

# The Wireless 6<sup>d</sup> Constructor

RADIO CONSULTANT-IN-CHIEF CAPT. P. P. PECKERSLEY M.I.E.E.

Vol. XII.



OCTOBER, 1931.

No. 60.

## SPECIAL EXHIBITION NUMBER

IN THIS ISSUE

# THE "I.E."



YOU CAN HEAR  
AUSTRALIA  
WITH THIS SET!

*Completely New!—*

*The first set of its kind  
ever designed*



● **THESE ALLIES OF THE MOST SUCCESSFUL RECEIVERS—**

THE



**H.F. CHOKE**

is specified for the "EXHIBITION" 4

The LEWCOS H.F. Choke is specially constructed to eliminate self-oscillation. Scientific research by highly-skilled engineers shows that this Choke can be used with complete confidence in its efficient performance on wave-lengths from 20 to 2,000 metres.

Write for fully descriptive leaflet R.33, which shows the Choke curves and gives tested values.

and a

**LEWCOS**  
Regd.

P.J.1 is specified for the "I.E." Receiver

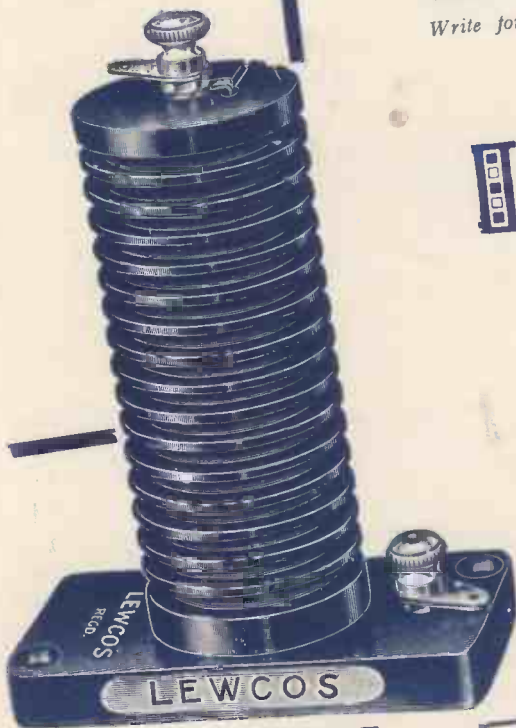
Read what the Technical Editor of "Popular Wireless" says about LEWCOS P.J. and P.V. Coils:—

"I have examined a complete set of Lewcos P.V. and P.J. coils, and I can assure you that they are really first-class components from every point of view."

"They are definitely superior to many other makes, and this, in the circumstances, is hardly surprising!"

"I particularly like the little mounting feet that are securely fixed to them, for these enable the coils to be mounted either vertically or horizontally."

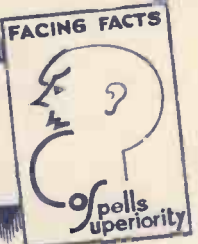
"Constructors should make a particular note of these 'Lewcos' P.V.'s and P.J.'s."



THIS IS THE ACTUAL SIZE OF THE **LEWCOS** H.F. CHOKE REDUCED PRICE 6/-



THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED  
Church Road, Leyton, London, E.10.



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*As some of the arrangements and specialises described in this Journal may be the subject of Letters Patent, the amateur and trader will be well advised to obtain the permission of the patentees to use the patents before doing so.*

Chief Radio Consultant:  
Capt. P. P. ECKERSLEY, M.I.E.E.



## BIGGER & BETTER THAN EVER

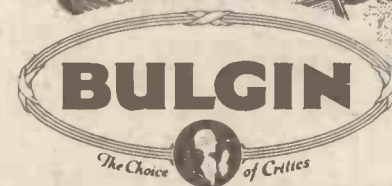
### THE FAMOUS BULGIN CATALOGUE NEW 1931-1932 EDITION

HERE it is—72 pages packed with details of new components essential to up-to-date radio.

Pages of practical hints and diagrams. An entirely fresh section detailing the new Bulgin Technical Service. Send 2d. postage for a copy without delay. Below are listed some of the brand new Bulgin productions.

**SEE THEM ON STAND 102,  
EMPIRE HALL, GROUND FLOOR.**

Thermo-Switch, New Range of Toggle Switches, Moving Coil Meters, Volume Controls, Valve Holders, D.C. Mains Equipment, New Range Anode Resistances, Grid Leaks, Spaghetts, Condensers, Fuse-holders, Terminals, Pick-ups, Mains Plugs, Quickwye, etc., etc.



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# THE NEW STANDARD OF VALUE

# LOTUS ALL-MAINS

# LUXURY SET *for* £14.14.0

*for A.C. or D.C. Mains*  
 MAGNAVOX MOVING  
 COIL SPEAKER - - -  
 MAZDA VALVES - - -  
 IRRESISTIBLE H.P. TERMS

Never before have such outstanding features, such a luxurious cabinet, such magnificent reception been available at such a low price. The new Lotus Table Console is made for both A.C. and D.C. Mains. It is conceived and designed by J. Sieger, the famous radio engineer, who is now a member of the Lotus Research Laboratories.

One-Knob Tuning, Hair-Line Selectivity, and All-Mains operation make for the acme of simplicity. The Magnavox Moving Coil Speaker, Mazda Valves, S.G., Detector and Power, make for unequalled reproduction.

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TRULY THE RADIO OF THE FUTURE—  
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The Hire Purchase Terms are irresistible. 27/9 deposit secures this marvellous set, the balance being paid in 11 monthly instalments of 27/9 each. Ask your dealer for a demonstration. CASH PRICE £14 14s. A.C. or D.C.



**RADIO OF THE FUTURE — NOW!**

**TABLE CONSOLE**

# LOTUS

**THE WORLD'S KEENEST TUNING  
 KEENEST PRICED POWER SET** ▶

**ALL  
 BRITISH  
 MADE**

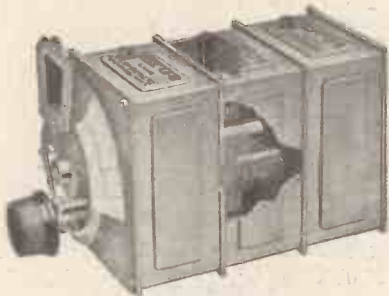


# LOTUS

**A complete range of new Components at keenly competitive prices, by J. Sieger, the famous radio designer**

*In addition to the new Lotus Components illustrated below, there are many new lines, including Gang Condensers, Transformers, Chokes, Switches, Slow-Motion Drives, etc. You will be interested in the complete range, write to-day for full descriptive list.*

Famous from the earliest days of broadcasting, Lotus Components have always enjoyed the esteem of the radio constructor. This year many new lines have been born from the Lotus Research Laboratories. Designed by the genius of J. Seiger, and manufactured with the unequalled resources of the Lotus Works and experience, they are miracles of efficiency and value. In no case has quality been sacrificed for price. Nevertheless, through highly intensified production, they are within the reach of every pocket. All the leading set designers specify Lotus. They know that for reliability and efficiency they are absolutely reliable. Follow the experts' lead; insist on Lotus Components.



**GANGED CONDENSERS.**

Each unit is totally screened and precision matched, and sturdy construction ensures lasting accuracy. With Disc Drive 5/- extra. Or with Drum Drive 7/6 extra. 3-Gang (as illustrated) 30/-. 4-Gang 40/-.

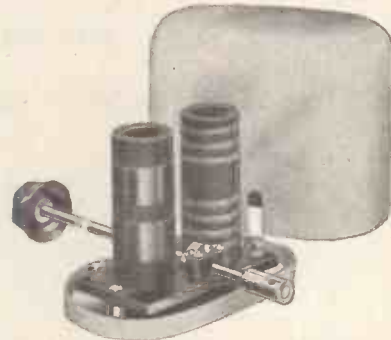
**2-GANG  
20/-**



**UNIVERSAL SWITCH.**

A provisionally patented rotary switch with self-cleaning contacts. Easily ganged. For many types of switching arrangements.

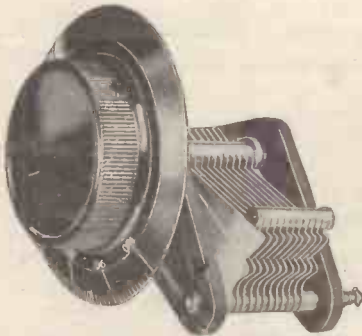
**1/6**



**BINOCULAR DUAL-WAVE COIL.**

Long and short-wave windings on separate formers, silent wave-change switch. These coils are all matched and can be ganged. Completely and compactly screened. Designed by J. Sieger for Hair-line Selectivity.

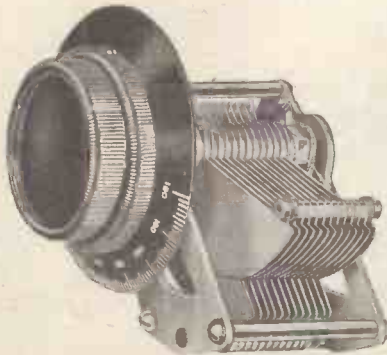
**10/6**



**RIGID-DRIVE LOG CONDENSER.**

An inexpensive but reliable component for the home constructor. 3/6. With Knob-Dial '0003 and '0005 capacity.

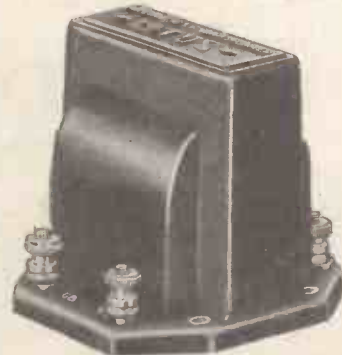
**3/6**



**SLOW-MOTION CONDENSER.**

Stout construction with integral ball-bearing slow-motion device. Complete with Knob-Dial. Capacity '0003 and '0005.

**6/6**



**AUDIO TRANSFORMER No. 1.**

An inexpensive instrument for the home constructor. It is remarkably efficient and has a good, straight-line amplification curve. Ratios 3-1 and 5-1

**5/6**

LOTUS RADIO LTD. MILL LANE LIVERPOOL



# NEW!

—more powerful—more selective—  
even better all-round performance

Here is an entirely new standard of Radio value—a powerful 3-valve, Screened Grid Receiver for the amazingly low price of £6.15.0—the Cossor Empire Melody Maker Model 234.

This remarkable Receiver incorporates all the most up-to-date developments in Set design. It uses the very latest types of the famous Cossor Valves. As a result it possesses outstanding performance.

Its selectivity is remarkable—its range is enormous. Even when used close to a Regional transmitter it will

cut out its powerful transmission like magic and bring in the programme you want to hear—all the main European stations are within its reach. Its performance is equal in every way to that of the most costly 3-valve S.G. Receiver.

Yet in spite of its efficiency it is so simple that you can easily assemble it yourself—no Wireless knowledge is necessary. Merely bolt the components on to the drilled, all-metal base plate, connect a few wires and it is ready for use. Get full details of this outstanding Set—Use the Coupon.

# Cossor EMPIRE Melody Maker Model 234

### HIRE PURCHASE TERMS

You can obtain the Cossor Empire Melody Maker for only 15/- down and nine monthly payments of 15/-.



### EXTERNAL WAVE-CHANGE SWITCH

Wave Change Switching is effected by operating the switch at the end of the cabinet—"in" for long—"out" for short.



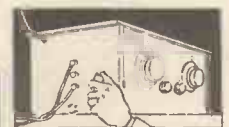
### COSSOR METALLISED SCREENED GRID VALVE

Even better performance is ensured by the use of a Cossor Metallised Screened Grid Valve with its record low inter-electrode capacity and its ability to eliminate stray coupling effect between anode and nearby components.



### COMPLETELY SCREENED COILS

The coils used in the Cossor Empire Melody Maker are completely screened in metal "pots," entirely eliminating direct pick-up, thus further improving selectivity.



### SERIES AERIAL CONDENSER

The variable Series Aerial Condenser permits adjustment of selectivity to give the fine tuning necessary to cut out powerful local stations.



### ALL-METAL BASEPLATE

Construction is simpler than ever, due to the Metal Base Plate, which is supplied with every hole drilled, thus automatically positioning every component.



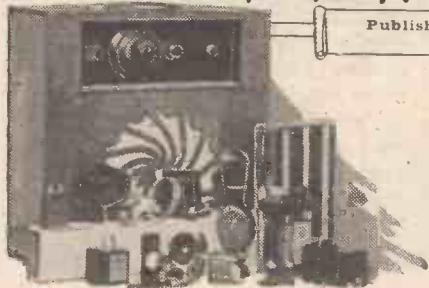
To Messrs. A. C. Cossor, Ltd., Highbury Grove, London, N.5.  
Please send me free of charge one of your Constructional Charts which tells me how to build the Cossor Empire Melody Maker.  
Name.....  
Address.....

W.G. 10/31.

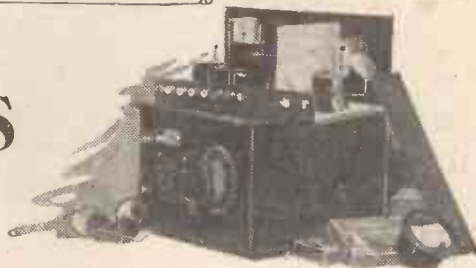
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# The WIRELESS CONSTRUCTOR

Published by the Amalgamated Press, Ltd., Fleetway House,  
Farringdon Street, London, E.C.4.



## THE EDITOR'S CHAT



Some notes on an entirely new type of receiver, and the most outstanding impressions to be gathered from this year's Radio Exhibition.

ONCE upon a time a gentleman named Columbus, who was interested in a sailing expedition across the Atlantic to find a new country, put up his proposition to the King of Spain, and although he eventually succeeded in getting the expedition financed, suffered a good deal from the criticism of various other Spanish men of letters, courtiers, scientists, etc., who were exasperatingly slow in the uptake.

### A Wonderful Set

So one day Columbus gave them an ordinary chicken's egg and said: "Stand that up on one end." Hours were spent in attempting to do this, and eventually it was decided by the critics that it was an impossible thing to do—and that an egg could not be balanced on one end.

Columbus promptly took the egg, tapped it gently, cracked the shell and stood it up. "Why," said the critics, "there's nothing in that. It's as simple as anything." "Quite!" said Columbus; "but you never thought of it!"

Now the story of Columbus and the egg is rather akin to the "I.E." set, which we publish in this issue of the WIRELESS CONSTRUCTOR. This particular receiver includes an "Extenser," and for the benefit of those readers who have not thoroughly acquainted themselves with the properties of this invention I am taking this opportunity of pointing out that it is a new idea.

### Entirely New

Although when you investigate the idea you might very well say: "It's perfectly simple," my retort is that "You never thought of it"—or, at least, as far as I can gather at the moment, nobody ever thought of

the idea until it was put into practice in the form of the "Extenser."

By using the "Extenser" in this receiver it makes it possible for you to change to short waves from broadcasting waves as easily as going from medium broadcast waves to long broadcast waves. And you can do this without changing coils and without operating any switches.

All you have to do is to turn the "Extenser" dial to different dial readings. The self-changer-contacts on the shaft of the "Extenser" does the rest for you!

Exhibition time is a time when we expect to see plenty of new ideas, and there is no doubt that this year at Olympia the amateur will have plenty of opportunity of realising how fertile the industry is in this respect. You have but to glance at the pages

### MATHELECTRIC TRICKS!



The latest electrical wonder from U.S.A. It turns mathematical problems into light, scrutinises them with a photoelectric cell and then draws the answer in the form of a graph on a moving table.

of our special Exhibition Review in this issue to realise what great strides have been made in technique in the last twelve months.

### Come and See Us

This is not the place to enter into a long and detailed discussion of what you will see at Olympia this year, but if you can't get to the Exhibition make a point of studying the Exhibition Review with great detail, and also the advertisements which are included in this issue.

But I hope that you will all turn up at Olympia this year and visit us at our Stand No. 67, where the WIRELESS CONSTRUCTOR experts will be on duty to answer your queries.

Reduction in cost is obvious when you glance at the prices of some of the sets and components at this year's Exhibition, and it is quite clear that the radio trade is not at all intimidated by depressing rumours of taxes, etc.

The trade realises, and quite rightly, that a bold policy is necessary, and consequently the listener is going to benefit probably more than he had ever benefited before, by this year's Exhibition.

### Worth Several Visits

In short, I should not be surprised if the authorities at the Exhibition this year don't regret not running the Exhibition for a longer period. It was said last year, with a considerable amount of truth, that it was impossible to appreciate all that was to be seen at Olympia in one visit.

This year it will be more true than ever, and I think readers will agree after they have been to the Exhibition once that it is well worth a second and even a third visit.

# QUEER QUERIES



Some suggestions about unusual radio faults that may help you towards better reception.

By P. R. BIRD.

A MIDDLESEX reader who gets his H.T. from the D.C. mains writes to complain of his "shocking" aerial. "It is really a good aerial," he says, "but if you touch it when the eliminator is on you get a shock!"

Hearing that this state of affairs is caused by using D.C. mains earthed on the positive side, he asked an "electrical" friend to examine the whole scheme from the point of view of safety. And the friend's opinion was that the set was perfectly safe to use, because you couldn't get at a live part anywhere in ordinary use—except the aerial lead.

So the question arose as to what was the best way of making that safe to handle? And the answer is that it can be done in several ways, but the easiest method is to place a good condenser in the aerial lead.

Unless the aerial is fairly long it is better to use a rather large capacity series condenser, such as .001 mfd., and it should be *inside* the set.

Here it is perfectly safe, and the fact that one side of it will be "alive" is no drawback. Its other side—that connected to the aerial lead itself—will be quite safe to touch, provided, of course, that the condenser is of good quality.

## The "Unexpected" in Radio

In such a complicated collection of apparatus as a big wireless set it is not a wonder that anything out of the ordinary is regarded with suspicion, if not anxiety, by the set owner, and for every queer case that is talked about there are probably dozens which worried owners never bother to mention.

Some of these are amusing and some are astonishing—like the grid leak, which, when the lid of the set was opened, sprang out of its clip, described a somersault in the air, and

fell into an open mains unit, which promptly blew up! At least, it sparked and blew the fuses, much to the astonishment of the owner, who was still holding the lid open, in amaze!

One less spectacular peculiarity which has been rather puzzling of late concerns S.G. valves or pentodes having a terminal mounted on the glass bulb of the valve. The question

### IS YOUR SET O.K.?

If you are puzzled by a radio problem, remember that the "Wireless Constructor" Technical Queries Department is fully equipped to help you.

Full details of the service, including scale of charges, can be obtained on application to the Technical Queries Department, "Wireless Constructor," Fleetway House, Farringdon Street, London, E.C.4.

SEND A POSTCARD, on receipt of which the necessary application form will be sent by return.

LONDON READERS, PLEASE NOTE. Application should not be made by telephone, or in person at Fleetway House or Tallis House.

often arises: "Is it a danger sign when such a terminal is loose?"

And the fact that the vacuum of the valve is not impaired when the connections leading through the bulb to one of its electrodes are obviously movable, instead of being rigidly fixed, has caused considerable puzzlement.

There is no need to worry about a loose terminal so far as the vacuum goes, for this latter is taken care of by very efficient "sealing" of the wires where they pass through the glass, the external terminal being merely to make contact with this point. So that if one of your terminals tends to part company from the glass bulb

you need not worry about the vacuum part of the business.

But concentrate on keeping the loose terminal free from unnecessary strain or stress when connecting up. Remember that finger-tight contact is ample here, and do not attempt to screw the terminal with pliers or some other strongly gripping device.

Provided such care is taken there is no need whatever to worry about a terminal at the top of the valve having become loosened from the glass.

## Taking His Time!

One Barnsley reader of the WIRELESS CONSTRUCTOR who owns a stop-watch has been keeping a close eye upon his A.C. valves, with curious results. It appears that he replaced an M.L. output valve in his set with another of the same type but a different make, which behaved somewhat differently in operation.

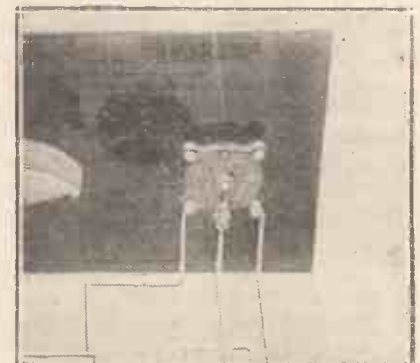
So far as reception proper was concerned it was perfectly O.K. But what worried our friend was that it took much longer to heat up than its predecessor.

With commendable Yorkshire thoroughness he had tested the exact time lag on many occasions, and he found that the new valve was more than half as long again in "warming up to its work." Was this, he asked, a sign of incompetence?

It was not. Different makers employ rather different methods of indirectly heating the cathode, with the result that some of the valves get hotter much more quickly than others, apparently of similar characteristics.

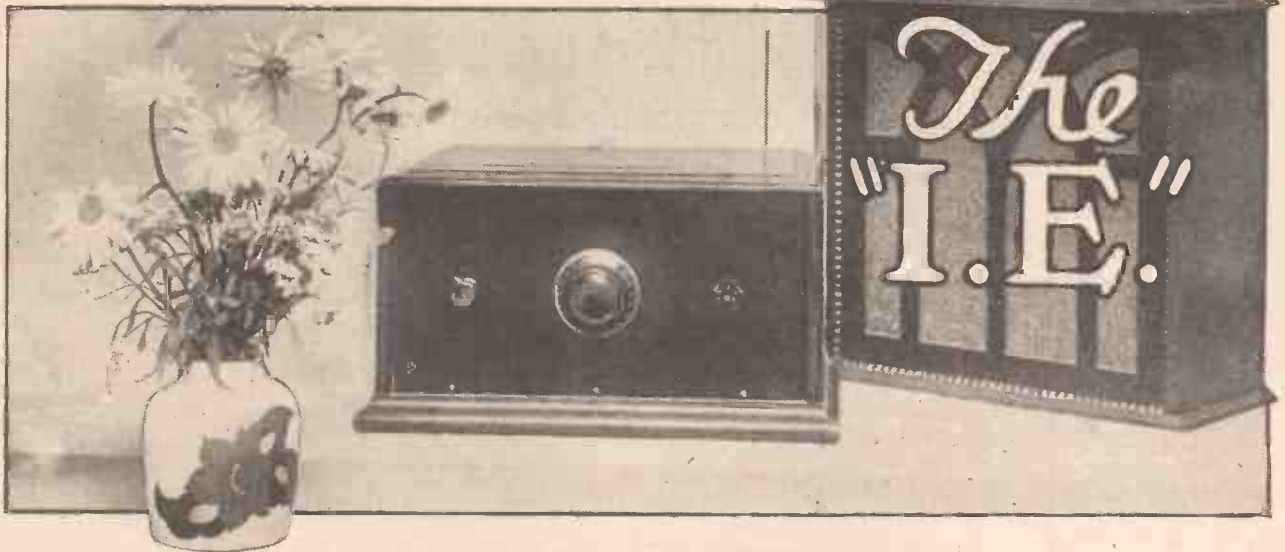
This is nothing whatever to worry about, and provided such a valve warms up and comes properly into action within about two minutes of being switched on, it can be regarded as normal in that respect.

## "WATCH YOUR STEP"



When you come to wire up a differential reaction condenser, remember on many makes the fixed vanes have two terminals per set. See you don't wire up to one set of fixed vanes only.





SHORT waves are no longer merely the happy hunting ground of the expert . . . the man who can turn leaden dots and dashes into golden messages, the man with the fairy-like touch—in fact, the expert! No, the broadcast listener, the ordinary enthusiast, the constructor, in fact, anyone—can turn to the short waves and tune in alternative programmes with the greatest possible ease, providing he has the right apparatus.

Why, there are dozens of broadcasting stations waiting down there

**Designed and Described by  
VICTOR KING**

*This is absolutely the first set of its kind ever designed either for home construction, or factory production for that matter. By rotating the single tuning dial you travel through ordinary broadcasting and short-wave stations transmitting from the ends of the earth. For the first time the short-wave programmes are really brought to your fireside. The "I.E.," despite its 100 per cent simplicity, is one of the "hottest" designs of its type that has ever been conceived.*

for you, and stations that won't tie you down to one continent either. The short waves are to-day already a "third broadcast band"—so come on, down you go!

**What About It?**

It's show time now, the time when all constructors like to "feel" the progress radio is making. The time when they begin to plan the new set they must build because the old one, while still jolly good, is getting a bit out of date.

You yourself want a set that will enable you not only to be right "in

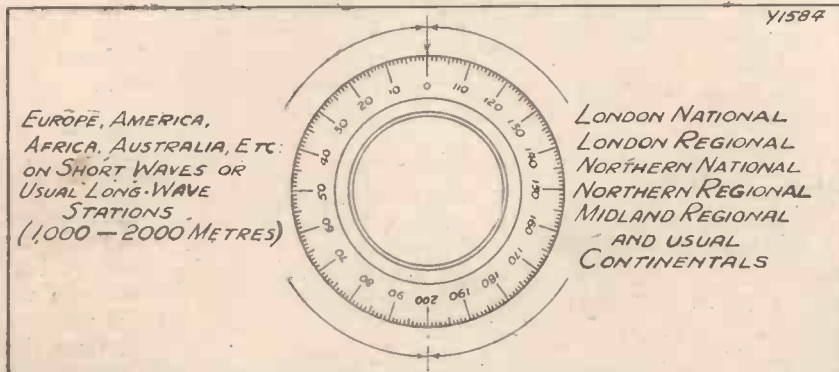
**YOUR SMALL SHOPPING LIST FOR THIS MIRACLE RECEIVER**

- 1 Ebonite panel, 14 in. x 7 in. (Goltone, or Peto-Scott, Permcot, Wearite).
- 1 Cabinet for above, with baseboard 10 in. deep (Camco, or Peto-Scott, Ready Radio, Langmore).
- 1 .0005-mfd. Extenser, with slow-motion dial (Formo, or Cylton, Wavemaster).
- 1 .00015-mfd. ordinary reaction condenser (Telsen, or Polar, Ready Radio, J.B., Lotus).
- 1 "On-off" switch (Bulgin, or Ready Radio, Lotus, Peto-Scott, Igranic).
- 3 Single-coil mounts (Magnum, or Lotus, Wearite, Igranic, Ready Radio, Graham Farish).
- 1 P.J.1 coil (Ready Radio, or R.I., Lewcos, Wearite, Melbourne, A.E.D.).

- 1 H.F. choke (R.I., or Telsen, Lewcos, Varley, Ready Radio).
- 1 Ordinary ratio L.F. transformer (Igranic, or Telsen, R.I., Ferranti, Varley, Lewcos).

- potentiometer (Igranic, or Wearite Ready Radio).
- 1 2-megohm grid-leak and holder (Graham Farish, or Dubilier, Telsen, Ferranti).

**ALL THE WORLD ON ONE DIAL!**



*Without coil-changing, or even a switch operation, the single tuning dial brings in the very short waves and ordinary broadcasting.*

- 2 Four-pin valve holders (Benjamin, or Lotus, Clix, Telsen, Bulgin, Formo, Graham Farish).
- 1 Baseboard-mounting 400-ohm

- 1 .0003-mfd. fixed condenser (T.C.C., or Ferranti, Telsen, Ready Radio).
- 1 .0001-mfd. fixed condenser. (This may not be necessary, see text.) (Telsen, or Ready Radio, Dubilier, Goltone.)
- 9 Indicating terminals (Ealex, or Igranic, Belling & Lee, Goltone, Clix).
- 1 Terminalstrip, 14 in. x 2 in.
- 2 Battery wander-plugs (Clix, or Igranic, Belling & Lee, Ealex). Glazite or Lacoline.
- Spring clip, flex, screws, etc.

## The "I.E."—continued

the swim," but ahead of all the others, don't you? Then you want the "I.E.," the set that is—well, just read on and see for yourself.

Perhaps you think it is going to be just simply a special short-wave set. If you do, then you are a very long way out. Its scope is by no means so limited.

Perhaps, then, you think it must be an ordinary broadcast set adapted to go down to short waves by changing coils. Again, then, if you do you are sadly mistaken. It is no such ordinary receiver.

### World-Wide Range

But I must not expect you to guess, for an entirely new scheme altogether is utilised. A scheme which is only made possible by the remarkable properties of the new tuning component, the Extenser.

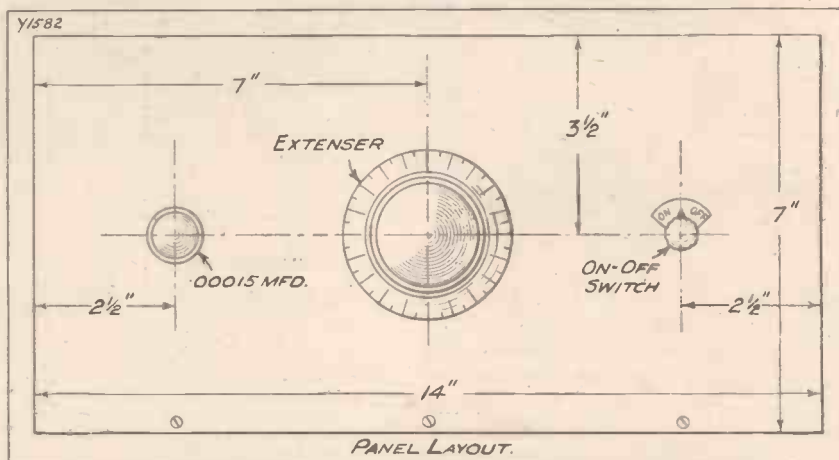
Suppose for a minute you are listening to your local, say the Northern Regional programme, and the wanderlust bug comes along and gives you a little bite, and you wonder how the American stations are coming over. What do you do?

Simply this, if you have made up

the "I.E." You just turn the tuning dial through a matter of some hundred odd degrees or so, give the reaction a spot of adjustment, and there you are!

The Extenser, as most of you no doubt know, for its fame has already reached to many parts of the world, greatly simplifies tuning. Instead of tuning over one band on half the con-

### THERE ARE ONLY THREE PANEL ITEMS



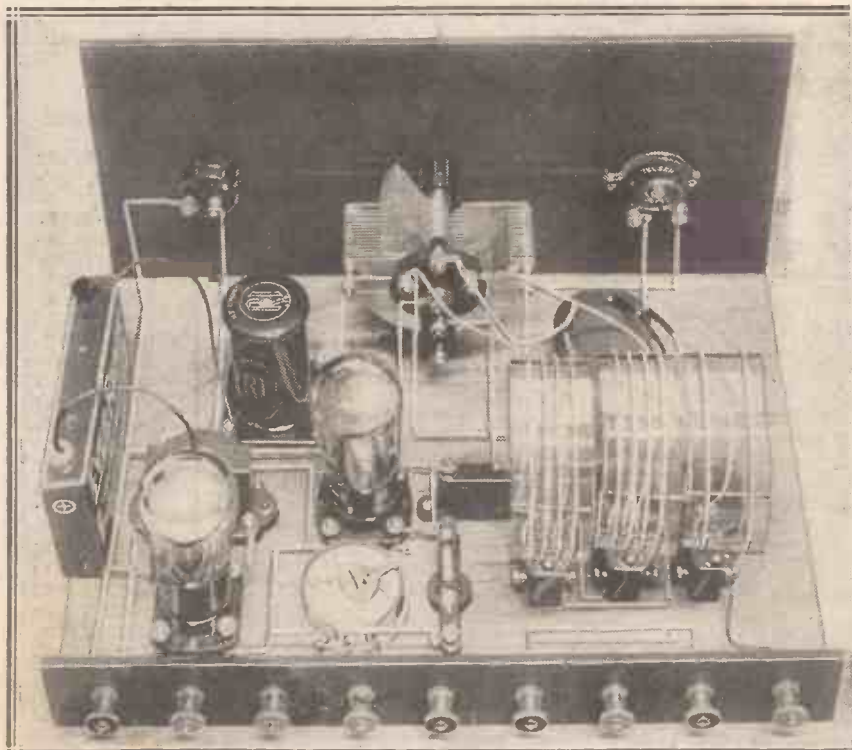
There are no hidden controls. The three shown above are all there are.

Just glance at the theoretical circuit diagram, and I will elucidate this wonder for you. First of all a word about the Extenser.

denser scale, then juggling with switches to go over to another band which is also tuned over the same dial readings, the Extenser uses the whole of the dial.

The half normally unused is employed for tuning on the second band, and the wave-change switch is abandoned altogether. Up to the present the wavelengths on which it has been used have been the two normal broadcasting bands, but it is just as applicable to any other two.

### LESS THAN ONE EVENING'S WORK



Note the extremely few components and the mere "handful" of leads that have to be connected up. Yet, there is not a set in the world capable of giving you what the "I.E." holds in store for you.

### Long Waves as Well

In the case of the "I.E." the scheme is applied to the medium and short waves, the two bands on which most stations are to be heard. Do not think that this means that the receiver will not tune on the long broadcast waves, though. These can also be received every bit as efficiently.

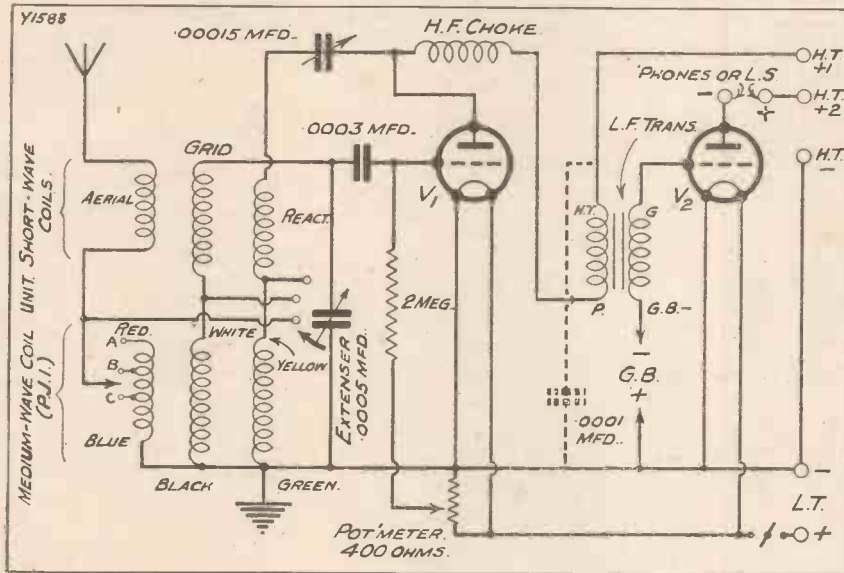
On the circuit diagram you will spot three coils for short waves, namely, aerial, grid and reaction. There are also three windings which serve the same purpose for the medium waves, and these three are all incorporated in one unit known as a P.J.1 coil.

Over one half of its movement the Extenser shorts-out the medium-wave windings by its self-changer contacts. The set is then tuning on short waves.

For medium waves the contacts are open and the various coils are then in

# The "I.E."—continued

IT HAS AN EXTREMELY WIDE TUNING RANGE



*Short-wave reception is fully equal to that given by a special short-wave set, and the wave-range covered is unusually wide. The ordinary broadcast results are exceptionally good.*

series for medium waves. Thus you see the medium waves take the place of the long waves in the more usual Extenser arrangement, with which I expect you are quite familiar, and the short waves take the place of the medium waves.

For this reason the medium waves will, in the case of the "I.E.," be received on three-figure dial readings, while the two-figure readings will serve for the short waves, and for the long waves when these are in use, because the long-wave coils are plugged in the coil holders in place of the short-wave ones.

### Obtaining Smooth Control

This is all made quite clear in a special diagram, so I will not dwell on it any longer. Beyond this part the circuit is fairly straightforward, except perhaps for the .0001-mfd. fixed condenser which is shown dotted.

Sometimes you will find this necessary, and sometimes it will make no difference at all. Its purpose is to cure threshold howl when a tendency towards this presents itself.

Yes, in effect it is directly across the detector's H.T. positive and H.T. negative. How does it work? Well, I am not prepared to say. Threshold

howling is a very peculiar thing, and therefore a peculiar cure is permissible!

I have my own theories on the subject, but I am afraid the matter is too deep to be gone into here. Anyhow, this cure serves its purpose in a remarkably effective manner; which, after all, is what really counts.

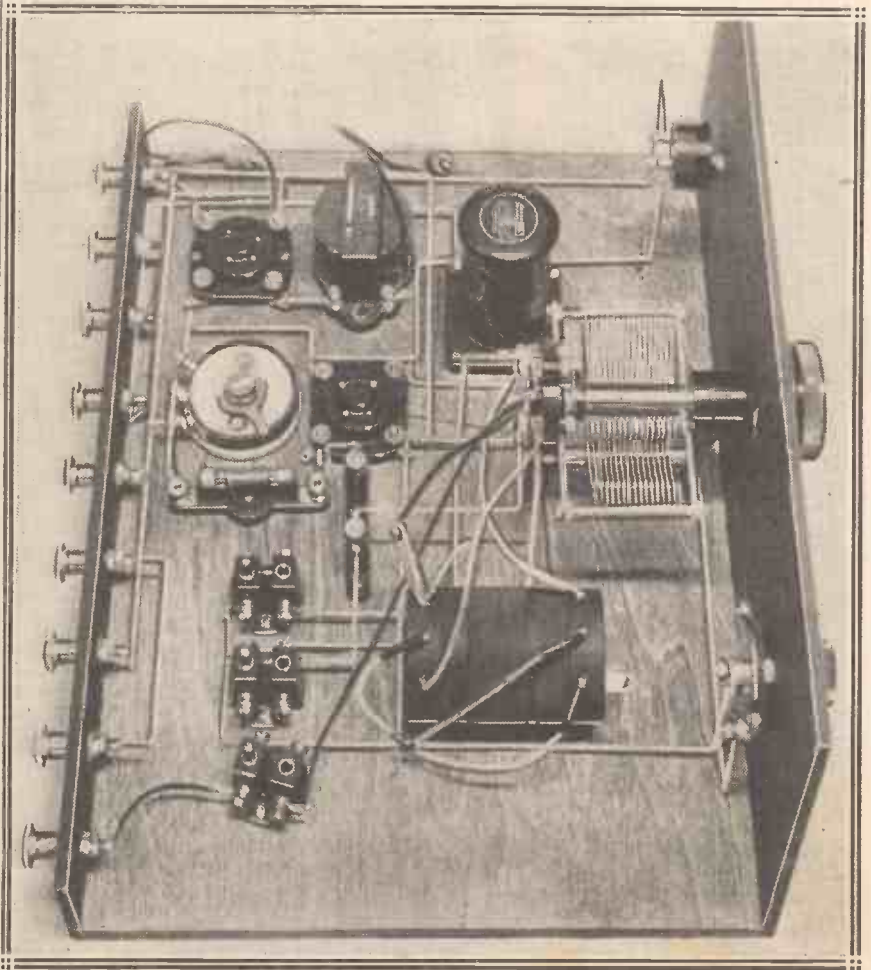
### Coil Details

Now for more practical matters. You can see for yourself that the set is extremely easy to make, so I need not rub that in.

The P.J.1 coil may be purchased ready made, or you can wind it yourself in a few minutes if you prefer. If you do, proceed as follows.

Wind the coil with 30-gauge D.S.C. wire on a former 2 in. in diameter and 3 in. long. The aerial winding consists of 9 turns tapped at the fourth and sixth turns.

