

THE WIRELESS EXHIBITION: SPECIAL NUMBER.

Popular Wireless

Every Thursday
PRICE
3d.

No. 222. Vol. X.

and Wireless Review

September 4th, 1926.

Scientific Adviser: SIR OLIVER LODGE, F.R.S., D.Sc.



Features In This Issue.

Low and High Tension from A.C. Mains.

Further Notes on the Filadyne.

The Ideal Loud Speaker.

THE "P.W." ULTRA-SELECTIVE ONE-VALVER.

Special Articles
dealing with the Wireless Exhibition at Olympia.

An American eight-valve super-het, with but one control is shown
in our cover photograph.

MARCONI

Associated with wireless as with every industry there is always one outstanding name around which development and progress have centred. That name must surely mean guaranteed efficiency in

VALVES



MARCONI TYPE D.E.2

A very economical and yet most efficient valve for 2-volt accumulators. Consumes about one-third the amount of current of the D.E.R. type.
Fil. volts 1.8. Fil. Amps. 0.12.

14/-

Exact information about your valves will add to your wireless pleasures and lessen running costs. Publication No. 443a contains some simple data well worth reading. Send postcard for a copy.



MARCONI TYPE D.E.5

A dull emitter eminently suitable for L.F. amplification. Recommended as last valve of an Amplifier using R.5v. or other valves running from 6-volt Accumulators.
Fil. volts 5-6. Fil. Amps. 0.25.

18/6

NOTE NEW REVISED PRICES

TYPE	VOLTS	OLD PRICE	NEW PRICE	TYPE	VOLTS	OLD PRICE	NEW PRICE
D.E.2 (L.F. & H.F.)	2	15/6	14/-	D.E.5 & D.E.5 B..	6	22/6	18/6
D.E.3 & D.E.3 B..	4	16/6	14/-	D.E.5 A	6	26/-	22/6
D.E.4	4	22/6	18/6	D.E.8 (L.F. & H.F.)	6	22/6	18/6
D.E.Q.	4	27/6	25/-	The prices of all other types of Marconi Valves are unchanged.			

THE MARCONIPHONE COMPANY, LTD.

Registered Office: Marconi House, Strand, London, W.C.2

Look for this Signature



Head Office: 210-212, Tottenham Court Road, London, W.1

Your Guarantee of Sound Design.

AMPLION

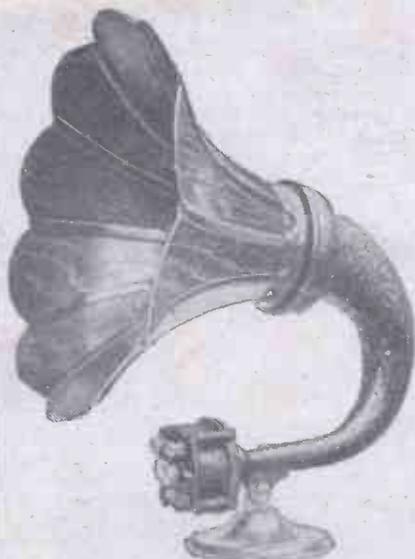
The most Comprehensive range of Loud Speakers in Existence

Look out for Announcements regarding the new **AMPLION** Loud Speaker Valve



Look out for Announcements regarding the new **AMPLION** Loud Speaker Valve

A Typical Radiolux AMPLION Type R.S.i.o. (oak) price £7 7s. The Radiolux is obtainable in two sizes and in different finishes from £4 15s. to £13 13s.



A Typical Dragon AMPLION Type A.R.19. Price £5 5s. Other models in this series at 48/., 65/., and £8 10s.

AMPLION



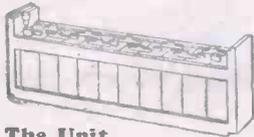
AMPLION Gramophone Attachments.
Type AU.4 - - - 24/6
Type AU.5 - - - 37/6
Type AU.6 - - - 55/-



A Typical Swan-neck AMPLION Type A.R.38.o. (oak) Price 95/-. Other models in this series at 38/., 58/., and 84/-.

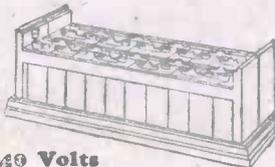
LOUD SPEAKERS

The only H.T. Accumulator built on the principles of the expanding Bookcase



The Unit

Each unit consists of 10 glass cells making a total of 20 volts. Each individual cell can be tapped—thus ensuring extreme flexibility of voltage control. A stout oak framework protects the cells against damage.



