. It has its own fuses, and is available to the public for the modest figure of 9s. 6d.

TELSEN ELECTRIC CO., LTD.
Stand No. 88.

For the new season Messrs. Telsen have practically re-designed the whole of their range of components. In addition to ordinary components, they have now turned their attention to mains units, and a visit to their stand at Olympia should prove most interesting.

This year many of their products are completely screened, a good example being their I.F. chokes, of which there are three models. An all-wave

binoocular model selling for 4s. 6d., a standard screened choke suitable for waves between 100 and 2,000 metres at 2s. 6d., and lastly a special short-wave type at 3s.

"Class B" components are also to be seen on their stand; these consist of one multi-ratio driver transformer, one output transformer, and an output choke. Both these latter models are also of the variable ratio pattern. The price is 8s. 6d. in each case. Two types of "Class B" valve holders are also listed, one of the anti-microphonic, and the other of the rigid type.

Still another departure from last year is the introduction of a tubular electrolytic condenser. This condenser is of the dry pattern, and is supplied complete with mounting bracket. It is available in three different capacities, namely 4, 6 and 8 mfd.

Another very interesting Telsen feature for the new season is their iron-cored screened coils. These coils employ an iron dust core which has enabled their size to be greatly reduced, without sacrifice of efficiency. These coils can be had in single, twin or triple sets.

MESSRS. C. A. VANDERVELL, LTD.
Stand No. 228.

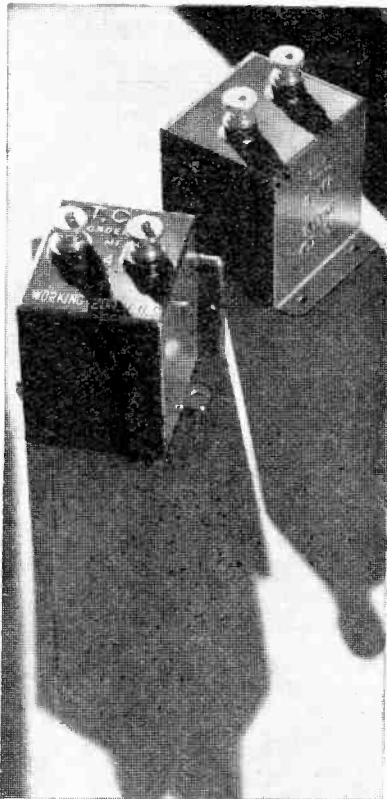
Everything for the battery man is the motto of this firm. L.T. accumulators in both glass and celluloid containers, "All Position" non-spillable "jelly acid" cells for portable receivers, high-tension accumulators, and even H.T. dry batteries are among the articles offered this season.

An interesting feature of their glass L.T. accumulators is the provision of a special metal carrier. It is easily detachable, and yet it is impossible for the cell to slip.

There are three types of glass accumulators, the "N.A.G." which is intended for heavy duty work, and the "S.G.M." and "S.G.M.2" which are of the slow discharge pattern. The celluloid model is an excellent alternative to the glass cells, where weight is a consideration, and when desired these can be supplied cemented together to make up 4 or 6-volt units.

The "jelly acid" cells are ideal for portables, the absence of any liquid electrolyte makes them

(Continued on page 266)



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CURRENT PRICES OF T.C.C. CONDENSERS

START right with your condensers—whatever the set you can't afford to take risks. Be sure your condensers are of unquestioned reliability—be sure they are T.C.C. Price may be a consideration, T.C.C. cost little more than ordinary condensers, but they are pedigree condensers backed by the oldest firm in the country whose activities are solely condenser making.

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PAPER CONDENSERS. TERMINAL TYPES

Mfd.	Type 50/61	Type 80 81	Type 101	Type 121
0.1	s. d. —	s. d. 2 0	s. d. —	s. d. —
0.25	—	2 4	—	—
0.5	2 4	2 6	5 0	7 0
1	2 6	3 0	6 0	8 6
2	3 6	4 0	9 0	13 0
3	5 0	6 0	—	—
4	5 6	7 0	17 6	25 0
5	7 3	9 0	22 0	31 0
6	8 6	10 6	25 0	37 6
8	11 0	14 0	—	—
10	14 0	17 6	—	—

PAPER CONDENSERS. SOLDERING TAG TYPES

Mfd.	Type 65	Type 84	Type 87
0.1	s. d. 1 8	s. d. 2 0	s. d. 2 2
0.25	1 10	2 2	2 4
0.5	1 11	2 4	2 6
1	2 0	2 9	3 0
2	2 8	3 9	4 0
3	—	—	—
4	5 0	6 9	7 3
5	—	—	—
6	7 0	10 0	—
8	9 0	13 0	—
10	11 6	16 0	—