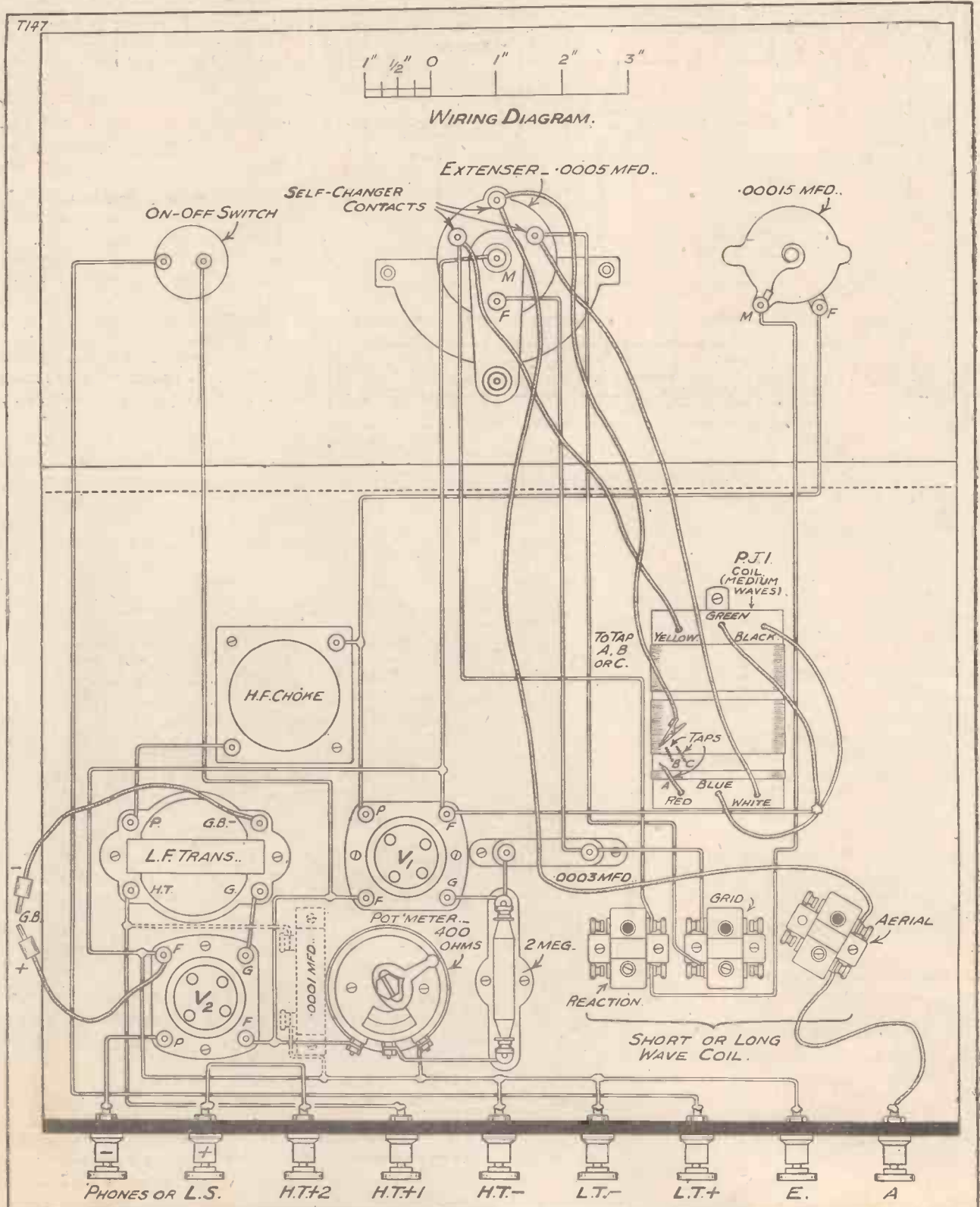
## IMPOSSIBLE WITHOUT AN EXTENSER



Such a remarkable set could not have existed had it not been for the Extenser, which also adds to its general efficiency and reduced wiring.

# The "I.E."—continued

THERE ARE NO SCREENS, NO COMPLICATIONS, AND NO SNAGS!



You need have no doubts at all as to the merits of the "I.E." No compromises or sacrifices have been made in order to achieve the spectacular "short-ordinary" results.

## The "I.E."—continued

### THE "WIRELESS CONSTRUCTOR" "I.E." RECEIVER

Circuit: Det. and L.F. (automatic change from short waves to medium waves).

#### VALVES.

1st (nearer coils): Special det. type or H.F. type.  
2nd (when using 'phones): L.F. type: (When using L.S.): small power type.

#### VOLTAGES.

L.T.: 2, 4 or 6 volts, to suit valves.  
H.T.+1: 30 to 60 volts.  
H.T.+2: 100 to 120 volts.  
G.B.: Up to 9, according to output valve requirements.

#### COILS.

For Long Waves.  
Holder nearest end of baseboard: 50, 75 or 100; centre holder: 200 or 250; remaining holder: 100 or 150.

For Short Waves.

BAND.	1st holder	2nd holder	3rd holder
30-metre band	2	4	4
40-metre amateur band	4	6	6
			Other sizes may be tried here

#### OPERATION.

Right-hand knob turns set on and off.  
Left-hand knob controls reaction. Turn to the right for increase.  
Tune on centre dial. Normally two-figure readings give short waves. Three-figure numbers give medium broadcast waves. With long wave coils in position (see coil details) long-waves are received on two-figure readings.

#### NOTES.

Adjust potentiometer on baseboard to give smooth control of reaction.  
Use spring clip on top of medium-wave coil, to position which gives best results as selectivity and volume.  
Adjust aerial coupling on short waves by twisting coil mount which is held by only one screw.

spots are positions where the set will not oscillate due to too tight coupling with the aerial. On long waves it will usually be best to have the three coils all parallel.

Should you find that on medium waves the tuning does not go low enough for a particular station you happen to want, just take about 8 turns of the P.J.1 Coil, starting at the black flex, and join up again afterwards.

#### Varying Selectivity

Regarding the spring clip to the medium-wave coil this can go either on one of the two taps or to the beginning of the coil. The idea here is to try all three and decide for yourself which seems best.

You can use either 'phones or speaker with this set, but I do not expect you will find the former necessary except sometimes on the short waves.

**HAVE YOU GUESSED  
WHAT "I.E." MEANS?**

The beginning of this winding is the red connection and the end the blue;  $\frac{3}{8}$  in. farther along the coil is the grid winding, which has 64 turns. Beginning white, and end black.

Another  $\frac{1}{4}$  in. along and the reaction winding is started and is in the same direction as the grid winding. It consists of 34 turns, the beginning being green and the end yellow.

#### ACCESSORIES

Valves. One special det. or H.F. type, and 1 L.F. or small power type (Mazda, Cossor, Osram, Six-Sixty, Fotos, Eta).

Batteries. 100- or 120-volt H.T. battery and 9-volt grid-bias battery (Drydex, Pertrix, Ever-Ready, Lissen, G.E.C.).

Accumulator to suit valves (Exide, Ediswan, Lissen, Pertrix, G.E.C.).

Loud Speaker. (B.T.-H., Blue Spot, Celestion, Amplion, Undy).

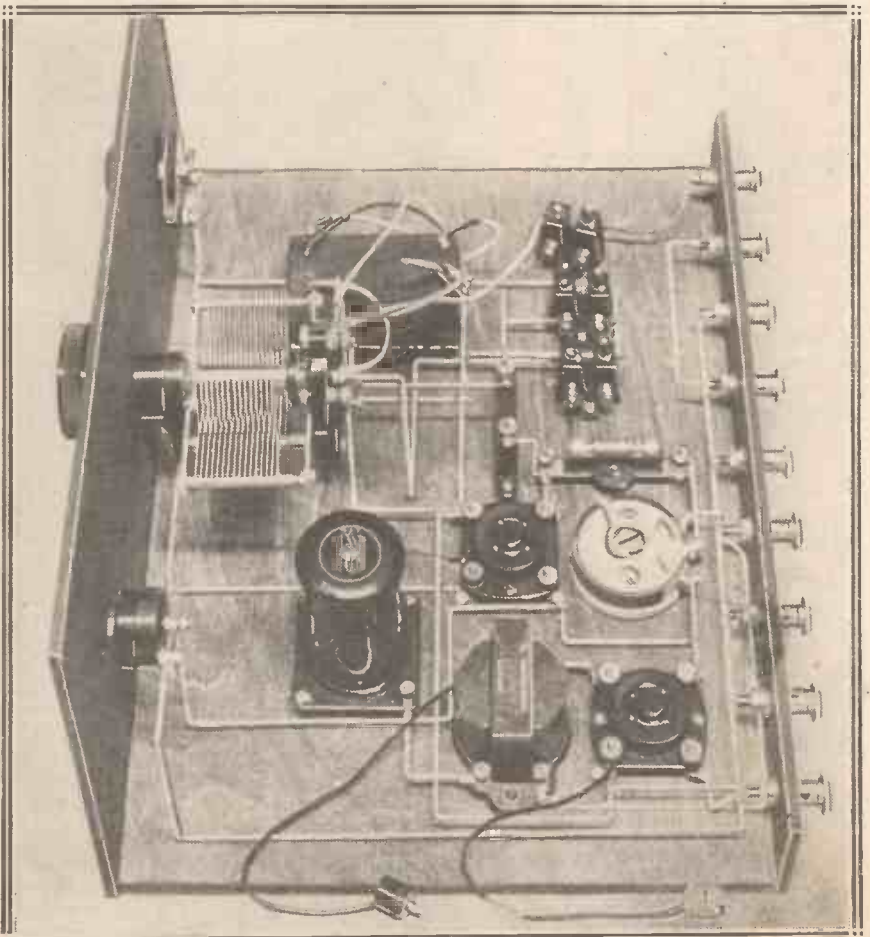
'Phones. (B.T.-H., Ericsson).

Mains Unit. State type, voltage and frequency of mains when ordering, also describe set and number of H.T. taps (Regentone, Ekco, Atlas, R.I., Heayberd, Tannoy, Lotus).

Coils (Igranic, or Atlas). (See Operating Box.)

The short-wave aerial coil holder is only held to the baseboard by one screw, so that you can twist it about when the coil is in position.

The object of this is to enable the coupling to be altered, which often proves very helpful in removing any dead spots from the dial. Dead



"I.E." is an abbreviation of "Imperial Extenser," a particularly apt name for this extremely interesting set!



# ROUND the DIALS

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

**I**F it is possible for a chilly and wet summer to have a brighter side, the brighter side of our alleged summer must surely have been the radio reception conditions. Foreign stations are supposed to fall off to vanishing point on a simple set during summer-time, but this year they were so long in falling off and so early in making a reappearance that there was no bad "off season" at all worth mentioning.

### A "Good" Summer!

Many a disgruntled holiday-maker, kept in by unfavourable weather, must have been surprised at the strength and clarity with which the foreigners found his aerial. Both on medium and on long wave-lengths really long-distance reception has been possible quite early in the evenings, giving wonderful promise of what the winter will bring forth when darkness settles in early.

Towards the bottom of the long-wave dial both Oslo and Kalundborg have been phenomenally good, and the return of Oslo to his former activity is very welcome. He has a habit of putting out really good programmes late at night, weekdays and Sundays, which make him a most desirable standby.

### Logging the Long-Wavers

Many listeners who have not tried for some of these long-distance stations imagine that even if received the programmes would not be understandable. This is quite a wrong view of the case, for it will be found that numbers of the big and popular stations make a special feature of the latest British gramophone records, with all the latest songs in English.

What their own local listeners make of such a record as "My Canary Has Circles Under His Eyes," in English,

is beyond my comprehension! But I can vouch for the fact that such programmes make jolly good entertainment for the listener in this country.

### Improving Daventry

Both the Paris stations, with Huizen, Konigswusterhausen, and, of course, Kalundborg and Oslo, are worth watching closely, strength from one or other of these on many nights being quite sufficient to emphasise the sad need of an overhaul of our own Daventry (5 X X) station. Fortunately there seems no doubt that this will be taking place soon, and Daventry will be gingered up to give adequate representation of this country on long waves.

In its day, 5 X X was the finest station that could be imagined, but to stand still for several years while all the neighbouring stations have been improved almost beyond recognition has been the unworthy fate of our National transmitter.

\*\*\*\*\*  
 \* **POINTS FOR** \*  
 \* **PURCHASERS** \*  
 \* *Interesting details from manufac-* \*  
 \* *turers about recent trade activities.* \*  
 \*\*\*\*\*

### New Varley Components

**O**LIVER-PELL CONTROL, LTD., have prepared a leaflet dealing with their new range of components, and in view of the low prices of some of these it is well worth having it on hand. Full information and technical details are given of the new transformer, L.F. choke, wire-wound resistances, universal holders, H.F. chokes, and also those very handy Spaghetti resistances.

It will be supplied to any reader of the WIRELESS CONSTRUCTOR on application to the firm at Kingsway House, 120, Kingsway, W.C.2.

### Amplifying Equipment

This is the title of an attractive book prepared by Igranic Electric Co., Ltd., for those interested in the loud-speaker distribution of gramophone records. The illustrations show many installations on piers, in theatres, tea gardens, hotels, speedways, and so forth.

The book is obtainable on application to 149, Queen Victoria Street, E.C.4.

### Price Reductions

Price reductions being the order of the day (and very nice, too!), all constructors will be interested in the statement that Messrs. J. J. Eastick & Sons, Ltd., of 118, Bunhill Row, E.C., are making many price reductions in their famous range of Eelex terminals, etc.

This is certain to be a popular decision, considering the great numbers of constructors who will be incorporating Eelex components in their receivers, and we are sure that the firm will not lose by it.

### Coils for Constructors

We hear that both Lewco's (London Electric Wire Co.) and Ferranti, Ltd., are now manufacturing the famous P.V. and P.J. coils, and this reminds us that there are several other coil developments under consideration, or about to be disclosed. A careful scrutiny of the advertisements in the pages of this journal will reveal the fact that the home set-builder is being catered for uncommonly well in this direction, and readers will find plenty of reference to it in the supplement dealing with the exhibition.

### E. K. Cole, Ltd.

Ekco Works, Southend-on-Sea, have issued some particularly interesting literature concerning their new products for this season, which promise to enhance still further the great name made by this concern.

The new power supply units are sure to be popular, both A.C. and D.C., and the firm's easy terms scheme enables the more ambitious receivers to be brought within reach of all classes of the community. The beautiful radio-gram console and consolette models, with their bakelite cases, high-quality reproduction and enormous sensitivity, will undoubtedly make a very strong appeal.

# WHEN THE SET GOES WRONG

By VICTOR KING



I AM going to tell you a story against myself in the hope that others, too, will profit by my sad experience. The yarn concerns a four-valve receiver, one of two that I use for ordinary "domestic" purposes.

It is an all-D.C.-mains affair designed to operate in conjunction with a separate radio-gram amplifier. There is a fairly hefty H.T. unit having four separately variable plus outputs, and an independent L.T. unit embodying lamp resistances.

## Like a Motor-Bike!

By operating a switch this four-valver can be connected to a loud-speaker extension system serving four moving-coil loud speakers in different rooms. Should it break down, it is a matter of but a few moments to start off a five-valve all-mains set which feeds into the same loud-speaker chain from another room.

One day the "four" did pack up. At least, it developed a most annoying complaint. So long as the volume control was kept well down the reproduction was clean, but the moment I attempted to get some real "punch" out of the thing—"Pop-pop-pop-pop-pop-pop-pop," a sound like a slow-running motor-bike engine resulted.

"Ah! Motor-boat would you!" I grunted, and proceeded to lift up the lid and renew my acquaintance with the innards of the receiver. Everything seemed to be de-coupled "up to the eyebrows." I had a look at the H.T. unit. That had its own "separation"; every plus outlet was apparently completely "antimoed."

## Trying to Track It

In fact, the whole arrangement was absolutely bristling with de-coupling devices. I always was a stout advocate of "safety-first" measures!

I turned the set on again and carefully wangled its controls. The

*An account of a harrowing personal experience given in our popular contributor's happiest vein. You will enjoy reading about his exhausting hunt for the cause of a receiver's failure and may derive no inconsiderable profit from it yourself.*

"pop-pop-pop-pop-pop-pop" was still there right enough, every time the volume control was rotated more than twenty degrees or so from minimum. I lit a cigarette and slumped down into a chair with furrowed brow and busy brain.

I tried to visualise a reason for this sudden departure from normality on the part of a receiver that had been giving sterling service two or three hours a day for over two years. There were no batteries to depreciate and nothing had been touched!

Then I remembered that for some curious reason the amplification of

the outfit had seemingly started to increase a few weeks before the "pop-pop-pop" came along. I had not thought much about this at the time. Vaguely I wondered whether all the stations had increased their power. But the other set had maintained its same even standard.

## Considering the Symptoms

"Oh, well," I said to myself, "maybe the aerial isn't leaking so much (it never was a 100 per cent efficient affair). Or perhaps the volume control is leading me up the garden."

As I recollected this, it occurred to me that it was the additional magnification that was at the root of the "motor-boating." If this were the case, then the de-coupling could not be as effective as I had thought it was.

Up went the lid of the set again, and I carefully checked over the circuit. I couldn't add any more

## BROADCASTING A LOTTERY DRAW



The proceedings at a recent Austrian State Lottery draw were broadcast from the Vienna station, and in the above photo you can see the microphone which was installed for this purpose.

## When the Set Goes Wrong—continued

de-coupling components, for everything meriting de-coupling was already de-coupled! So I swapped some of the resistances for ones of higher values, and did ditto with a few of the fixed condensers.

I changed the resistance in the H.T. feed to the detector valve for a high-class L.F. choke, arguing that the impedance of this should be such that when set off against the easy path of a 4-mfd. fixed condenser I had de-coupling *in excelsis* at the most vital spot of all.

### "And That is That"!

I took out the "anti-mobo" resistance in the H.F. H.T. lead and inserted an H.F. choke in series with an L.F. choke!

Then I closed down the lid and stacked back all the books and papers that had been dustily roosting on it. "And that is very much that!" I smirked, conscious that I had before me one of the world's most completely de-coupled radio receivers.

Then I switched on and disdainfully flicked the volume control round to "full speed." "Pop-pop-pop-pop-pop-pop-pop-pop-pop-pop-pop-pop-pop-pop." My goodness, it was louder than ever—or seemed so. Was I staggered?

"Vic, my lad," I said to myself, "it's time you gave up radio and looked for a job of work in the garden. There's that bed by the summer-house that needs a bit of weeding."

But, of course, I couldn't go more than a few yards from that wretched receiver. I kept wandering back to it, giving it a baleful glare and wandering away again.

### Getting Warmer

Finally, I decided the only thing to do was to give it a thorough overhaul. I inserted milliammeters in all the H.T. leads; there was a voltmeter permanently connected across the L.T.

The first thing I noticed was that the power valve was taking only 10 milliamperes, instead of the 30 that represented its normal figure. But the meter needle did not flicker so long as the volume was not pushed up until that horrid "pop-pop" started. Then it waggled like a bay-leaf in a storm.

I reduced the volume until the steadiness (accompanied by undistorted music) returned, and then

experimented with grid-bias adjustments. But either a decrease or an increase of grid bias introduced distortion and needle flickers.

I tested the H.T. voltage. It was quite O.K.

Then, experimentally, I drastically reduced the grid bias. The milliamperes did not rise.

"Ah," thought I, "we're getting warmer! Somewhere there is some dirty work going on in the plate circuit of this power valve. Something is springing some unauthorised resistance, and that resistance is causing unwanted coupling effects. Hence the motor-boating."

I bow my head with shame. I await with bitter heart all those letters starting: "I don't call myself a radio expert, but——"

### WIRELESS WHILE WAITING



*A debutante whiles away the weary wait—that always precedes a Court presentation—with a portable set. Apparently she has attracted the admiring attention of one of the other guests!*

However, my confession is not yet complete. For hours I had been obsessed with the idea that my set was motor-boating, that somewhere, somehow, a ghastly L.F. interaction was occurring.

And all the time the popping was due to something else entirely. The power valve had lost its emission! Instead of a hefty tube able to handle the most beefy of inputs, it had degenerated into a miserable "first L.F." or 'thereabouts. Even with over 200 volts on its platter it could

muster up no more electrons than the equivalent of 10 milliamps.

The increasing amplification was a complete illusion, and I was misled by the early overloading into thinking that the mag. was going up. Such is the fallibility of the human ear!

But to run so quickly into a rhythmical popping. That was a new one on me for all my fifteen years of radio!

### Diagnosis Dangers

There are dozens of morals that can be tacked on to this yarn. Personally, I'm strong for this one: "You can never know so much about anything that you can't learn a whale more."

You might be suddenly smitten with a harsh, grating noise.

"Easy! Loud speaker out of adjustment," says you.

It might not be. It sounds like the loud speaker because the noise is coming from the loud speaker. So are all the noises developed by the outfit.

I will point to another major error that I committed. I did not have a milliammeter in the plate circuit of the last valve of that four-valver. But I assure you that there had been one, but that it had been "borrowed" and never returned. You get that way with an all-mains outfit!

In future there will be a milliammeter permanently connected in the H.T. mains lead, so that I can immediately detect the slightest variation in the H.T. current. If the milliamps drop I shall know that it is a probability that one of the valves has lost emission. The L.T. voltmeter indicates the well-being of the filaments. The L.T. volts would go up if one of the filaments went.

### A Lesson Learnt

But I won't say—I shall never say: "Ah, that is so and so, for sure! I must do this or that."

I've had my lesson, and when the indications are that a certain something has happened, I will nod my head and wag my finger at the wretched set and say: "It looks as though so and so has happened, or it sounds as though so and so is at fault. But you don't catch me twice. It may be something else entirely different."

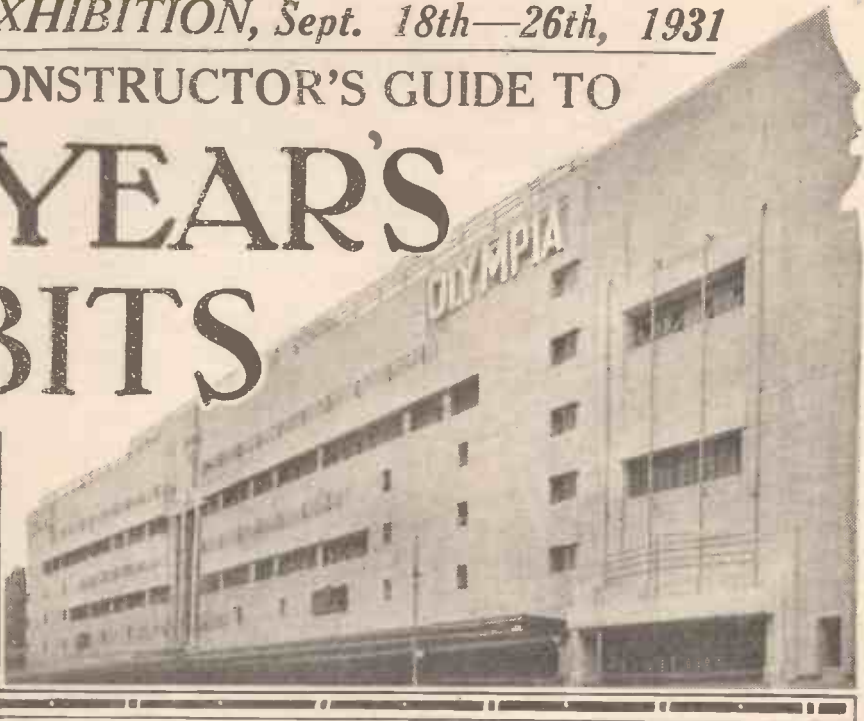
And I commend that idea to all CONSTRUCTOR readers.



**NATIONAL RADIO EXHIBITION, Sept. 18th—26th, 1931**

**THE WIRELESS CONSTRUCTOR'S GUIDE TO**

**THIS YEAR'S EXHIBITS**



*A very carefully compiled review of the Radio Exhibition, including details of the new components, accessories, and interesting receivers. Even if you are unable to visit the Show in person you need not miss any of the good things, for you can enjoy "a look round" and appreciate the represented radio progress by means of this vivid account.*

**THE AMALGAMATED PRESS, LTD.**  
Stand No. 67 (Empire Hall.)

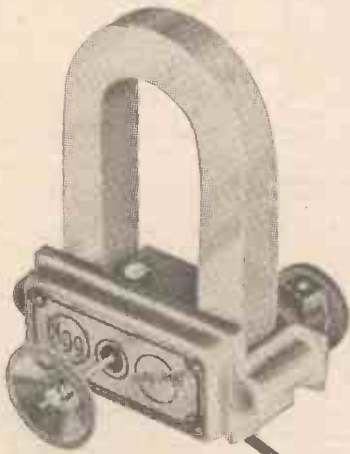
To the regular reader of the WIRELESS CONSTRUCTOR there is no stand in the whole exhibition which is so important as this one, where the world's greatest periodical-publishing firm, The Amalgamated Press, Ltd., is represented. Every WIRELESS CONSTRUCTOR reader is welcome, and for the benefit of those with technical questions, members of the technical staff will be in attendance all day to give advice.

In past years this service has proved extremely popular in maintaining the close contact between our readers and ourselves.

A particularly attractive feature of the display this year will be the originals of WIRELESS CONSTRUCTOR receivers described in this issue, so that no prospective builder of the "I.E." and the "Exhibition" Four should miss the opportunity of looking over the originally constructed models.

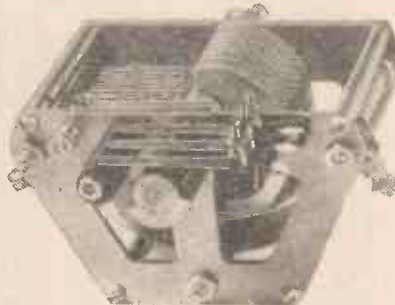
You will see from the size of the crowd that rapidly accumulates that our readers do not hesitate to flock round for information and advice, and as this will be our only opportunity of meeting you until next radio show we hope you will take the chance of dropping in and having a word with your friend—the WIRELESS CONSTRUCTOR.

**AN OLD FRIEND**



*All constructors who have made cone speakers are familiar with the fine reputation of the Blue Spot units, one of which is shown here.*

**SIMPLIFIED TUNING**



*A fine model of the Extenser, the new tuning component introduced by the "Wireless Constructor." It is a Cyldon, made by Sydney S. Bird.*

**AUTO ELECTRIC DEVICES, LTD.**

Pessimists who thought that the day of the home-constructor was over should pay attention to this display, which shows how he flourishes and is still catered for with the utmost keenness.

Here are to be found such purely constructional lines as the famous P.V. coils, and those invaluable little Coil Quoits, as well as volume controls, potential dividers, and so forth.

The A.E.D. pick-up, also, is located here, and will engage the attention of all keen radio-gram enthusiasts.

**BELLING & LEE, LTD.**

Not only are there a number of very interesting new lines on view here, but a selection of the old-established favourites will merit the close attention of every purchaser.

Terminals, of course, are always interesting, and from the extremely neat and inexpensive Q-type which retail at 2d., to the highly-polished 100-amp. 7,000-volt type introduced for charging boards, there are many worthy of notice. The Belling-Lee twin connector, designed for extending H.T., L.T., or mains leads, provides complete coupling for the price of 1s. 6d., while the new Belling-Lee "banana plug," a big brother of the standard wander plug, will fulfil a long-felt want.

Yet another new line is the Belling-Lee fuse, in two types—those for batteries and those mains, with carrying capacities varying from 60 milli-amps. up to a maximum of 3 amps.

All ratings and sizes are retailed at the one price of 6d., which will certainly ensure a big sale.

Notable price reductions are in the fuse holders, the flexible leads, and the well-known Belling-Lee safety plug and socket, in which it is impossible to touch metal parts. The keen constructor simply cannot afford to miss this stand.

**BENJAMIN ELECTRIC, LTD.**

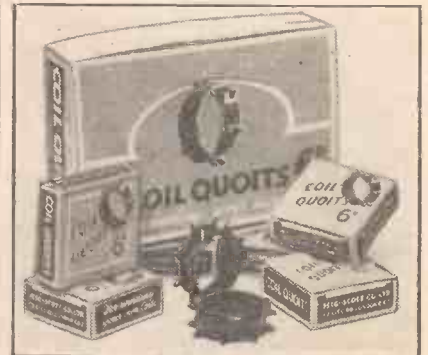
This firm has been responsible for some very successful lines, and on the stand this year will be found many firm favourites, including some of special interest to gramophone users and owners of portables.

Among them is the Benjamin turntable, which is a ball-bearing stand enabling you to take full advantage of the directional properties of your portable set's frame aerial. For outdoor purposes its collapsible legs are brought into use so that the set can be swung round easily.

Indoors the legs fold up, and the rubber cushions with which the table is equipped will not scratch or damage the set or the furniture. It retails at 7s. 6d.

The Benjamin valve holder, with its well-known anti-microphonic effect, is, of course, well to the fore in various forms, including the Vibroder, which retails at 1s. 6d. Push-pull switches, rotary switches, in single-pole and double-pole styles, and a double-pole rotary switch with a clearly defined central off position, for 3s., are among the bargains here.

**EASY COIL WINDING**



*The coil, quoit has done more than anything else to simplify making coils at home, and here you see them as marketed by Messrs. Peto-Scott, Ltd.*

## Varied Items for Home Constructors

### SYDNEY S. BIRD.

Every radio set embodies a variable condenser or two of some kind or other, and if you have ever wondered why so many of them embody Cyldon condensers you have only to look at the display here to satisfy yourself as to the cause.

### USEFUL FOR S.G.'s



A five-pin W.B. valve holder that is very suitable where H.F. valves pass through vertical screens.

Real engineering jobs, backed up by a five years' guarantee, and with the specialised experience of a technical service department behind them. One of the most striking exhibits at the whole show of Olympia is here—a gorgeous ganged Extenser as used for that star of star receivers, the WIRELESS CONSTRUCTOR "Exhibition" Four.

For less ambitious sets there are other Extensers in plenty, each embodying the absolutely unique principle which makes this component the outstanding feature of radio development this season.

The rest of the Cyldon range is as varied as ever, and no short-wave enthusiast should miss the "series gap" condenser, having two sets of fixed vanes which are insulated from each other, and two sets of moving vanes in series between them. As the contacts are only taken to fixed vanes, and the moving spindle is entirely insulated from the rest of the condenser, certainty and silence are assured even on the shortest of wave-lengths.

All the old trouble of noisy operation due to pig-tails and the varying conductivity of bearings, etc., is entirely eliminated in the Cyldon "series gap" condensers. And, of course, like the other Cyldon products, it is backed up by a five years' guarantee.

### BRITISH BLUE SPOT, LTD.

There is no part of a radio equipment in which efficiency shows up more instantly than in a loud speaker, and it is in this very line that the British Blue Spot Co., Ltd., has made its enviable reputation. Blue Spot, in fact, concentrate on realistic reproduction, and the great demand for their complete speakers and units testifies to their success.

Realising the importance of correct mounting, the firm is emphasising the Blue Spot chassis for their units, and these have now become inseparable companions which never fail to get on well together.

Visitors who are fond of dancing and others interested in gramophone reproduction will pay particular attention to the Blue Spot pick-up, in the design of which special attention was paid to tracking, ease of movement and volume control.

The Blue Spot reputation will certainly be reinforced by this year's exhibits.

### FOR THE SPEAKER



This handsome cabinet for housing your loud speaker is made by Messrs. W. T. Lock.

### BRITISH EBONITE CO., LTD.

The largest ebonite former in the world is sure to attract considerable attention here, for the giant exhibit will be a fine example of this class of work.

Ebonite panels and mouldings and special exhibits of the world-famous Becol formers in many new sizes and types will be on view in profusion. The exact dimensions, respective reference numbers and all details will be given to constructors on the look out for good-quality material, who will undoubtedly crowd around this stand.

### BRITISH GENERAL MFG. CO., LTD.

Tuners are the speciality of this well-known Brockley firm, and in past years they have been very successful indeed with compact components of this description.

### AN ACCESSORY THAT COUNTS



The L.T. battery is a vital item in the obtaining of good results, and here is a cell on which you can always rely.

This year we have not had full particulars of the display to be staged, but tuners will again figure prominently, as well as the mains transformers and chokes which have been such successful "B.G." lines during the past season.

### THE BRITISH HARD RUBBER CO., LTD.

The British Hard Rubber Co., Ltd., is justifiably proud of its newest development in the manufacture of ebonite, which is named "Permeol." It is a non-discolouring ebonite made of material which has exceptional insulating qualities and is guaranteed to keep a permanent colour even under strong sunlight.

A mirror-like surface and polish permit the most delicate of engraving, and some very pleasing specimens of this class of work will be shown as well as ebonite coil-formers, tubes, switch plugs, and so forth.

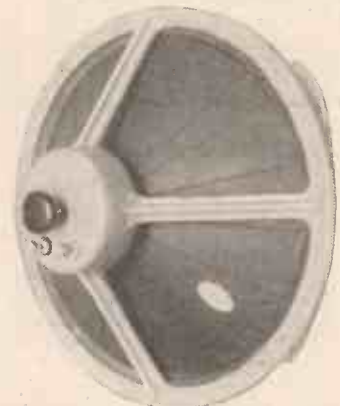
As Permeol is claimed to be the only ebonite on the market which is not liable to discolouration,

and it retails at 4s. 6d. for an 18 by 7 by 3/16th-in. panel, it is sure to score a triumph.

### BROWNE WIRELESS CO. OF G.B., LTD.

If you are looking out for sets you will certainly be interested in the Browne products, which

### A GOOD RANGE



This is one of the Celestion loud speakers of which a comprehensive range is on show.

include the new "Baby Grand." This is a two-valver which sells complete with valves and speaker in a solid oak cabinet for £3 5s.

As this is the "Royalty Paid" price, and the set's performance is right up to Browne standards, there is no doubt that the Baby Grand will be a much-talked-of feature of this year's show.

### A. F. BULGIN & CO., LTD.

The choice of critical constructors has so often in the past fallen on Bulgin components that many an old-timer wireless constructor will automatically make for the Bulgin display. And newcomers to the radio game will certainly not pass it, for there are extremely attractive lines this year.

It is impossible to particularise where so many are so good, and we must be content with indicating the variety here by stating that the new lines will include fixed potentiometers, double-pole switches, thermostatic switches, wire-wound volume controls, volume controls with switches, vibration-proof terminals, long-contact valve holders, twin enclosed fuse holders, combined plug and fuse holders, high-test tubular condensers, grid leaks, moving-coil voltmeters, moving-coil milliammeters, D.C. mains eliminators, D.C. mains grid-bias potentiometers, gramophone needle boxes, drum Dialite, tapped anode resistances, new range Spaghetts, super-type Spaghetts, bakelite differential condensers, and Quickwyre.

### C. F. & H. BURTON.

Like many other of the famous firms whose names are associated particularly with components, this concern has also complete receivers in production, the "Empire" S.G. Three having achieved a name for its distinctive layout and control accessibility.

In the component line, of course, Burton valve holders, switches and condensers will still be doing duty in many a set. The short-wave man will be greatly interested in the Burton H.F. choke,

### NEAT DOUBLE SWITCH

A two-pole Telsen on-off switch which is particularly suitable for coil switching.



## Great Advances in Loud-Speaker Units

which covers the wave-band of 20 to 2,000 metres. It is barrel-shaped, like the unit in the Burton binocular choke, but it is mounted horizontally and is very compact with low self-capacity and high inductance. The Burton audio transformers, in ratios 1 to 3 and 1 to 5, will also be on show here.

### CARRINGTON MFG. CO., LTD.

As specialists in scientific case-work, The Carrington Mfg. Co., Ltd., are well known to readers of the WIRELESS CONSTRUCTOR, especially under their trade mark, "Cameo." In fact, the Cameo cabinet speaks for itself, being made in a most engaging variety of styles and finishes pleasing alike to the woodworker and to the housewife who studies appearance.

Of special interest is the "Melodee" loud-speaker cabinet, obtainable in oak, mahogany or walnut finish at 22s. and 24s. A larger size comes out at 30s. in oak, and 33s. for the mahogany and walnut finishes, the inside dimensions in this instance being 15½ in. by 6½ in. by 7½ in. It is "built on sound lines."

### CELESTION, LTD.

This firm have for long been famous, as specialists in sound reproduction, and Celestion, Ltd.'s, stand is sure to be eagerly sought by those on the look out for loud-speaker value. They will find plenty to choose from.

The lowest-priced model in the Celestion range is the D.10, which sells in oak at £3, and mahogany at £3 10s. Next comes the model D.12, of which sensitivity is perhaps the most outstanding feature.

### USEFUL MAINS UNIT



The Atlas people market a comprehensive range of mains units, both D.C. and A.C. This is one of their A.C. models, which will operate from any supply pressure between 200 and 250 volts.

The D.20 incorporates a well-designed sensitive electro-magnetic reed movement, working in conjunction with the famous Celestion reinforced diaphragm, and at the same price (viz.: oak £7 15s. and mahogany £8 5s.) there is the model D.50, which has been recently developed in the Celestion laboratories.

If you are looking for a complete loud speaker ready to mount in your own cabinet, or your own baffle board, there is a model D.20, which retails at three guineas and incorporates every exclusive Celestion feature. Also to be seen here are two remarkable new models operating on the moving-coil principle, and for the gramophone-lover a new Celestion gramophone pick-up.

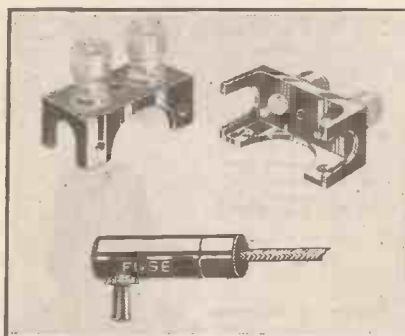
A quick needle-release device is one of the features of this attractive instrument.

### CHLORIDE ELECTRICAL STORAGE CO., LTD.

Are you looking for an L.T. battery that will stand and hold its charge when not in use, and can be left without attention (even though partially discharged) for long periods without suffering any detriment? These are just the points for which the famous Exide mass-type batteries are specially designed.

They are particularly useful when recharging is necessary only at infrequent intervals, and are quite happy when used for the long, slow or intermittent discharges which are customary in country districts. Other attractions will, of course, figure at this display, but the visitor will return to the Exide mass battery from sheer interest in its many features.

Points that will please the discriminating are the following: The terminals are non-interchangeable, and are not only of different colour, but of different shape, so that they can be safely connected in the dark without confusion.



Messrs. Belling & Lee, Ltd., exhibit this very useful terminal block, and also the combined wander plug and H.T. fuse.



Telsens components are well known to nearly everyone. And if anybody wants an inexpensive loud-speaker unit, the one illustrated above is just the thing. It costs only 5s. 6d.



Inductor balanced-armature loud speakers are famous for their excellent reproduction. This sample is a product of Messrs. Ferranti, Ltd.

The identification label embodied in the moulded lid, on which the name of the owner of the battery can be written in celluloid. Large vent plug which facilitates the refilling and hydrometer testing. The acid-level line, which is moulded on all four sides of the glass; and the specially-designed carrier which prevents the cell from being jolted out of it.

### CLARKE & CO. (M/C), LTD.

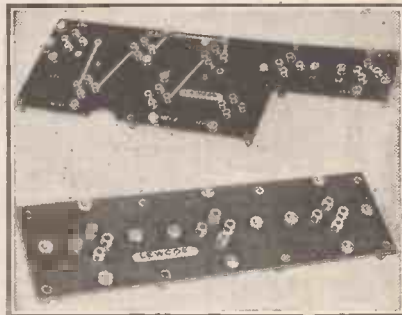
"Atlas" is a familiar name to WIRELESS CONSTRUCTOR readers who remember the many good components that have from time to time made their appearance under this name in the past. Latterly the firm have specialised in mains units and components, and this year the man with A.C. mains will find some very attractive models to choose from, while his friend with D.C. will be delighted to learn that the D.C.16 has been reduced in price from £3 15s. to £2 17s. 6d.

The output is 150 volts at 25 milliamps., and there is a smaller unit for the man requiring only up to 15 milliamps. with a voltage output of 120. This also has been reduced in price, and is now £1 15s.

On the A.C. side there are some very interesting lines, including an entirely new, high-tension mains unit for use with sets not requiring more than 12 milliamps. Three tappings are provided.

Particularly attractive, too, is an entirely new all-mains unit for converting sets not requiring more than 20 milliamps. to "all mains" without alteration to the set itself or renewal of valves. An equally interesting line is a special model giving H.T., G.B., and trickle-charger.