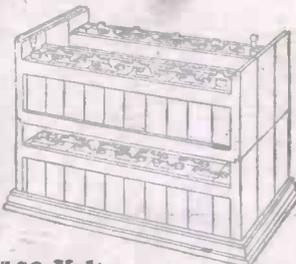
40 Volts

For 40 volts two units are required clamped side by side and mounted on a handsome solid oak base. For 60 volts as in large illustration above three units would be required.



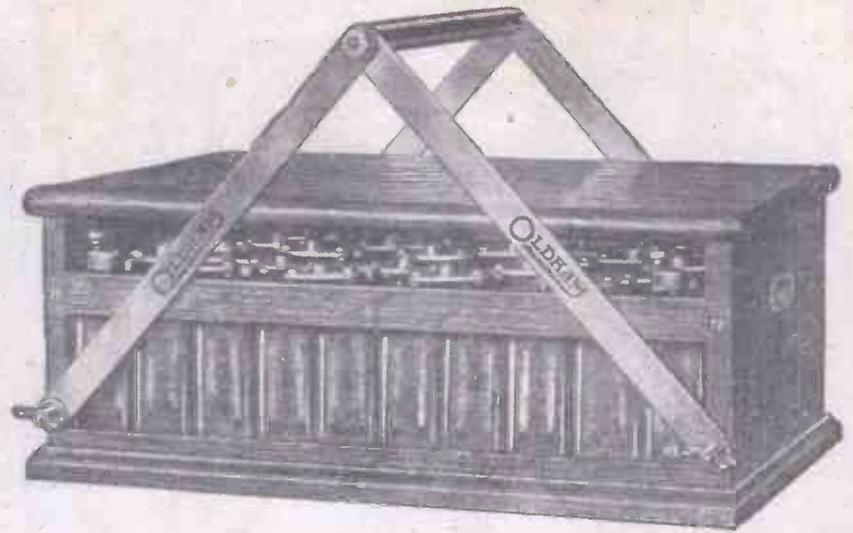
80 Volts

Two tiers of two units each are required. The same base and lid are used as for 40 volts.



100 Volts

Two tiers are used—the bottom one containing 3 units and the upper one containing only two units with blank end pieces to separate them. For 120 volts the end pieces are removed and a complete unit is substituted.



Put some "pep" into your Wireless Set

IF your Receiving Set seems to have lost some of its vitality—if it is not so responsive to weak signals as it used to be—if foreign stations are more difficult to pick up—if the local station has fallen off in quality and volume—if cracklings and sizzlings are the usual accompaniment to every programme—then suspect our old friend the H.T. Dry Battery. In all probability he is the offender. A plentiful supply of H.T. current is necessary to obtain the best results. The average H.T. dry battery will lose voltage steadily even if unused. How rapidly then will its

voltage fall if it is used with a big multi-valve Set.

Wireless enthusiasts all over the country are discarding their H.T. dry Batteries and changing over to the wonderful new Oldham H.T. Accumulator. And immediately they are obtaining an amazing improvement in reception. The Loud Speaker takes on a new standard of tonal purity—stations which couldn't be heard at all are received at full strength, cracklings and noises entirely disappear. This wonderful change is entirely due to the unfluctuating flow of H.T. current which only an Oldham Accumulator can give.

Stop wasting money on Dry Batteries—invest in an Oldham H.T. Accumulator instead

You waste money every time you buy a Dry Battery because it can never be recharged. And when you buy it you don't know how long it has been in stock. A dry battery starts working the moment it is made. Not so an Oldham H.T. Accumulator. When you choose an Oldham you buy wisely—you get long service. An Oldham will last for years. It can be recharged for a shilling or two again and again. It will save its cost very quickly. But if you want the best results be sure it is an Oldham for only Oldham has the Special Activation Process—the method which ensures a plate holding its charge for several

months without the risk of sulphation.

Only Oldham has the expanding unit idea. You can buy your units just as you require them and add to your voltage with the minimum of expense. Look at the compactness and convenience of the Oldham H.T. Accumulator shown above. Note its extreme portability and workmanlike appearance. Observe its stout glass cells—

each one is instantly available for examination—and its thick buckleproof plates. Then go to your Dealer and ask him to show it to you—we are confident you'll never use another H.T. Dry Battery.