MICA CONDENSERS

Mfd.	Type M	S.P. Type	Type 34
.00005	s. d. 0 8	s. d. —	s. d. 1 3
.0001 3	0 8	2 0	1 3
.0004/5	0 9	2 0	1 3
.001/4	1 0	2 6	1 6
.005/6	1 6	3 0	2 0
.01	2 0	—	3 0

ELECTROLYTIC CONDENSERS

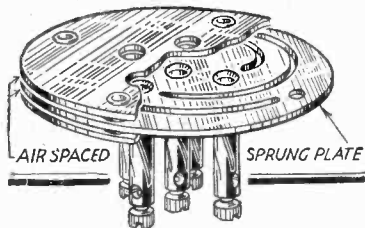
Mfd.	Type 802 Aqueous	Type 801 Aqueous	Type 902 Dry
8	s. d. 6 0	s. d. —	s. d. 6 6
4	5 0	—	—
7	—	6 0	—

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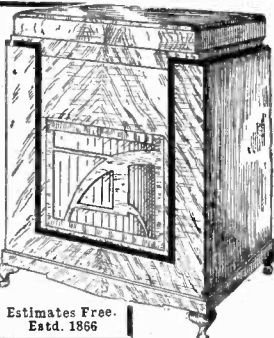
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WHAT YOU WILL SEE AT OLYMPIA

—continued from page 265

perfectly safe while in any position. They are made in a wide range of capacities, and the dimensions are extremely minute. These batteries are supplied charged and ready for use.

There are many people who favour the H.T. accumulator. Listeners who come within this class will find that they have been catered for very fully. The accumulators are supplied in 10-volt units having a capacity of 5,000 milliamp. hours. The price is 6s. 3d. per unit. If required, they can be supplied in 60-volt groups with crate for 45s.

Those readers who prefer the dry H.T. battery will find adequate sizes available. There is the Standard type for sets requiring 6-8 milliamps., the Triple capacity model which will stand a drain of anything from 8-20 milliamps., and, finally, special batteries for portable sets. Grid-bias batteries are also available.

VARLEY (OLIVER PELL CONTROL, LTD.).
Stand No. 85.

On the Varley stand visitors to Olympia will see an extensive range of high-grade components. In view, however, of recent developments, particular interest will attach to the exhibit of Varley tuning coils.

It is several years since this concern first began experimenting with metal cores, and the introduction of the new Nicore coils is the result of much hard work. The new coils are unusually efficient, and a remarkable degree of consistency has been obtained.

An entirely new development introduced recently by this firm is Permeability Tuning, and all those readers who are interested should not fail to pay a visit to their stand. This form of tuning, by the way, dispenses entirely with variable condensers.

Other components include a comprehensive array of "Class B" and P.P.P. transformers and chokes. These are available in various ratios to suit different valve combinations.

THE WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD.
Stand No. 32.

This firm, well known to readers on account of their metal rectifiers, are showing some very interesting and useful exhibits. Their range of rectifiers includes models for both L.T. and H.T. purposes.

On the high-tension side the smallest instrument is the H.T.5, which will give 120 volts at 20 milliamps., and so we go up in easy stages to the largest unit, the H.T.11, which is capable of giving 500 volts at 120 milliamps., or 400 volts at 150 milliamps. The prices range from 12s. 6d. to 35s.

Besides these models there is an extremely useful batch of L.T. models, which are intended for charging purposes. The L.T.1, at 10s. 6d., is rated at 6 volts 1 amp.; then there are six others, L.T.2, L.T.4, L.T.5, L.T.6, A.4, and finally A.6, rated at 6 volts 3 amps., and priced at 47s. 6d. From the above you will see that their range is very comprehensive indeed.

A recent addition to the Westinghouse family is the "Westector." It is really a development of the Westinghouse Metal Rectifier, and is intended for detector circuits. It is supplied in four models—two half-wave and two of the full-wave type. The prices are 7s. 6d. and 10s. 6d. respectively.

Another interesting exhibit is a special metal rectifier that enables D.C. meters to be used for measuring A.C. voltage and current. It can be had in 1, 5 and 10-milliamp. styles, and the price is only 25s.

This firm also manufactures a range of complete battery chargers, and those interested will do well to pay a visit to their stand.

WHITELEY ELECTRICAL RADIO CO., LTD.
Stand Nos. 123 and 129.