### A SUPER-HET AID



These handy "super-het" boxes are made by Messrs. "Lewcos," Ltd. They save quite a lot of time and trouble, as the valve and coil sockets are already wired.

A feature of this will be the isolation of the L.T. battery from the set, accumulator connections being made only to the unit. This is a very "natty" idea that will probably make a strong appeal, and is certainly one of the features of the Atlas display that must not be missed.

### E. K. COLE, LTD.

Recognised as pioneers of all-electric radio, with all the advantage of plug-in simplicity, this firm's products have long been known to the wily seeker of mains bargains. And this year's display of beautiful cabinet-model radio-grams, console models, and console receivers, will certainly engage the interest of the general public. Some of the Ekco models have been so popular that they are being retained this year, but the most prominent feature of the display will be the new combined sets and speakers. The console models are manufactured in the figured bakelite that was used with such success last year, and the console models and radio-grams are housed in extremely well-designed cabinets.

Good as are the sets, units, etc., inside, the very superior workmanship and the handsome appearance of these models are sure to monopolise attention, while the firm has also some extraordinarily attractive power supply units compact enough to fit into any portable receiver.

These have a unique method of adjusting the H.T. tappings and are provided in the 18- and 25-milliamp. range. The whole Ekco display exhibits that nice attention to every detail which has made the firm so extremely successful in the past.



A feature of this Dagenite accumulator, made by the National Accumulator Company, is the charge-indicator device.

COLVERN, LTD.

To many a wireless constructor Colvern is a name to conjure with, for this firm has been associated with successful components for a very long time. This year's display shows the same

VERNIER DRUM-DRIVE



A drum-drive condenser with vernier control produced by the "Polar" people.

insight into what the public needs in the difficult technique associated with specialised components. What will undoubtedly prove one of the leading

A RECEIVER "DE LUXE"



"Elco" products are noted for their excellent quality and good performance, and this console radio receiver is a good example.

Designed to Delight You

lines of the Colvern display is the variable Colverstat. This is a wire-wound variable resistance which was designed essentially for use as a volume control or as a voltage regulator.

Strongly made, it can be obtained in the standard values of 1,000, 2,500, 5,000, 10,000, 15,000, 20,000, 25,000 and 50,000 ohms. The price is 5s. 6d.

POSITIVE SWITCHING

This Benjamin switch is beautifully made, and its design ensures very positive switching.



A. C. COSSOR, LTD.

Cossor valves—is there anyone who doesn't know about them? If so, he certainly ought to make straight for this year's display, for it is an extraordinarily attractive one.

Everyone who watches radio advertisements—and all wise men do that—will be familiar with the firm's plan of publishing technical details of the construction of their products, and the enormous popularity of the Cossor valve shows that the public appreciate the information given to it.

There are all sorts of valves, of course, and ample literature is available showing exactly what they will do under operating conditions. This year the firm is making a very strong point of a remarkably ingenious constructional achievement of seven-point suspension, and the valves alone are an eye-fuel!

But backing up the valves there are the Cossor sets and loud speakers, two new models of the latter being extremely attractive propositions. Here is a cheaper oak model for 25s., and another highly-sensitive balanced-reed instrument, obtainable in walnut or oak finish, at 55s.

Specially recommended for use with the Cossor Empire Melody Maker, they are certain to be as widely popular as this deservedly well-known receiver.

It is interesting to note that the staggering figure of 350,000 Melody Makers have been issued to the public, and the latest three-valve S.G. set for £6 15s. is certainly likely to increase that number!

The new all-electric Cossor Melody Maker will be welcomed with open arms by the man who has mains in the house. Dispensing with accumulators and dry batteries, it uses the new A.C. mains valves of extraordinary efficiency, and its running cost is less than that of the smallest lamp in your house.

Cossors point out that this means your broadcast programmes will cost you less than a Id. a day, and the constructional charts make the job of assembly a sheer delight.

WILL DAY, LTD.

All the latest parts and sets of various makes are attractively arranged here, and in addition the firm will show one of the latest talkie picture outfits; this is not the sort of outfit you will

FOR SMOOTH CONTROL

This is the distinctive wire-wound potentiometer produced by Watmel, Ltd.



buy for home use, as the price comes out at about £300! But it will be of interest to everyone concerned with realistic reproduction.

It consists of a special projector fitted with the Will Day sound amplifier, main amplifier and either logarithmic or moving-coil loud speaker. It is a safe bet to say that after taking a look at it you will wish you brought £300 along!

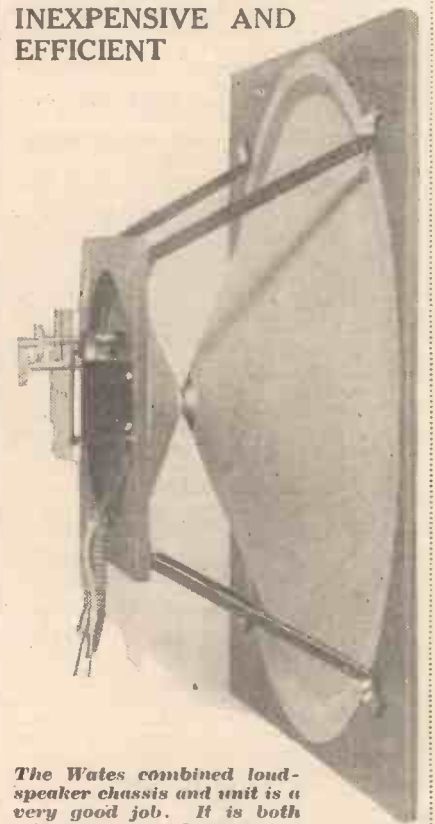
DONOTONE LOUD SPEAKER.

The name Donotone is usually associated with loud-speaker development, for at the time when most firms were sticking to quite orthodox designs the Donotone tuned gong loud speaker came in for much comment. Unfortunately this year we have not received particulars of the Donotone display, and as this may mean that something good is monopolising all the firm's resources at the moment we certainly advise constructors to pay the stand a visit.

DUBILIER CONDENSER CO., LTD.

Have you ever been let down by a dud condenser? Most of us would have to answer "Yes" to that question, but very few of us

INEXPENSIVE AND EFFICIENT



The Wates combined loud-speaker chassis and unit is a very good job. It is both inexpensive and efficient.

would be able to affirm that it was a Dubilier that went back on us. For the firm has a great reputation for the robustness of its products, and is keenly anxious that its productions should enhance its name for dependability and durability.

It will be remembered that last year the firm scored a great success with the Dubilier anti-interference unit, and this year they are introducing the new Dubilier Spaghetti wire-wound resistance, which is recommended for use with the R.I. Parafeed transformer, and retails at 1s. 6d.

Purity enthusiasts who are keen on getting the Parafeed system of L.F. amplification going satisfactorily will note with pleasure that the exact accessories for use with the Parafeed are obtainable in the Dubilier range, the ones recommended being the usual large fixed condenser and a resistance of the Spaghetti type.

## You Can Rely On All These Makes

### J. DYSON & CO., LTD.

All the "Godwinex" products are to be exhibited here, and as they are very varied—ranging from a 2s. 6d. earth tube to all-mains units which come out at about ten guineas—there will be plenty to ponder over!

A very wide range of H.T. supply is covered by the different units, varying from one with two positive tappings with an output of 15 milliamperes to heavy-duty models with four tapping voltages up to 200 and an output of 50 milliamperes.

In addition there are grid-bias units at 12s. 6d., chargers for L.T. accumulators, compact units for portables, all-mains units for providing both high and low tension, with the addition of grid bias, specially designed for converting battery receivers into all-mains sets and employing Westinghouse metal rectifiers.

### "KNIFE-EDGE" TUNING



The "Stenode" is noted for its extreme selectivity and long range. This model is built by Messrs. Radio Instruments, Ltd.

Interesting features of the earth tube referred to are that it is heavily coated inside and outside with lead, and gives over 180 square inches of earthing contact. It is almost needless to add that all the Godwinex mains-supply units comply with the I.E.E. regulations covering the operations of radio apparatus from supply mains.

### J. J. EASTICK & SONS, LTD.

It will hardly be necessary to call the attention of WIRELESS CONSTRUCTOR readers to this stand, for the Ealex components are so well known and attractive that the set builder automatically inclines towards it.

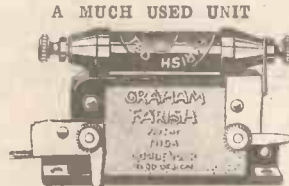
It has been arranged to show the full range of the Ealex products this year, and in addition to the many and various terminals there will be the well-known earth bowl, the Ealex safety switch, and a number of other old friends. Particularly interesting to set-builders are the "Byldurone" cabinets, which are to be backed up by a representative range of high-class sets and components. For the super-het "flend" there is a new "Ealex" frame aerial retailing at £1, and another

entirely new line caters for the short-wave man in the form of the Ealex short-wave converter, which retails at 16s.

Do not miss these additions to the Ealex range.

### EDISON BELL, LTD.

When the many old friends of this firm flock around to see what it is doing this year they will be confronted with many new lines. A complete three-valve screened-grid band-pass receiver with



### A MUCH USED UNIT

The Graham Farish grid leak and condenser is a very neat unit. It is suitable for almost any type of set.

moving-coil speaker, mains-operated, is one ambitious line on the stand, and other sets include a radio-gramophone, a five-valve super-het portable for mains use, and one for battery use, as well as a four-valve S.G. band-pass receiver with moving-coil speaker for mains operation.

There is also a permanent-magnet moving-coil speaker for use with a big power-valve or pentode. Other lines showing will be pre-set condensers, and some of those very handy little Spaghetti resistances ranging from 300 to 100,000 ohms.

Among the many components will be attractive new lines in the form of pick-up devices and microphones, so that the whole display promises to be an uncommonly interesting one.

### EDISON SWAN ELECTRIC CO., LTD.

As this Company now handle the radio business of the British Thomson-Houston Co., Ltd., the joint products of these two great firms will be on view.

Radio will never be a tame, uninteresting business while its very basis, the thermionic valve, is continually going forward from development to development and triumph to triumph. Lower running costs, higher efficiency, greater stability, more power—these are all fundamental features around which radio design groups itself in fascinating combinations of circuits, of an efficiency absolutely unattainable as little as a year ago.

In the various epoch-making developments which have attended the evolution of the modern valve, Mazda valves, made at Brimsdown, Middlesex, and marketed by Edlswans, claim recognition for their revolutionary pioneer work.

The very first indirectly-heated valve, which made such a sensation at the 1926 Radio Show, was introduced by the Mazda engineers.

Two years later the introduction of the first indirectly-heated S.G. valve, in 1928, scored another success for Mazda technique, and now the range of valves is a topic of conversation wherever radio enthusiasts gather together. All are here, from the little 2-volters which are known and used the world over, to the various specialised valves now being developed.

As an example of absolutely up-to-date technique the new D.C. mains valves should not be missed, and neither should the latest R.K. permanent-magnet loud speaker.



### THE ALL-METAL WAY

The Westinghouse metal rectifier figures a great deal in mains units. It is a tremendous success.

### EVER-READY CO. (GT. BRITAIN), LTD.

The influence of radio development upon the older electrical industries is nowhere illustrated better than in its application to battery technique. To meet the specialised demand for the various classes of sets, Ever-Ready have evolved different



An inexpensive permanent-magnet moving-coil loud speaker, bearing the name of Graham Amplion, Ltd., a very old-established firm.

classes of batteries, each assembled by experts, and each exactly fitted to give maximum service in the sphere for which it was designed.



### EVER POPULAR

Speaks for itself.

For the small set there is the "Winner" series of Ever-Ready batteries with a discharge rate of from 6 to 10 milliamperes, and these are backed up by a range of "Popular" and "Standard" types

### MATCHES ALL OUTPUTS



Variable ratio output transformers are extremely useful components. This model is of Varley manufacture.

## Well-Made and Well-Tried Lines



Mains condensers must be made carefully and properly tested. Those seen here are Formo.

and portable units of which compactness is a special feature.

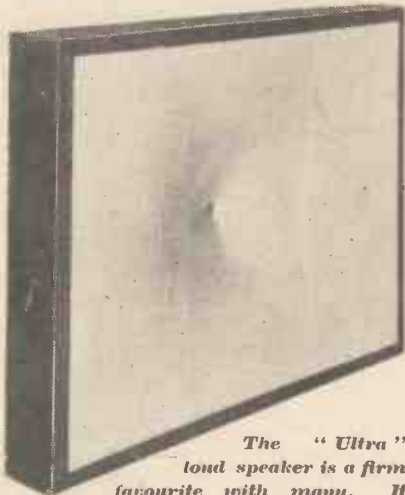
For larger sets there are the "Popular Power" batteries, giving an emission of from 10 to 16 milliamperes, and the new high-power type in blue and orange container, constructed of super-capacity cells, and which can be used with sets requiring from 20 to 25 milliamperes.

As the question of grid bias is invariably linked with that of high-tension supply, special grid-bias batteries are also available, with intermediate tappings arranged at each 11-volt cell by means of sockets for plugs. There are also high-tension cells with patent terminals and sockets, which allow tappings to be taken with wander plugs, and give unlimited flexibility.

The insulated connecting wire is fitted to the negative, looped ready for attachment to the positive of the adjoining cell, thus making replacement but the work of a moment.

Besides the dry cells there is an effective display of accumulators specially designed for wireless requirements, including glass cell accumulators of

### A "LINEN" SPEAKER



The "Ultra" loud speaker is a firm favourite with many. It employs a "doped" type of "cone."

various capacities, celluloid case accumulators of the free acid types and unspillable for portables, ebonite cell unspillable accumulators, etc. Of particular interest is the indicating device fitted to Ever-Ready glass cell accumulators in which a two-ball indicator tells exactly the condition at any moment.

#### FERRANTI, LTD.

When we wrote to Ferranti, Ltd., asking for early information as to what they were showing on their stand at the radio exhibition we received a voluminous reply which promises great things for the visitor!

Ferranti's will, of course, continue marketing the range of audio-transformers which are such a well-known feature of this company's products, and there are many noteworthy additions to their other lines as well as revisions of interest to all radio men.

Builders of mains set and mains units will

note with interest the low price, high capacity and high test voltage of the fixed condensers, and there are several completely new lines which cannot fail to attract attention. Output, push-pull, and all sorts of other transformers will, of course, be here in great abundance, and this year the firm have available a full range of H.T. supply units which cover well the scope of the average user's requirements.

Power resistances at 5s. a time are another very attractive line, while anode-feed units, various radio-meters, including electrostatic voltmeters, and triple-range voltmeters in various types, are attractively represented. The new type of H.T. supply unit giving up to 115 milliamperes at 200

### FROM A FAMOUS FIRM



These excellent H.T. batteries are made by the Exide people and can be relied upon to give useful service.

volts is likely to prove exceedingly popular, while other interesting lines are grid leaks, and rejectors to cope with various B.B.C. stations.

The big range of Ferranti receivers will be on view, and the firm intends showing a super-heterodyne receiver using an inductor speaker. This latter and various moving-coil speakers are another strong range, sure to create wide interest, and special attention is directed to the low-priced permanent-magnet speaker.

#### FORMO (A. PREEN & CO., LTD.)

Always alert to the possibilities of perfection in tuning simplification, Arthur Preen & Co., Ltd., the makers of the famous Formodensor, have again extended their range with great success.

Undoubtedly their *pièce de résistance* is the Extenser, for trouble-free tuning, which was introduced to the world in the WIRELESS CONSTRUCTOR. The Formo version of this remarkable component has all that compactness and finish that might be expected from this famous firm, its slow and fast-motion dials giving the exact adjustment so essential for the really exact tuning required for elusive foreigners.

A particularly pleasing feature of the Formo Extenser is the fact that its self-changer is fitted with silver-gold contacts which ensure perfect electrical continuity over the necessary 100 degrees, and avoid all possibility of trouble due to corrosion which might otherwise set in. Purchasers should make a point of trying to detect, without the aid of vision, just when the Extenser is switched to long and when to short waves—they will find it some job!

And what is this? A ganged and shielded condenser especially suitable for band-pass and super-

### VALVE "CANS"



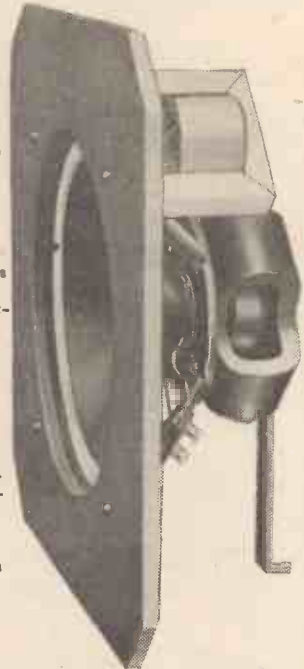
These Six-Sixty valve screens are very useful for helping towards complete H.F. stability.

het circuits, with absolutely unique features, including an illuminated dial and shadow tuning!

Old friends like the Midget condenser, the vernier dial, the Mica-densor, mains condensers, dual-range and P.V. coils make this a display to linger over,

### READY TO MOUNT

This is the Edison Bell permanent-magnet type moving-coil loud speaker. It is supplied complete with output transformer, and is ready to mount on a baffle.



#### FULLER ACCUMULATOR CO., LTD.

Although the name Fuller has long been associated with electrical batteries of all types, this firm was one of the first to realise that the modern valve is a complex instrument, so sensitive in its

### A FINE MAINS KIT



This is a mains model of the Cossor Metody Maker. The parts are supplied in kit form ready for assembly at home.

## Visit Us at Stand No. 67



*Valves are one of the very strongest features of the Radio Show, and many foreign visitors come over specially to see these alone. This is one of the Osram M.H.A.'s.*

reaction to every influence that the old type of accumulator is a much too clumsy article to link with it. And so they prepared a special range of radio batteries catering for all types of sets and circumstances.

There are H.T. dry batteries, low-tension and high-tension accumulators, in amazing variety, each with special Fuller features.

The mammoth plates of the L.T. batteries, the microporous paste, the special terminals, and the patent nonslip metal handle, folding out of the way when not in use, all bespeak the utmost care and concentrated experience.

### GENERAL ELECTRIC COMPANY, LTD.

The Geophonic radio programme is an amazingly attractive one. The already famous products of this firm are to be backed up by a number of new lines which make a show in themselves.

Some indication of the scope of the G.E.C. programme is provided by the fact that there are no less than five new all-electric sets for A.C. mains. The prices range from round the 15-guinea mark to a radio-gram which comes out at about forty guineas, and which must be seen to be appreciated.

D.C. receivers, portables, table models, all-wave super-heterodynes (giving clear reception over thousands of miles) are backed up with the latest model of the Music Magnet—the famous G.E.C. kit set.



*Two of the special Sparta radio batteries made by Fullers.*

A Music Magnet conversion set enables the new Music Magnet to be worked from A.C. mains, and serves equally well for last year's Music Magnet, and we think it will appeal to a very wide public, together with a truly amazing range of loudspeakers which are also to be displayed. This range includes an "inductor dynamic," while the power question is tackled on equally comprehensive lines in the form of various mains units.

An output filter at 19s. 6d., and a combined G.E.C. wave-trap and coupling unit, are new additions, while other star features of the new goods are a "Hiflux" L.F. transformer, low-loss variable condensers, and a power unit for the man with D.C. mains.

### GRAHAM AMPLION, LTD.

The high standard of Amplion production has been fully maintained this year, and the various unit-driven and moving-coil speakers merit the close attention of the discriminating. There are different types to appeal to all pockets, a feature of the balanced-armature unit being that it may be matched to power valve or pentode output, thus ensuring the best possible response.

The Amplion permanent-magnet moving-coil loudspeaker is designed to operate at its highest efficiency with either two-, three- or four-valve sets, working very well with power, super-power or pentode valves, as it is fitted with a transformer that provides three alternative ratios to cope with different classes of output valves.



### IT'S VERY USEFUL!

*Here is a Sovereign wall-plug and socket, very handy for L.S. extensions or any similar job.*

Both of the Amplion permanent-magnet moving-coil models employ special diaphragms, prepared expressly to resist the effects of climatic changes and to ensure faithful reproduction at all times. It is worth noting, too, that the larger permanent-magnet m.c. speaker and all the moving-coil cabinet models may be purchased on deferred terms.

### GRAHAM FARISE, LTD.

A number of new lines on this stand will claim the eye of the constructor, all the recent additions to the Graham Farise products being of special set-building suitability.

The Spaghetti resistance links, for instance, which are made of nickel-chrome wire, giving maximum wattage dissipation ratings, is a good line; and another very interesting range is the bakelite dielectric variable condenser known as the "Litlos." It is specially suitable for reaction, for it is almost impossible for the condenser to short-circuit, while its smooth action renders it delightful to handle.

For those who prefer the differential type there is a "Litlos," provided with the usual two sets of fixed and one set of moving vanes. Another attractive line is the sprung valve holder of the four-pin type, which is encased in a bakelite moulding and retails at 10d.

A new L.F. choke, a new L.F. transformer, and some low-priced push-pull switches will also claim notice, the latter being particularly attractive to set owners on account of the advantages of one-hole fixing and bakelite moulding and positive contact.



*A Dubilier non-inductive condenser, specially suited to certain band-pass circuits.*

They are offered at only 8d. each. There is certainly plenty to see on this stand.

### S. C. HEYBERD & CO., LTD.

"What are Heyberd's showing?" will ask the mains man. The answer is an extensive range of all-electric units, mains units, and a kit of mains-unit parts.

Although Heyberd's mains components have been widely known for the last six years, the complete mains unit has been marketed only during the last twelve months.

It speaks for itself that the makers now feel confident enough to give a guarantee of three years, free of breakdown, with all their component parts. Of the H.T. mains units there is a great variety, and full details will gladly be given to visitors.

### BRITISH THROUGHOUT



*A coil former from the works of the British Ebonite Co., Ltd.*

Two entirely new all-electric units, complete and ready to switch on, in metal cases with bakelite panels, employing Westinghouse full-wave rectification and silver and bronze control switches, must certainly not be missed. Apparatus for large outputs, small outputs, variable voltages, and many practical points for easy and efficient working, characterise this excellent display.

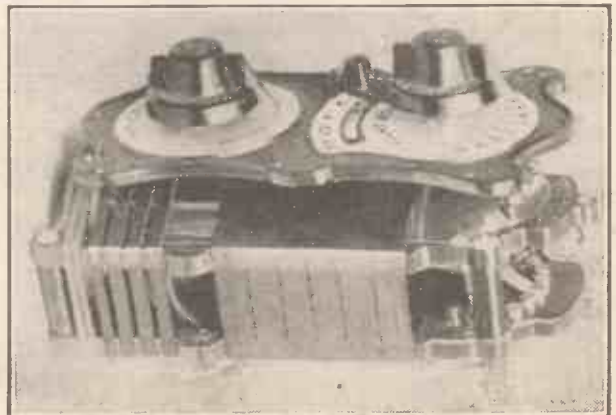
### IGRANIC ELECTRIC CO., LTD.

Visitors to the Igranic stand will, as usual, have plenty to see, for this go-ahead firm continues to

## THE CHOICE AT OLYMPIA IS UNBOUNDED



*Never before has the radio constructor been catered for so well as at this year's Show. Of these two representative components, that on the left is the "A.E.D." volume control, whilst to the right is the British General tuner.*



## The Radio Show is Beckoning You!

specialise in a large number of lines of particular appeal to the home constructor.

Coils, of course, will be here in full force, all varieties being represented from the good old honey-comb duolateral to special short-wavers, dual-range coils, and coil holders.

There have been a number of additions to bring the Igranix products right up to the last minute, and in a number of cases if the component itself has not been altered the price has been lowered, which from the point of view of many of us is just as good as a new component.

The gramophone owner will be interested in the new "Phonovox" pick-up, and quality enthusiasts will see with interest the alterations in L.F. chokes; the C.15 type, for instance, being redesigned to carry 20 milliamps., and the price reduced.

Similarly, C.30 has been redesigned to carry 40 milliamps., and the C.60 redesigned to carry 80 milliamps., and in both these instances, too, this has been accompanied by a reduction in the cost of the component.

The famous "Indigraph" dials are again featured and supported by differential condensers, fixed condensers, pre-set condensers, and the various variables that have won such popularity.



### BINOCULAR CHOKE

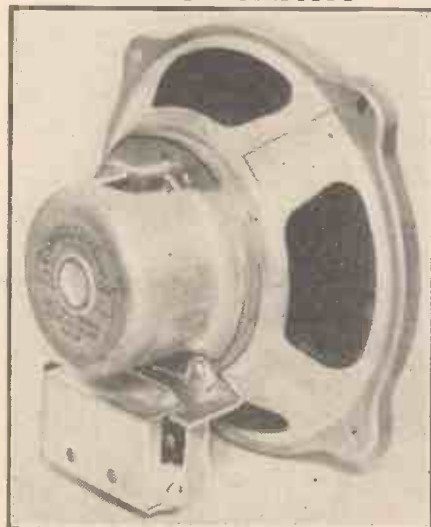
*This H.F. choke is one of the popular lines.*

Jacks, switches, a new design of grid leak, L.F. transformers, valve holders, micro-condensers, dial illuminators, potential dividers, resistances, resistance holders, rheostats and potentiometers, and insulators, will make the constructor sit up and wonder if there is any component this firm does not make.

### JACKSON BROS., LTD.

Look out here for the new "J.B." Extenser, a special feature of which is the individually adjustable self-changer contacts, which are noiseless in operation and self-cleaning. A silent brush contact is fitted to the rotor. The construction is very solid, a stout aluminium frame is used and extra-heavy hard aluminium valves.

### REALLY COMPACT



*The Magnavox moving-coil loud speaker, for use with D.C., is remarkably small considering its power.*

The "J.B." Extenser has a polished finish, and is supplied complete with an illuminated slow-motion disc drive and oxidized silver escutcheon plate, giving a particularly fine panel appearance. Full range and noiseless action is assured on both wave-bands.



*This low-frequency transformer is a highly favoured Lissen line.*

Compactness, lightness and rigidity are features of the "J.B." Thy No. 2, which is of special interest if you are considering the building of a portable. A very ingenious feature of this little chap is that its slow-motion mechanism, which has a ratio of 8 to 1, is housed in the bottom bearing and so takes no extra space!

As for advanced condenser construction, we have the "J.B." Chassimount and the new enclosed gang condenser, and such remarkably attractive assemblies as the type U20 ganged condenser, and its big brother, the U30.

This is supplied complete with special screen and calibrated illuminated disc drive, and has been specially recommended by Varley Products for use with their constant square peak coils.

### JEWEL PEN CO., LTD.

Although a jewelled pen itself seems to have but little connection with radio, this firm is well known for their permanent crystal detectors, plug-in coil-holders, lead-in tubes, terminal boxes and similar handy gadgets. Unfortunately, no particulars of the display this year have been received at the time of going to press.

### LECTRO LINX, LTD.

A remarkable display is on show here which every true set builder will take care not to miss. There are simply dozens of ingenious terminals, connectors, plugs, sockets, knobs, hooks, rings, pins, valve holders—in fact, everything in these lines that the constructor's heart could desire.

The prices are temptingly arranged to make the articles even more attractive; typical examples being spade terminals which fit all sizes of screw terminals, and incorporate a patent wiring device, for 2d.; all-in terminals which are completely insulated from the hand when making connections, 6d.; wander plugs which are adjustable to take any socket and which a turn of the insulator locks into position, 3d.; and accumulator knobs which keep corrosion from terminals and ensure good contact, for 4d.

It is impossible to do more than indicate the enormous variety on show here, but the large number of firms who now incorporate the Lectro Linx resilient sockets for single or multiple plug-in devices, such as the five-pin valve base, testify to the many merits of this line. The permanent and effective contact available from solid pins with this form of contact avoid many troubles which have been traceable in the past to defective contacts, for the socket takes up any decentralisation of moulded-in pins, conforming to their alignment and rendering effective contact certain.

This is a display which we can confidently recommend as certain to be of interest.

### LISSEN, LTD.

The name of this firm has become a household word with set builders, for "Lissens" were pioneers in the low-price high-efficiency market, and no detail was too small for their consideration.

Since then the firm has grown and grown, ever turning their attention to new phases of the radio industry. The new process H.T. batteries set up a new Lissen standard, and recently they scored

another spectacular success with the Lissen valves in 2-, 4-, and 6-volt varieties.

We should not, however, let our appreciation of this latest Lissen venture blind us to the merits of the scores of lesser components that made this name famous. So many little Lissen fixed condensers and grid leaks have been sold that these low-priced lines must in the aggregate overshadow many a really ambitious range of complete sets, speakers, etc.

Everything that the constructor wants is here—valve holders, coils, switches, fixed, variable and semi-variable condensers, panels, grid leaks, resistances—all right up to the Lissen standard, and down to Lissen prices.

And if you are looking for a mains unit do not forget to inspect the Lissen "eliminators," which are obtainable for either A.C. or D.C. supplies.

### W. & T. LOCK, LTD.

Is it an oak cabinet you want, or mahogany, or walnut? W. & T. Lock will not mind a whiff, for they have an amazing variety on view here.

From the plain box with open front up to handsome eight-guinea fellows for radio-gram requirements—there is a great range of style and finish, and all needs can be met in "Cabikok" cabinets of distinction. Particular attention is drawn to a number of attractive new lines.

### EASY TO MOUNT

*A T.C.C. condenser that can be fixed upright, as shown, or horizontally.*



### LONDON ELECTRIC WIRE CO. & SMITHS, LTD.

Is it a "Gangster" you are building? Or an "Extenser" Five? Or the "I.E."?

No matter what the set, you are pretty sure to need something from Lewco, for this firm is in the unique position of having had over fifty years' experience in wire manufacture on a very large scale, with the result that its coils for radio have become world-famous.

There are, of course, all sorts and types, including not only the latest tuning coils, but H.F. chokes and associated apparatus in both high-frequency and audio-frequency engineering. One of the latest lines which is sure to engage the attention of the would-be constructor is the new type Spaghetti flexible resistance, the terminals of which are so constructed as to prevent loose connections. The blue

### ON THE SHORT WAVES



*One of the famous Colvern 6-pin short-wave coil units, for use upon the very high frequencies, where American and Australian stations can be heard.*



# All Your Radio Needs Supplied

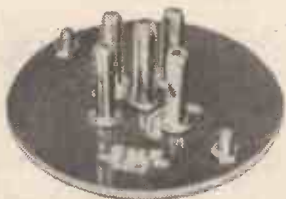


*This valve holder is a well-known example of Lotus wares.*

sleeving is made of a special material which eliminates the possibility of cracking.

There is a range of more than twenty of these resistances at varying prices, ohmic values, and current-carrying capacities. Typical examples are: the 300-ohm resistance which can carry 15 milliamps, 9d.; 5,000 ohms for 10 milliamps at 1s.; 20,000 ohms for 7.5 milliamps, for 1s. 6d.; 100,000 ohms for 5 milliamps, for 1s. 6d. There is also a 100,000-ohm centre-tapped Spaghetti, which retails at 2s. 3d.

## FIRM CONTACT



*The "Clic" valve holder is specially shaped to ensure a good grip.*

### LOTUS RADIO, LTD.

Valve holders, condensers, switches, plugs and jacks, transformers, small variable condensers, and more transformers, an entirely new disc-drive for variable condensers, miniature reaction condensers, astatic coils, ganged condensers—that will give you an idea of the variety on view on this stand.

And as the Lotus components are now well known to all who are versed in the radio game there is no doubt that all the many lines will be the centre of great interest. Remote control of loud speakers, etc., is still one of the main items of this firm's programme.

Of undoubted interest is an entirely new Lotus product which cancels the previous logarithmic condensers previously marketed by this firm. In it the slow-motion gear is contained right inside the spindle.

The completely screened special condenser assemblies which have been designed to have an accuracy of 5 per cent between each unit, and can be operated by the Lotus drum or disc drive, are certain of an enthusiastic reception.

### MAGNAVOX (GREAT BRITAIN), LTD.

The latest arrivals in the "Magnavox" family of loud speakers will be on show here, including the C.M.130 model, which has a unique M-shaped cobalt-steel magnet and three-ratio transformer. Fitted with a 7½-in. cone, this chassis and transformer retails at £3 3s.

A new D.C. mains-energised model, also complete with three-ratio input transformer, is on view, the price of this chassis being £2 12s. 6d.

### NATIONAL ACCUMULATOR CO., LTD.

Certainly the constructor can have no complaint on the score of power supply at this year's Show, for here is another firm devoting itself to the high-class production of radio power for high- and low-tension circuits. The majority of the accumulators are fitted with the well-known patent tell-tale device, which immediately indicates the state of the charge of the cell at all times from fully charged to complete discharge.

This valuable feature had in the past been available in the standard ranges of low-tension accumulators in glass or celluloid cells only, but it has been extended to the popular thick plate type of low-tension accumulator, and also to the glass high-tension accumulator.

In the latter case two floats are used, one being the charge indicator and the other a discharge indicator. Could anything be simpler?

Standard accumulators without the tell-tale device are also available, and the range of Dagenite accumulators is particularly comprehensive with a type available for every wireless purpose. The only National Accumulator Co's accumulators in which the tell-tale device is not available are those made up in moulded composition, and, of course, the jelly-acid types.

## FOR L.T. and H.T.



*A Tannoy combined L.T. charger and H.T. mains unit.*

### THE NEW LONDON ELECTRON WORKS, LTD.

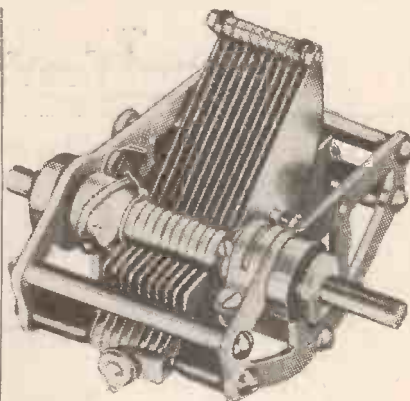
Known perhaps best of all for its "Electron" wire and "Superial," its big brother, this firm has a number of other interesting features. For those who dislike the usual mast and outdoor aerial there is something new in the shape of an Electron screen aerial which can be fitted in the loft, under the roof, or behind a cupboard door.

Another line of interest to the man who uses an indoor aerial is the Electron insulated aerial pin, obtainable in sixpenny boxes, and the constructor will not fail also to notice the simple strip which is intended to obviate solder and reduce construction work to a minimum.

This strip, which is tinned, is supplied in 12-ft. lengths, and it is pointed out that if a little care is taken the inter-capacity effects between leads will be considerably less than with ordinary wire.

### OLIVER PELL CONTROL, LTD. (VARLEY PRODUCTS.)

Progress in radio design is illustrated here by an entirely new range of components, backing up



*This condenser is made by Jackson Bros., who specialise in easy tuning.*

the old friends, and enhancing the Varley name. Realising that only matched coils could ensure perfect ganging, the Varley experts early got down to an inductance assembly exactly matched, so that the tuning will keep in step over the whole long- and medium-wave range, and the result is the Varley Constant Square Peak Coil, and an excellent H.F. intervalve coil for use with it.

The latest addition to the range of Varley L.F. chokes is the Nichoke II, which is extremely compact and suitable for smoothing, output filters, etc. Its inductance is 14 henries at 50 milliamps, and 20 henries with no D.C. Price 10s. 6d.

*Valves are better than ever this year, and the one illustrated here is an example of Mazda design, which is always well to the fore. As will be remembered, the first indirectly-heated valves to be introduced were Mazdas.*



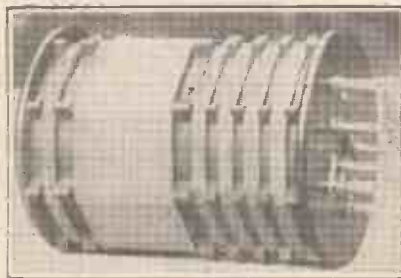
A number of other new lines call for special attention, particularly the Varley junior multicellular H.F. choke, with an inductance of 120,000 microhenries. This is priced at 3s. 6d.

The Varley universal valve holders at 1s. 6d., and the Varley Spaghetti resistances which are made in values from 100 to 100,000 ohms, are sure to claim popular attention, while the Varley Popular wire-wound resistances and the Varley Niclet L.F. transformer are other recent additions to the range of this go-ahead firm.

### ORMOND ENGINEERING CO., LTD.

Here is a display of radio gear which includes many extremely attractive old friends as well as a large number of new lines. The latter includes

**"GET A GOOD ONE WHILE YOU ARE ABOUT IT"**



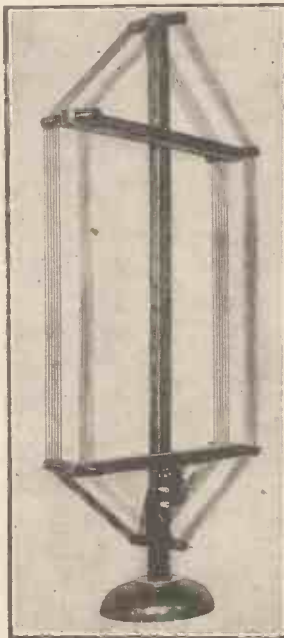
*In radio one faulty part lets the whole set down, and that is why it pays to buy goods with a reputation behind them. Three famous lines are represented above. The mains unit (left) is a "Heayberd," and to the right of the famous Pertrix battery is a "Wearite" Explorer coil.*

# This Year's Olympia Will Beat All Records!



An example of a well-thought-out design—a Bulgin valve holder for 4-pin or 5-pin valves.

a loud speaker and chassis which is provided for fitting into portable receivers as a complete unit, or for mounting into cabinets as a finished loud speaker. Incorporating a four-pole adjustable L.S. unit, which retails at 25s.  
—A complete moving-coil chassis is another very interesting new line, the design being arranged to handle heavy inputs without distortion. A transformer is incorporated, with terminals provided for alternative ratios to match up with



A wave-change switch on its base is a feature of the Elex frame aerial.

the valves used in the output stage of the receiver.

Other new loud-speaker lines are the four-pole adjustable loud-speaker units which are easily mounted on a chassis, and are fitted with a large cobalt magnet to ensure sensitivity. This retails at 8s. 6d.

## RED DIAMOND SWITCH



This is one of the Jewel Pen Co.'s products.

An oak cabinet loud speaker, a panel switch, and, of course, the latest example of twin-drum-condenser control, make this an unusually interesting display.

### CHAS. A. OSBORNE.

Radio cabinets of solid British workmanship are the feature here—ready to assemble if you prefer to make your own, assembled if you wish; polished, or ready to polish—in fact, cabinets for every need. Builders of the famous "P.W." "Comet" Three and "Comet" Two will be specially interested in Model No. 215, which is prominently displayed here, and there are also cabinets for all the latest types of loud speakers.

### OSRAM VALVES, LTD.

If you want to get an idea of how radio is progressing, developing, extending and thriving, consider the modern valve. You will probably be astounded to realise that quite apart from transmission and such special technique there are more than fifty entirely different forms of Osram valves on the market, each one specially designed to do its own job of work.

There are, in fact, twelve different classes of Osram valves, ranging from old friends like the 2-volt general-purpose to double-grid valves for frequency changing, and the very latest indirectly-heated cathode valves for D.C. mains. You can pay up to £5 10s. for a super-power valve with an impedance of only 835 ohms, or plunk down 8s. 6d. for another type with an impedance of around 60,000 ohms.

The range is so great that it seems invidious to pick out different examples, and the valve-set owner who is desirous of knowing just how the valve market is going forward will be amply rewarded for every minute he spends inspecting this wonderful collection.

### E. PAROUSSI.

Enthusiasts on screening will make for this stand without hesitation, for the name of Paroussi is associated with particularly attractive highly-polished metal screens, in aluminium or copper. Builders of the "Gangster" will have already considered Parex components, and all set-builders will do well to pause over the differential condensers, S.G. valve holders, coils, H.F. chokes, panels and copper strips which are available here.