10d. per volt

40 volts £1 13 4 60 volts £2 10 0
80 volts £3 6 8 100 volts £4 3 4
120 volts £5 0 0

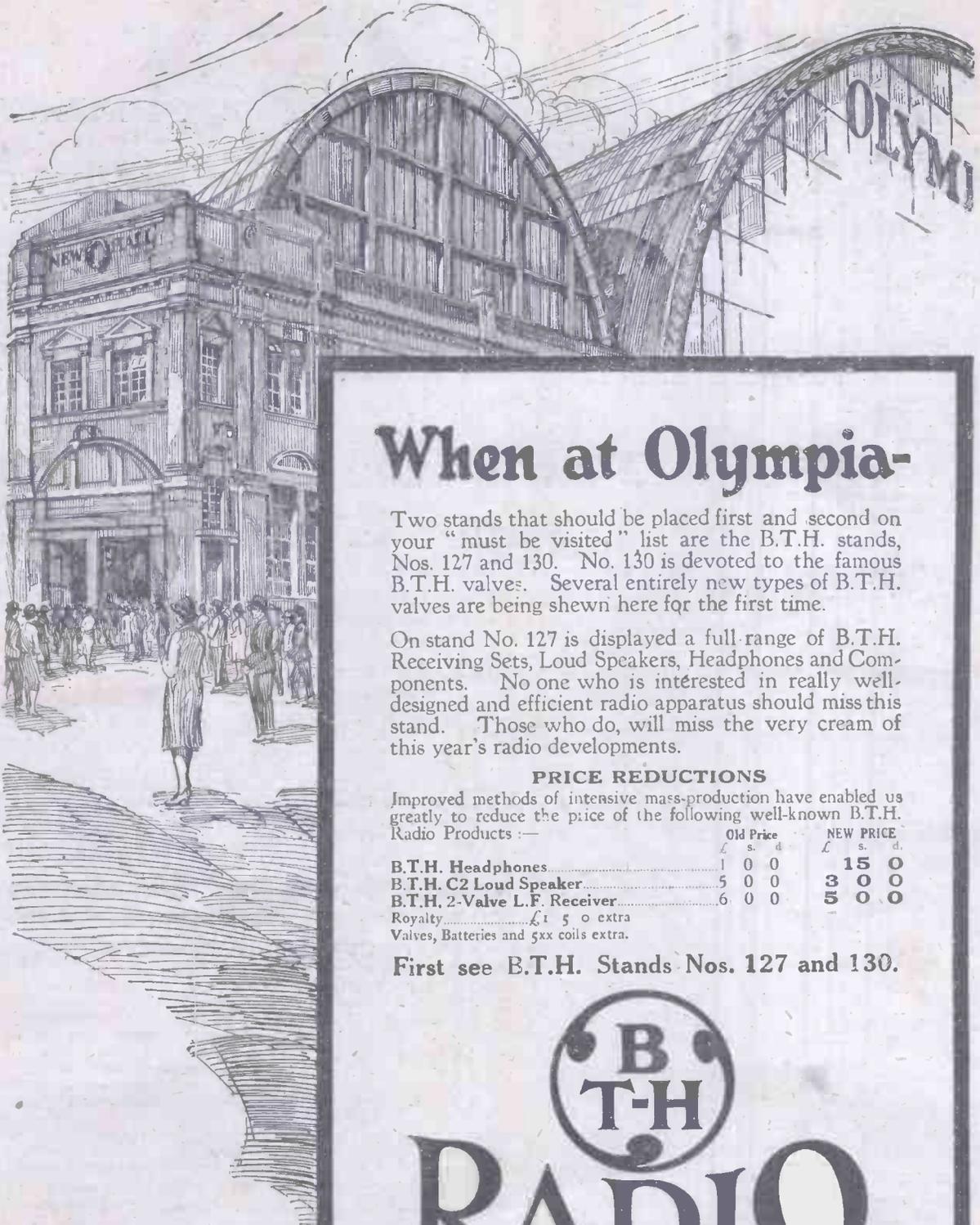
Complete with lid and handles.

Solid oak base 3/6 extra if required.



Special Activation Process Batteries

Oldham & Son, Ltd.,
Denton, Manchester.
London Office: Hazlitt House, Southampton Edg. W.C.2.
Manchester: Looker's Ltd., Deansgate.
Glasgow: 120, Wellinton St. Gilbert Ad. 5777.