The new season sees the introduction of an entirely new feature in all the W.B. permanent-magnet loudspeakers, and a visit to their stand at Olympia should be well worth the trouble. The new range will be known as the "Micro-lode" series.

This series comprises the W.B. P.M.1A "Micro-lode" model, which is a permanent-magnet loudspeaker of the moving-coil type, suitable for small halls or for outstandingly pure reproduction at home. It is priced at £6.

Following on this, there are two more permanent-magnet types. The W.B. P.M.2A "Microlode" and the P.M.6 "Microlode." The latter is a new junior instrument with a 6½ ins. cone. It can be bought for the moderate figure of 32s. 6d.

In the energised field class there are two chassis models available. Both these are known as the E.M.2, one being designed for D.C. mains supply, and the other for working from a 6-volt

accumulator battery. The former can also be used on A.C. mains with the addition of a rectifier unit.

Besides loudspeakers, there is now an imposing series of "Class B" components listed. Conversion units, driver transformers, output chokes, etc., are all to be found in their catalogue.

MESSRS. WILKINS & WRIGHT, LTD.
Stand No. 20.

The high quality of "Utility" components has been known to readers for many years, and it is interesting to note that many new lines will be added to their already comprehensive range this season. Do not fail to visit their stand at your earliest opportunity.

Several new types of die-cast gang condensers will be on show. These have a minimum capacity of '000018 mfd., which, as readers will no doubt realise, is extremely low, and a maximum of '00052 mfd. They are available in two-, three- and four-gang units in both the ordinary type and superheterodyne model. The latter, by the way, are designed for an immediate frequency of 110 kcs.

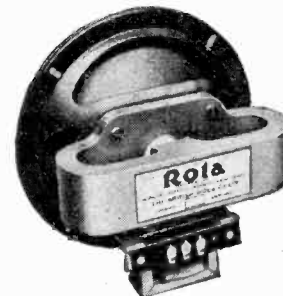
Another fascinating exhibit is a new slow-motion dial with reduction ratio of 14:1. This is priced at 2s. 6d. and 3s., depending whether a flat or bevelled dial is required.

Two other dials which should prove very useful are a very fine micro-dial with a ratio of 50:1, together with a direct drive, and a novel full vision dial, which should enhance the panel appearance of any set tremendously. The former is available in the flat type for 7s., and with a bevelled dial for 7s. 6d.; while the latter can be had for 6s. 6d.

WINGROVE & ROGERS, LTD.
Stand No. 93.

Polar condensers have held a high place in the variable condenser world for a great many years, and it is interesting to note that further advances have been made.

In addition to their old lines, several new dial designs have been produced. These are known



"Rola" moving-coil speakers are available in permanent magnet and energised types, and can be obtained with transformers suitable for "Class B," pentode, or power outputs. A permanent magnet model is shown

as the Full Vision Drives and Moving Scale Drive. Three of the former type are listed, one having an "accurate" drive, another a "semi-circular," and finally one with a "horizontal" drive. There is only one model of the latter type, however, this having a more or less normal disc arrangement.

A new range of gang condensers known as the "Star Minor" is also available. This includes five different models. A two-gang, a three- and four-gang, and lastly two superhet types, in three- and four-gang assemblies. The superhet types are designed for 110 kc.

In the short-wave field, Polar condensers have always been very successful, and readers will be particularly interested in a special two-gang, short-wave condenser for high-frequency work.

WRIGHT & WEARE, LTD.
Stand No. 1.

Readers who visit the Wearite stand at Olympia this year will find a most imposing array of components of all types.

One of the best known lines is perhaps their famous superhet coils. These are as much in evidence this year as ever before, and they can be recommended thoroughly to anyone wishing to build this type of set. They are also made in compact dual, triple and four coil units.

If your reception of foreign stations is spoiled by heterodyne interference, you will find their heterodyne filters very useful. They are available in two types. Type A to cut off at 3,500 cycles, and type B 5,000 cycles.

Of particular interest to mains set builders is the Wearite range of power transformers. These are available in all the usual sizes, a novel feature of their construction being the provision of a disc arrangement which switches the primary winding for different mains voltages, the particular voltage for which it is adjusted showing through a small slot in the disc.

Screened and unscreened H.F. chokes are also among the range of components listed. Type H.F. P.A. is a very useful model. It is designed especially for S.G. valves, the connection to the top of the valve being made by a screened flexible lead which comes out through the top of the choke. The price is 4s.