### PERTRIX, LTD.

The claim of the Pertrix Dry Battery Co. is that every battery that leaves their factory means that someone is going to get better reception! The Pertrix accumulator is built on more than 40 years' practical experience, and particulars should certainly be obtained if you are looking for a good L.T. supply. The Pertrix H.T. batteries are in standard capacity and super-capacity types, and they have now a younger brother in the form of a Pertrix battery for your flashlamp.

### PETO-SCOTT, LTD.

"Pay the Postman" is one of Peto-Scott's slogans, and no method could be handier! "Peto-Scott" is one of those sympathetic firms who realise that Mr. Everyman has not always got the cash on him, so C.O.D., cash or hire purchase terms are a strong feature of their business policy.

It is often not realised that the firm deals with a wide variety of radio manufacture, and does not extend its favourable terms only to its own products. These, however, should not be missed, because amongst them are to be found many extremely interesting items, including those handy little Coil Quits.

Super-het. fans should also look out for their Peto-Scott frame aerial, and in fact will find much



One of the sets in the G.E.C.'s extensive range of receivers. It is provided with controls placed very accessibly at the ends.



Here is one of the famous Igranitic Type J low-frequency transformers.

to interest them on the stand, for the firm has rather a leaning for super-het. requirements. Kits of parts for the "Comet," for the "Pop-Vox," and many WIRELESS CONSTRUCTOR sets, etc., are also well to the fore, making this a most attractive display.

## NO REPLACEMENTS



You don't need to keep replacing the H.T. battery if you use mains power. This is a Regentone H.T. unit.

### P.R. PRODUCTS.

Although no details have been received from P.R. Products for the display arranged for this year, there is no doubt we shall again see the (Continued on page 339.)

## SOMETHING ENTIRELY NEW



This quality output transformer with variable ratio to suit output conditions is one of the latest Ready-Radio lines.

# SAVOY HILL —NEWS—



## Need for a Forward Policy

I HOPE I am not getting stale and falling into the error pointed out by Mr. Filson Young in the B.B.C. programme paper, but I do feel the need of a new touch of inspiration and freshness of outlook in the structure and production of our broadcasting service.

As one who has always supported the British conception of radio organisation in contrast to the American conception, perhaps I have more than an ordinary title to offer my misgivings about what Savoy Hill is now pleased to term "the inevitability of monopoly."

My present impression is that the people at Savoy Hill are not consciously drifting away from public opinion. I would go so far as to say that from Sir John Reith downwards they are constantly making efforts to justify their privileged position.

But the danger remains. Despite the intention and the effort the B.B.C. seems to be losing touch with public opinion in a way which has never happened before. If they are not careful they may lose their monopoly.

## Trouble in Wales

It was only by the result of a keen contest that the Welsh National Party at its annual conference at Barmouth was not committed to the recommendation of drastic measures against the B.B.C. At the same time there was a serious situation in Newcastle and the North-East of England.

There was also a simmering of trouble in the Midlands. It is obvious that the B.B.C. is in for a period of peculiar difficulty which will be a supreme test.

## Covent Garden and the B.B.C.

I heard the other day that there is growing tension between the B.B.C.

and Covent Garden, despite the constant endeavours of Mrs. Philip Snowden to keep things running smoothly. The situation is so strained that on at least three occasions of which particulars have been given to me "scenes" have occurred.

Of course, the trouble is that the Covent Garden Syndicate of 1930 has not exorcised the anti-B.B.C. tradition from Covent Garden. The second mistake was not to give Dr. Adrian Boulton authority over the whole of the operations of Covent Garden.

The situation may still be retrieved if Mrs. Snowden insists on bringing in Dr. Boulton before the end of the autumn season. If this is not done, I say "good-bye" to the amount which has been voted for the opera subsidy.

## British Artistes Abroad

There is a sense of grievance at the refusal of the B.B.C. to give letters

of introduction to British artistes in order that they may be helped to get employment when travelling on the Continent. I heard last week that the B.B.C. had undertaken to avoid recommending any British artistes to any foreign broadcasting authorities.

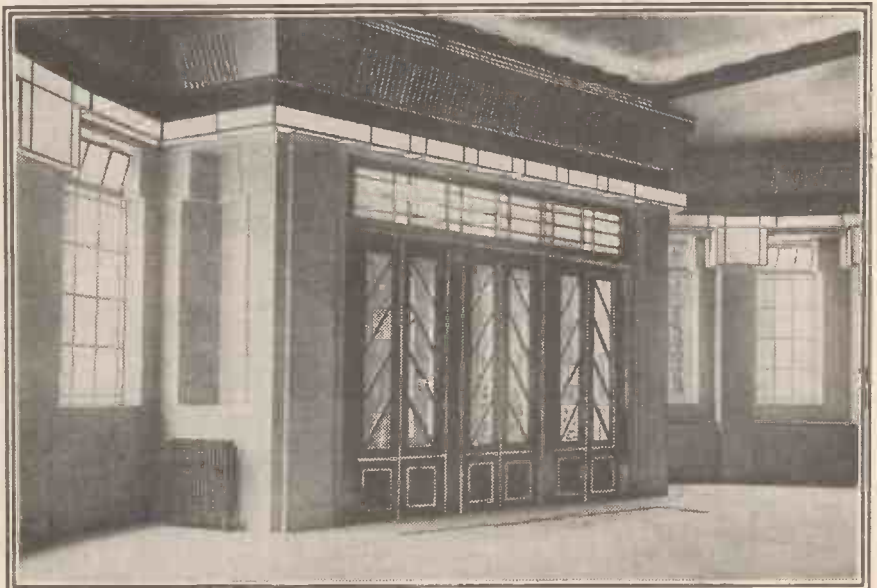
I confess I cannot understand this extraordinary attitude. I know as a fact that the German stations are anxious to have British talent, and that in the absence of any advice and guidance from the B.B.C. they have to take anything that comes along.

## Our Neighbours' Programmes

It seems that what has happened is the too literal application of some general principle of mutual international forbearance. Anyway, it deserves examination.

At last there is a chance of real Tzigane music regularly provided by the B.B.C. "straight from the horse's

## "THE GATEWAY TO SAVOY HILL THE SECOND"



A view from the inside of the artistic bronze "front-door" of the B.B.C.'s new building at Portland Place, which is now all but completed.

# Savoy Hill News—continued

mouth," arrangements having been concluded for the relaying of this fascinating music regularly from Budapest next winter.

### Mr. Ashbridge

I congratulate Mr. Ashbridge on the result of his experiment at Newcastle. It seems to me that the Chief Engineer of the B.B.C. is doing an extraordinary difficult job most creditably, and I should like to hear that the WIRELESS CONSTRUCTOR is to be the vehicle of communicating to the public another series of exclusive articles like those which Mr. Ashbridge wrote in this journal two years ago.

### Mr. Churchill's Case

How funny that Mr. Whitley should have to deny his old parliamentary colleague, Mr. Churchill, the opportunity of developing his thesis on India.

I was interested to see that Sir John Reith's name did not appear in the official correspondence that was published. Perhaps this was just as well, if only because it may be possible for Sir John to initiate some alternative proposal which may attract Mr. Churchill to the microphone.

It would be very stupid if the difference of opinion about India were to be allowed to exclude Mr. Churchill permanently from the micro-

phone. Incidentally, I gather that his proposed talk on India would have been as unpopular at Palace Chambers as in Downing Street, or, for that matter, in Old Queen Street.

### The Problem of Auditions

The Musical Advisory Committee of

There is a suggestion that the over-worked audition officials at Savoy Hill tend to get into a rut and, without meaning to, may not be receptive to strikingly new and original talent. I think there is something in this, and that it would be a good plan to vary the audition staff.

## RECEIVING IN THE WORLD'S "BIGGEST YET"

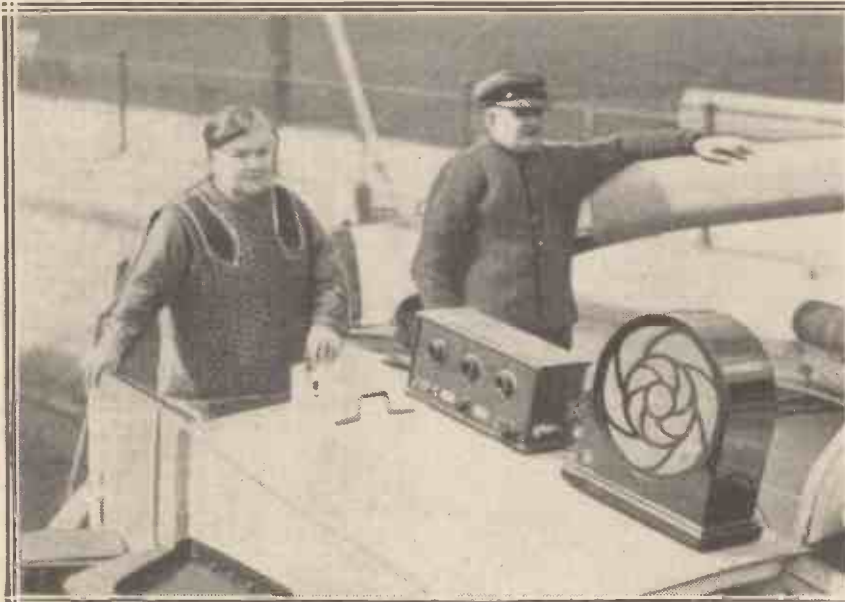


This is the compact apparatus at the largest receiving station in the world, the new German commercial radio station at Berlitz.

the B.B.C. is again considering the vexed problem of auditions for artistes and instrumentalists.

\*\*\*\*\*  
\* **LOUD-SPEAKER** \*  
\* **BREAKDOWNS** \*  
\* \*\*\*\*\*

## THE BARGEE, HIS WIFE AND HIS RADIO



A typical scene on a German canal, where life may be a little cramped, but is greatly enhanced by the possession of a radio receiver.

**P**ECULIAR as it may seem, there are plenty of reasons why a loud speaker connected directly in the plate circuit *should* break down.

It is carrying the full plate current of the power stage, and a high H.T. voltage exists between the windings and earth. Should the current become excessive in any way, the coils might be burnt out, while intermittent disconnections in the circuit will cause voltages to be induced sufficient to puncture the insulation and thus short-circuit a number of turns.

Further, should the connections be reversed, a de-magnetising effect occurs, gradually weakening the poles.

It is no wonder that breakdowns often occur, but they would nearly all be entirely prevented by the simple recourse to a choke filter output.

H. R.



THIS issue of the WIRELESS CONSTRUCTOR is the 1931 "Show" number. Once again we are within a few days of the National Radio Exhibition at Olympia, and firms are busily engaged in putting finishing touches to their winter programmes.

**Already on the Market**

It is usual at such a time to look upon the winter as a "new" season, but this term hardly applies nowadays, for it is rapidly becoming the general practice to release new developments as soon as they are ready, and not to hoard them up for the Show.

Especially is this the state of affairs in the world of valves, so that this year at Olympia we shall not see so very many new arrivals in the valve ranks as we might expect. We have been introduced to most of them, or their early brethren, already.

For instance, if the manufacturers had wished they could have kept back the indirectly-heated D.C. valves and they could have been released on September 18th as a "revolutionary development." But it was decided otherwise, and the public already know about these valves; and, in fact, one make has already made its appearance on the market.

**A Few New Types**

Further types are being introduced at Olympia, however, and other makes will be ready for the winter. Still, the fact remains that the indirectly-heated D.C. valve, long awaited by set manufacturers and home-constructors alike, is a very big step forward, and because it has arrived unheralded by any fanfare of trumpets or advertising shrieks it must not be regarded as unimportant.

*Although there are a number of new valves at Olympia this year, the manufacturers have preferred to release most of them beforehand, instead of holding them until the Show. Here is an interesting account of the merits of the various recently introduced types.*

The D.C. valve, of course, is somewhat restricted in its growth; it cannot increase in size and power in the same way as the A.C. valve. There is little likelihood of our seeing the D.C. counterpart of the A.C.P.1, or the P.P.5/400, PX4, etc. The reason seems obscure until one remembers one thing—the mains voltage.

With A.C. we can step-up the H.T., potential to anything we like and with the exception of the P.P.5/400, the A.C. valves we have mentioned only need 200 volts H.T., while they need something like 30, 32, and 35 volts grid bias respectively.

**Where A.C. Scores**

The P.P.5/400 can be ruled out; it needs 400 volts H.T. But what of the other two? Surely with most D.C. mains we can give the required 200 volts H.T.! Of course we can. But what about automatic bias?

A mains valve is but half an affair if battery bias is required, and if mains bias is used this voltage has to

**KEEPING WATCH ON THE WORLD'S LIGHTNING**



*This apparatus at Slough is used for keeping a record of lightning flashes, and has a range of many thousands of miles. It is really a very powerful radio receiver, designed specially for the reception of atmospherics.*

## The New Season's Valves—continued

be subtracted from the available H.T. voltage. Thus if we have 210-volt D.C. mains and use a PX4 type of valve, what happens?

### The Bias Bug-Bear

We need 35 volts bias at 200 volts H.T. Obviously we can only give 10 volts and still have 200 left—in reality less than that, owing to drop in smoothing circuits. But we can neglect that for the present.

We have, therefore, to strike a happy medium, and eventually arrive at something like 180 volts and 25 volts G.B.

ordinary three-electrode valves. The D.C. Pen. especially is an exceedingly fine valve, and is capable of giving a large, undistorted output.

The double or bi-grid valve has also recently made its appearance on the British market, and specimens can be obtained from several of the valve manufacturers. This valve is useful for detector-oscillator purposes where super-hets are concerned, and has been brought out for this purpose.

The two-volt range of valves has been augmented very considerably. Many new Mazda valves are being introduced for the "season," and

characteristic to assist in overcoming the cross-modulation bugbear.

Cross-modulation, as you will remember, is the name given to that nasty habit of the local coming through on top of another strong station even when the set is "perfectly" selective. For instance, in an S.G. set tuned to the London Regional and close to that station one may hear the London National during intervals in the former's programme, even though the tuning of the receiver is sharp enough to give a good gap between the stations.

### EXAMINING THE "WORKS" OF A NEW RADIO-GRAM



The H.M.V. people run a special school where they give dealers a short course of instruction on the "inner workings" of their apparatus. Here you see members of the trade examining the "innards" of a new radio-gram.

With 240-volt mains we could almost do it, neglecting the smoothing drop; but such a near-the-margin business could hardly be satisfactory enough to warrant the production of valves of this calibre.

So we shall probably have to be content with smaller valves or pentodes. And, after all, why not pentodes? They are remarkably efficient, and for given input power they give a greater milli-wattage output than

several fresh screen-grid valves have already been placed on the market.

### Latest S.G. Types

Notable among these are the S.21 and S.22, two valves which have slightly different characteristics, and therefore enable one to pick out one or the other for any particular use.

The S.21 is for ordinary S.G. amplifiers where more than one valve is used, and it has a specially straight

### An Old "Snag"

It is due to a form of overloading causing distortion of the S.G. valve's characteristics, then partial rectification sets in, and instead of the tuned S.G. stages helping to cut out the other local they are fed with modulated H.F., the H.F. of the proper station plus modulation from the partially rectified unwanted station, the impulses from which have crept through the initial tuned circuits to the first S.G. valve.

Here the impulses are rectified and then mixed with the H.F. from the wanted station. Henceforward no amount of selectivity will do one jot to unmix the mess.

The long, straight characteristic of the S.21 is said to assist in preventing this rectification, which is due to the strong signal's effect on a not-too-linear characteristic.

The S.22 is a valve with a higher magnification factor and mutual conductance than the S.21, and is useful for one-stage H.F. circuits where greater amplification is required.

### Useful Mullard Range

The Mullard list for the new season is well worth studying. For super-hets they have included the 1D.G., a double-grid valve, while for D.C. receivers the P.M.13 and the P.M.25 have been introduced.

On the A.C. side several new valves are appearing. Some of the most interesting of these are the 904V., a detector with an amplification factor of 90, the 244V., and the Pen.4.V., which latter is an indirectly-heated A.C. Pentode.

The P.M.24C. and D. are two more valves which will prove as popular as their brethren, the P.M.24A. and 24B.



# The "EXHIBITION" FOUR

*A receiver which sets a new standard of simplicity, efficiency and novel design. You simply turn one very conveniently placed dial, and in roll stations, from near and far, on either long or medium waves.*

**Described by A. S. CLARK**

WHEN someone in a B.B.C. symphony concert hits the drums extra hard, or when a fanfare of trumpets "smites" the microphone, how many milliammeters there must be that "kick" at the volume. And how many more there would be that would "kick" if every set employed one!

When the needle of a milliammeter connected in the plate circuit of an output valve "kicks," you know that distortion is taking place and that a valve on the L.F. side of the set is overloading—or possibly two are overloading. You also know that the correct thing to do is to cut down the volume a bit.

## "Killing" Good Music

But suppose when the music rises to a positive crescendo of sound the needle does not budge the slightest, but takes everything quite steadily, are you entitled to sit back with a smirk of self-satisfaction, and pride yourself that you are getting absolutely undistorted reproduction? No, you most certainly are not!

There is another way in which distortion may be taking place. The meter tells you a good deal, but not everything.

Actually there are two distinct forms of distortion. There is that which we have been discussing, which is due to overloading, and is really a matter of partial rectification; and then there is what is known usually as "frequency distortion."

Personally, I think it would be better described as "distortion due to unproportional handling of varying frequencies."

If you pass two notes into a loud speaker, both of the same intensity, but differing in frequency, and that speaker reproduces one so that it is much louder to the ear than the other, then the said speaker is guilty of frequency distortion. Do you get the idea?

## "Frequency Distortion"

If you think of it for a bit you will begin to realise that almost every piece of radio apparatus is culpable of this sort of distortion to a certain degree. Yes, even the transmitter does its share!

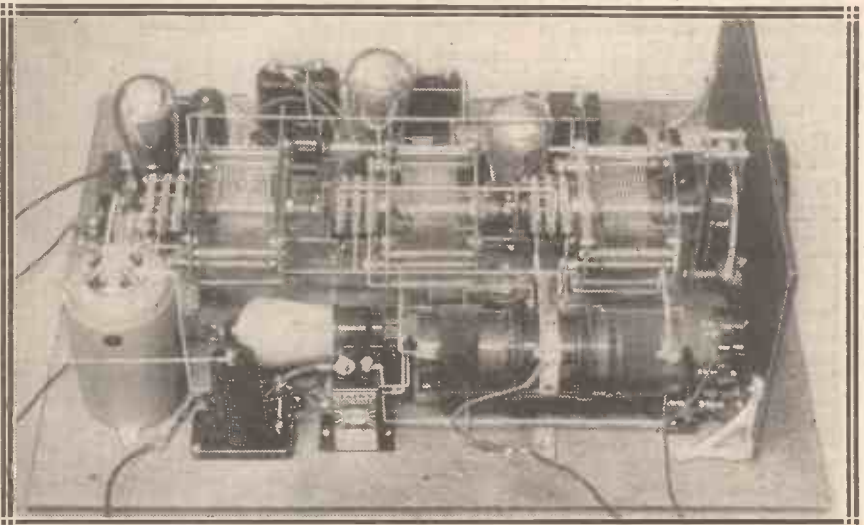
But it is not the slightest bit of good putting one of them after a set that is playing havoc with the frequencies. And it is just in connection with this matter of frequency distortion that the difference exists between a properly designed receiver and one that is merely a few components slung together.

In drawing up a design as a whole, not only must attention be given to the provision of a volume control to avoid the first and commonly recognised form of distortion, but the various stages of the receiver must be so arranged that the output is as far as possible a representation of the input.

## A Good Set

To do this it is often necessary to offset a certain frequency distortion in one part by an "opposite" fre-

## REMARKABLE RESULTS—REMARKABLE SIMPLICITY



*This is one of the easiest sets to build you have ever seen. There is no screening, no coils to wind and no special constructional jobs; it is just a straightforward piece of work that anyone may tackle with confidence.*

But we can neglect what the transmitter does, for it is a mere nothing when compared with what often takes place at the receiver. Given a good input there are many speakers available that will give you reproduction really worth hearing.

frequency distortion in another part. Naturally, also, to get this effect component values must be just right.

The "Exhibition" Four is a good instance of a receiver in which every little detail has thus thoroughly been worked out. But its good design

## The "Exhibition" Four—continued

does not end with the circuit, for it has many other fine features.

Take the general design. It is so arranged that it will stand just where you want it, and the controls are the right height to come easily to hand as you sit comfortably in a chair.

This matter of tuning in comfort goes further than that, too, because this is a real one-hand set. There are just three controls in all—the on-off switch, the volume control, and the tuning dial.

There is no reaction knob to fiddle with at the same time as the Extenser. You just turn the latter, and stations roll in on both wave-bands according to the dial reading.

### Dozens of Stations

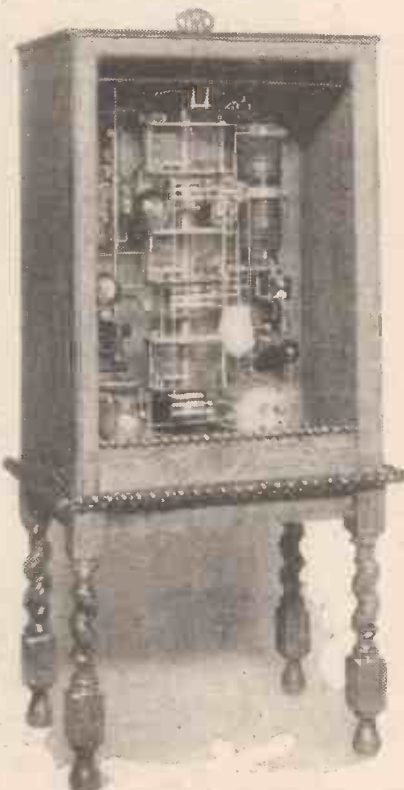
Don't think it is a local receiver only; the stations come in just as though reaction were in use, except that there is no reaction condenser to adjust. What more could you want?

Before getting down to "brass tacks" let's have a look at the circuit diagram. First of all we have a special band-pass circuit to look after the necessary selectivity and yet provide good quality.

This is tuned by a double Extenser, another section of which tunes the interval band-pass coil. This latter still keeps the quality O.K., and at the same time provides a high degree of amplification from the screened-grid valve.

For the rest we have a carefully de-coupled detector, followed by one R.C. stage and one transformer stage

### TRULY TRIUMPHANT



*There is something very majestic looking about the completed receiver, which is sufficiently elegant to grace any room in the house.*

of the parallel-feed variety. And finally the output is handed on to the loud speaker via the output filter.

The cabinet itself makes quite a "smart" piece of furniture, and, in spite of its elegance, does not require

much skill to construct. Although, of course, you could easily get it made up for you, for the benefit of those who desire to construct it themselves full details will be given next month.

In the cabinet you see in the photographs a special glass panel was provided in the front because the set is on exhibition at the radio show. This can be replaced by a nicely polished wood panel; but I fancy many of you will like to have glass, because the innards of the receiver make quite a pretty show.

### Easy to Build

If you are rather taken by the design of the "Exhibition" Four, but do not want such an elaborate cabinet, there is no reason why you should not use an ordinary one with the panel in a vertical position as usual. However, the special cabinet is well worth the trouble of making or cost of buying.

As far as the assembly of the receiver is concerned there is nothing difficult; in fact, it is a particularly straightforward one to construct. There are no special components to make, no coils to wind, and not even any screens to assemble or copper foil to fit in place.

The whole thing will not take you long, so just a few hints and then you can get along with the work. To start off there is a point to explain *re* the Extenser assembly.

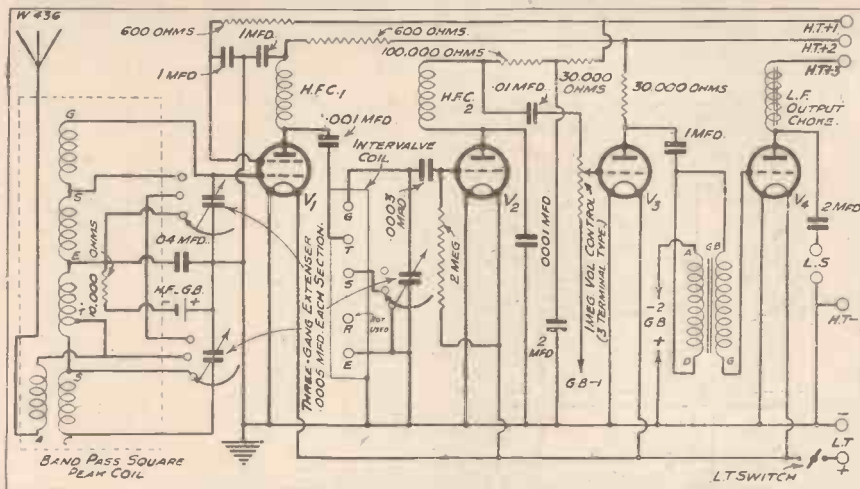
This Extenser has three sections, and the self-changer contacts are slightly differently arranged from the

### HERE IS A LIST OF WHAT YOU WILL NEED

- |  |   |   |
|--|---|---|
| 1 Panel, 11½ in. × 7 in. (Permeol, or Wearite, Goltone, Red Seal).   | Telsen, Helsby, Formo, Peto-Scott, Lissen).   | 1 Parafeed L.F. transformer (R.I.).   |
| 1 Special cabinet for above, with base-board 19 in. × 14 in. (See text.)                                   | 1 .0001-mfd. fixed condenser (Telsen, or Ediswan, Ready Radio, Dubilier, T.C.C., Ferranti, Lissen, Graham Farish, Goltone). | 1 Small output choke (Igranic, or Telsen, R.I., Varley, Ferranti, Bulgin).  |
| 1 .0005-mfd. triple-gang Extenser, with slow-motion dial (Cyldon).   | 1 .0003-mfd. fixed condenser (Dubilier, etc.).  | 2 600-ohm Spaghetti resistances (Bulgin, or Ready Radio, Telsen, Magnum, Varley, Igranic, Goltone, Sovereign, Graham Farish, Peto-Scott, Lewcos).         |
| 1 Square Peak band-pass coil (Varley).   | 1 .001-mfd. fixed condenser (Ferranti, etc.).   | 1 10,000-ohm Spaghetti resistance (Lewcos, etc.).   |
| 1 Interval Square Peak band-pass coil (Varley).  | 1 .01-mfd. fixed condenser (Lissen, etc.).  | 2 30,000-ohm Spaghetti resistances (Ready Radio, etc.).   |
| 1 L.T. switch (Ready Radio, or Bulgin Rotary, Telsen, Igranic, Lotus, Peto-Scott, Wearite, Magnum).        | 1 4-pin horizontal type valve holder (Parex, or Bulgin, W.B.).  | 1 100,000-ohm Spaghetti resistance (Magnum, etc.).  |
| 1 1-megohm potentiometer-type volume control, with 10½-in. extension handle and mounting bracket (Magnum). | 3 4-pin ordinary valve holders (Lotus, or Wearite, Telsen, Clix, Formo, Magnum, Bulgin, Lissen).                            | 4 Indicating terminals (Belling & Lee, or Igranic, Ealex, Clix, Goltone).   |
| 1 .04-mfd. non-inductive fixed condenser (Dubilier).   | 2 H.F. chokes (Telsen and Lewcos, or Ready Radio, Varley, R.I., Peto-Scott, Sovereign, Bulgin, Wearite).                    | 2 Terminal blocks (Belling & Lee).  |
| 3 1-mfd. fixed condensers (Formo, T.C.C. and Dubilier, or Telsen, Peto-Scott, Ferranti, Igranic).          | 1 2-meg. grid leak and holder (Graham Farish, or Telsen, Ediswan, Dubilier, Igranic, Varley, Ferranti).                     | 2 Panel brackets (Magnum, or Camco). Battery plugs, spade connectors, etc. (Clix, Belling & Lee, Igranic, Ealex). Glazite or Lacoline. Flex, screws, etc. |
| 2 2-mfd. fixed condensers (Ferranti and T.C.C., or Telsen, Dubilier, Igranic,                              |   |   |



# The "Exhibition" Four—continued



The circuit, a clever combination of all the latest in radio.

The use of this special contact scheme accounts for the fact that, as you see in the circuit diagram, one of the self-changer contacts on the third section of the Extenser is joined direct to earth.

### Biasing the S.G. Valve

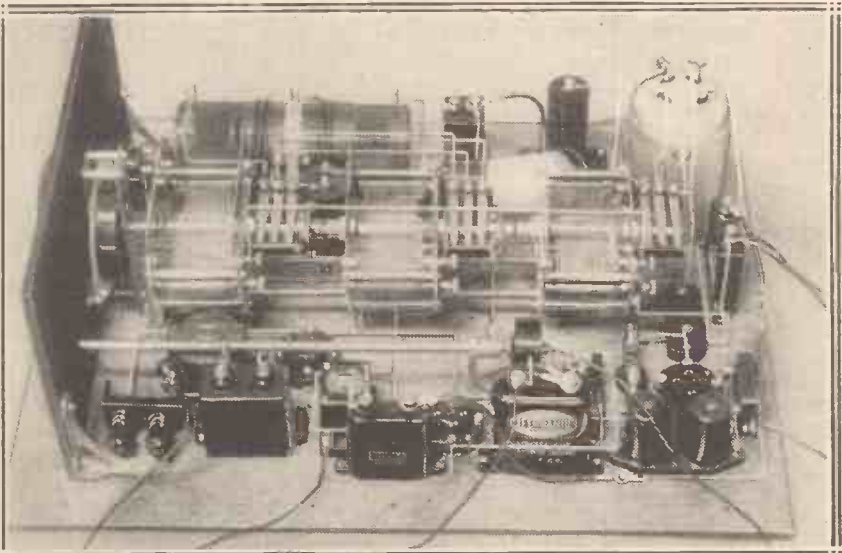
There is another little point in connection with the .04-mfd. condenser that is worthy of mention, and that is the use of a resistance of 10,000 ohms in series with the grid-bias battery across it. This is to ensure that the grid-bias battery does not materially effect the action

### GOOD LAYOUT GIVES EASY WIRING

normal. Instead of the usual scheme in which the metal member that connects the self-changer contacts together is joined permanently to the moving vanes of the Extenser, this member is completely isolated from the moving vanes. When ordering your Extenser there is no need to specify this, because in all ganged Cyldon condensers (the make employed in this set) this scheme is incorporated.

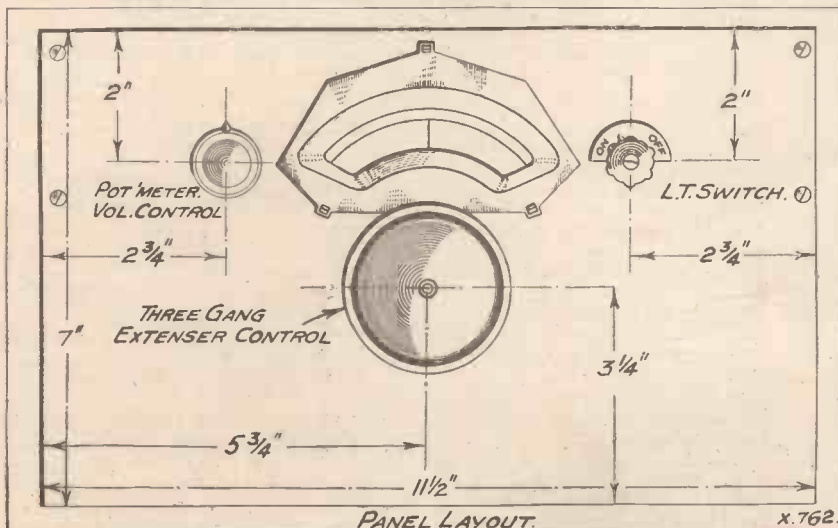
### A Point to Note

The scheme is necessary because when the self-changer contacts are joined together they do not have to go to the moving vanes. The use of a band-pass arrangement makes a .04-mfd. fixed condenser necessary, and the self-changer contacts are taken to the non-earthed side of this.



In this photograph you see the receiver when it is completely wired.

### TWO KNOBS AND A DIAL—THAT'S ALL!



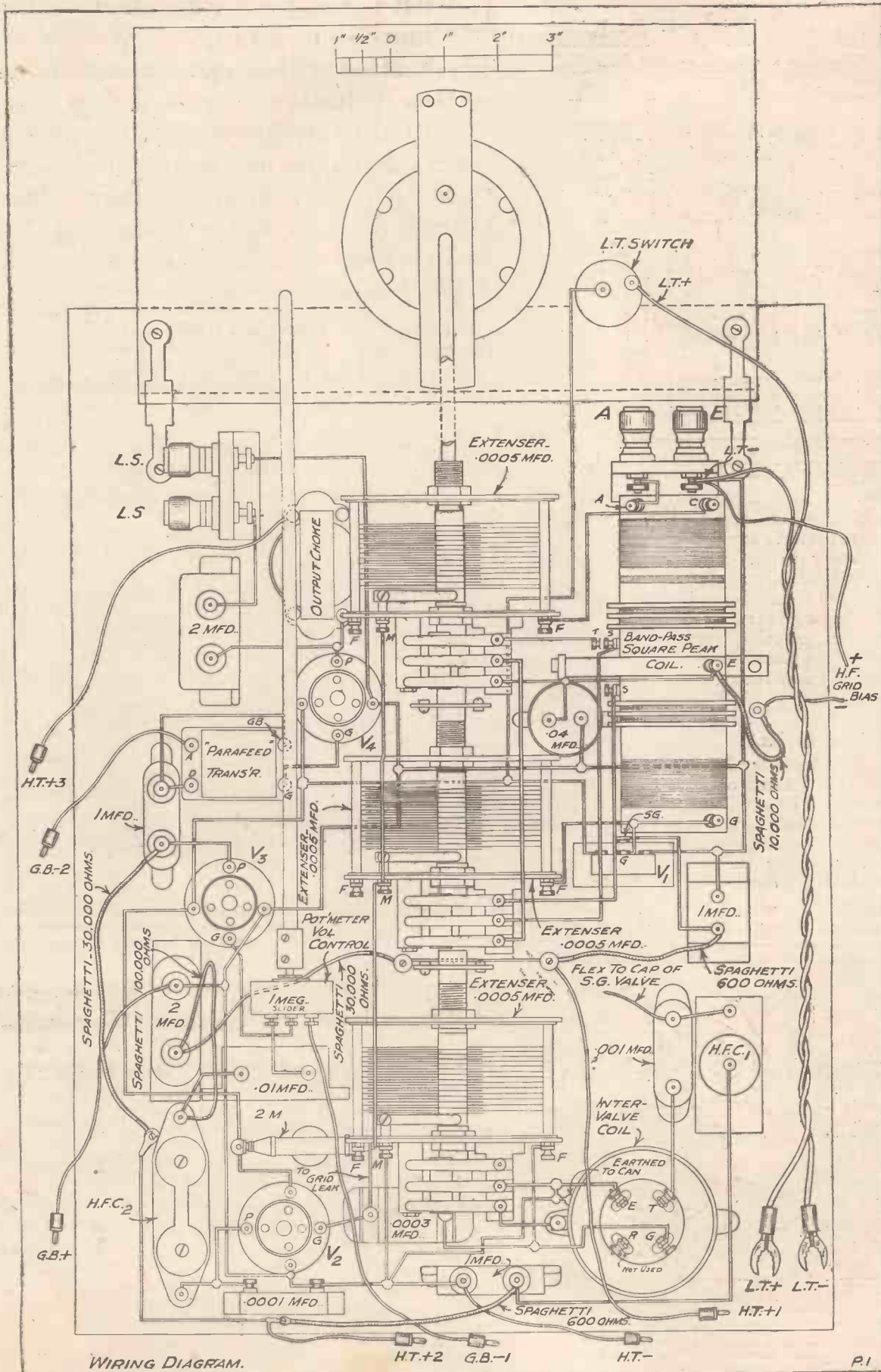
The dial is the only control for tuning. The two knobs being operated only occasionally, either to switch on or off or to vary the volume.

of the condenser, as the band-passing might otherwise be upset.

The order in which the self-changer contacts are joined up in the theoretical diagram is not quite the same as in the practical wiring diagram. This, however, is of no consequence, because it is immaterial which connection goes to which contact. The electrical effect is just the same.

### Straightforward Wiring

Apart from the cabinet, which, as already mentioned, will be described in full next month, the construction is largely just a matter of screwing components to the baseboard and wiring them up. In fact, there is very little for me to tell you about this aspect of the receiver.



**ACCESSORIES**

**Loud Speakers.** (Blue Spot, B.T.-H., Celestion, Undy, Amplion).

**Valves. 1 S.G.** (Cossor, Eta, Mazda, Six-Sixty, Osram, Lissen).

1 H.L. (Mazda, or Fotos, etc.).

1 L.F. (type L.210) (Osram etc.).

1 Super-power (such as Six-Sixty 230S.P., etc.). (Four- or 6-volt valves of similar characteristics can be used.)

**Batteries.** H.T., 120-150 volts (Dry-dex, Ever-Ready, Magnet, Pertrix, Lissen).

G.B.: 9 or 1.5 volt for S.G. valve (see above).

G.B. for L.F. valves to suit valves, up to 18 volts (see above).

**Accumulators.** Voltage to suit valves (Exide, G.E.C., Pertrix, Lissen, Ediswan).

**Mains Units.** (Regentone, Ekco, Tanroy, R.I., Heayberd, Atlas, Lotus) (state voltage and type of mains and give details of set when ordering):

Every  
Ready Radio kit  
is tested  
and passed  
before  
despatch

G.P. Kendall

Mr. G. P. Kendall, B.Sc., has now joined the staff of Ready Radio as Chief Engineer. He was, for many years, Assistant Technical Editor and Chief of Research in "Popular Wireless" and "Modern Wireless."

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BUILD THE "EXHIBITION" FOUR		"I.E."	
	£ s. d.		£ s. d.
1 Polished ebonite panel, 11 1/2" x 7" x 3/16", drilled to specification	3 6	1 Polished ebonite panel, 14" x 7" x 3/16", drilled to specification	4 6
1 Wavemaster Extenser .0005-mfd. triple-gang condenser, and dial	2 9 6	1 Oak cabinet with 10" base-board	1 0 0
1 Varley square-peak band-pass coil	15 0	1 Wavemaster Extenser .0005 mfd. condenser, slow-motion type	15 6
1 Varley intervalve square-peak coil	8 6	1 ReadRad .0001-mfd. Brookmans type condenser	2 6
1 ReadRad L.T. switch	10	1 ReadRad on-off switch	10
1 Sovereign 1-megohm potentiometer type volume control	4 6	3 Single coil holders	2 6
1 ReadRad 10 1/2" extension handle and baseboard bracket	2 0	1 P.J.I. coil unit	3 6
1 Dubilier .04 non-inductive type condenser	2 0	1 ReadRad "Hilo" H.F. choke	4 6
3 T.C.C. 1-mfd. fixed condensers	8 6	1 R.I. general purpose L.F. transformer	10 6
2 T.O.C. 2-mfd. fixed condensers	7 8	2 4-pin. valve holders	1 0
1 T.C.C. .0001 fixed condenser type "S"	1 6	1 ReadRad 400-ohm slide potentiometer	2 9
1 T.C.C. .0003 fixed condenser type "S"	1 3	1 ReadRad 2-megohm grid leak and holder	1 4
1 T.C.C. .001 fixed condenser	1 10	1 T.C.C. .0003-mfd. fixed condenser, Type "S"	1 3
1 T.C.C. .01 fixed condenser	2 6	1 T.C.C. .0001-mfd. fixed condenser	1 6
1 Junitt 4-pin horizontal-type valve holder	1 9	9 Belling-Lee type "R" terminals	2 3
3 Valve holders 4-pin type	1 6	1 Terminal strip, 14" x 2" x 3/16", drilled to specification	1 6
2 H.F. chokes, ReadRad and Lewcos	10 6	2 Wander plugs	4
1 ReadRad 2-meg. grid leak and holder	1 4	3 Lewcos plug-in coils, Nos. 75, 250, 150	12 6
1 R.I. Parafaced L.F. transformer	8 6	3 Atlas short-wave coils, 1 No. 2, 2 No. 4	7 8
1 R.I. L.F. choke, type G.P.	12 6	2 Valves to specification, Mullard PM2DX, PM2	19 0
2 600-ohm Spaghetti resistances	1 6	1 Packet Jimlinx for wiring	2 6
1 10,000-ohm Spaghetti resistance	1 0	Flex, screws, coil of glazite and tapping clip	10
2 30,000-ohm Spaghetti resistances	3 0		
1 100,000-ohm Spaghetti resistance	1 6		
4 Belling-Lee type "R" terminals	1 0		
7 Belling-Lee wander plugs	1 2		
2 Spade tags	3		
2 Belling-Lee terminal blocks	1 4		
1 Wooden base-board, 19" x 14"	1 6		
1 Fair ReadRad panel brackets	1 10		
1 Siemens S.G. cell	1 0		
1 Packet Jimlinx	2 6		
4 Valves to specification, Cosmor S.G., Mazda H.L. and Super-Power and Mullard L.F.	2 10 6		
Flex, screws, and coil of Glazite	1 0		
TOTAL (including all accessories)	£10 13 3		

**"EXHIBITION" FOUR**  
Kit "A" (less valves) £8 2 9, or 12 equal monthly instalments of 15/-  
Kit "B" (with valves) £10 13 3, or 12 equal monthly instalments of 19/6

**"I.E."**  
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## The "Exhibition" Four—continued

Actually there are no battery terminals, as the batteries are connected via flex to the various points. Note the method employed for making contact in some cases to the ends of Spaghetti type resistances.