When at Olympia-

Two stands that should be placed first and second on your "must be visited" list are the B.T.H. stands, Nos. 127 and 130. No. 130 is devoted to the famous B.T.H. valves. Several entirely new types of B.T.H. valves are being shown here for the first time.

On stand No. 127 is displayed a full range of B.T.H. Receiving Sets, Loud Speakers, Headphones and Components. No one who is interested in really well-designed and efficient radio apparatus should miss this stand. Those who do, will miss the very cream of this year's radio developments.

PRICE REDUCTIONS

Improved methods of intensive mass-production have enabled us greatly to reduce the price of the following well-known B.T.H. Radio Products :-

	Old Price			NEW PRICE		
	£	s.	d.	£	s.	d.
B.T.H. Headphones.....	1	0	0	15	0	0
B.T.H. C2 Loud Speaker.....	5	0	0	3	0	0
B.T.H. 2-Valve L.F. Receiver.....	6	0	0	5	0	0
Royalty.....	£1 5 0 extra					
Valves, Batteries and 5xx coils extra.						

First see B.T.H. Stands Nos. 127 and 130.



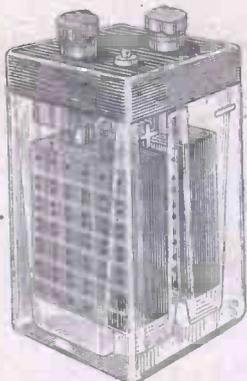
RADIO

B.T.H. Radio Apparatus is stocked by
all good Radio Dealers.

The British Thomson-Houston Co. Ltd..

For Dull Emitter Valves

Exide
DTG



Exide
DFG

20 amp. hours.

4/6

each.

45 amp. hours.

8/6

each.

ON ONE CHARGE,

300 hours	With single '06 Valve	700 hours
70 hours	With '06 Valve, and '1 amp. Power Valve	250 hours

ON ONE CHARGE.

No other Cells, dry or wet, primary or secondary, can give such results at the same low cost.

EXIDE DTG and DFG CELLS — Will hold their charge, when not in use, for 6 months.

Can be recharged for a few pence.

Steady discharge free from fluctuation gives pure reception.

Valve rheostats once set can be left alone.

DRY BATTERIES :—

Deteriorate rapidly, even when not in use. When exhausted must be scrapped.

Discharge is uneven, causing noise and distortion.

Valve rheostats have continually to be readjusted.

DRY BATTERIES ARE NOW OBSOLETE.

Exide

The Long-Life Battery.

Sold by ALL REPUTABLE DEALERS.

See local Exide Battery Week display: September 20th—25th.
Advt of The Chloride Electrical Storage Co., Ltd., Clifton Junction, Nr. Manchester.

First Class Fare!

Every page of MERRY MAG. sparkles with light-hearted wit and gaiety. It is the brightest and breeziest of magazines, packed with laughter-raising stories and articles, humorous pictures and cartoons. Take a copy home with you. Ask for the—

MERRY

MAG. Buy a Copy To-day. 7d.

Invaluable to EVERY Amateur and Constructor.

The "POPULAR WIRELESS"

BLUE PRINTS of TESTED CIRCUITS

Every wireless amateur and every wireless constructor will find these "POPULAR WIRELESS" Blue Prints absolutely reliable. They have been most accurately drawn, and every circuit has been tested under normal broadcasting conditions by the technical staff of "Popular Wireless." It will be seen from the complete list given below that the series covers a very wide field. The veriest tyro will find each print most straightforward to follow and the receivers most easy to construct.