THE NEW SUPER CIRCUITS

—continued from page 220

going to be *some* proposition, and for power, simplicity of control, selectiveness and compactness I can visualise it leaping right into the front rank. Indeed, no "straight" set could touch it.

And if the price were right it would undoubtedly "sweep the board" in the mains field.

Will Grow in Popularity

But that is looking ahead a bit too far. For the immediate future, despite all the recent progress that has been made, I believe the super will, for some time, still have one foot in the "de-luxe" class so far as this country is concerned, although there can be no doubt that it has come back to stay.

For years it was regarded as all but dead, but now it has been re-vivified and will grow in popularity.

IN LIGHTER VEIN

—continued from page 257

'Ere, old feller, this is to celebrate our merry meetin'," and he flung Rupert the bare bones of the sirloin.

"Do you mean to say that Rupert is your dog?"

"Yus, and I'm so glad to find 'im again, that 'e's the only thing of yours I'll take. Good-night, lady. Good-night, gentleman."

And the burglar made his exit through the window, followed by the heinzhound.

Cause for Complaint

"A fine dog that," said Mrs. Goop. "They call him a watchdog, and he makes friends with every burglar who comes near the house."

"Anyhow," twittered the Professor, "you can't complain, for the blessed dog's the only thing he's taken. We haven't lost anything worth mentioning."

"What about my birthday present," snarled Mrs. Goop.

There's no satisfying some women.

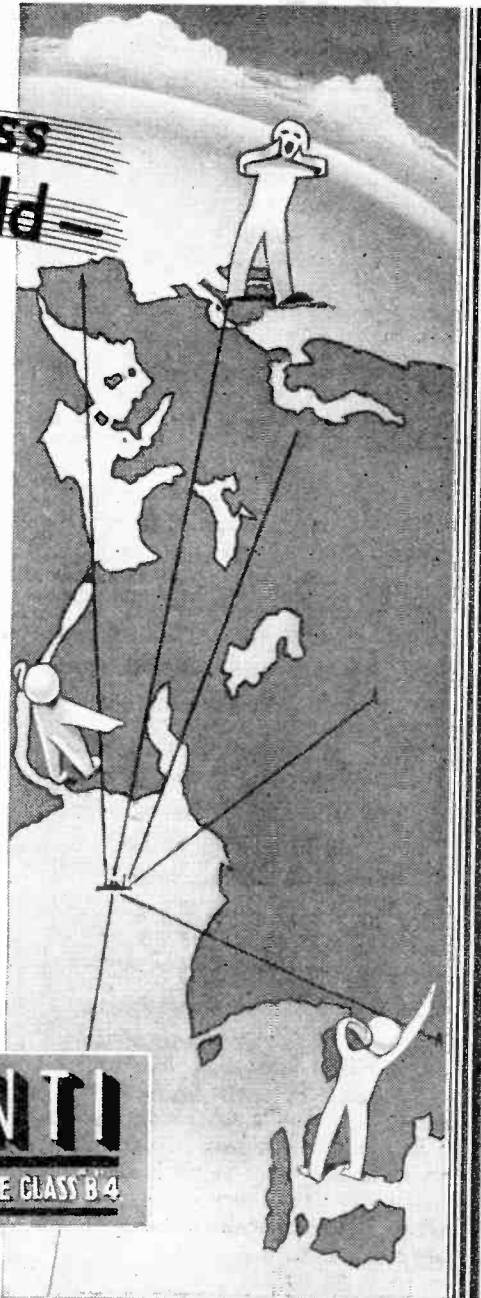
Half across the World—

come successful test reports of the new Short-wave set designed for the home constructor by Ferranti—now being tried out from England to Singapore with most gratifying results.

This Short-wave Receiver is a typical Ferranti product; a thorough engineering job, designed with the best components to give the best results; adaptable, selective, far-reaching, efficient—with the usual Ferranti regard for Quality of Reproduction.

In detail, the range of this Short-wave set when built to the Ferranti chart, is from 15-100 metres: Ferranti Plug-in Coils may readily be changed for medium-wave reception up to 600 metres if required. The circuit is a Battery operated 4 valve Screened Grid one, including a high grade Class "B" output stage.

Charts now ready. Send 1½d. stamp NOW for your copy. Components will shortly be in dealer's hands. SEE the DEMONSTRATION MODEL on Stand 74 at Olympia (also Stand 38 at the Scottish National Radio Exhibition Glasgow)



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Dear Sirs,—Please give me your best **PART EXCHANGE** value for the old Radio Apparatus detailed in my letter attached.