### Securing "Spaghettis"

The tag at the end of the Spaghetti is screwed to the baseboard by means of an ordinary wood-screw and the flex lead is clamped under the tag. A secure joint is thus obtained without any risk of the tag being loosened on the end of the Spaghetti.

The intervalve band-pass coil is housed in an aluminium case and this case is earthed. This is carried out by fixing a wire under one of the screws which are employed to hold it down.

Now a word about the valves and batteries. The latter are arranged inside the cabinet, there being room for them to stand on the floor.

Of course, there is no reason why you should not use an H.T. mains unit instead of the H.T. battery if you so desire. In this case you can quite conveniently bring the mains lead through the bottom of the cabinet.

I should advise you to use a mains unit if you can, as otherwise you will have to be content with a small power valve for the output and will not be able to handle so much volume.

The first valve is an S.G. with a  $1\frac{1}{2}$ -volt grid-bias battery, or you can use one of the special 9-volt ones if you like. The second or detector valve should be of the special detector or H.F. type, and the third valve an ordinary L.F. valve.

### Regarding the Valves

The amount of bias required for the last valve will depend upon the valve used, and you must be guided by the maker's figures. G.B.—1 will want about 3 or  $4\frac{1}{2}$  volts.

Unless you already have the valves on hand there is no point in using 4- or 6-volt ones. Two-volt valves will not require such a large accumulator and it will consequently fit in the cabinet easier.

You will want 120 or 150 volts of high-tension. On H.T. plus 1 put between 60 and 80 volts, finding the best value by trial. H.T. plus 2 should have 120 volts and H.T. plus 3 the maximum you have available.

That's all there is to tell you about the accessories and now a few words about the operation.

The ganged Extenser will tune in medium-wave stations on the two-figure readings and the long waves on the three-figure readings. No adjustments in the way of ganging are necessary with this Extenser, its sections and the coils being sufficiently balanced in the first place.

### A Final Hint

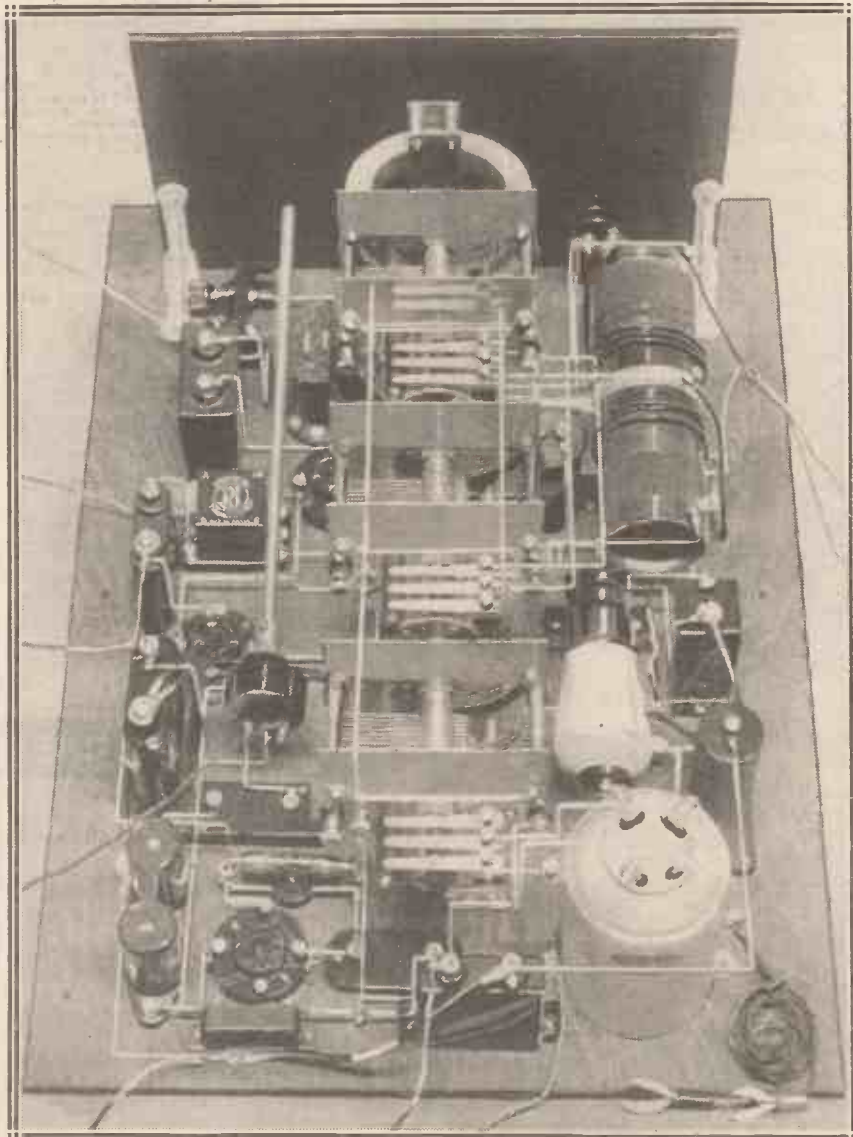
It must be realised that as this set is so sensitive without reaction there is enormous amplification of H.F. taking place, and it is not impossible that some of it might get through to the

L.F. side. If it does it will make itself known by a rather noisy background and an apparently slight tendency to instability.

If you experience this, all that you need do is to insert a grid-stopper in the grid circuit of the first L.F. valve. This will consist of a .25-megohm grid leak.

You will find this set ideal as a home receiver, for apart from the fact that it is the simplest thing on earth to control, it is completely shut in when not in use and the old bugbear of dust on the panel is absent.

### A SET THAT BRISTLES WITH EFFICIENCY



*There is something about the "Exhibition" Four that makes an irresistible appeal to the constructor, be he long-distance enthusiast or the man who likes a simply controlled but powerful local receiver. It makes one "itch" to get at the pliers and screw-driver.*



# AS WE FIND THEM

## NEW APPARATUS TESTED

### Ferranti Condenser

**M**ESSRS. FERRANTI, LTD., of Holinwood, Lancs, are now marketing a new fixed condenser, tested on 500 volts D.C., which is divided into two sections, giving a capacity of 1 mfd. on each side of a common centre terminal.

### A USEFUL UNIT



*This Ferranti condenser unit comprises two condensers each having a capacity of 1 mfd.*

These condenser units are enclosed in a metal case and are secured to the baseboard by means of two loose-fixing brackets which hold the unit tightly into position, or alternatively enable it to be removed simply by unscrewing one of the brackets.

These condensers are very useful for by-passing purposes, etc., and enable a considerable economy in space to be effected.

### Coil Quoits

Messrs. Peto-Scott & Co., Ltd., 77, City Road, London, E.C.1, have sent

us samples of their latest coil quoits. These are beautifully moulded of brown material. Two moulded feet are provided to enable the quoits to be screwed to the baseboard, and there are four holes so that the ends of the winding can be neatly passed through the moulding. We can thoroughly recommend these coil quoits, which retail at 6d. each.

### Amulet Valve Seals

We have received from Messrs. Graham Farish, Ltd., Masons Hill, Bromley, Kent, a number of "Amulet" valve seals.

The object of these valve seals is to close the gap between the glass bulb of an S.G. valve and circular hole in the metal screen through which the bulb passes, when the valve is mounted in a horizontal position.

In appearance the seals resemble a spiral spring armlet band, except for the fact that they are smaller in size. The band is simply passed over the valve bulb and pressed into contact with the screen.

These accessories are a useful refinement and retail at 6d. each.

### Burndept Two-Valver

We have recently had an opportunity of trying out one of the Burndept "Merrymaker" receivers—a two-valver of the detector and L.F. type retailing at £5 15s. 0d., complete with all accessories.

It is an attractive little set, the loud speaker, batteries, etc., being enclosed in the cabinet. The operation is extremely simple, and at Tallis

House we had no difficulty in separating the two Brookmans Park transmissions, which incidentally came in at good strength on the loud speaker.

An adjustable selectivity control is included in the design, as well as long- and medium-wave switching.

### Clix Valve Holders

Messrs. Lectro Linx, Ltd., of 254, Vauxhall Bridge Road, London, S.W., have sent us a sample of a Clix panel-mounting valve holder, particularly suitable for use in mass-produced receivers, and making use of the well-known Clix helically-slotted sockets.

We were impressed by the excellent contact possible, and also by the fact that the minimum amount of solid dielectric is employed, thus reducing any possibility of losses.

The price of the 5-pin valve holder is 6d., and the ordinary 4-pin type sells at the low price of 5d.

### NEW RADIO FACTORY



*The radio industry continues to grow, and among the many firms who have recently taken over new premises is Messrs. A. F. Bulgin & Co., Ltd. Their new up-to-date factory is shown in this photograph.*

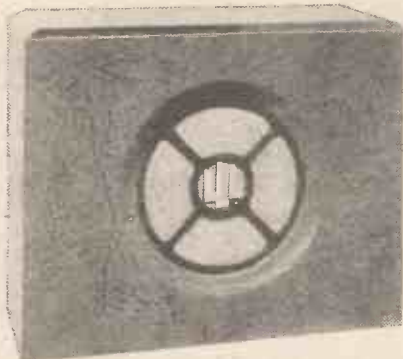
## As We Find Them—continued

### Telsen Components

We have received from Messrs. Telsen Electric Co., of Birmingham, a selection of their latest components, comprising Spaghetti resistances, small variable condensers, L.F. chokes, output transformers, etc.

In the case of the chokes and transformers, the first thing that strikes one is the extremely fine external finish; handsome brown bakelite mouldings are used, and all terminals

### COMPACTNESS WITH QUALITY



The Lanchester moving-coil speaker utilises a permanent magnet. A dual-purpose output transformer is included in the design so that the output circuit can be matched up with the valve.

are clearly marked in gold lettering upon a black background. An earthing terminal is also provided for the purpose of earthing the core.

The output transformer made by this firm has a ratio of 1/1 and a nominal rating of 15 henries primary inductance at 15 milliamps., the maximum current being 25 milliamps.

There are also a number of chokes, such as a pentode output choke, L.F. amplifying and smoothing chokes.

The Spaghetti resistances are soundly made and clearly marked with the resistance value, which is stamped on to the tags forming the ends of the resistance element. The prices of the Spaghetti resistances range from 6d. to 2s., and the maximum current-carrying capacities being rated at 42 milliamps. in the case of the 300-ohm resistance, and 1½ milliamps. in the case of the 150,000 ohms.

We tested one of the reaction condensers and could detect no sign of mechanical imperfections in the movement. The component had that nice velvety feeling which is so necessary for the satisfactory control of reaction. A copper pigtail connection is provided, so there is no possibility of any troubles occurring due to bad contact between the moving vanes and their appropriate terminal on the condenser.

These small condensers are of the one-hole-fixing type, and have handsome moulded knobs, a feature of the

### Eelex Frame Aerial

Messrs. J. J. Eastick & Sons, of Eelex House, 118, Bunhill Row, London, E.C.4, have brought out an attractive and efficient frame aerial of the wave-change type.

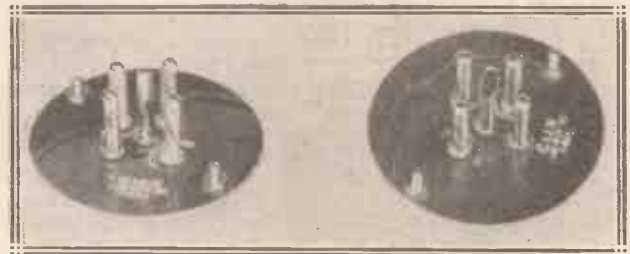
The frame has two green silk-covered windings, the turns being carefully spaced on slotted ebonite rods. There is a switch for changing over from medium to long waves and vice versa, and also three sockets to take plugs for connecting up to the ends of the windings.

On test we found the frame to work well, the lower wave-length reading appearing to be about 250 metres. The retail price of this aerial is £1.

### Lanchester Loud Speaker

We have recently had on test one of the Lanchester moving-coil permanent-magnet loud speakers, sent in

### EFFICIENT VALVE HOLDERS



These Clix valve holders have the minimum amount of solid dielectric, and make use of the well-known Clix helically-slotted sockets.

moulding being an arrow indicator which clearly shows the position of the moving vanes at any moment.

Telsen components are remarkable for their exceedingly moderate price, and will, we feel sure, achieve considerable popularity.

by the Lanchester Laboratories, Ltd., Spring Road, Tyseley, Birmingham.

The speaker in question was the "Senior" model, retailing at £4 4s. or £4 12s. 6d., with a dual-purpose output transformer, giving ratios of either 48-1 or 36-1.

The magnets are made of cobalt steel and the speaker is contained in a Rexine-covered cabinet, approximately 13 in. by 10 in. by 5½ in. The output transformer is built into the back of the cabinet, and is arranged with a centre-tapping so that push-pull can be used if desired.

There is also a switch to enable the output circuit to be matched up to a variety of output valves.

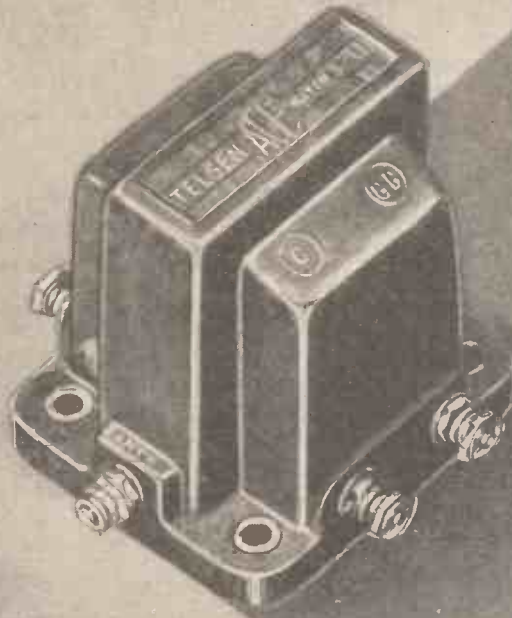
On test we found this speaker to be sensitive and the quality was crisp and well defined, with no trace of boominess or other unpleasant effects. In chassis form the price is only £2 18s. 0d.

### ATTRACTIVELY FINISHED AND MODERATELY PRICED



A selection of Telsen components. The L.F. transformers and chokes made by this firm are enclosed in beautifully moulded cases of polished brown bakelite

# Telsen's first claim to fame



## TELSEN L.F. and OUTPUT TRANSFORMERS

Telsen Transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest of engineering principles, these robust, full-size transformers will give not only efficient but enduring service.



### TELSEN L.F. TRANSFORMERS

TELSEN "ACE" TRANSFORMER, Ratios 3-1, 5-1 .. .. Price 5/6  
 TELSEN "RADIOGRAND" TRANSFORMER, Ratios 3-1, 5-1 .. .. Price 8/6  
 TELSEN "RADIOGRAND" 7-1 SUPER-RATIO TRANSFORMER .. .. Price 12/6  
 TELSEN INTERVALVE TRANSFORMER, Ratio 1'75-1 .. .. Price 12/6

### TELSEN OUTPUT TRANSFORMERS

TELSEN MULTI-RATIO OUTPUT TRANSFORMER, giving three ratios of 9-1, 15-1, 22'5-1 .. .. Price 12/6  
 TELSEN OUTPUT TRANSFORMER, Ratio 1-1 .. .. Price 12/6  
 TELSEN PENTODE OUTPUT TRANSFORMER .. .. Price 12/6

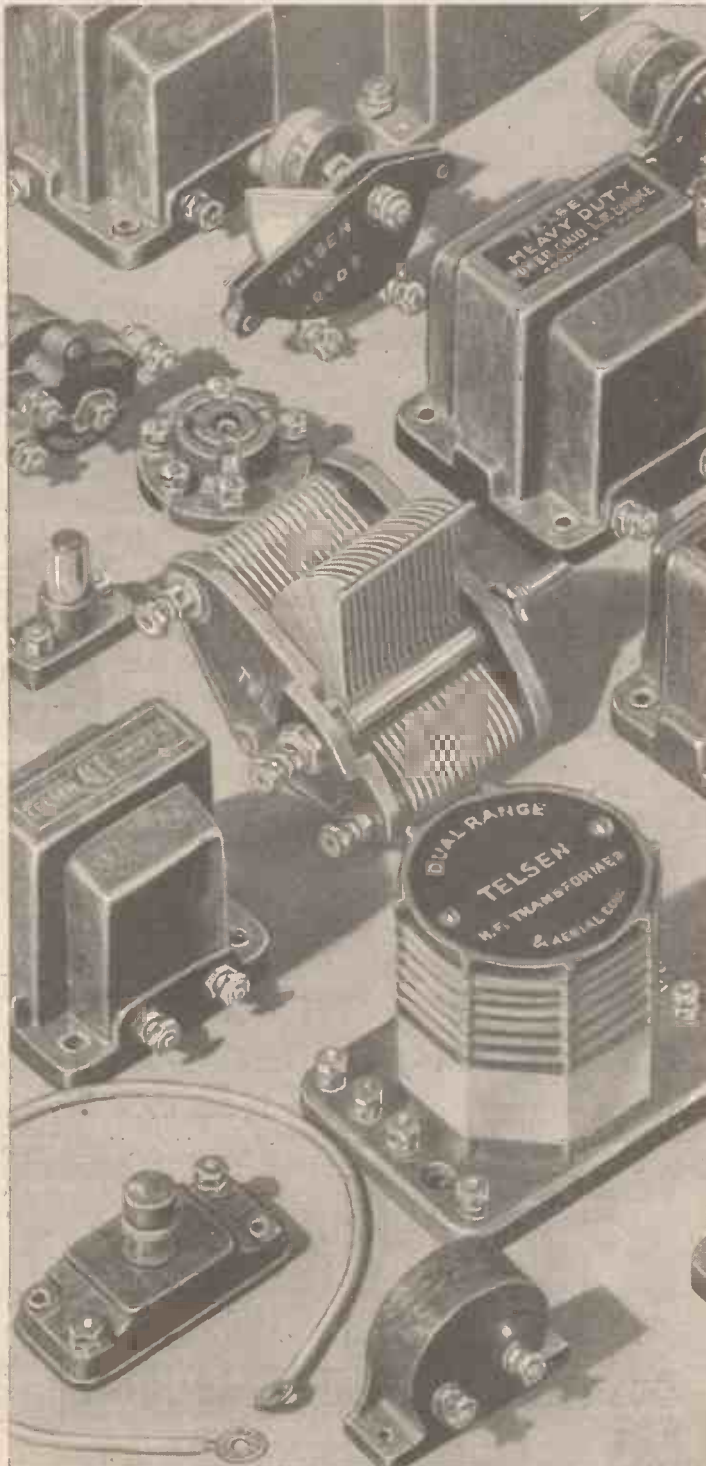
### TELSEN L.F. CHOKES

TELSEN L.F. INTERVALVE COUPLING CHOKE, 40, 100 and 125 henrys .. .. Price 5/-  
 TELSEN OUTPUT CHOKE (PLAIN), 20 henrys .. .. Price 8/-  
 TELSEN OUTPUT CHOKE (TAPPED), 20 henrys .. .. Price 8/6  
 TELSEN HEAVY-DUTY POWER GRID L.F. CHOKE, 40 henrys .. .. Price 8/-

# TELSEN

THE LARGEST RADIO COMPONENT MANUFACTURERS IN THE WORLD

# BUILD BETTER WITH



The foundations of Telsen's amazing success were established long before Olympia. The crowds at Stand 19 are only the crowning achievement of years of patient research and careful planning, and the justification of the new Telsen Components and new Telsen prices announced in June of this year.

Experts and amateurs, mass constructors of radio sets, and enthusiasts, whose keenness is confined to one home set—all have paid generous tribute to the construction, the finish and the performance of the whole Telsen range of radio components.

They build better than they know who build on Telsen.

- Valve Holders .. from 6d.
- Push-Pull Switches from 1/-
- H.F. Chokes .. .. from 2/-
- Transformers .. .. from 5/6
- Output Chokes .. from 8/-
- Power Grid Chokes .. 8/-
- L.F. Coupling Chokes .. 5/-
- Slow-Motion Dial .. .. 2/6
- Mica Condenser .. .. 6d.
- Pre-Set Condenser .. .. 1/6
- Variable Condenser .. 4/6

# TELSEN

THE LARGEST RADIO COMPONENT MANUFACTURERS IN THE WORLD



# TELSEN COMPONENTS

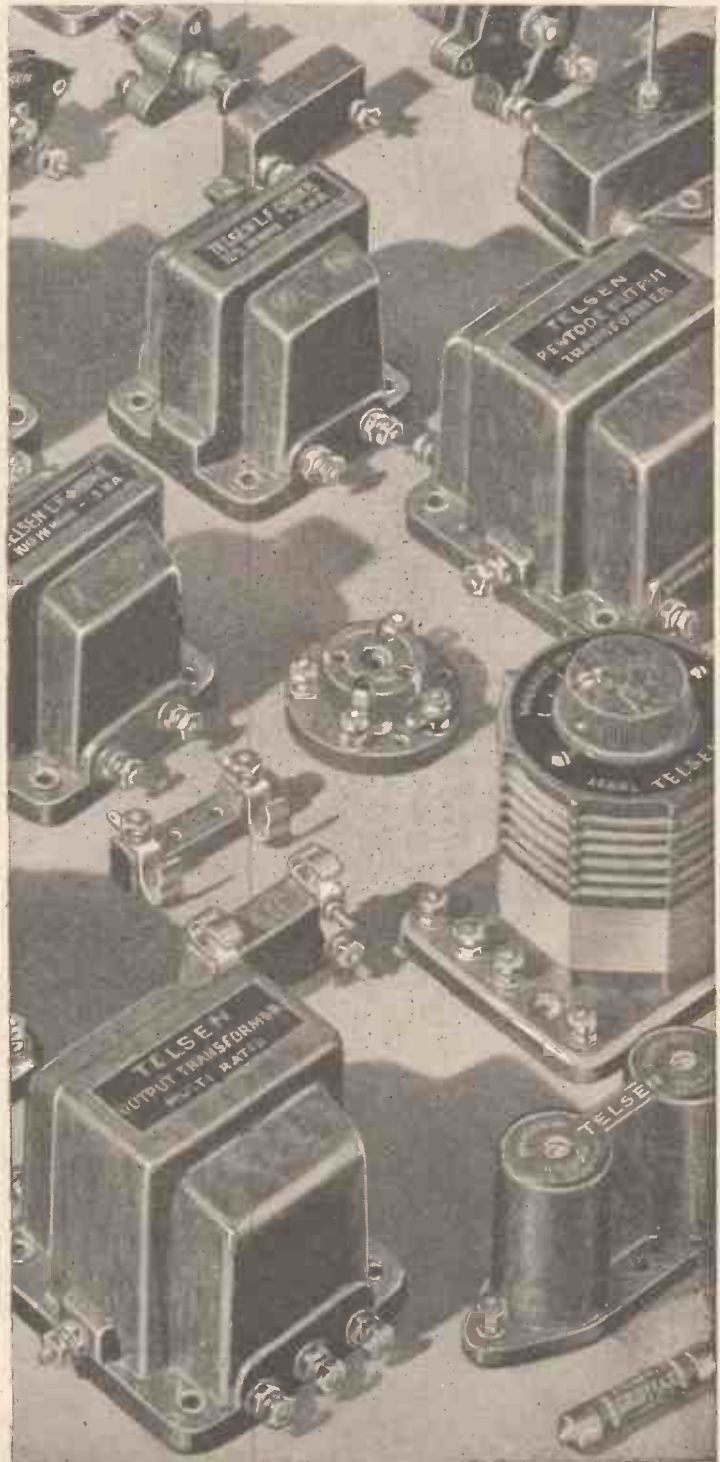
You can see for yourself at the Telsen Stand at Olympia that everything claimed for the new Telsen Components is, if anything, understated. Pick up these components, admire the solid construction—from smallest to largest, each one a work of real craftsmanship. Consider the handsome Bakelite casings and the grained finishing and marvel that such proud quality can be priced so modestly. Ask any questions you like and read the specifications for yourself—and finally put Telsen to the test of actual performance—you will be proud of the achievement of an all-British firm.

They build better than they know who build on Telsen.

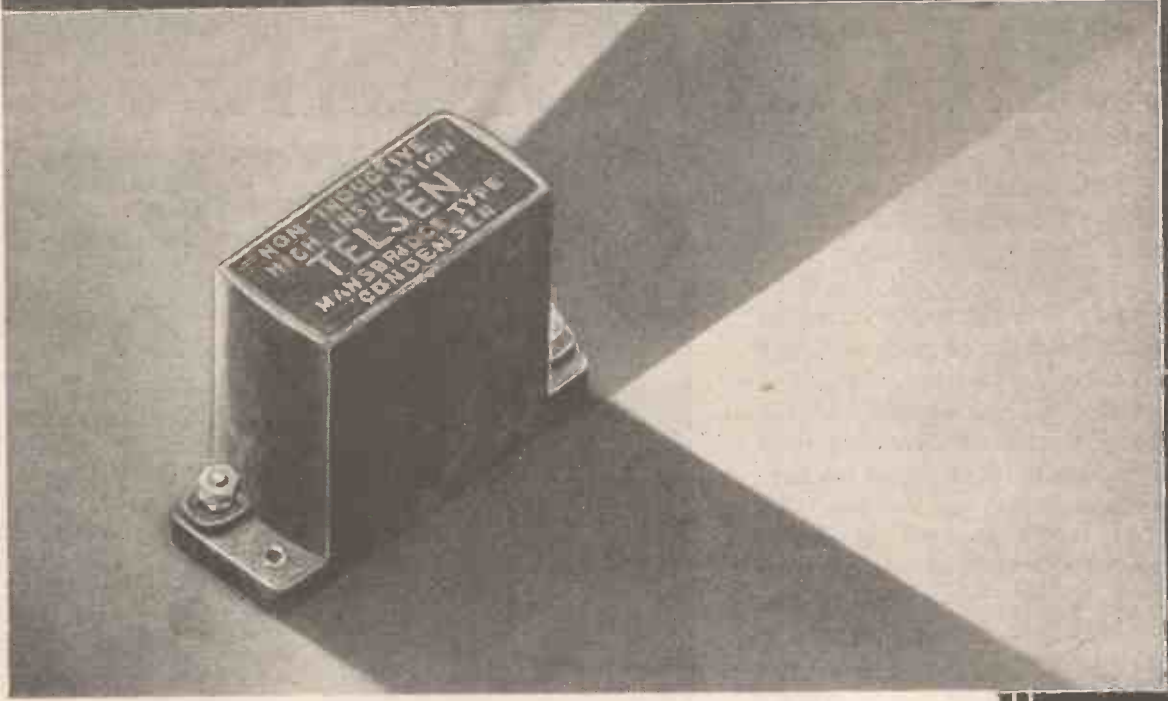
- Tuning Condenser .. .. 2/-
- Reaction Condensers from 2/-
- Differential Condenser .. 2/-
- Paper Condensers .. from 1/6
- Spaghetti Resistances from 6d.
- Loud-Speaker Unit .. .. 5/6
- Aerial Coils .. .. from 5/6
- Fuse Holder .. .. . 6d.
- Grid Leak .. .. . 9d.
- Grid-Leak Holder .. .. 6d.

# TELSEN

ALL-BRITISH  
RADIO COMPONENTS



*One of Telsen's latest achievements*



**TELSEN MANSBRIDGE TYPE CONDENSERS** from **1/6**

Telsen have installed the most advanced plant in the world for the manufacture of Mansbridge Type Condensers. Only genuine Mansbridge foil paper and the finest linden tissue are employed in the exclusive method of manufacture. Every Telsen Mansbridge Type Condenser is hermetically sealed from the atmosphere, and Post Office standards of insulation are adopted throughout.

The preliminary research, the most modern plant in the world, the finest raw materials, the latest methods of manufacture and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation over years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive.

THE FOLLOWING VALUES ARE GUARANTEED WITHIN 5%.

Cap. mfd.	500-Volt Test.		1,000-Volt Test.	
	Price		Price	
.01	1/6	.. ..	2/6	.. ..
.04	1/9	.. ..	2/9	.. ..
.1	1/9	.. ..	2/9	.. ..
.25	2/-	.. ..	3/-	.. ..
.5	2/3	.. ..	3/3	.. ..
1.0	2/3	.. ..	3/6	.. ..
2.0	3/-	.. ..	5/-	.. ..

**TELSEN**

**ALL-BRITISH RADIO COMPONENTS**

Advt. of Telsen Electric Co., Ltd., Birmingham.

IN LIGHTER VEIN

WE VISIT THE SHOW

By "WIRELESS WAYFARER"

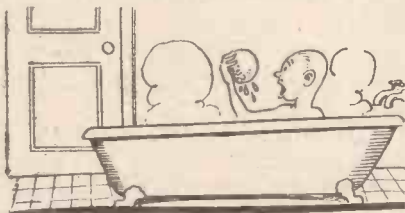


"Ah, ha!" said Professor Goop, glancing through the letter which he had just opened.

"And what," I inquired, "are you ah-haing about? I gather from the tone of the exclamation that you are pleased, if not indeed triumphant. Am I wrong in inferring that you have drawn a horse for the big race?"

"Entirely wrong," snapped the Professor. "I never draw horses in sweepstakes; in fact, I take the blackest view of them."

NEARING SATURATION



"Sitting happily in my bath."

"So do I. That's why they are called sweepstakes. If all the coupons and counterfoils that I have held were placed end to end—"

"Yes, yes, I know and so would mine, but we are not talking about sweepstakes. I have really important news."

"You have, have you?" I asked. "Pray get it off your chest or, as they say in Chicago, come clean."

News from Nastikoff

"I have the greatest of great news," cooed the Professor. "This letter is from Nastikoff, which, as you ought to know, but probably don't, is the capital of Yugo-Toblažia; it tells me that my old and highly esteemed friend, Professor Yupushoff, proposes to accompany me on a visit to the Wireless Exhibition. You can put him up, can't you?"

"No," I said at once, "I have met Professor Yupushoff, and the reply to your kind question is most emphatically no, nein, non, and whatever is the strongest negative in Yugo-Toblažia. In other words, having met your beastly Professor, I refuse absolutely and a great deal more than

that to have him beneath my roof during his stay in this country."

"But, but, but," spluttered the Professor.

"Now look here, don't get grid-currenting or bottom-bending, or otherwise overloading. Let your speech be crystal clear."

Coming to England

"Well, I can put up one at the 'Microfarads,' but Professor Yupushoff says that he is bringing with him his highwellborn colleague, Dr. Schnitzelplutz."

"Don't do that again," I said, wiping the back of my right ear. "I have the strongest possible objection to these high-explosive names. People with names like soda-water siphons should jolly well stay in their own country."

"But what am I to do?"

"Why, have the two of them," I said.

"But I have only one spare bedroom."

"Well, stick them both in that. I can lend you a camp bed."

"But there's only one bathroom for the whole house."

"Don't be absurd," I told him, "you can be quite sure that they won't take baths in September. Surely you know that in Yugo-Toblažia the whole nation baths only on the twenty-ninth of February, when this day happens to fall on a Sunday."

"It is one of their oldest national customs, just as they change their shirts only in the months that have no 'R' and their collars on the first of each of the thirty-day months. September happens to be one of these, so that your guests' neckwear will be quite above suspicion."

Moved to Action

This pacified the Professor, who remained calm until he happened to read the letter over again.

"Great grid-leaks!" he screamed. "Yupushoff says that he is writing on the eve of their departure. That means that they will be here tomorrow."

The front door bell rang violently at this moment, and presently we were conscious that things were happening both outside the front door and in the hall. We went out. In the hall a bewildered maid was trying to understand one weird-looking bandit who was holloaing at her words compounded entirely of "X's" and "Z's."

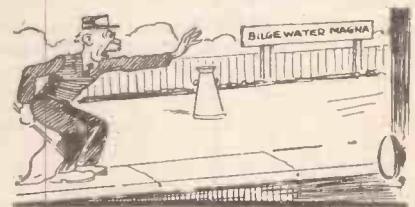
A more realistic imitation of violent atmospherics as reproduced by a moving-coil loud speaker I have never heard. The other cut-throat was waving his arms madly round his head whilst he argued with an equally fluent taxi-driver.

Running to "Earth"

Remembering a most pressing engagement, I slipped back into the Professor's den and left by the French windows. The horrid Professors, I gathered, had made the last stage of their journey by aeroplane and so had arrived on the heels of Yupushoff's letter.

On the following morning, sitting happily in my bath, I had just opened my mouth wide for a really good top note when there was a crash

UNGUARDED MOMENTS



"We left Bilgewater Magna without the Guard."

on the door. It made me jump so much that I rammed the sponge halfway down my throat and was quite a while getting it out again.

"Hi! Hurry up!" yelled the Professor. "Don't you know that this is the opening day of the Exhibition? My two distinguished visitors are dying to be off."

"Well, let 'em," said I. "I don't want 'em."

"But you've got to come with us."

"Most emphatically I will not."

## In Lighter Vein—continued

"Look here," warbled the Professor, "they are both absolutely full of money and they're going to stand all expenses."

After thinking it over whilst drying and doing my daily dozen, I came to the conclusion that I might be on to a good thing and decided to accompany the party. I arranged to meet them at the station.

Introductions having been effected, I explained to our visitors that I was willing to act as treasurer to the expedition, and was rewarded with a volley of thanks and a wallet well stuffed with notes.

### In Good Hands!

"How lovely it feels," I said, "to have a pocket full of Catterer."

"What on earth do you mean?" asked the rest in chorus.

"Well, just look at the signatures."

They all studied the notes and Schnitzelputz pointed an accusing finger at me.

"Your Latin are bad," he remarked. "You should say a pocket full of Catterorum."

The journey up to Olympia was comparatively uneventful. Thanks

### HIGH VELOCITY!



"Eet ees all rrrrrrot," snapped Professor Schnitzelputz.

to my foresight in purchasing first-class tickets we had the compartment to ourselves.

The only slight contretemps was caused by a little playfulness on the part of Professor Yupushoff, who was enchanted by the guard's whistle method of starting trains, and proved himself capable of producing an exact imitation by inserting most of his two enormous hands into his mouth. This was so successful that we left Bilgewater Magna without the Guard, and on reaching Slopston-in-the-Slush minus this important official we had to go back and pick him up.

On reaching the Great Rendezvous of the Enlightened I suggested that before examining the exhibits it

would be as well to strengthen ourselves at once with a light lunch. We therefore adjourned immediately to the restaurant and I proceeded to order just the kind of meal that seemed indicated. A little firmness was required here.

### Producers of "Soupospherics"

"Soup," said Professor Yupushoff. "Eet ees necessaire that I 'ave soup."

"And me," chortled Professor Schnitzelputz. "Eet ees more than necessaire. I vill 'ave soup."

As no music was provided in the restaurant to drown the soupospherics of which both Professors were obvious producers, I took a firm line. Still, though it contained no soup I can claim that my little menu was a very satisfactory one, particularly as hearing from both Professors that they drank only mineral waters I ordered a magnum of champagne and introduced it as the veritable English dry ginger.

They said emphatically that ours was the best dry ginger in the world. By three o'clock or so we were all in the best of good humours, and we were just about to move into the Exhibition hall when Professor Goop happened to mention the side-band theory.

"Eet ees all rrrrrrot," snapped Professor Schnitzelputz.

"Eet ees not; eet ees trrrruth," roared Professor Yupushoff.

Next moment they were hard at it. Their English proving unequal to the occasion they lapsed almost instantly into high-tension Yugo-Toblazian. This is a language which is accompanied by so much gesticulation that you can almost follow the speaker's trend without understanding a word of his speech.

### "Maximum Output"

I mean that when one man picks up a cheese soufflé and hurls it in the other's face with a flood of words you realise instantly that he is saying "I am not in complete agreement with you," and when the other chappie gets up and socks his pal on the jaw with a chair you understand at once that the words which accompany his gesture imply: "Much as I respect your vast knowledge of the subject, there is, I think, one small point that you have failed to grasp."

We Britons, though, as a race, seldom understand the foreigner. You will hardly believe me when I

say that the two Professors, thus conducting the mildest of arguments, were promptly flung out of the restaurant. Arrived in the main hall one found himself near a stand piled up with valves, whilst the other was in close proximity to an exhibit of low-frequency transformers.

Each seized armfuls of the ammunition at hand and proceeded to drive home his points. In about twenty-five

### A "CHARACTERISTIC CURVE"



Propelled into Addison Road.

and three-fifths seconds they were propelled into the Addison Road by completely unsympathetic chuckers-out.

"What's to be done now?" said the Professor. "They haven't seen a single thing in the Exhibition. We have simply got to get them back again somehow."

### "A Close Shave"

"Easy," I said; "there is a perfectly good barber's shop not far away."

When they entered the barber's shop the Professors were the he-est of he-men, with faces enshrouded in bristling masses of hair.

When they came out their own mothers wouldn't have known those close-cropped clean-shaven little runts. We easily put them back again, for not a soul recognised them. Talk about Samson and Delilah!

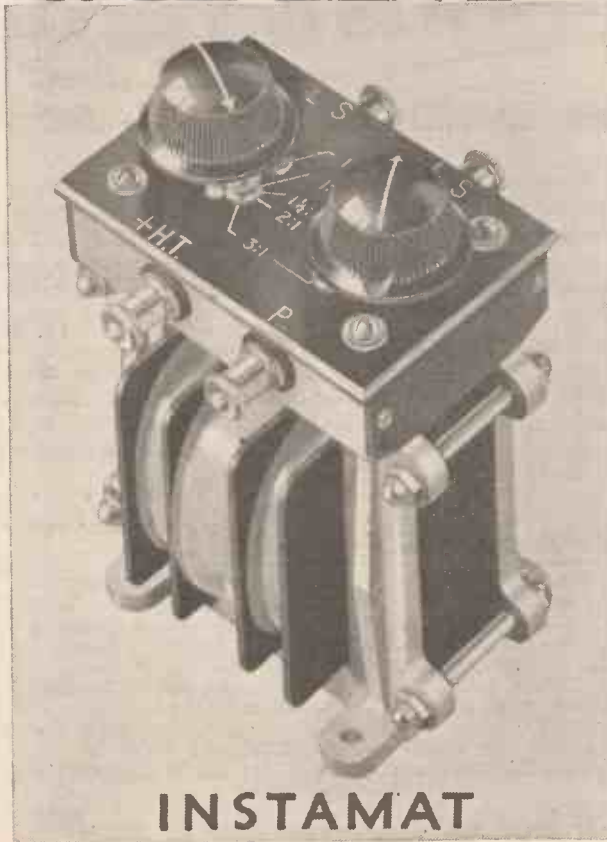
"I vill 'ave tea," said Professor Yupushoff. "I am 'ongry. I 'ave 'ad no food for a 'ole hour."

Of course, a further friendly argument arose during tea, and they were again emitted at a close approach to the speed of light.

Happily I had ordered more genuine English ginger ale, so that when we drove them down to Croydon and pushed them into the Indian Air Mail each of them quite believed that he was stepping into the Mudbury Wallow train. Nothing could have been heartier than the farewells which the Professor and I waved to them.

# QUALITY DEPENDS

## on your OUTPUT STAGE



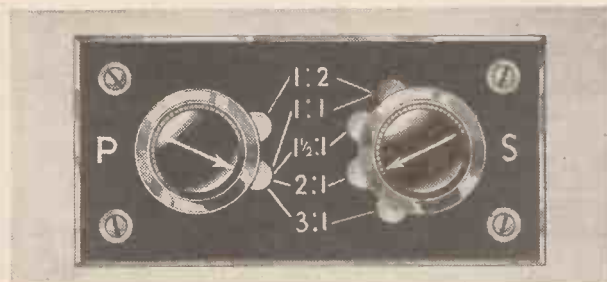
**INSTAMAT**

Your output stage must be right. You can have the best set and the best speaker that money can buy, but, unless they are accurately matched, quality must suffer.

Any radio expert will tell you that an output circuit is essential in a receiver capable of giving good quality and volume. It not only isolates the loud speaker from the set, thereby protecting the windings and guarding the user against shock, but also prevents the voltage to the output valve being reduced. But the output transformer must be correctly designed. It must have very low D.C. resistance and yet be able to carry a heavy current without core saturation and—it must be of the correct ratio.

The most positive means of obtaining the correct ratio is to try a number of different ones, switching rapidly from one to another until the actual reproduction from the loud speakers proves definitely that you are obtaining the perfect ratio.

That is just what the INSTAMAT enables you to do. It is an output transformer of the most perfect design, fitted with an ingenious switching arrangement with which you can vary the ratio whilst you are actually listening. No need to switch off the set or disconnect wires—just turn the switch knobs and hear the tone change. It is the only output transformer capable of giving you perfect quality by the turn of a switch.



**INSTANT MATCHING SWITCHING  
ON THE INSTAMAT**

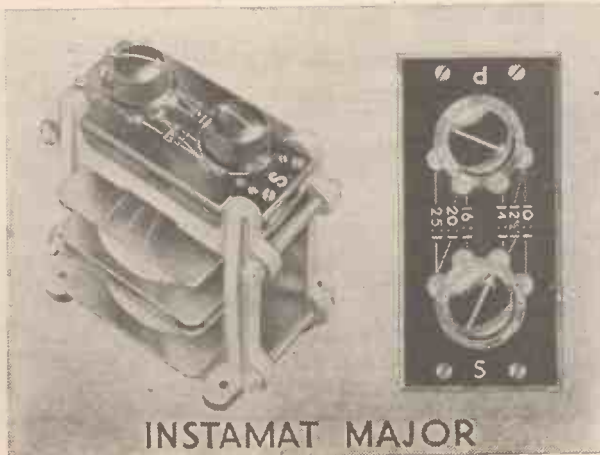
# INSTAMAT OUTPUT TRANSFORMER

STANDARD

MAJOR

Connect between last valve and loud speaker. For all types except moving-coil speakers. Gives instant matching by the choice of five different ratios, all clearly marked. Extremely low D.C. Resistance, very heavy current carrying capacity and particularly generous core. **Price 27/6**

**FOR LOW RESISTANCE MOVING-COIL SPEAKERS**  
Six ratios—10 to 1 up to 25 to 1. Heavy gauge windings and particularly large core. Current carrying capacity up to 150 milliamperes, without core saturation. Primary D.C. Resistance only 40 ohms; secondary 2 ohms. **Weight 4 lbs. Price 37/6**



**INSTAMAT MAJOR**

## Ready Radio Ltd

To Ready Radio Ltd., 159, Borough High St., London Bridge, S.E.1.  
Please send me details of the "INSTAMAT."

Name .....

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Take this List when  
you go Shopping



# The LIGHT CHARGER

Here is an easily made "charging-board" for D.C. mains, in which the necessary lamp resistance is made up into an attractive reading lamp.

Designed and Described by C. MAXWELL.

THE apparatus necessary for charging accumulators from D.C. mains is extremely simple, and really consists of merely the necessary resistance to cut down the voltage.

There are two types of resistances which are commonly used for charging purposes when the supply is from mains.

The first type of resistance is a length of resistance wire wound on a former. It may be fixed in value, or may have taps on it, and sometimes a switch is provided for varying its resistance.

### Using the Resistance

The second kind of resistance consists simply of electric light bulbs, or one bulb, as the case requires. Most of you have probably seen such bulbs on the switchboards of some charging stations.

Frequently the bulbs are of the carbon filament type, but they could equally well be ordinary ones, and give out quite a good light. It is this latter fact which lead us to design the "Light Charger."

This is quite an ordinary charger for D.C. mains, with an electric bulb acting as the resistance, but so arranged that it can also be usefully employed as a table standard lamp.

A glance at the photos will show you that it is quite neat in appearance, and one look at the diagrams should convince you that it is simple to make. It is also quite inexpensive.

Either H.T. or L.T. batteries can be charged from it. Full details for choosing the right sort of bulb for your particular case are given later. First of all we will consider the components and materials required.

### Materials Required

An ordinary pendant type bulb holder is required, with a simple shade and wire shade-holder, on the lines of that illustrated; unless you prefer to

There is no need to have an ugly resistance-board disfiguring the room when charging can be carried out with this handsome and efficient device.

use a much more elaborate one, to which there is no objection. Also a wooden switch plate about 6½ in. square, this being obtainable from any general electricians.

You will need a mains type of switch, of very small dimensions, because it has to fit beneath the switch plate, and must not be deeper than this plate. The one we used was a Bulgian, which serves the purpose very well.

Two terminals of the insulated type will be wanted, some plastic wood,

thick and 3½ in. diameter, and three pieces of ½-in. 3-ply wood 14 in. long and 1 in. wide. That completes the details of what you require with the exception of flex, a plug or adapter for mains connection, screws, brads, etc.

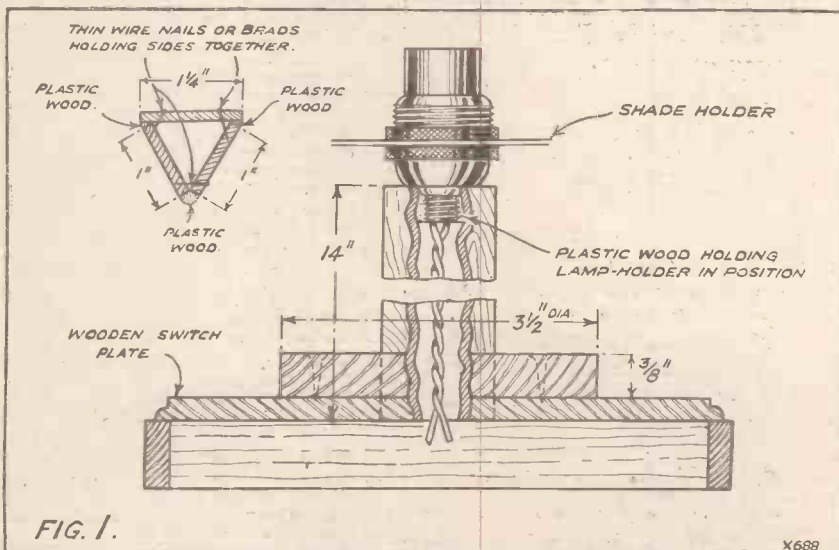
Your first job should be to form the upright of the stand.

### The Flex Lead

The three long pieces of wood are fixed together in triangular form with brads, and the corners rounded off with plastic wood. Then a hole is made in the round piece to take one end of the standard, which passes through it a little way and into another hole in the switch plate at the position indicated.

These holes should be circular and of such a size that the upright just

### HOW TO MAKE THE LAMP STANDARD



Not much need be said about this sketch, which clearly explains how the little wooden standard is cut out and made up. Note the plastic wood filling shown in the small figure.

and one or two pieces of ordinary wood. The dimensions for the latter will be found in the diagrams.

There is one circular piece ¾ in.

fits in tight. The plastic wood will serve to fill up the space left.

Now mount the switch and terminals where shown. The stand is

## The Light Charger—continued

now ready for the bulb holder, to which the flex should be attached in the normal way, but the small metal ring and the pieces of wood between which it clamps the flex should be omitted.

Thread the flex down the centre of the stand, and wire up as shown. The holder is held tightly in place with plastic wood forced down the gaps between it and the triangular upright. A coat of enamel, in any colour desired, completes the charger.

### Choosing a Lamp

Now we will consider the bulb to use. First of all we will suppose an L.T. accumulator is to be charged. Its voltage can be ignored—that is to say, it does not matter whether it is a 2-, 4-, or 6-volt accumulator.

It is intended that a fairly low charging rate shall be used, approximating to a trickle charge. The accumulator must not be connected to the charger and to the receiver at the same time. It must, of course, be charged a little more than it is discharged, so as to keep it in a fully-charged condition.

The best scheme, therefore, is to arrange to charge at just a little higher rate than that at which you discharge, and to put the accumulator on charge for just the same length of time as the set is run.

Suppose your set takes .4 of an amp. altogether. Add a little on, as suggested, and call it .5. What you have to do is to multiply the voltage of your mains by the rate at which you wish to charge, and that will give you the size in watts of the bulb.

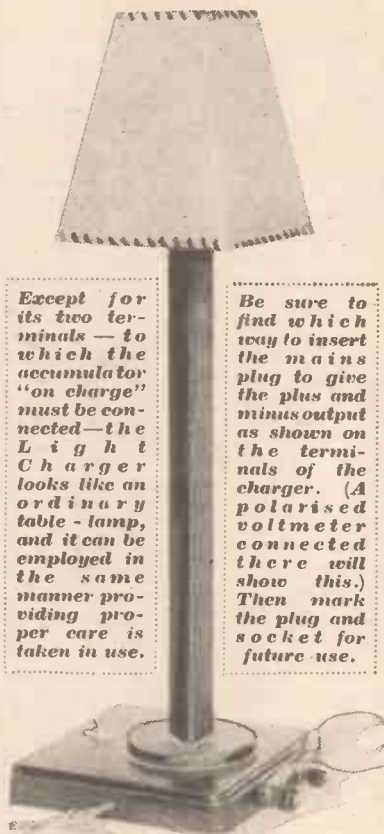
For instance, in the case we are considering, if the voltage of the mains was 120, then multiplying this by .5 we get an answer as 60 watts, the size bulb to use.

Should the wattage work out rather high, you can use a smaller bulb and charge for a proportionately longer period.

### For H.T. Accumulators

With H.T. accumulators it becomes necessary to allow for the voltage drop across the accumulators.

You have to allow approximately  $2\frac{1}{2}$  volts per cell. So first of all multiply the number of cells by  $2\frac{1}{2}$ . Suppose you have 60 cells giving a normal working voltage of 120, this will give you 135 volts to allow ( $60 \times 2\frac{1}{2}$ ).



Except for its two terminals—to which the accumulator "on charge" must be connected—the Light Charger looks like an ordinary table-lamp, and it can be employed in the same manner providing proper care is taken in use.

Be sure to find which way to insert the mains plug to give the plus and minus output as shown on the terminals of the charger. (A polarised voltmeter connected there will show this.) Then mark the plug and socket for future use.

The next step is to deduct this from the voltage of your mains. At this point you may begin to wonder how it is going to be done if your mains voltage is only, say, 120.

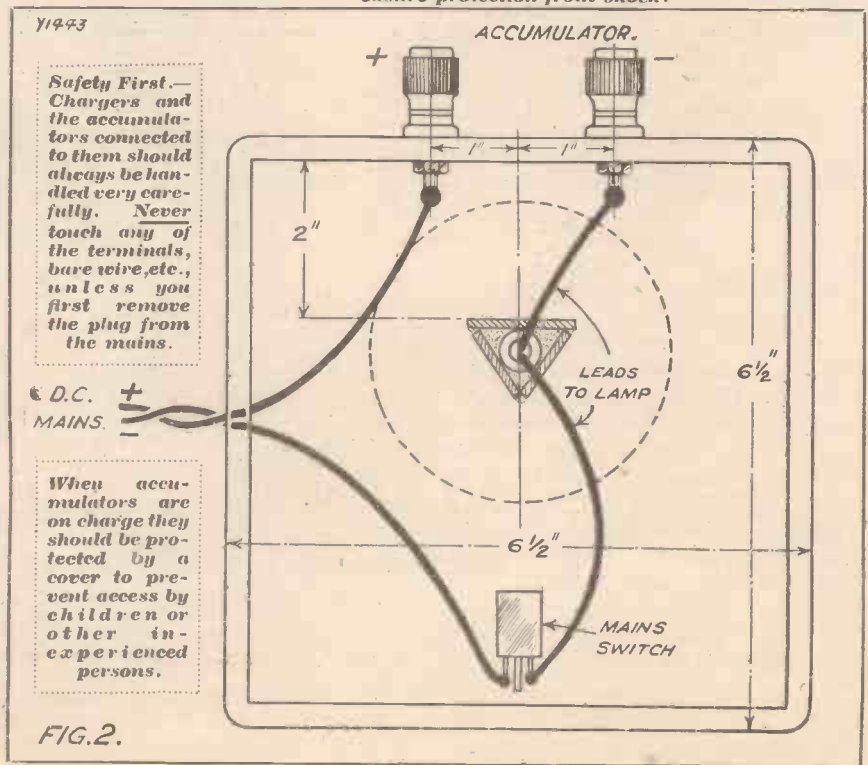
What you will have to do is to arrange the battery for charging in two series-parallel links of 30 cells each. Then subtracting  $67\frac{1}{2}$  ( $30 \times 2\frac{1}{2}$ ) from 120 you get  $52\frac{1}{2}$  volts.

### The Wattage You Want

You should try and arrange your resulting voltage to be approx. 50 or 100, and use lamps of 50- or 100-volt rating. (If the nearest figure you can get is more than 60 volts, you must use a 100-volt lamp. The light may then be a little dull, but this cannot be helped.)

The calculation of the wattage of the lamp to use is worked out in just the same way as for an L.T. accumulator, but this time you multiply the remaining voltage ( $52\frac{1}{2}$  in our instance) by the current and use the nearest wattage lamp obtainable. Remember that accumulators in parallel must be charged at twice the rate applicable if they were in series, if the charge is to take the same time.

**VERY SIMPLE WIRING** is a feature of the Light Charger, as will be seen from the sketch below, which shows the connections inside the base. Note that a proper mains switch is employed, to ensure protection from shock.





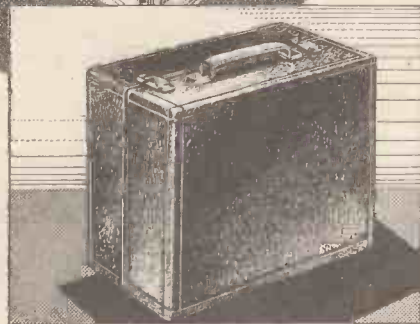
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*• In some instances the reduction is slightly over 25 per cent. and in some slightly under.*



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Radio  
Exhibition,  
Olympia

STAND 8,  
MAIN HALL

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● **Exide "C" TYPE BATTERIES** for Low Tension also reduced in price.

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N.23.



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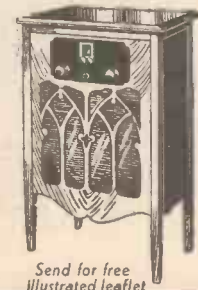
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Height 3 ft.; removable back, lift-up lid. In oak. Delivered free in England and Wales. Any Speaker fitted for cost of speaker only.

Price 45/-



Send for free illustrated leaflet

# TELEVISION IN GERMANY

By A. A. GULLILAND.

*Although television has not yet reached the stage where it can take a place in our everyday lives on a level with broadcasting, it is very interesting to watch its advancement. Here is an account of how it is progressing in the "Fatherland."*

ONE of the most popular systems of television in Germany is the Telehor A.—G. Recently, considerable changes in the company running this system have been made.

The Telehor patents have been bought up by Tekade, of Nuremberg, the well-known valve section of the Felten and Guillaume concern, and the Berlin laboratory has been moved to new quarters

### Television Entertainment

"Tekade television, system Telehor," as it is termed, have abandoned all ideas of keeping to the 9,000 cycles per second limitations. By the way, the German Reichspost, who, it will be remembered, are developing television on the transmitting side, are going over to 48 lines per picture instead of the 30 used hitherto.

Tekade are going one further. They say that if one has to use the short waves anyway, why not give the public a decent-sized picture with all details and let them have something which is neither a toy nor a piece of scientific research, but an amusement and entertainment?

Tekade are at the moment developing a system of television which, by means of wave-lengths round about 100 metres, will permit of broadcasting moving pictures of 100 lines per picture at a frequency of from 16 to 20 per second. The present 12½ frames per second give a very jumpy effect.

### 100,000-Cycle Band

This will mean a frequency band well over 100,000 cycles per second. On the transmitter side the well-known Nipkow disc will be retained, each hole being fitted with a special lens.

On the receiver side a Nipkow disc, or even a mirror wheel, for 100 lines of picture would be much too unwieldy

and expensive for home use. For Tekade's principle is to provide a television receiver for home use and not for cinema theatres only.

### A New Device

But without a Nipkow disc and without a mirror wheel, what then? Tekade have already found the answer: A pile of sheets of glass or metal piled one on top of the other in the form of a skewer or corkscrew.

The edges of these sheets are polished to act as mirrors, and thus the mirror screw solves the problem: One sheet (about 1 millimetre thick) being used for each line, so that for 100 lines the whole screw is not higher than 10 centimetres, is inexpensive, as easy to drive as the Nipkow disc, and has the great advantage that without becoming too unwieldy it can be made to project a picture the size of

the new international postcard (10 by 14 cm.) without magnification or enlargement by means of lenses.

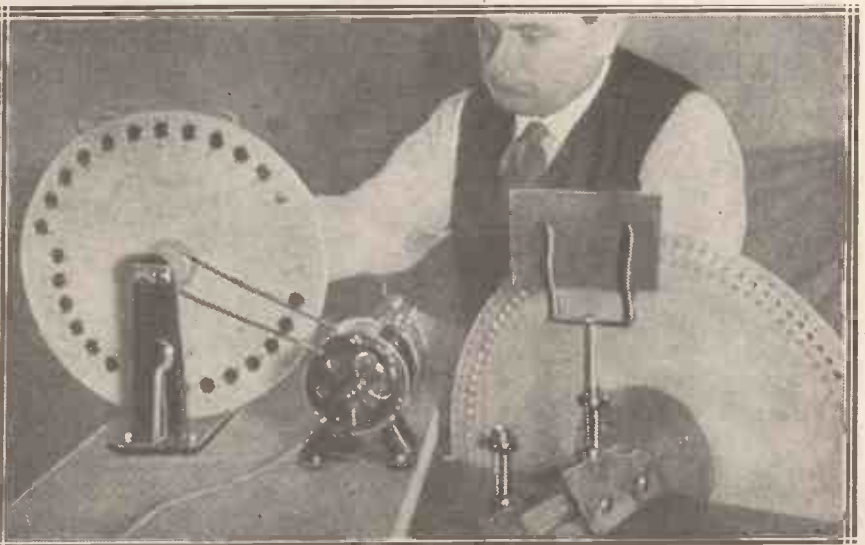
All very well, you will tell me, but will it be possible to scan a football match with the new system or not? Well, the answer is No. And the answer will be No in the eyes of all that know anything about it for many years to come still.

### Postcard-Size Images

Tekade are therefore for the present concentrating on developing a really good receiver which will give postcard-size images decently illuminated and without flickering and on transmitting films. Why films when one could have the real thing?

Certainly it will be possible to have the real thing in a studio, but till we are able to transport the unwieldy television apparatus like a microphone

### NEW SCANNING DISC GIVING IMPROVED DETAIL



*In the television system employed in this country the picture to be transmitted is divided up into 30 lines and the whole is scanned about 12½ times per second. This makes a very coarse image, and the new German apparatus is here seen which improves detail tremendously by splitting the picture up into 100 lines 20 times a second.*

## Television in Germany—continued

to any place, until then surely it will be better to send a man with a movie-camera to the actual event, have the film developed and printed, and broadcast it in the evening, when everybody has the chance of listening-in.

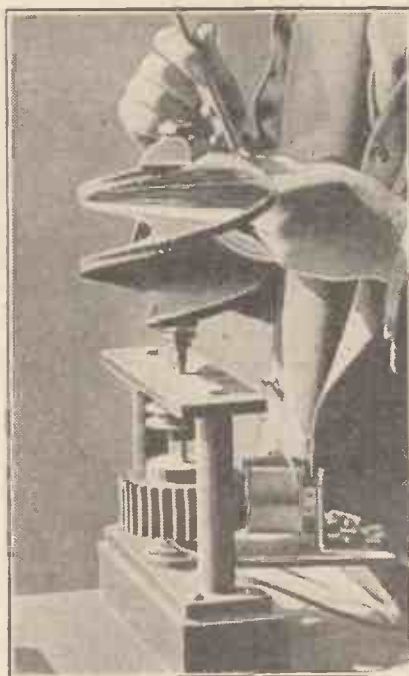
Will the thrills be less? Hardly, till we really can have the real thing, and then for convenience sake one will take to bottling sight as one already does with interesting interviews which have to take place at noon but are only broadcast in the evening.

### Synchronising System

As far as technicalities go, the synchronising system is still the same. A motor driving the Nipkow disc, or scanning disc, at the one end, the picture impulses being made to keep the motor at the receiving end driving the mirror screw in step, and these further being helped by the motor already being kept at the picture frequency by means of a valve generator.

A special lamp is being developed by the Tekade valve department which is neither a neon tube or a Kerr cell, but which will handle the enormous picture frequency ably and will give good light. A special screen is being tested made of some fluorescent material which will be used at the receiver end to minimise flicker.

### AT THE RECEIVER



Owing to the large discs required for the new German apparatus, the receiving one is replaced by this ingenious corkscrew affair, which has a number of mirror-like surfaces all round its edge.

I saw some tests at the Tekade laboratories, and found that with the picture projected on to the screen the

12½ frames per second did not flicker nearly as much as when they were projected on to a white screen.

The Reichspost daily transmit television films over Witzleben, Königswusterhausen, and Döberitz (this latter on S.W. with 10 kw.).

\*\*\*\*\*  
 \* **REVIVING "JELLY"** \*  
 \* **TYPE ACCUMULATORS** \*  
 \* *A Useful Tip for Portable Set* \*  
 \* *Owners.* \*  
 \*\*\*\*\*

**T**HE printed directions on most jelly acid accumulators state that if left in a discharged condition it will be useless for further service. This, while true, is a little misleading, as the difficulty is not insurmountable.

Recently, two cases of this trouble came to my notice. In the first, the owner sent the battery to the maker's depot, where it was condemned. As it cost 25s. and had only been in use for a few months it was a bit of a shock, so as things couldn't be made worse we tried filling the battery to above the plates with ordinary accumulator acid, and recharged it.

### As Ordinary Cells

This cured the trouble and the accumulator is now giving excellent service again. In the second case I had personal proof, as I tested the cell, after recharging without adding acid, and it ran down rapidly and was certainly useless.

After filling as before, and recharging, it held its charge, and showed no signs of deterioration. True, they are no longer pure jelly acid cells, but unless you stand the set on its head and let the acid escape they are none the worse for that, and the attempt is well worth while before discarding the accumulator.

\*\*\*\*\*  
 \* **AIMING AT THE IDEAL** \*  
 \* *Two Transmitter Items.* \*  
 \*\*\*\*\*

In all transmitting stations, great importance is attached to the symmetry of the earthing arrangements.

The B.B.C. has developed a method of frequency control by means of tuning forks which is tested to give an accuracy of within about five parts in a million.

### SANDHURST CADETS TAKE UP TELEVISION



One of the new subjects recently adopted at the famous Royal Military College at Sandhurst is that of Television. A number of students are here seen round a Baird receiver.

# 3 AMPLION MOVING COIL UNITS . . . .

M.C.6 UNIT — The most wonderful value; a super-sensitive instrument at a really attractive price. Can be used either with Power, Super-Power or Pentode Valves . . . a matching transformer is fitted as standard. The M.C.6 also is fitted with non-hygroscopic diaphragm.

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**29'6**  
UNIT with Matching  
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**42'-**

Type E.M. 644  
A most efficient energised Moving Coil for D.C. Voltage 100/110, 200/240, very suitable for use with A.C. Sets. Full details of alternative methods of operation supplied with each model.

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**PERMANENT  
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Complete with Trans-  
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M.C.9 UNIT—Will faithfully handle enormous volume without distortion. Fitted with a non-hygroscopic diaphragm which is positively climate-proof. Particulars of suitable transformer ratios are supplied with each unit.



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Suitable Transformer  
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UNIT ONLY

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# AMPLION



# A PRACTICAL MAN'S CORNER

In this section, which is of special interest to the set-builder, many valuable hints on construction and the handling of tools are given.

By R. W. HALLOWS, M.A.

If you don't possess such a thing as a ratchet screwdriver, I would rather advise you to stand yourself one next time you have—well, how much do you think, to spare?

It is not a matter of notes or even of whole shillings. Actually you can buy the little chap illustrated in Fig. 1 for sixpence at Woolworth's, and I have no hesitation in recommending it.

It is foreign made, of course, but so far as I know there is no such

## VERY USEFUL

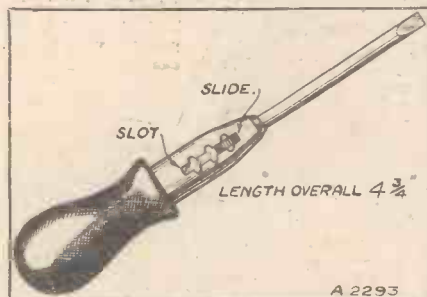


Fig. 1. This handy little screwdriver was bought at a popular store for sixpence! It is of unknown manufacture—but who could resist it?

thing as a British-made ratchet screwdriver at such a price. This baby screwdriver, which is only  $4\frac{3}{4}$  in. overall, has a blade just over  $\frac{1}{8}$  in. in width.

## How It Works

It is well shaped, and is an excellent fit for 4 and 6 B.A. screws, as well as for small woodscrews. Some readers may wonder just what a ratchet screwdriver is.

If you look at Fig. 1 you will see that there is a slot in the lower part of the handle in which a slide travels. Push the slide down to the position

shown in Fig. 1, and the screwdriver is then fixed as you turn clockwise to drive a screw in, but free-wheels, so to speak, as you move your hand back again for the next twist.

## A Larger Model

This is a very handy arrangement, as you will soon find if you come to try it. You can lock the screwdriver so that the blade is fixed whether you turn clockwise or anti-clockwise by moving the slide to the middle position as shown in Fig. 2.

Pull the slide right up to the top and the blade is fixed as you turn anti-clockwise to loosen a screw, but free-wheels as you move clockwise before giving the next turn.

If you want something rather bigger I can recommend at the same establishment the tool illustrated in Fig. 2. The handle costs sixpence and a set of three interchangeable blades a further sixpence.

## Interchangeable Blades

These blades, which are again very well shaped and of good metal, are of very handy widths. The biggest is nearly  $\frac{1}{4}$  in. (actually 6 m/m), the medium one  $\frac{3}{16}$  in. (5 m/m), and the smallest just over  $\frac{1}{8}$  in. (4 m/m).

In the handle there is a socket with a flat just beyond it. You will see from the illustration that each of the blades has a flat cut in its non-business end. To change blades, you simply pull out the one that is in the holder, and push in whichever you require.

It should be held firmly in place by its flat being pressed against that of the socket. You may, however, find that the blades are not quite such a tight fit as you would like them to

be, and it is a very simple business to put this right.

All that you have to do is to tighten the hole in the socket, and here is the way to set about it. Take out the blade. Hold the handle in your left hand, and lay its end with the flat uppermost on the closed jaws of the vice or any other flat metal surface.

Take a medium-weight hammer and tap at the place marked "X" in Fig. 2, using many moderate blows rather than a few cave-man swipes. The socket is made of pretty hard metal, so that you needn't be afraid of hammering it.

## A "BOB" WELL SPENT

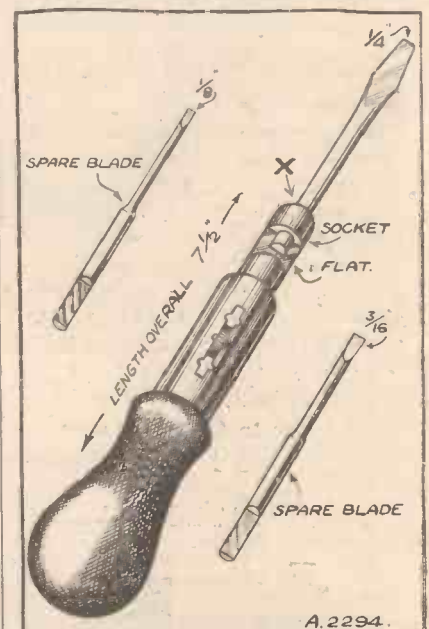


Fig. 2. If you feel like having a "splash" you might do worse than buy one of these. It is a little larger than the cheaper model, but it has two "spare" blades.

# SQUARE PEAK

(REGD TRADE MARK)

## 9 Kc. SEPARATION!

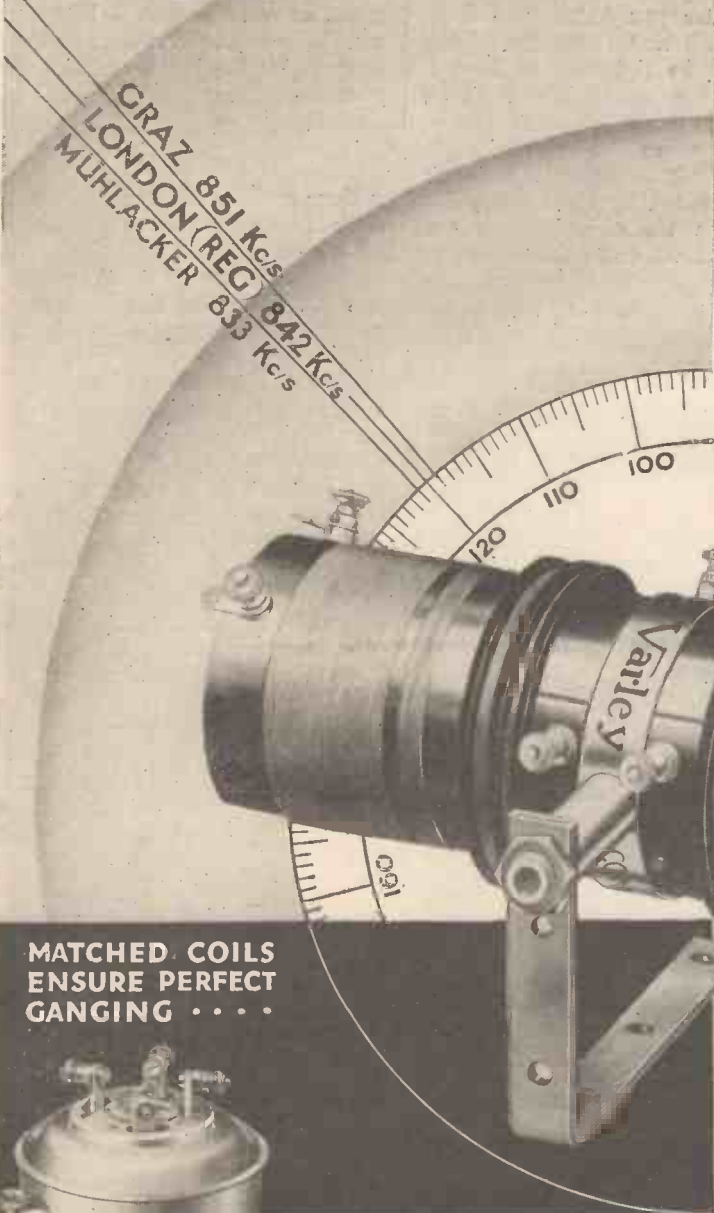
"With the Varley Coil there is substantially a Square Peak resonant curve approximately 9 kc. in width. Thus it is possible to obtain high selectivity without detriment to quality. . . . Signal strength is maintained at a surprising high level. . . . compact and efficient." (Test Report, "Wireless Constructor," August, 1931.)

"I can only repeat that it has altered my receiver. Stations apparently lost "for ever" owing to new high-power transmitters and their swamping effect are once more present." (T.E.D. 'L.)

"The sharpness of tuning is uncanny." (Midlands.)

The Varley "Square Peak" band-pass coil (dual-range) Regd. design No. 763904 Pat. Pending. Easily replaces most existing aerial coils. Needs no screening. Gives the sharp tuning of a Super-Het. with better quality and at lower cost.

Illustrated is the new additional Model BP7, with terminals instead of wave-change switch, enabling the coil to be used with Extensers or any type of remote control switch.



MATCHED COILS  
ENSURE PERFECT  
GANGING . . . .



H.F. INTERVALVE COIL. (Dual range). New model without switch, for use with the "Square Peak" Coil type BP7. Completely screened. Its inductance inside the screen is exactly matched to that of the "Square Peak" Coil to ensure perfect ganging.

List No. BP8. Price 8/6

(Also supplied with wave-change switch List No. BP6. Same price.)

15/- Supplied with Universal mounting bracket (Model BP5. Complete with wave-change switch. Same price.)

## THE "SQUARE PEAK" COIL



STAND No. 58 OLYMPIA

## A Practical Man's Corner—continued

Keep on trying the blades and continue hammering until you have closed the socket enough to press their flats well up and to make them a good tight fit. I should mention, by the way, that when you want to move the slide in either of these screwdrivers you must press it down with the thumb against its spring before doing so.

### Oiling the Screwdriver

The slide has two little lugs on it, which fit into the notches in the slot which you will notice in the drawing. One other point: no oil hole is provided in the metal part of the

put into wood, ebonite or metal, and driven home quite tight tends, in course of time, to loosen slightly. Go round any piece of work a month or two after you have finished it, and you will find that most of the screws can be tightened at least a quarter of a turn. Why? Well, look at it in this way.

A screw, when you have driven it in first of all, is tight because the pressure exerted by the surrounding material on the threads pulls the head hard down on to the surface or into the countersunk hollow. The material, therefore, below the head is under pressure.

When therefore you try to unscrew you are pitting your strength against the firm contact established between a very considerable length of verdigrised or rusty surface. Only a jerk will loosen this contact, and you cannot give the jerk by straining on your screwdriver in an anti-clockwise direction.

### The Difficulties

Your position is rather like that of a motorist who tackles a steep hill with a sharp bend at its foot; he cannot get a run at it. You cannot just fix your screwdriver into the nick of the screw and then give a sudden twist anti-clockwise.

Or, rather, you *can*, of course, but if you do several things are quite certain to happen. The driver will slip out of the nick of the screw; it will probably spoil the slot, so that you will be very much handicapped in any further efforts; the left-hand corner of the screwdriver blade will in all probability be broken off—and it is not at all unlikely that in a matter of split seconds you will be shouting for sticking-plaster to apply to your forefinger.

We have seen that, owing to the loss of elasticity in the material into which it is inserted, the screw will probably take a fraction of a turn inwards. It will move in this direction also because such a movement tends to clear the verdigris or rust.

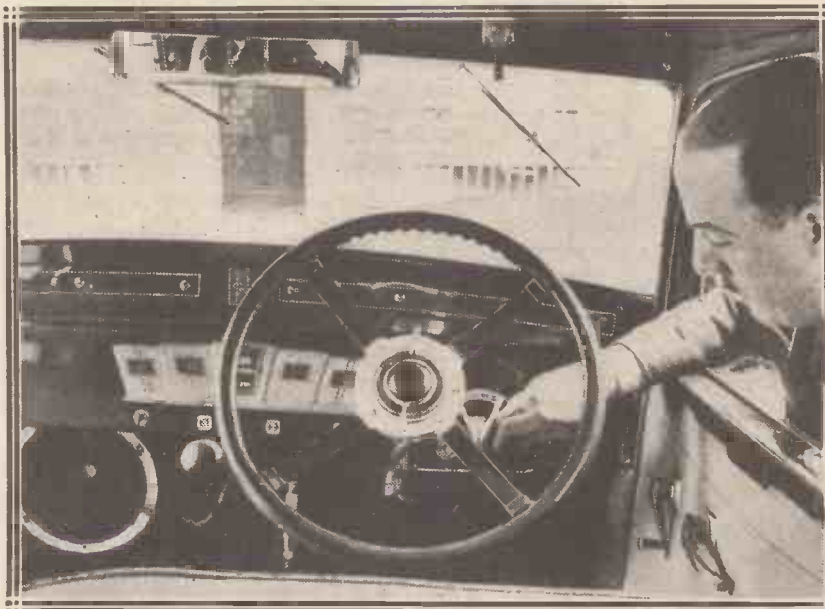
### Preventing Sticking

Now then. If you can make this little movement clockwise you are like the motorist who *has* a run at his hill. You needn't jerk when turning anti-clockwise. The threads have been cleared of obstructions, and the screw will in all probability come out quite easily.

If it doesn't, don't go on trying, or you will certainly incur the calamities to screw, screwdriver, and finger already mentioned. Just apply a little paraffin and give this half an hour or so to soak in. Paraffin has extraordinary penetrating powers, and it worms its way down the threads, breaking down the verdigris and rust.

If you are likely to want to remove a screw at a future time, here is a good tip. Make sure that the oxide film cannot form, and the best way of doing this is to grease the screw before you put it in.

### RECEIVING RADIO WHEN ON THE ROAD



*Radio receivers for cars, although popular in America, have not caught on very well in this country. Mr. A. H. Williams, director of Selfridges, however, believes in keeping abreast of the times, for he has just had a set installed in his car. The tuning controls are mounted on the steering column, and the loud speaker can be seen to the left.*

handle, but the ratchet mechanism and the spring require a few drops from time to time. You can get the oil in by pressing the slide right down with your thumb-nail.

I have been asked by several people why it is that it should be a good tip when trying to loosen a very tight screw to give it first of all a fraction of a turn in a screwing-in or clockwise direction. Surely, they say, it ought to be easier to loosen than to tighten a screw that has become fixed.