Name.....
Address.....

T.W.C.9/33.

S.T.'s OLYMPIA RADIOGRAM

—continued from page 217

will have a long life, while giving adequate light.

(13) Having drilled the condenser drive hole and checked it by slipping the set into position, the diagram supplied by British Radiophone with the three-gang condenser can be used to mark the hole for fitting the escutcheon plate. This hole is cut by drilling a series of small holes along its boundary and cutting away the bits between the holes with a penknife.

Matching Knobs

(14) The set is illustrated with a Colvern knob of the type used for ordinary ganged coils; this is merely because I do not think the knob supplied with the Ferrocart coils har-

VALVES

USED BY DESIGNER.

- S.G. Marconi or Osram "Catkin" VMS4
- Det. Marconi or Osram "Catkin" MH4
- Pentode. Marconi or Osram "Catkin" MPT4
- Rectifier. Mullard DW2 or Marconi or Osram U10

SUITABLE ALTERNATIVES.

- | | | | |
|---------|---------|-----------|----------|
| Make | S.G. | Detector. | Pentode. |
| Cossor | MVSG | 41MHL | MP/Pen |
| Mullard | MIM4V | 354V | Pen/4V |
| | (met) | | |
| Mazda | AC/SQVM | AC/HL | AC/Pen |
| | (met) | | |

monises with the remainder of the set owing to its large size.

The cost of these knobs is very small, and the constructor, in this case, as in all others in connection with the set, may think it desirable to specify the name of the set for which the component or components are to be used.

The only adjustment on the whole circuit is that of trimming. The coils are already matched for inductance and the condenser is of a type having a good reputation for matching as between sections. It is therefore only necessary to trim for incidental capacities.

alteration of tuning being carried out if necessary.

The operation of the set, of course, is simplicity itself, and, in conclusion, I can urge you, with every confidence, to build this radiogram.

For those who find it easier to work from a full-size blueprint, one is

BLUEPRINT OF S.T.'s OLYMPIA RADIOGRAM

As this magnificent Radiogram will be a current design for the next twelve months, a special blueprint is available

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All applications should be addressed to The Radio Queries Department, The Fleetway House, Farringdon Street, London, E.C.4. A Postal Order value 1/7½d. to cover cost of blueprint and postage should be enclosed.

A good general method is to trim first of all on the local station roughly, reducing the volume control while doing this. Keep the trimmer capacities as small as possible. Finally trim on a weak station at the bottom end of the medium waveband with the reaction adjusted to its critical value (i.e. just before oscillation).

Trimming is Easy

There are three small trimming adjustments, and each is altered in turn to give the maximum signal strength. The difficulties of trimming are grossly exaggerated. The real trouble has been the difficulty of maintaining the circuit in gang throughout both wavebands, but, given a good brand of ganged coil, and a good ganged condenser, and a good design of set, the constructor will have no trouble.

To obtain maximum selectivity with the set the volume control should be reduced and signal strength brought up with reaction, a slight

available of this set for 1s. 7½d. post free, from The Radio Queries Dept., The Fleetway House, Farringdon Street, London, E.C.4.

JOHN SCOTT-TAGGART.

* HONOUR FOR SIR *
* AMBROSE FLEMING *

THE Institute of Radio Engineers of New York, U.S.A., meeting in their Annual Convention at Chicago on June 26th, have awarded their Gold Medal of Honour this year to Sir Ambrose Fleming, F.R.S., for the conspicuous part he has played in introducing physical and engineering principles into the science of radio. Sir Ambrose was the inventor of the first form of thermionic valve, which is now the master weapon of wireless telegraphy and telephony, and without which there would have been no broadcasting as it exists to-day.

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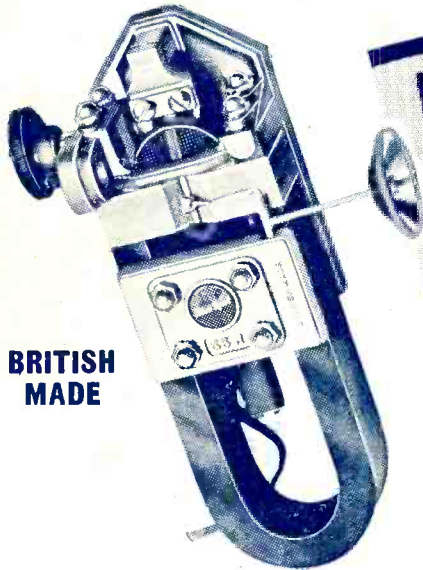
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