### Two Reasons

Well, it isn't, and here is the reason, or rather the reasons, for there are two of them. First of all, a screw

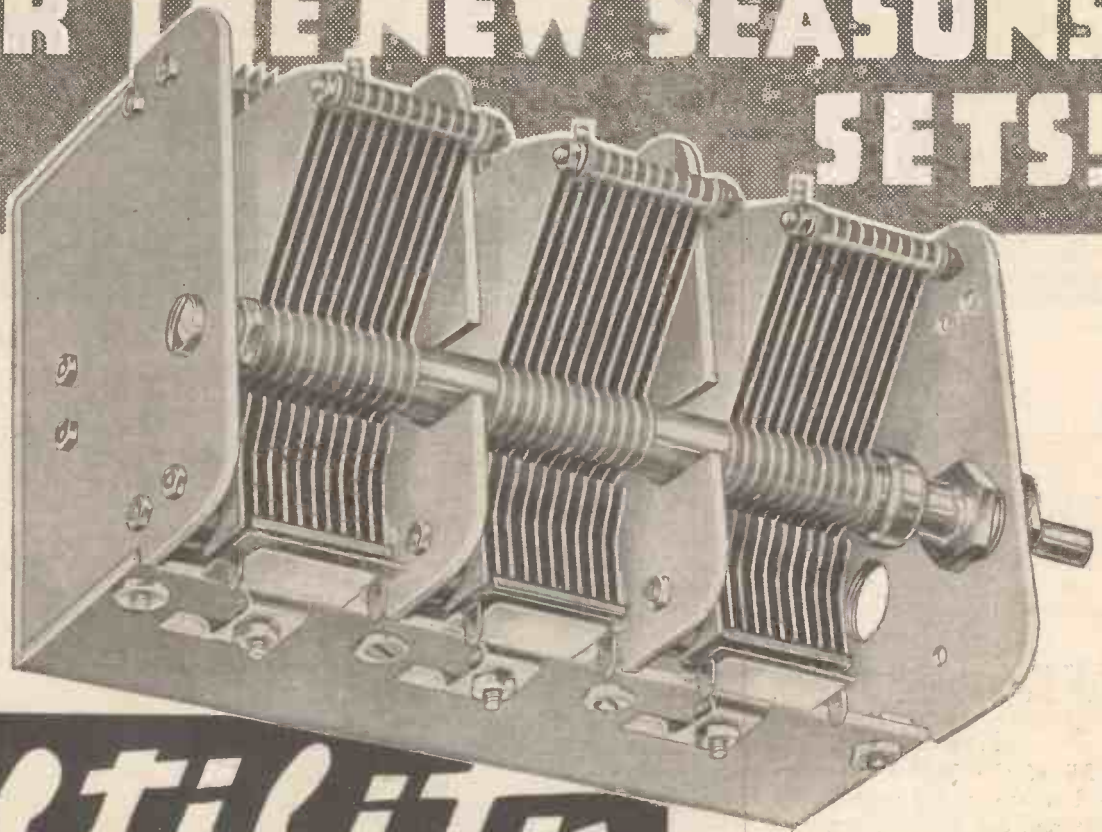
Now under pressure nearly all materials tend to lose a little of their elasticity. In other words, the material "gives" somewhat and the pressure is released. You can, therefore, take up the screw part of a turn.

### Rust and Verdigris

Next point, why should a screw ever refuse to move in an unscrewing or anti-clockwise direction? Because a film of rust or verdigris, as the case may be, forms between the contact surfaces of the male thread of the screw itself and the female thread in the material into which it has been inserted.



# SCREENED CONDENSERS FOR THE NEW SEASONS SETS!



Most of the new circuits will be ganged. But whilst tuning will be simplified in theory, the circuits will demand matching of a much higher degree of accuracy and absolutely perfect screening. With these requirements in mind "Utility" designers have produced a group of instruments which are unsurpassed.

The new "Utility" ganged condensers are so constructed that it is impossible to set up torsional stresses during tuning operations, a common fault with most ganged condensers. Therefore, capacity remains constant—a vital factor in delicate tuning. Exceptionally smooth action and dead accuracy of tuning are secured by an ingenious ball-bearing centre spindle.

**SEMI-SCREENED**

**TOTALLY SCREENED**

Cat. No.			Cat. No.		
W.305/2	Two-gang	17/6	W.306/2	Two-gang	22/6
W.305/3	Three-gang (as illustrated)	22/6	W.306/3	Three-gang	27/6
	Friction Dial 2/6 extra.	(Prices of four-gang on application.)			

★ Send a post-card for the new "Utility" Catalogue.

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BRITISH AND BEST	THE NATIONAL RADIO EXHIBITION OLYMPIA	SEPT. 18 to 26
SEPT 18 to 26		BRITISH AND BEST

Belmont

# WITH PICK-UP *and* SPEAKER



Conducted by  
A. JOHNSON-RANDALL

I AM writing this page immediately following a visit to the Gramophone Company's works at Hayes, and I feel sure that all of you will like to know something about the H.M.V. radio-gram range for 1932.

As you may well judge, this well-known firm has a splendid research and development department together with a factory equipped with everything required for making first-class precision apparatus.

## New Models

All of the H.M.V. next season's models are one hundred per cent new, and one of them is a most fascinating piece of apparatus. It is called the Model 117 Automatic Record-Changing Playing Disk.

It comprises a walnut cabinet containing an electric turntable motor and a self-changing turntable capable of playing up to eight 10-in. or 12-in. records at one loading.

The device can be used in conjunction with practically any radio or radio-gram receiver, or if desired with an ordinary electrical gramophone amplifier and speaker.

## The Self Changer

The records are placed upon a platform, which consists of two sliding arms or jaws, the records being located by an extended centre spindle. The jaws automatically release one record at the time, and during the changing operation, which incidentally takes only eight seconds, the pick-up in swinging away from the record operates a switch which cuts out the amplifier and so eliminates any clicks or "plops" in the loud speaker.

On the front of the cabinet there are a volume control and a press button

which controls the record changing.

If you wish to play eight records you load up the machine with the required number and set the index switch to the figure eight. You then press the button and the machine does the rest.

Possibly you will get tired of one of

## VERY ATTRACTIVE



*The new H.M.V. turntable and motor which automatically changes and plays up to eight records. A volume control and pick-up are included in the unit.*

the records before it has been played right through. Well, then, you just press the button once more and it automatically changes over to the next record in the pile.

## Most Intriguing

If, say, you only want to hear two records, you set the index switch to the figure two and so on. If you like you can have the same record eight times. I must confess that I found

it a most intriguing piece of apparatus. It retails at 18 guineas, complete with pick-up and tone-arm.

The pick-up fitted to the H.M.V. radio-gram sets and electrical reproducers is known as the No. 15. It is extremely sensitive and with the average record has an output of about 2 volts. This means that only a small amplifier is required for ordinary domestic purposes.

## Easily Converted

The response curve is arranged to give a "lift up" on the bass to compensate for the falling off on the record at the lower end of the musical scale. The pick-up can be rotated in order to facilitate needle changing.

There is also a second model of this pick-up, which is suitable for fitting to existing tone-arms. The idea is that those listeners who already own an ordinary gramophone can, if they wish, convert them into electrical reproducers at a moderate price.

This scheme saves the cost of a special turntable and motor. A volume control is fitted and is provided with clips to which resistances can be attached so that the response curve of the pick-up can be adjusted to suit the amplifier or loud speaker.

## Power-Grid and Pentode

Among the other models in this new range is a three-valve radio-gram receiver having a screen-grid H.F. stage, a power grid detector and a pentode output. The loud speaker is a moving-coil type and the set is intended for all-mains operation.

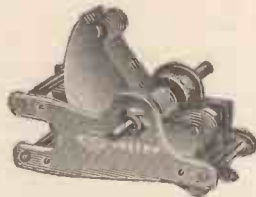
We hope to be able to give the full details of how to fit the pick-up to the "Extenser" Five next month.



# Announcing the IGRANIC 1931=2 PROGRAMME

## Sensational Price Reductions

Prices become effective on September 18th, 1931



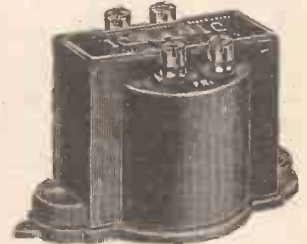
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·0005 mfd. . . . . Price 5/9  
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 ·00015 mfd. . . . . " 5/-



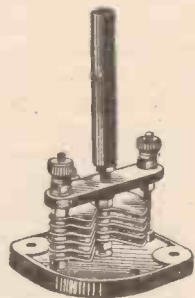
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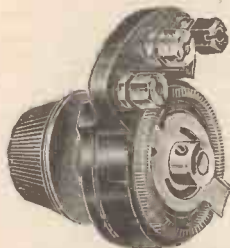
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 Ratios 5-1 and 3-1.

Price . . . . . 15/6



**IGRANIC MICRO CONDENSER**

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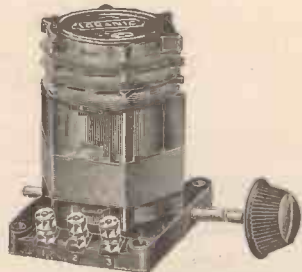
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# PICK-UP HINTS and TIPS



Interesting notes on some practical aspects of radio-gram reproduction.

By A. BOSWELL

I WAS having a chat the other day with a technical research man whose job is connected with pick-up design. We were discussing an amplifier circuit used in a reproducer listed by his firm. He mentioned that, although the pick-up designed and marketed by his company gave a response curve which was the converse of the gramophone record curve, it was also necessary to adjust the amplifier response curve to ensure the highest degree of fidelity.

## Balancing Out

The pick-up in question was designed to give a straight line from about 150 cycles to 4,000 or 4,500 cycles, and below 150 cycles the response was increased to make up for the decrease in the reproduction of the bass on the record. Of course, recording is yet by no means perfect; and electrical reproduction shows this up, particularly on the lower register. In addition, the fact that the average loud speaker is not all that it might be in regard to the lower notes makes things worse.

It is undesirable to counteract this by mechanical resonances in the pick-up, but it is a simple matter to adjust the curve in the amplifier itself.

In the amplifier in question the L.F. transformer was parallel-fed and the coupling condenser value suitably chosen so as to produce the required "lift" at the bass end.

## Increasing the Bass

Those who have "shunt-feed" L.F. stages can, by experimenting with the coupling condenser, frequently improve their low-note reproduction considerably.

I wonder why there is a tendency sometimes to treat the pick-up side of a set as an afterthought. I have a

case in mind at the moment. The receiver is a good design, and commendable in every way from the radio point of view. Two pick-up terminals are provided, and these are connected directly between the grid of the detector and L.T.—.

### SUGGESTED RECORDS

- |                                     |                  |
|-------------------------------------|------------------|
| Vocal.                              |                  |
| The Cobbler's Song                  |                  |
| Peter Dawson                        | H.M.V. B.3772    |
| We Two, and Would You Take Me       |                  |
| Back Again?                         |                  |
| Layton and Johnstone                | Col. D.B.560     |
| Just Two Hearts                     |                  |
| Sidney Hamilton                     | Broadcast        |
| Orchestral.                         |                  |
| Gilbert and Sullivan Selection      |                  |
| Light Symphony Orchestra            | H.M.V. C.2236    |
| Hungarian Rhapsody (No. 1)          |                  |
| London Symphony Orchestra           | H.M.V. D.1931    |
| Hungarian Dances                    |                  |
| Viennese Light Orchestra            | Broadcast Twelve |
| Dance.                              |                  |
| We're All Good Pals At Last         |                  |
| Jack Hylton                         | H.M.V. B.6042    |
| Pardon Me, Pretty Baby              |                  |
| Ambrose and his Orchestra           | H.M.V. B.6038    |
| My Brother Makes the Noises for the |                  |
| Talkies                             |                  |
| Jack Payne                          | Col. C.E.317     |
| Moonlight Saving Time               |                  |
| Jack Payne                          | Col. C.E.308     |
| When the Moon Comes Over the        |                  |
| Mountain                            |                  |
| Lew Sylva and Band                  | Broadcast 735    |
| Lights of Paris                     |                  |
| Riverside Dance Band                | Broadcast 733    |

When you wish to go over to gramophone you have to detune on radio, and, moreover, you have no negative bias on the detector, which now becomes an L.F. amplifier. Surely it would have been quite easy to incorporate a switch in the set so that the radio side could be disconnected and a small negative bias applied to the valve in the usual manner. Pick-ups are getting very sensitive these days, and if you are making your detector function as an L.F. valve on "gramo" it is well

worth while to apply 1½-3 volts negative to its grid, otherwise there is a distinct risk of distortion at this point, and however good the remainder of the amplifying equipment is the record reproduction will not be of the best.

## Good Earth Essential

Here is a tip that may help those troubled with L.F. instability.

I was testing out a radio-gram, and directly I switched in the pick-up a high-pitched whistle started.

I was puzzled because the H.T. supply was perfectly O.K., and there seemed to be no particular reason for the trouble. However, I carried out some further tests with a negative result, and finally came to the earth. Incidentally, this earth had previously been behaving satisfactorily with other amplifiers, but the one under test was of the high-magnification type and would show up any weaknesses in the earthing arrangements.

On tracing the earth lead down to its connection on the main water-pipe I found that the contact between the pipe and the clip had become oxidised and needed cleaning. I removed the clip and scraped the joint with a pen-knife, replaced the clip, and tried again.

The amplifier now behaved perfectly and there was no trace of L.F. oscillation, so it was evident that the cause of the trouble was a high-resistance connection or, in other words, a bad earth. So don't forget to look over your earth at regular intervals. It pays.

Just a word about controlling volume. I like to do my record changing and volume controlling from my armchair. That is probably because I am lazy, but I must confess that the idea of having to get up whenever I have to put on another record or make an adjustment to the strength doesn't appeal to me.

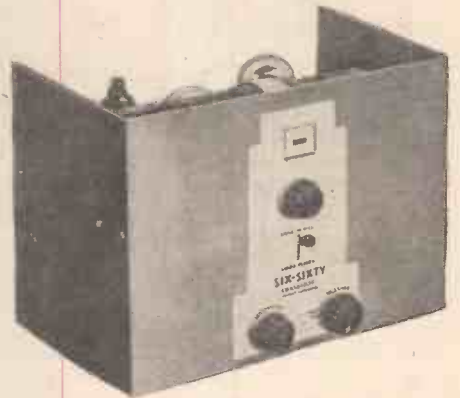
## Potentiometer Control

So I use a turntable with a well-fitting soundproof lid on the cabinet (this is because I don't want to hear any "chattering" or "dithering" as the pick-up traverses the record grooves). My volume control, comprises a potentiometer having a value of 250,000 ohms joined across the pick-up and placed on the front of the turntable cabinet.

I can then have the cabinet by my side, the pick-up being connected to the amplifier by two flexible leads. In fact, I am now thinking of going a stage farther and of purchasing a "self-changing" turntable.

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Have you examined yet the new Chassikit principle of construction? Write NOW for the big beautifully illustrated folder. Intensely interesting—telling you how simply and without possibility of error you can build the complete all-metal chassis of the most modern 3-Valve S.G. Pentode Receiver. With these:—Pre-Selector band-pass tuning (*the most successful solution of selectivity problems*) . . . Multistat COMBINED Switch and radio and gramophone volume control (*also entirely new*) . . . Triple ganged tuning with ONE KNOB . . . latest metallised S.G. and Det. valves, and PENTODE output valve.



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The SIX-SIXTY Chassikit comprises three factory-built units—condenser assembly, coil assembly and the valve unit accommodating the remaining essentials. Screening is COMPLETE. Result an all-metal Chassis of the most advanced type. Each unit factory-tested. A variety of beautiful cabinets from 10/6 to 12 gns. Or incorporate it in cabinet of your own design. There is great adaptability.

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W.C.



*Radio for All—A Simplified Calculation—Where the Filter Scores—What a Peak will Do.*

I CANNOT go to our Radio Exhibition without marvelling at the appeal radio has for anyone and everyone. Each year I meet at our stand, clerks, parsons, doctors, bankers, office boys, merchants, farmers, schoolboys, old ladies, foreigners, men in uniform, married men, single men, engineers, commercial travellers, young married couples, painters, busmen, policemen, airmen, explorers, people of independent means—oh, and people of every type of which you may think.

One after the other they come, all the time on an equal footing, all enthusiasts, all with one interest. "Radio for all" is the truest slogan ever thought of, whether it be price, or whether it be person.

**Easy Calculation**

But to change the subject from such ruminating. As a youngster and as a—well, as a radio enthusiast, maths., mental or otherwise, has never been one of my brightest accomplishments.

Therefore, like other lazy people I welcome any means of simplifying simple calculations. Have you met this one yet?

If you want to know how many valuable H.T. volts you will lose by putting a resistance in the plate circuit of a valve just proceed thus. Multiply the milliamps. taken by the valve by the thousands of ohms in the resistance.

**A Typical Case**

Having got on to the involved subject of maths. I must do the thing properly and give an example. So here goes.

Suppose we put a 25,000-ohm resistance in the anode circuit of our detector valve to act as a de-coupling, and the valve takes a milli-amp. Then we drop 25 volts, i.e.  $25 \times 1$ . That's all, both ways.

Talking about de-coupling reminds me. You know the old query: what's the difference between an output transformer and an output filter? You do? Well, here's a

point that is often left out in the cold.

In the matter of de-coupling the last valve from the H.T. supply and so avoiding L.F. instability, bad quality, howling, and so on, the filter has all the advantages. It is a complete de-coupler in itself.

The choke stops L.F. from going through the H.T. and the condenser passes it to the filament via the speaker. With a transformer the L.F. has to go through the primary with the steady anode current, and then has to complete its journey via the H.T. source.

**Handling Volume**

Do you know the answer to this? There are two sets using similar power valves, both valves are working properly and both have the same H.T. and G.B., but one will handle much more volume before it overloads (as indicated by a milliammeter in its plate circuit) than the other.

Yes, it certainly seems that if both valves are working under the same conditions, and assuming similar speakers, they should handle the same volume BUT, — this is worth noting. Suppose the transformer in one set has a sharp peak near the middle frequencies, and the other has a more or less level characteristic.

That peak will cause overloading long before the volume as gauged by the other frequencies is anywhere near overloading the valve. That's one reason why peaks are so undesirable. A. S. C.

NOR even the fascination of short-wave ether-searching can keep me away from an annual "recuperation" break.

And as I write these notes miles from anywhere—to be precise, tucked away on one of the peaks of Derbyshire, I'm given over to thinking what a dull place the world would be if short waves were non-existent!

**In the Country**

It's only when you get away from the short-wave outfit for any length of time that you begin to appreciate the joys of straining your ears to catch a whisper-like call-sign of some far-off short-waver—and were it not for the fact that I've managed to find someone in this remote village who possesses a short-waver (of sorts!) I'm afraid I should soon have become "home-sick"!

As it is, I have had an excellent chance of studying reception under almost ideal conditions. The aerial

\*\*\*\*\*  
\* **THE MONTH ON** \*  
\* **SHORT WAVES** \*  
\*\*\*\*\*

is something like 2,000 ft. above sea-level, and the nearest source of possible interference—trains, electric lifts, etc.—is at least ten miles away.

And as a result of my experiences I am convinced that it would require at least another stage of amplification in London—or any other thickly populated place for that matter—to obtain results equivalent to those I have heard from this village "thrown-together" two-valver!

Sydney (on 31.28 metres), P L E (Bandoeng, Java), and H R B (Tegucigalpa, Honduras), just to mention a few of them, I have heard here at quite decent strength, and it's a long time since last I managed to

log Sydney in London—even with a short-wave super-het. on the air.

And now, by way of concluding, I singled out a couple of "mystery" queries from my post bag before I left London.

**Have You Heard Them?**

The first was from A. M. (Leeds), who has logged an unknown station on 31 metres with the call-sign L S O R, or L X O R. I have heard him myself, A. M., and I believe it is L S O R (Buenos Aires), on 31 metres.

The other letter concerns a very powerful station that has made its appearance on about 32 metres. H. E. (Eckington) informs me that it is often on the air in the evenings radiating dance music, and announcements are occasionally made in English. Have any of you "Constructor" readers managed to get the call-sign?

G. T. K.

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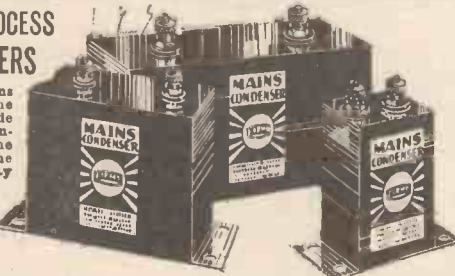
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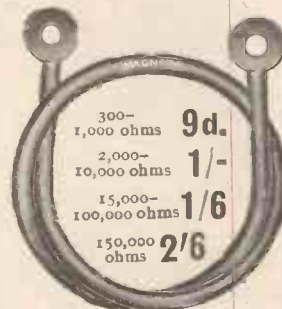
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# OUR NEWS BULLETIN

## Mihaly's Latest

PROBABLY by the time this issue is on sale, the Hungarian television inventor, Herr von Mihaly, will be in London. He is going to demonstrate his invention over here, and I understand that it is a comparatively simple device. Only one wave-length is used for the picture transmission.

## Universal Radio

It is estimated that about 10,000,000 houses in the United States are equipped with radio, while it is reckoned that 26,000,000 sets are now in use all over the world. Great Britain and Germany have about 3,500,000 sets each, France

about 1,250,000, while the United States, with 83 sets for each thousand population, tops the list.

Denmark has 63 sets for each thousand population and Sweden 60 sets for each thousand.

## The Symphony Season

The B.B.C. has just announced a season of Symphony concerts, which will begin on October 14th and end on May 4th. Dr. Adrian Boult will conduct twelve of these concerts, while the following famous conductors will conduct one each :

- Sir Landon Ronald.
- Nicolai Malco.
- Sir Henry Wood.
- Richard Strauss.
- Ernest Ansermet.
- Weingartner.
- Bruno Walter.

The list is good, but it might have been better if the B.B.C. had included Sir Thomas Beecham.

## Newcastle's Experiment

The Newcastle fiasco had to end and, in deciding to switch back to 288.5 metres, the B.B.C. did the only thing possible. The experiment was originally made to enable Newcastle to broadcast the North Regional programme, but synchronism of this kind inevitably caused unsatisfactory reception for listeners near Newcastle.

Nevertheless, I see that the B.B.C. is reported as saying that the experiment was technically a success. In fact, the official statement goes like this: "Technically the experiment has been of considerable value."

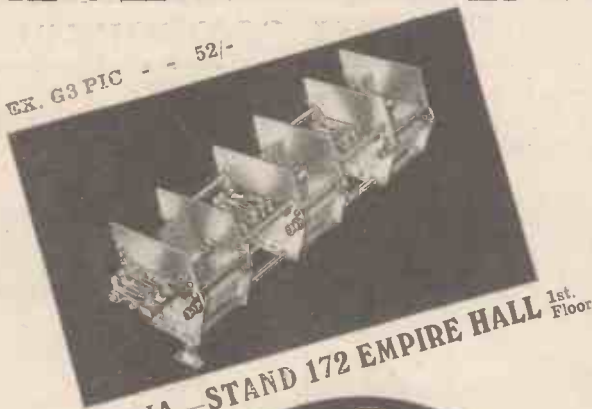
## A Storm of Protest

"During the first few days," goes on the report, "of the synchronised working, reception conditions were less satisfactory than had been anticipated due to temporary difficulties in obtaining the necessary high degree of synchronisation and stability."

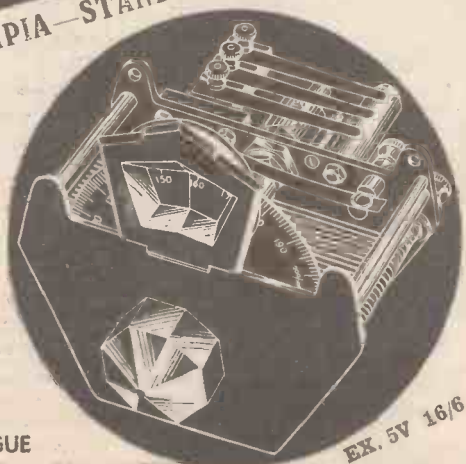
However, the B.B.C. received dozens, hundreds and even thousands of letters, so I understand, and something like a radio revolution was brewing in the North until Mr. Ashbridge—having investigated the whole business—decided to give Newcastle back its old wave-length.

(Continued on page 328.)

# AN EXTENSER FOR EVERY PURPOSE



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CYLDON is the only Extenser for Extenser sets—perfect wavechange switch, noiseless wipe contacts, 4-pillar construction, rigid and foolproof. Be wise—refuse to accept substitutes for the specified CYLDON in Kits of Parts you buy. Don't risk trouble—those who know always build with CYLDON.

- EX.5 Single Extenser .0005 mfd. (4" Bakelite 360° Dial 1/6 extra) 12/6
- EX.1T5 Single Drum Drive Extenser with Drum, Chassis and Bakelite Escutcheon 18/6
- EX.2T5 2-Gang Double Drum Extenser 37/6
- EX.3T5 Triple - ganged Double Drum Extenser 55/-
- EX.G2 PIC 2 Through-Gang Extenser with insulated commutator for Varley Square Peak Coil 30/-
- EX.G2 2 Through - Gang Slow Motion Extenser 36/-
- EX.G3 3 Through - Gang Slow Motion Extenser 58/-
- EX.G4 4 Through - Gang Slow Motion Extenser 80/-

**SPECIFIED FOR "EXHIBITION" 4**  
**CYLDON EX. G. 3. PIC.** Straight through Triple Gang Extenser with commutator insulated from centre spindle. Specially designed Extenser for VARLEY SQUARE PEAK COIL.  
 Price 52/-

**CYLDON Duplex Illuminated Dial** with Sector Vision dustproof window. 8:1 friction grip drive reduction. 360° movement special for CYLDON Extensers. Handsome modern escutcheon.  
 Price 7/6

**SPECIFIED FOR "I.E." CYLDON EX. 5.V Single Slow Motion Extenser.**  
 Price 16/6

Designed and manufactured in England. If your dealer cannot supply—send direct S. S. BIRD & SONS LTD. CYLDON WORKS, SARNESFIELD RD. ENFIELD ENFIELD 2071-2. Grams: Capacity, Enfield.



SEND FOR NEW CATALOGUE



# You'll be lost in wonder at Radiolympia

Even radio experts get a thrill out of Radiolympia. It is simply miraculous the strides Radio has made since last exhibition. All who realise the importance of Radio in modern life should keep a day free for Radio's great show.

COME TO RADIOLYMPIA

NATIONAL

# RADIO EXHIBITION

WHERE BRITISH IS BEST

# OLYMPIA SEPT 18-26

11 a.m. to 10 p.m. DANCING

ORGANISED BY THE RADIO MANUFACTURERS' ASSOCIATION,



## GO FURTHER

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## « VALVES »

A full range of first-grade valves at prices that will please you.  
Irish and Scottish Agents: W. J. BYRNE, 21, Temple Lane, Dublin.  
R. G. JACKSON NISBET, 132, Renfrew Street, Glasgow.  
THE ELECTRICAL TRADING ASSOCIATION, Aldwych House, Aldwych, W.C.2  
Telegrams: Eltradox, Estrand, London. Telephone: Holborn 8139.

OUR NEWS BULLETIN

—continued from page 326

Economy Proposals

Sir George May's Economy Committee put forward the suggestion that the Government should take another £475,000 from the gross licence revenue of the B.B.C. Naturally, this doesn't please the people at Savoy Hill, but, on the other hand, I understand that if this deduction is made it will not—as many listeners think—completely cripple broadcasting.

Where the Money Goes

It must be remembered, however, that the B.B.C. is very heavily committed. To begin with the new Broadcasting House is costing the B.B.C. £650,000, and it will probably cost another £200,000 to equip it. Broadcasting House not being big enough, an adjacent site has been acquired for further building, and I understand that this alone is costing an additional £50,000.

Sir John's Forte

There is no doubt that the national demand for economy will reflect on

the B.B.C. and that something very drastic will have to be done from the point of internal economy and revised administration. However, administration is Sir John Reith's forte, and listeners may rest assured that he will see that the B.B.C. is not crippled.

Regional Rejoicings

The B.B.C.'s decision to switch over the talks from the Regional to the

**If you go to Olympia do not forget to visit us at our stand, where you will be accorded a most hearty welcome.**

National programmes, thus leaving the Regional station free in the evening, seems to have met with universal approval. This decision will give listeners the opportunity of choosing between music or some other entertainment, and it will also leave the Regional station open to handle studio programmes, outside broadcasts, theatre relays, etc. Thus listeners will find an opportunity of choosing between definitely contrasted programmes.

The Prague Plan

No student of Continental broadcasting conditions to-day can fail to have observed that the Prague Plan is now obsolete. This was the general opinion expressed at the recent conference of the International Broadcasting Union at Lausanne.

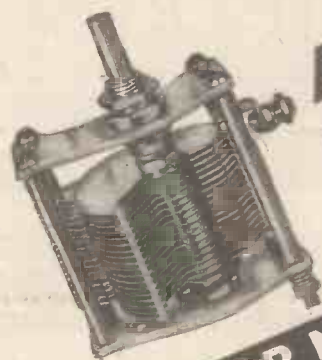
Readers will remember that, under the Prague Plan, the minimum separation between stations was fixed as 9 kilocycles, but although this was O.K. at the time, recent developments—especially in connection with new high-power broadcasting stations—have proved that a wider separation of the order of 12 kilocycles is now necessary.

Too Many Stations

The problem now under consideration is how is this increase in kilocycle separation to be brought about? The number of wave-lengths available is limited, and to increase the kilocycle separation necessitates a reduction in the number of stations. But at the Lausanne Conference nobody seemed willing to give up stations or wave-lengths.

Europe's Problem

What will be the result of the Madrid International Conference, (Continued on page 330.)



STAND 60

AMAZING VALUE with the high quality of 'POLAR'

These two new condensers, popularly priced and maintaining the high efficiency of Polar design and construction, offer you the greatest condenser value obtainable.

Both are made with aluminium vanes and end plates. Bonded rotors and ball-bearings. Rigid construction with four brass pillars.

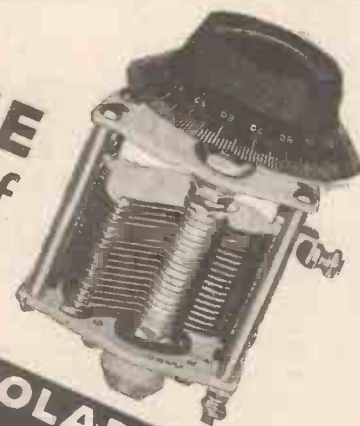
Capacities for both models: .0003, .00035, .0005.

Obtainable from all dealers. Catalogue free on request.

POLAR



CONDENSERS



OLYMPIA



## TO ASSURE ACCURACY AND RELIABILITY!

**N**OTHING is left to chance by T.C.C. . . . . every possible test is employed to be sure that only perfect condensers find their way to the stock room. Tests for true capacity. Tests for insulation, for mechanical strength, indeed tests covering every likely condition under which a condenser may be used. Because of this systematic series of tests, because of the use of only the best materials, and because of the unique experience of a quarter of a century's specialisation in condenser manufacture, T.C.C. can and do guarantee every condenser to be up to specification. That is your safeguard—Whatever your condenser need insist on the condenser with a reputation—T. C. C.

# T.C.C.

## CONDENSERS

TELEGRAPH CONDENSER CO., LTD., N. ACTON, W.3.

♡ 8805



See it on  
**STAND 44**

The New  
**Westinghouse  
Metal Rectifier  
H.T.8**

*which gives an output of  
250 volts 60 milliamps  
(after smoothing)*

**21/-**



**METAL RECTIFIERS**  
of all other types will also be  
on view

*The Westinghouse Brake & Saxby Signal Co.,  
Ltd., York Road, King's Cross, London, N.1.  
Phone: North 2415.*

WE ARE EXHIBITING AT



**OUR NEWS BULLETIN**

—continued from page 328

which will be held in 1932, heaven only knows. There seems to be as much confusion about broadcasting from the international point of view as there is about politics.

Meanwhile, the European wave-length problem is getting more acute, and it is likely that an emergency Conference will be called in the autumn, to which Governments will be invited to send their representatives.

**Clear the Chaos**

One thing is certain, that unless something is done—and rapidly at that—to clear up the growing chaotic condition of the European ether, broadcasting in the near future will be a very tangled proposition indeed.

**Vienna's Latest**

Talking of the European ether situation reminds me that Vienna is about to enter the lists as a high-power station. "Radio Wien" is a pretty good station as it is, and comes over extraordinarily well. But what will it be like when it increases its

power to 100 kilowatts from the present 20 kilowatts?

Its wave-length being 517 metres, it is hardly likely that the Vienna station will cause much trouble among the British stations, but the separation between Vienna and Brussels (Brussels' wave-length is 509) is by no means sufficient.

**NEXT MONTH**

The "I.E." Three will be described.

NOVEMBER

"WIRELESS CONSTRUCTOR"

On Sale Oct. 15th. Price 6d.

**Radio Weeks in the West**

From October 24th to November 1st, Cardiff will have its exclusive Radio Week. Whether this will please the Welsh Nationalists, I don't know, because they want—as far as I can gather—a Welsh Broadcasting Corporation of their own.

Bristol is also going to have its Radio Week, from September 19th to September 27th.

**RADIO REMINDERS**  
*Some Informative Jottings about Radio in General.*

When making up a set from a published design remember that deviation from the wiring diagram may greatly affect reception.

If mains valves are inserted into an ordinary set there is often danger of instability owing to the much greater magnification obtained.

At Brookmans Park and at Slaithwaite every transmitting valve has a separate grid and anode meter to show that the circuits in use are working properly.

The insulation of the valve-cooling water at 5 X X is obtained by running it at high pressure through a perforated plate rather like the rose of a watering-can. (This breaks up the water into fine particles, and thus makes for practically perfect insulation).

**A New All-Mains Set**

Details of the new "Lotus" all-mains set were not received in time for inclusion in the Exhibition Review in this issue, but will be found elsewhere in one of our advertisement pages together with particulars of the new "Lotus" components.

**RADIO - GRAM ENTHUSIASTS!**

Here's the way to the best possible reproduction

A well designed amplifier, a good moving coil speaker and—a B.T.H. Pick-up and Tone Arm. These are the ingredients for the finest reproduction of records. The recipe is recognised by leading Radiogram experts.

And there's no need now to forego your B.T.H. Pick-up on the score of cost. The new B.T.H. "Minor" is a product of the same engineering principles that have made the "Senior" Model the standard of excellence where Pick-ups are concerned. **Ask your dealer for a demonstration.**



**PICK-UP and Tone Arms**



THE EDISON SWAN ELECTRIC CO. LTD.  
155 Charing Cross Road, London, W.C.2



"Minor" B.T.H. Pick-up and Tone Arm. Price complete 27/6



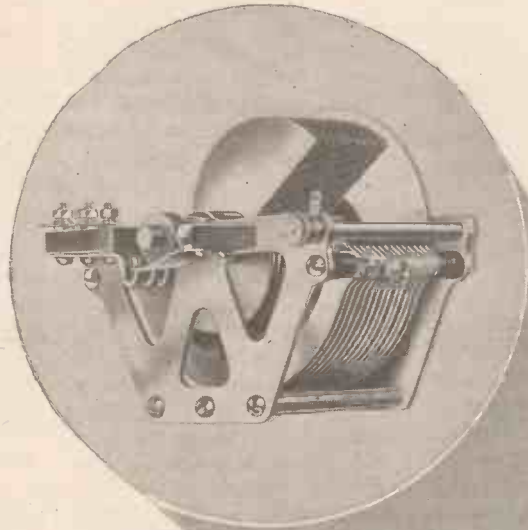
"Senior" B.T.H. Pick-up and Tone Arm. Price 45/-



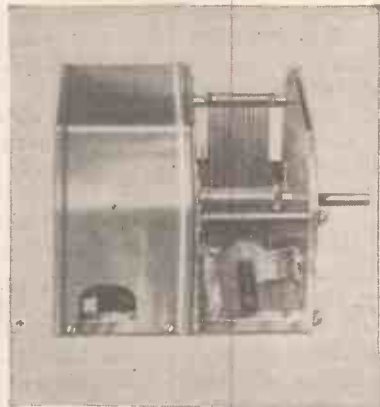
"Senior" B.T.H. Pick-up only with adaptors. Price 27/6



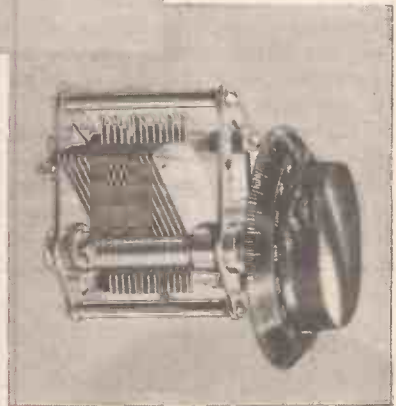
# WORTH WAITING FOR— THE NEW J.B. EXTENSER



**J.B. EXTENSER.** Individually adjustable switch contacts. Rigid 4-point braced frame. Highly finished. Complete with Illuminated Vernier Disc Drive. '0005 mtd., 14/6.



**J.B. ENCLOSED GANG ('0005).** Extremely rigid. Totally enclosed. Units matched within 1% and fitted with '0001" trimmers." Mounts on side or base.  
2-Gang . 20/-  
3-Gang . 29/6



**POPULAR.** Extra heavy gauge Brass vanes. Nickel-plated Frame. High grade ebonite insulation.  
**SLOW MOTION TYPE (35-1)** as illustrated, with 3 in. dial, 8/6.  
**PLAIN TYPE, 6/-** 4 in. dial, 1/6 extra.



**BASEBOARD DRUM DIAL** for use with ganged condensers. 4 inch Drum. Ratio 16:1. Oxidised silver or bronze panel plates. 7/6.

If it's a tuning device, J.B. make it—and make it better. In the new J.B. Extenser, for example, a silent brush contact is combined with the switch gear. And not only are the *switch contacts* noiseless and self-cleaning, but they are *individually adjustable*—a J.B. feature that ensures perfect contact over long periods of use. Other new J.B. products include Air-Spaced Differential Condensers at 4/3; Baseboard Trimming Condensers at 1/-; a Coupling Device at 9d. to gang two condensers while insulating the rotors, etc. See them all at

STAND No. 62, NATIONAL RADIO EXHIBITION, Olympia.



## PRECISION INSTRUMENTS

## SOME ELECTRICAL GRAMOPHONE HINTS

An article concerning "Induction" and "Universal" type motors.  
By Dr. J. H. T. ROBERTS, F.Inst.P.

**A**LTHOUGH spring-driven gramophone motors are still very much in the majority, electrically-driven gramophones are rapidly gaining in popularity.

Since the electrically-driven motor can only be used, of course, where there is a source of electric supply, it would seem at first sight to be out of the question to have a portable electric gramophone. As a matter of fact, however, most portable machines are never actually moved about to any extent, but occupy a more or less fixed place in the home, just like a cabinet gramophone, and therefore there is no reason why the electric motor should not be incorporated at any rate in the majority of portable gramophones.

Attempts have been made to meet the requirements of a portable and electric gramophone by incorporating a combined spring-and-electric motor; the gramophone can then be elec-

trically driven where there is a source of electric supply and spring-driven in other cases. There does not seem to have been very much sale for these combined spring-electric motors, however, no doubt owing to the higher cost and also to the fact that the utility of such a machine is limited.

Electrically-driven gramophones fall broadly into two classes—those having a "universal" motor and those having an "induction" motor.

### The "Universal" Motor

The former is "universal" in the sense that it can be used with either alternating current or direct current. Usually this type of motor is wound for about 100 volts actually applied to its terminals, and for the 200-250-volt range of supply it requires an electric lamp or some other form of resistance introduced in series with it. When used with the proper adjustable resistance it becomes uni-

versal both for voltage as well as for type of current.

The induction motor, on the other hand, can be used only on alternating current, and is therefore not universal so far as the type of current is concerned. It can, however, easily be made universal for voltage by a simple arrangement of the windings and alternative connections; it can then be immediately converted to operate on 100-110 volts or 200-250 volts.

The universal D.C.-A.C. motor is usually of the well-known type employing a commutator, and runs at a speed of about 12 to 15 times that of the gramophone turntable, a step-down worm drive being used between the two.

### Avoiding Interference

Although the universal motor has obvious advantages, inasmuch as it is adaptable for A.C. or D.C. and for any ordinary voltage, it has for gramophone purposes two drawbacks. The first of these is the sparking at the commutator, which, unless carefully minimised, is liable to give rise to trouble when a pick-up is used for the electrical reproduction of records.

It is possible to do a good deal by screening the motor; in fact, in some cases screening will completely cure (Please turn to page 334.)



Overall dimensions: 10" diam. x 4 1/2" deep.

Although offered at the amazingly low price of 45/-, the R. & A. "100" was designed for performance, and afterwards priced. Perfect reproduction is paramount, and will satisfy the most critical listener.

Sensitivity is of a high order and equal to the most expensive energised types. Ideal for small receivers, and also for those with inputs in excess of domestic needs.

The R. & A. "100" is exhibited at the Radio Exhibition, Olympia, on the stands of the leading Distributors. Your dealer will demonstrate, but in case of difficulty write us for name of nearest dealer who can supply.

Speech Coil Resistance, 8.5 ohms.

Requires a suitable output transformer.

**REPRODUCERS & AMPLIFIERS, LTD.,**  
FREDERICK STREET, WOLVERHAMPTON.

45/-

# CLIX

## Constructor's Kit

*Saves you Time and Money.*

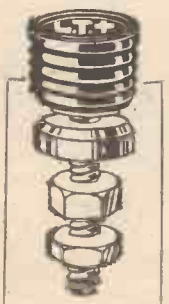


This kit contains an assortment of nineteen Clix fitments specially selected for the set builder. Every one is essential for every set you build. Buy a Clix Kit for your next set and save money.

Contents:—2 Spade Terminals engraved for L.T.; 2 Plugs (A and E); 2 Sockets (A and E); 7 Terminals, engraved; 6 Wander Plugs, engraved for H.T. 3/- and G.B. Value 3/5. Price 3/-

Illustrated Folder Free.

**PANEL TERMINAL**  
Strongly made with two lock-nuts and soldering hole for contact. Insulated knob. Easily read markings. For use with Clix Hook, Ring or Spade Terminals and all standard fitments. Adds to the efficiency and appearance of any set. 3d.



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Radio Exhibition,  
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**Cheapest — PERFECT — Contact**

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# GRAHAM FARISH

BROMLEY

KENT

LTD.



**GRAHAM FARISH OHMITES AND MEGITES**

We recommend these for duty on loads up to 1 or 2 watts (dependent on the size and voltage employed). All values from 100 ohms to 5 megohms. Price **1/6**



**GRAHAM FARISH ANTI-MICROPHONIC HOLDER**

The clever suspension of this robust valve holder ensures absolute freedom from microphonic noises. The whole enclosed in Bakelite moulding, connections being brought out to terminals. Price **9<sup>D</sup>**



**GRAHAM FARISH VOLUME CONTROL**

This has been produced for use in grid circuits of all types. Having unusually smooth control, silent and positive contact, the maximum value is approximately 4-megohm. Bakelite case. Indicator knob. Price **3/6**



**GRAHAM FARISH HEAVY-DUTY OHMITE**

This Graham Farish Heavy Duty Ohmite is for use where the required current is too high for our ordinary Ohmite. It is constant in value, of negligible self-capacity and non-inductive, which for most purposes renders it "better than wire-wound." Fitted with soldering tags and nickel terminals for easy connection. Price **2/3**



**GRAHAM FARISH KONE KAP GRID LEAKS**

A good carbon-type Grid Leak. Fits all Condensers and Holders. Made in 1, 2, 3, 4 and 5 megohms. Also with terminals. Price **9<sup>D</sup>**



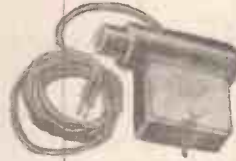
**GRAHAM FARISH FLEXIBLE RESISTANCE LINKS**

These Flexible Links are for use in place of the usual Resistances. Accurate and well within their ratings. Sizes from 1/- 1,000 to 20,000 ohms 1/- 25,000 to 100,000 ohms 1/6



**GRAHAM FARISH MULTI-WAVE H.F. CHOKE**

Specially designed choke for all radio frequencies between 50 and 3,000 metres. Impedance at 480 metres, 147,000 ohms. Complete with holder. Price **4/6**



**GRAHAM FARISH PICK-UP**

Of similar internal design to the Pick-up and Tone Arm Unit, but without arm for easy connection to existing tone arm. Entirely enclosed in Moulded Rosewood Case. Price **22/6**



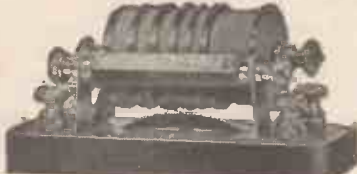
**GRAHAM FARISH PUSH-PULL SWITCH**

Exceptional value. Positive contact with snap action. Will give satisfaction for years. Self-cleaning contacts. Connections brought out to two terminals. One-hole fixing. Price **8<sup>D</sup>** Delivery 7 days.



**GRAHAM FARISH 'SNAP' L.F. TRANSFORMER AND CHOKE.**

A remarkable Transformer of small size—gives true stage gain at high and low frequencies, especially when used in conjunction with the "Snap" L.F. Choke in parallel feed following detector valve. "Snap" Transformer 3 : 1, 5 : 1 "Snap" L.F. Choke, 5/- Price **5/6**



**GRAHAM FARISH H.F. COUPLING UNIT**

A complete H.F. Coupling Unit incorporating the "Multiwave" H.F. Choke and "Megite" Grid Leak mounted on base with sealed Condenser. Matched Units are available at no extra cost. Price **5/6**



**GRAHAM FARISH 'SNAP' SPEAKER UNIT**

A marvellous production at the price. Powerful cobalt magnet gives sensitivity and the unit handles large outputs. Bakelite cased and complete with reed. Delivery 3 weeks. Price **5/6**



**GRAHAM FARISH PRE-SET CONDENSERS**

Moulded in Walnut Bakelite with locking nut and Terminal Connections. Popular capacities covering all requirements. F. .00005 to .0001 mfd. J. .00025 to .0003 mfd. G. .0002 to .001 mfd. H. .001 to .002 mfd. Price **1/6**



**GRAHAM FARISH AUDION R.C. UNIT**

Another popular line reduced in price. Incorporates "Ohmite" (100,000 ohms) and "Megite" (2 meg.) Resistances, on base with sealed MICA Condenser of correct capacity. Price **4/6**



**GRAHAM FARISH A.C. 4 CHASSIS SPEAKER**

Incorporating powerful and sensitive motor with special waterproof fabric cone of new design. A patented method of suspension enables the cone to move with the minimum of restraint, and at the same time forms a perfect seal between the cone and chassis. Aluminium housing. Finished frosted black. Price **21/-**



**GRAHAM FARISH PICK-UP AND TONE ARM UNIT**

Extraordinarily large output with even balance. Moulded in Walnut or Mahogany in modern design. Ball-bearing pivots. Price **32/6** Delivery three weeks.



## STAND 32 AT OLYMPIA

will have a complete range of our Radio Components. We shall be there to answer your questions. You will have an opportunity of seeing the quality of Graham Farish components. Our eleven years' experience of component manufacture has enabled us to give you tip-top quality at rock-bottom prices. This is our invitation—we shall be pleased to see you at Olympia.

**SOME ELECTRICAL  
GRAMOPHONE HINTS**

—continued from page 332

the trouble. On the other hand, I have known cases where this trouble was very persistent, no doubt due to some peculiarity of the pick-up and amplifier. In the second place, the universal motor, as already mentioned, generally runs at a fairly high speed compared to that of the turntable. This sometimes gives rise to a curious mechanical vibration of the turntable and with powerful electrical reproduction an unpleasant low-frequency "rhythm" may be heard. It is for this reason that the design of electric gramophone motors has tended rather towards the slow-moving armature or rotor, keyed directly upon the turntable shaft and so moving at turntable speed.

**The "Induction" Motor**

The induction motor has the great advantage that it does away with the commutator and the rotor is entirely disconnected electrically from the field windings. There is thus no possibility of commutator sparking or slipping sparking to cause inter-

ference in the amplifier. It is quite a simple matter to design an induction motor so that the rotor turns at turntable speed, in which case the rotor may be mounted directly upon the turntable spindle, as mentioned above.

In this way any vibration troubles due to the comparatively high speed of the armature or rotor are entirely obviated and in actual fact an induction motor of this kind is usually remarkably smooth in its action and free from vibration.

Although there is no sparking with the induction motor, interference in the amplifier may still arise, sometimes owing to the stray alternating field from the motor.

If you contemplate going in for an electrically-driven gramophone you will be well advised to choose an induction motor, preferably of the slow-moving type, if your supply is alternating current.

On the other hand, if your supply is direct current you cannot use an induction motor and will be obliged to choose one of the other type mentioned above, of which there are, however, two or three very good makes now on the market.

**Many Good Makes**

I have recently been carrying out some careful tests on a number of gramophone motors of various kinds, and I must say that not only are there two or three makes of induction motor which are beautifully constructed and give really first-class performance, but also I have found "universal" motors in which the drawbacks indicated above have been entirely overcome, so that whether your supply be D.C. or A.C. you should have no difficulty in obtaining a first-class electric gramophone motor to suit your requirements

**"MODERN WIRELESS"**

The October Issue of "Modern Wireless" is greatly enlarged and embodies a **24-PAGE COLOURED SUPPLEMENT** dealing with the NATIONAL RADIO EXHIBITION, a **Free, Full-Size BLUEPRINT** of the "M.W." "SUPER-QUAD" (an amazing 4-valve super-het set), and an enlarged "WORLD'S PROGRAMMES" Section  
**On Sale: THIS WEEK** Price: **ONE SHILLING & SIXPENCE.**

**37 DIFFERENT LETTERINGS.**

Belling-Lee Terminal, Type "R," with insulated engraved heads that can't come off. 37 different letterings that don't rub off. **3d. each.**

Type "M" **4d.** - Type "R" **6d.**  
Insulated and non-rotating name.

**BELLING-LEE TERMINAL MOUNT.**

To take two terminals of any type - **8d.**

**STAND  
No. 13**



**THE  
BEST TERMINALS  
IN THE WORLD.**

For perfect design, finish and workmanship Belling-Lee Terminals are unequalled. Chosen by all the leading Wireless Journals and by most manufacturers of sets and battery eliminators. *Your choice, too.*

**BELLING-LEE  
FOR EVERY RADIO CONNECTION**

**DON'T LEAVE IT TO CHANCE.**

Protect your S.G. or Pentode Valve with a Belling-Lee Anode Connector. Contacts are safely placed inside the insulated cap. Short circuits impossible.

- S.G. Safety Anode Connector - - - **6d.**
- Engraved Wander Plug - - - **2d.**
- Belling-Lee Battery Cords with engraved Wander Plugs and spring grip Spade Terminals. 5, 6, 7, 8, 9 and 10 way.
- 54 in. cords 4/- to 6/6. 30 in. cords 2/6 to 5/-.
- With fuse, 1/- extra.



**NATIONAL  
RADIO  
EXHIBITION**

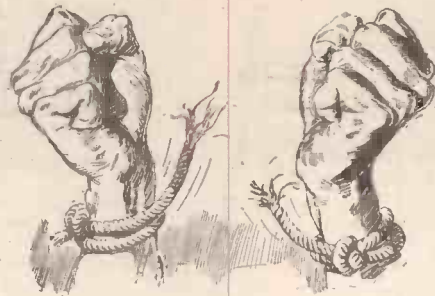




# CAPT. P. P. ECKERSLEY late of the B. B. C.

is contributing a weekly review of the latest developments in wireless to *The Daily Mail* every Wednesday. World-famous as one of the pioneers of broadcasting, both in connection with the Marconi Company and the B.B.C., his expert knowledge and unique experience are at your service.

*See  
The Daily Mail  
every Wednesday!*



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Don't be a slave to circumstances all your life. Break loose. All around you are people with no more intelligence than yourself who have climbed out of the routine class and

are occupying good positions because they availed themselves of specialized training.

Waiting for you at this moment is a bigger and better position. You can have it as soon as you have secured the training that will qualify you for it. And you can get that training in the spare time that you now let go to waste.

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### High-Grade RADIO GRAMOPHONE CABINET

of exclusive modern design, hand-made and polished on Queen Anne legs.

Figured Oak - - - £5 : 5 : 0  
Figured Walnut or Mahogany £5 : 19 : 6  
Carriage Paid.

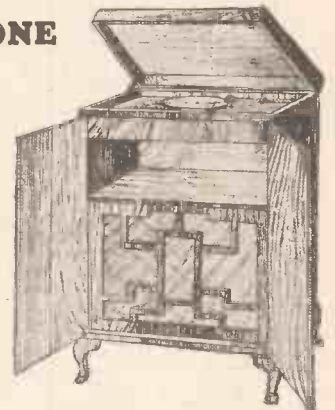
THE ACME OF CRAFTSMANSHIP  
Radio-Gram Cabinets from £3 : 19 : 6 to £21  
Wireless Cabinets - - - from £2

Photographs and 30-page illustrated Catalogue free.

Cabinets made to order a speciality.  
Furniture at Maker's prices.

**GILBERT,  
CABINET MAKER,  
SWINDON.**

Estimates free. Estd. 1866



### Melbourne RADIO



### JUNIOR COILS

With Coloured Flex Leads.

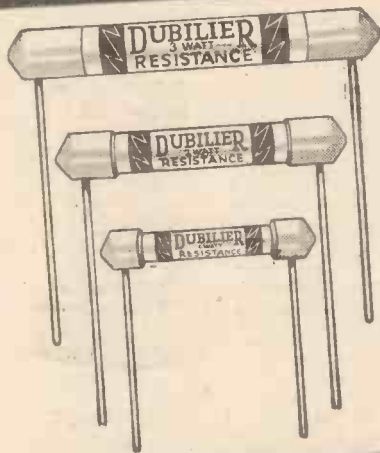
PJ1 - 2/9  
PJ2 - 2/-  
PJ3 - 2/9

"POP-VOX" COILS, 6/6 Per Pair

COIL QUILTS 6d. each. LOW CAPACITY COIL MOUNTS 6d. each.

**MELBOURNE RADIO SUPPLY**  
Norwood Buildings, Hoe St., London, E.17.

# A NEW RESISTANCE with ALL the BEST FEATURES



### PRICES

- 1-watt Type - 1/- each.
- 2-watt Type - 2/- each.
- 3-watt Type - 3/- each.

This range of resistances caters for every requirement in radio and fulfils a long-felt want for a really reliable British-made resistance which is manufactured under a patented process embodying all the essential features required at a price within the reach of everyone.

We are exhibiting at  
**THE NATIONAL RADIO EXHIBITION**  
Stand No. 92.

# DUBILIER

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

## IN THE RADIO WORKSHOP

Practical pointers for constructors.  
By H. H. LOW.

WE don't nowadays have the vast number of knobs on our panels that we used to, and it is unusual to see in a modern set a large number of terminals. The terminals are there, but they are on a small panel of their own tucked away at the back. On the front we have as a rule one or at the most two tuning dials, a reaction knob, a wave-change switch, and a volume control.

### Lettering the Panel

In the old days it was essential to indicate plainly on the panel the purpose of each of the fifteen to twenty knobs that it might contain, for otherwise even the expert owner

## NEXT MONTH

### Look out for THE NOVEMBER "WIRELESS CONSTRUCTOR"

A not-to-be-missed number!

The 'I.E.' THREE  
For Range and Quality.

The 'AMPLITONE'  
Controls Tone and Amplifies.

Order Now. Price Sixpence.

of the set might get lost. It is not so necessary to-day, but neat lettering adds to the appearance of a set and renders it more foolproof (observe the compliment to yourself, dear reader) in the owner's absence.

### A Good Finish

Any handyman who wants to explore a new field of considerable interest will find that it is well worth his while to acquire two or three simple graving tools. After a little practice on scrap bits of ebonite it will be found that there is little difficulty in cutting neat letters and figures on the front panel or the terminal strip of the set.

Once letters or figures have been cut with the graving tools all that remains to finish off the job is to fill them in with white. A good material for the purpose is a small tube of Chinese white, which you can obtain from any shop which deals in drawing materials.

(Continued on page 338.)

## WHEREVER "P.W." "COILS" ARE SPECIFIED USE

# FORMO

ARTHUR PREEN & CO. LTD.

### The "POP-VOX"

These coils are accurately made to the specification of "Popular Wireless." The windings are carefully made on a strong former fitted with feet for mounting. The efficiency of every set employing these coils depends largely upon the quality of material used. Do not risk poor results from inferior components—  
Fit Formo and be sure.

Price 3/9  
"P.J." Coils 2/- & 2/9

"P.W." DUAL RANGE COILS 12/6.

Complete Catalogue from  
**ARTHUR PREEN & CO., LTD.**  
Golden Square, London, W.1. See also pages 325 and 337. Factory: Crown Works, Southampton.

### Radio Furniture De Luxe! PICKETTS

Will delight you! Individually made; not mass produced. (Used by famous experts, B.B.C.) Advantages also of PIANO TONE! Baffle chamber, pure, mellow tone that thrills. Reduced prices: 55/- to £10 cash—or 10/- monthly. Photographs FREE.

PICKETTS Piano-Tone Cabinet Works, (C.W.), Albion Road, Bexleyheath.

## Engineers' Guide

containing the widest choice of engineering courses in the world

Qualify for a well-paid post in Engineering by studying at home with The T.I.G.B. Become an A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E., A.F.R.Ae.S., etc. Training until Successful is Guaranteed for the one fee. WRITE NOW for "The Engineers' Guide to Success," stating the branch, post or qualification that interests you, to

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## To Success

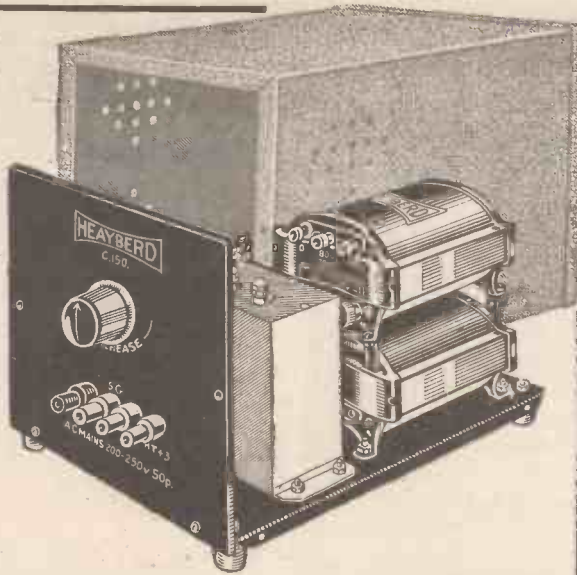
The Picture Paper with the MOST News—

## SUNDAY GRAPHIC

and SUNDAY NEWS.

PLEASE be sure to mention "Wireless Constructor" when communicating with Advertisers. THANKS!

**3 YEARS' GUARANTEE**



This warrant will be our Olympia revelation. It will be issued with every Heayberd Mains Unit and Assembled Kit of Parts. Visit our Stand, see all the new models and let us tell you of the Guarantee that is unequalled in the radio industry.

**MODEL C.150 KIT.** Output 150 v. at 25 m.a. Westinghouse rectification. Assembled in steel case. Requires wiring-up only. Simplified point-to-point diagram.

Price . . . . . **76/-**

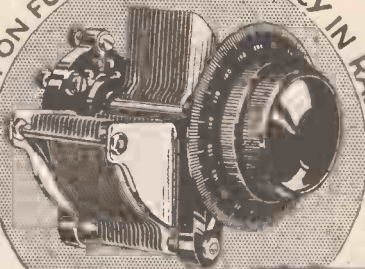
Send 3d. stamps for full lists showing how easy it is to build the Mains Unit best suited to your particular Receiver.

**STAND 68**  
Empire Hall



**10,**  
Finsbury St.,  
London, E.C.2.

**INSIST ON FORMO FOR EFFICIENCY IN RADIO**



Whenever the "Extenser" is specified fit the "Formo" and be certain of satisfaction.

**EXTENSER CONDENSER**

Dial Readings.

**0-100 covers 230-530 metres**

**0-200 covers 1000-2000 metres**

Price **14/6**

Visit Stand No. 61  
**RADIO SHOW**  
also pages 325 and 336.

The Formo design and construction of the "P.W." Extenser Condenser incorporates features of special importance for the experienced constructor who desires to choose the best components available.

The slow- and fast-motion dials give a silky smoothness essential for the tuning of close stations, whilst the special type of wave-switch is fitted with silver-gold contacts ensuring perfect electrical continuity.

All condensers are tested to 200 volts before despatch and are guaranteed to be exactly to "P.W." specification. Choose Formo and be safe.

From Radio Dealers everywhere.

**ARTHUR PREEN & CO. LTD.,**  
Golden Square, Piccadilly Circus, W.1.

Factory:  
Crown Works, Southampton.



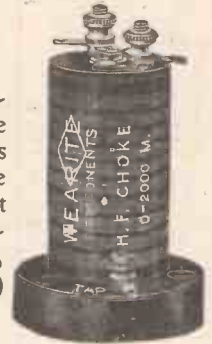
"I.E." & "EXHIBITION 4"

**"WEARITE" COMPONENTS ARE SPECIFIED IN BOTH THESE SETS—**

**WEARITE H.F. CHOKE**

A first-class component especially recommended for the "Exhibition 4." It covers efficiently the remarkable range from 10 to 2,000 metres without any marked resonances. Self-capacity very low.

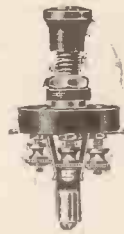
Type H.F.O., **6'6**



**WEARITE THREE-POINT SHORTING SWITCH**

Push-pull action. Sound self-cleaning contact. With insulated spindle, as specified for the "Exhibition 4."

PRICE **1'6**



**WEARITE 4-PIN VALVE HOLDER**

Suitable for use in the "Exhibition 4." This valve holder is fitted with sockets which split in four places and are therefore ideal for the new solid pins fitted to modern valves. Fitted with terminals and soldering tags. Price **1'3**

**WEARITE THREE-WAY COIL OR VALVE HOLDER**

Complete with terminals and tags. Coil sockets are sprung similar to valve holders. Price **2'9**

Write for free illustrated lists of these and other components.

**WEARITE COMPONENTS**

**WRIGHT & WEAIRE, LTD.,**  
740, HIGH ROAD, TOTTENHAM, N.17

Phone: TOTTENHAM 3857/8/9.

**SEE US AT OLYMPIA, STAND 152**



## A CABINET OF UNSURPASSED BEAUTY

The "Lincoln" Pedestal Cabinet is one of Camco's newest designs. It is a beautifully-proportioned and graceful cabinet suitable for All-Mains or Battery Sets and Speakers. Finished in a rich shaded walnut. Price £5:17:6. Post the coupon for the 1932 24-page Radio Cabinet Catalogue, and visit

**OLYMPIA STAND 51**  
(Empire Hall, Ground Floor).

CARRINGTON MFG. Co. Ltd.  
24, Matton Garden, London,  
E.C.1. Phone: HOL 8202,  
Works: S. Croydon.



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### SOLVE ALL H.T. TROUBLES

Per doz.	No. 1.	No. 2.
	s.d.	s.d.
Jars (waxed)	1 3	1 6
Sacs	1 2	1 9
Zincs	4 10	4 11
Rubber Bands (24)	4	4
Terminals	8	10

Trade Supplied.



#### LONG LIFE : SILENT : ECONOMICAL

Sample doz. (18 volts), complete with bands and electrolyte. No. 1, 4/1; No. 2, 5/-; post 9d.; terminals extra. No. 3, with terminals, 7/6 (10,000 milli-amps). Sample unit 6d. Orders 10/- carr. paid. New illustrated catalogue post free.

**FREE** Bargain List of Receivers, Amplifiers and Components

C. TAYLOR, 57, Studley Road, Stockwell, London.

COILS &



COMPONENTS

As used and recommended for the

### "EXHIBITION" FOUR

4-PIN Horizontal VALVE HOLDER 1/6  
H.F. CHOKES - - - - - each 3/6  
SPAGHETTI RESISTANCES All Sizes.

### THE "I.E."

P.J.1. COIL - - - - - 2/6  
H.F. CHOKE - - - - - 3/6  
00015 REACTION CONDENSER 4/-  
EBONITE PANEL, drilled, 14" x 7" - 4/-

**E. PAROUSSI** 10, Featherstone Buildings, High Holborn, London, W.C.1  
Phone: Chancery 7010

Make

## The DAILY SKETCH

YOUR Picture Paper

## IN THE RADIO WORKSHOP

—continued from page 336

Work the white into the grooves cut by the graving tools, using a clean piece of rag wrapped round your fore-finger for the purpose. When the white has dried in the grooves clean off any surplus from the panel with a wet cloth.

### 'Ware the Switch

If there is one component in the wireless set that most people would not suspect of being able to "play up" it is probably the filament switch. For all that, filament switches can and do cause quite an amount of trouble. In the last month or two I have found that outbreaks of noisiness complained of by no fewer than three set owners were due to faulty filament switches and to nothing else.

### Those Crackles

The type of switch which is most often to blame is one of cheap make in which the contact spindle is moved inwards or outwards between two spring arms. Switches of this type are usually quite blameless when of good make, but with cheap ones trouble, as I have shown, is not infrequent.

The reason, as a rule, is that the contact springs do not exercise a sufficient pressure on the metal part of the spindle, which is itself often not perfectly round. The way to test a push-pull switch is to turn on the set and then to rotate the switch knob very slowly. Should it be faulty you will hear crackles when it is turned to certain points.

### Give It Away!

It might be possible to effect a cure, but often I do not think that it is worth while to fiddle about with a poorly made and poorly designed switch. The most sensible thing to do is to present it with a bright smile to your worst enemy and to stand yourself a new one of decent quality.

### YOUR BIT TOWARDS ECONOMY

Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste, but will make sure of getting your copy regularly each week.

## CIRCUITS

Our 1932 Radio Catalogue contains original and interesting diagrams for two-, three- and four-valve circuits. Every serious constructor should send for his copy which will be mailed free by return of post.

The Benjamin Electric Ltd.,  
Tarfiff Road, Tottenham, N.17.  
Tottenham 1500.



## USED IN THE BEST SETS

## BECOL EBONITE

GUARANTEED AND READY FOR USE  
USE THE FAMOUS LOW-LOSS FORMER—TESTED

APPLY FOR PRICE LIST

SOLE MAKERS:

THE BRITISH EBONITE CO., LTD.,  
HANWELL, W.7.

## "POPPY CARGO"

a hitherto unpublished story by

## JACK LONDON

appears in the OCTOBER Issue of The ARGOSY MAGAZINE, which is packed with splendid fiction—twelve interesting short stories and a complete book-length novel.

The ARGOSY MAGAZINE

For October. Now on Sale 1/-

**THIS YEAR'S EXHIBITION**

—continued from page 288

famous P.R. mast, the pride of many a back-garden! Constructors will remember, too, with interest, the P.R. valve, and such specialities as a neat loud-speaker assembly, which has already scored a great success.

**RADIO INSTRUMENTS, LTD.**

Many a constructor seeing the two letters, "R.I.," prominently displayed, will walk straight over to this stand, to find out what Radio Instruments are doing. He will come away with an eye-ful!

As everybody knows, the firm concentrated on the low-frequency transformer business at the very beginning of broadcasting, and of late have been associated with the development of nickel alloy cores and parallel feed, so that in addition to a comprehensive display of R.I. coil and condenser lines, and lines like the Madrigal, which have become an institution, there are uncommonly interesting newcomers to the R.I. component range.

A request for a general-purpose output smoothing choke of smaller rating than the famous Hypercore has been met by the provision of a G.P. (General Purpose) choke with a core of low-loss iron. Capable of carrying 30 to 60 milliamps, it will be found just the thing for a large number of receivers using power or super-power output valves.

Another extremely interesting R.I. exhibit is the Stenode Radiostat receiver, in a handsome figured walnut cabinet of modern design. The remarkable selectivity of this receiver has been the subject of much discussion, so that the actual model is sure to be a centre of great interest.

Here, too, is the "Parafed" transformer, weighing only 3½ ounces, and with an inductance in the primary of 18 henries. The curves show the remarkable results in straight-line response achieved by this component at the N.P.L.

Two other new lines must be mentioned, the Unigrad potentiometer volume control and the new transformer—the Dux—with a ratio of 1 to 3½. The makers claim that this transformer will do for radio constructors what Morris has done for the motorist!

High primary inductance and low self-capacity are features which will be certain to make a strong appeal to the knowing ones, and even the less experienced will be attracted to the R.I. stand by the fine finish which is characteristic of all the items.

**READY RADIO (R.R., Ltd.).**

In well-informed radio circles there has been much talk and speculation about this year's Ready Radio programme, and although it was generally believed that they had "something good up their sleeves," nobody seemed to know just what it was. "Will Ready Radio break new ground at Olympia?" is a question that has often been asked of late.

As everybody knows, the firm has in the past specialised with tremendous success in the supply of complete kits of parts, incorporating a large proportion of components of their own manufacture. And the rumour got around that the Ready Radio component range was to be extended and



**FOR YOUR H.F. STAGE**

A neat horizontal-type valve holder made by E. Paroussi, and marketed under the name "Parex"

"hotted up" by the inclusion of some recently developed real eye-openers.

And rumour was right, as the firm's Olympia display will demonstrate. Some really remarkable new Ready Radio lines will be shown.

Of outstanding interest is the "Instamat" Major Output Transformer.

Other lines are a new H.F. choke of unusually uniform efficiency over the whole of the medium- and long-wave tuning ranges, of sufficiently low self-capacity and high efficiency to be recommended for intervalve coupling with the S.G. valve; and a super-het. H.F. choke, specially

suitable for excluding I.F. currents from the L.F. circuits.

Mention must be made, too, of a new silent-in-action L.F. volume control, and of an ingenious indicator which silently reproaches you with the word "ON" in letters of fire if you attempt to go to bed without switching off your set!

Lack of space prevents mention of other new Ready Radio lines, so the keen visitor must make a point of visiting the stand to see them all for himself. He will certainly find a crowd there!

**REGENTONE, LTD.**

The Regentone display is a comprehensive one, for here is a firm which has specialised with great success in mains units, although this is by no means the whole of its activities, and the all-electric receivers should certainly be seen.

The All-Electric Four for A.C. mains employs two stages of H.F. amplification, a detector, and one super-power output valve, and is an excellent example of Regentone design. Builders of "An all-metal mains unit," described in the WIRELESS CONSTRUCTOR last month, will remember that the Regentone power transformer was recommended, and the choice of this instrument is endorsed by Westinghouse in every circuit of their "All-Metal Way" booklet.

If you can get a copy of "The Simple Way to All-Electric Radio," avail yourself of the opportunity, for it is improbable that you will be able to get at all the Regentone components you would like to inspect!

**SIX-SIXTY, LTD.**

The whole of the Six-Sixty range of radio components is here on display, backed by the famous Six-Sixty valves; 2-volters, 4-volters, and 6-volters are all represented in profusion—including the latest developments in radio technique such as the indirectly-heated screened-grid valve—and rectifiers for full-wave and half-wave.

Output valves with large grid swings, pentodes with tremendous magnification, low-impedance, indirectly-heated A.C. output valves, and directly-heated output valves, will be found, and all characteristics are available for the interested purchaser.

The valves should not blind the visitor to the fact that Six-Sixty are showing many other good lines, including the latest valve screens and the Popular Six-Sixty cone assembly.

(Continued on page 340.)

**FERRANTI SPEAKERS**

THE outstanding quality of Ferranti Speakers is attained by intense research, careful selection of the materials used, great manufacturing facilities, and unrivalled experience in true reproduction. It is these factors which establish Ferranti Speakers in a pre-eminent and predominant position.

The Ferranti Standard Moving Coil Speakers are established as the finest reproducers of radio speech and music that science has yet devised, and maintain that position by consistent excellence of workmanship.

Now comes the NEW Ferranti Inductor Speaker, which is surpassed only by the best moving coil speakers.

All models also available in cabinet form.

SEE AND HEAR THEM AT STAND No. 45, OLYMPIA EXHIBITION.



FERRANTI, LTD., HEAD OFFICE AND WORKS: HOLLINWOOD, LANCs.

LONDON: BUSH HOUSE, ALDWYCH, W.C.2.



Chassis of Moving Coil Speaker ready for mounting in Cabinet or on baffle board.

**PRICES :**

- A.C. Mains energised, Moving Coil Type, A.1 Chassis only, £9 10 0
- D.C. Mains energised, Moving Coil Type, D.1 Chassis only, £5 17 6
- D.C. Mains energised, Moving Coil Type, D.2 Chassis only, £2 5 0
- Permanent Magnet, Moving Coil Type, M.1 Chassis only, £9 10 0
- Permanent Magnet, Moving Coil Type, M.2 Chassis only, £5 10 0
- Permanent Magnet, Moving Coil Type, M.3 Chassis only, £3 10 0
- Inductor Speaker, Chassis only, £3 10 0

THIS YEAR'S EXHIBITION

—continued from page 339

SOVEREIGN PRODUCTS, LTD.

Here there are a great many lines of interest, the firm having specialised in tuning devices, such as a selector, tuner, station selector, the Sovereign selector unit, and various other selectivity devices.

Low-priced fixed condensers guaranteed to be within 5% of the rated value, quality grid leaks, six-pin bases, terminal mounts, wall plugs and sockets, and volume controls, all showing evidence of careful design, will be on show.

In the adjustable resistance line we have here low-priced potentiometers, rheostats, and variable high-resistances suitable for use in H.T. mains units. Compact H.F. chokes at 2s. are also available; and the Sovereign Spaghetti resistance links, at prices ranging from 4d. to 1s. 3d., are sure to create considerable interest.

STANDARD BATTERY CO., LTD.

The Wates' Star loudspeaker unit will be one popular item on show here, backed up by three models of the Wates' chassis with its distinctive double cone. Most constructors are familiar with the Wates' Standard battery, with its Uniblock units of Leclanché cells; but many will make acquaintance for the first time with the Wates' rotary converter, which provides an A.C. output from D.C. mains.

In the instrument line there are the various meters, including the "Three-in-One," and the Universal test meter for rapid fault-finding. Fixed condensers and resistances, potential dividers, Wates' Star pick-up, and an ingenious automatic gramophone stop which can be fitted to any type of gramophone, will all be on view, backed up by the well-known synchronous gramophone motor.

The discriminating constructor will be particularly pleased at the low-priced fixed condensers, which cost only 5d. for the smaller capacities, 6d. for the medium sizes, and 8d. up to .005 mfd.

TANNOY PRODUCTS, LTD.

Power from the mains is one of the ideas underlying Tannoy Products policy, and many outstanding examples are to be seen here. One interesting claim of this stand is that it has the only mains unit incorporating independent grid bias and giving 20 milliamps. at 120 volts H.T. grid bias with three tappings up to 12 volts (independent of high tension), and a trickle charger for 2, 4, or 6 volts L.T.

Westinghouse rectifiers are used, and the instrument is available on easy purchase terms.

Many other Tannoy products are of special interest, although probably nothing will attract more attention than the all-electric radio-gramophone, the senior model of which incorporates a Mazda transformer-coupled moving-coil speaker.

TELEGRAPH CONDENSER CO., LTD.

Everybody knows that a condenser is a difficult thing to test, and when you buy one you have to buy it more or less on faith.

Its capacity may be correct, or it may not, and as for the materials in it—well, you cannot see them, so you are obliged to take them for granted. Unless you deal with a firm with a reputation for making these things.

Everybody knows that T.C.C. is exactly such a firm. They cannot afford to risk their twenty-

five-year-old reputation by using inferior paper or insulation, and no matter what capacity condenser you buy you get the same T.C.C. quality and dependability.

TELSEN ELECTRIC CO., LTD.

As the Telsen range comprises about thirty components, all of which will be on show at Olympia, there will certainly be plenty to see at their display. The big lines of this firm are already well known to all wireless constructors, and we fancy that a great many new friends will be formed by such recently introduced items as the compression condenser, which has a very low minimum capacity, and makes an excellent selectivity adjuster.

The Spaghetti flexible resistances also are specially attractive, and the price of these is 6d. for the lower resistance values, 9d. for the 23-milliamp. range of resistances (1,500, 3,000, and 5,000 ohms), and so on.

A strong feature will be the famous Telsen Ace and Telsen Radiogrid low-frequency transformers, which need no introduction to constructors; and also some very attractive lines of variable condensers, including the bakelite dielectric differential.

There are also bakelite dielectric ordinary reaction and tuning condensers, with unique advantages; and the Telsen logarithmic variable condenser, in which the vanes are clamped by a new process and the frame is triple-braced.

ULTRA ELECTRIC, LTD.

The name of "Ultra" is inevitably associated with the development of the linen diaphragm speaker, and although we have not received particulars of this firm's display at the time of going to press, we are sure that the searcher for realistic reproduction should include this stand in his list of calls.

WATMEL WIRELESS CO., LTD.

Probably the most eye-taking component here is the Watmel wire-wound power resistance, which has been designed for use in circuits requiring a non-inductive winding, such as for free grid-biasing, potential dividing, voltage regulation or de-coupling.

The resistance being permanently fixed, there is no fear of corrosion between metal contacts. It is very compact, and mounted in a moulded bakelite case.

Guaranteed to be within 5 per cent of the rated ohmic values, and with a temperature rise of less than 10 per cent, these resistances can be obtained in a range extending from 100 to 100,000 ohms.

WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD.

Everybody knows the Westinghouse metal rectifier, which is now incorporated in so many complete sets and H.T. supply units. The display of the Westinghouse people themselves is sure to attract the man with mains, who will find plenty of applications of the principle to radio reception and charging.

The neat compactness of the dry rectifier needs no emphasis, and dealers and others interested in small battery-charging stations should on no account fail to investigate the "All-Metal Way" of doing business.

An interesting feature of the stand will be the fact that one of the battery chargers, a large affair called the A.R.C.4, will be demonstrated daily, but the ordinary set user will probably be interested most of all in the various units for grid bias, and low- and high-tension.

WHITELEY ELECTRICAL RADIO CO., LTD.

Here we have all the W.B. products—and that is saying a lot! Valve holders, of course, in plenty, including some for American-type valves, antiphonic types, four- and five-pin universal screened-grid types, holders for D.C. valves, and types for under-baseboard mounting and above-baseboard.

Switches also will be well represented here, and the four-pole balanced-armature cone unit, the cone loudspeaker; the cone chassis and stand; and the patent cone speaker in bakelite cabinet, will all merit the closest attention.

But we fancy the crowd will be thickest round the W.B. permanent-magnet moving-coil speaker, which is so sensitive it will work from any ordinary set, and yet can handle so large an output that it has been installed in numbers of talkie-cinemas. It is guaranteed to retain its magnetism with ordinary use for five years; the magnet being Darwin cobalt steel, Sheffield made.

WILKINS & WRIGHT, LTD.

They call them the "Utility" components, and their utility has been proved the world over by set builders. Full particulars of the display here have not been received, but we understand that variable condensers will again be a speciality, including the little "Mite."

This is a useful miniature of the famous Utility standard pattern condenser, measuring only 2½ by 2½ by 2 in., with vanes fully extended. As the capacity is .0005 mfd. and it suits any type of receiver, the little Mite has already made many friends all over the country.

For the .0005 model the price is 6s. 6d., and a .0003 variety is available at 6s. and a .0002 mfd. at 5s., with verniers extra. The standard condensers themselves will be remembered for their smooth ball-bearing movement, and their absence from noise and backlash in action.

WINGROVE & ROGERS, LTD.

The many excellent condensers must necessarily monopolise most of the stage here, especially as the firm has reduced most of the prices of important lines, such as the Polar Ideal, and the Polar Ideal drum control.

Multi-valve owners will find particular interest in the Polar gang, and the Polar drum two, three- and four-gang, while owners of the simpler sets will find that they, too, are well catered for.

The various differential and reaction condensers, the special short-wave condensers, the drum-drive and the disc-drive make this display a fascinating one for the man who is on the look-out for smooth control, backed up by Polar workmanship.

WRIGHT & WEAIRE, LTD.

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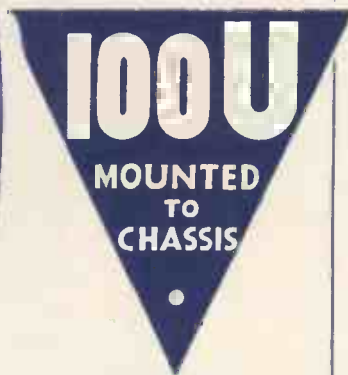
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