P.W. BLUE PRINT
Number

1. DETECTOR VALVE WITH REACTION.
2. UNIDYNE DETECTOR VALVE WITH REACTION.
3. 1-VALVE L.F. AMPLIFIER.
4. CRYSTAL DETECTOR WITH L.F. AMPLIFIER.
5. H.F. (Tuned Anode) AND CRYSTAL, WITH REACTION.
6. H.F. AND CRYSTAL. (Transformer Coupled, Without Reaction).
7. 1-VALVE REFLEX WITH CRYSTAL DETECTOR (Tuned Anode).
8. 1-VALVE REFLEX AND CRYSTAL DETECTOR (Employing H.F. Transformer, without Reaction).
9. H.F. AND DETECTOR (Tuned Anode Coupling, with Reaction on Anode).
10. H.F. AND DETECTOR. (Transformer Coupled, with Reaction).
11. DETECTOR AND L.F. (With Switch to Cut Out L.F. Valve).
12. DETECTOR AND L.F. UNIDYNE (With Switch to Cut Out L.F. Valve).
13. 2-VALVE REFLEX (Employing Valve Detector).
14. 2-VALVE L.F. AMPLIFIER (Transformer coupled with Switch to Cut Out Last Valve).
15. 2-VALVE L.F. AMPLIFIER (Transformer-Resistance Coupled with Switch for Cutting Out Last Valve).
16. H.F. (Tuned Anode), CRYSTAL DETECTOR AND L.F. (with Switch for Last Valve).
17. CRYSTAL DETECTOR WITH TWO L.F. AMPLIFIERS (with Switching).
18. 1-VALVE REFLEX AND CRYSTAL DETECTOR, with 1-VALVE L.F. AMPLIFIER, Controlled by Switch.
19. H.F. DETECTOR AND L.F. (with Switch to Cut Out the Last Valve).
20. DETECTOR AND 2 L.F. AMPLIFIERS (with Switches for 1, 2, or 3 Valves).

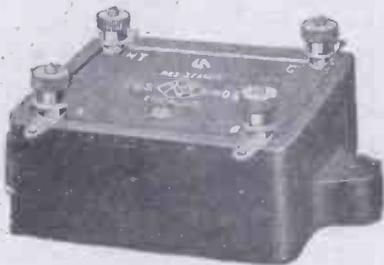
ALL "POPULAR WIRELESS"
BLUE PRINTS ——— 6d. EACH

All orders for these Blue Prints should be sent direct to the "Popular Wireless" Queries Department, Fleetway House, Farringdon Street, E.C.4, enclosing a stamped addressed envelope and a postal order for 6d. for each Blue Print Ordered.

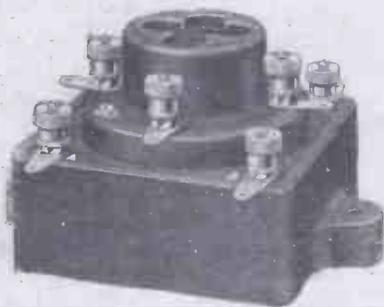
VISIT STAND
No. 162
RADIO EXHIBITION
OLYMPIA, SEPT. 4-18

The Cosmos

Resistance Coupling Unit



Type "O" The Unit alone.
Price 8/6



Type "V" a similar unit incorporating
the "Cosmos" Spring Valve Holder.
Price 10/6



Complete with S.P.18/B (Blue Spot)
Valve. Price 24/6

Real purity of production

Even the advertisements of the best Transformers plead guilty to imperfect amplification over the whole musical range. Real purity of reproduction can only be obtained with resistance capacity coupling. The Cosmos coupling unit with a suitable valve can be as effective as a transformer-coupled stage. Avoids all distortion and effects considerable economies in first and operating cost.

Designed primarily for use with the "Cosmos" S.P. Blue Spot Valves, it can be used successfully with any valve having an amplification factor of 30 or more.

Additional Advantages:—

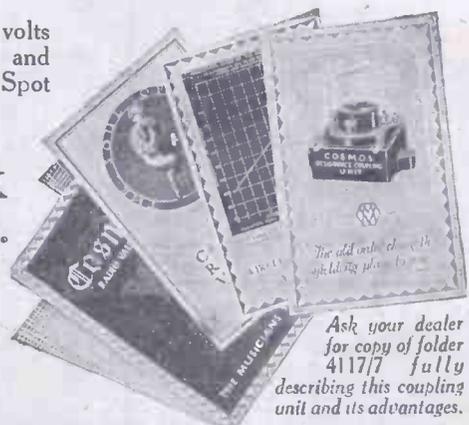
1. Maximum possible amplification per stage.
2. Economy in filament consumption.
3. Economy in H.T. battery consumption.
4. Immunity from breakdown caused by complete or partial failure of the windings of transformers or chokes.
5. Small space and light weight.

The consumption of the "Cosmos" S.P. Blue Spot Valves is 0.09 amps. The anode current of '2 to '25 M.a. taken by the "Cosmos" S.P. Blue Spot Valves is less than 1/20th of that required by the valves usually employed with transformers or chokes. The life of the battery is correspondingly increased.

A high-tension battery of 120 volts is adequate with this unit and "Cosmos" Shortpath Blue Spot Valves.

**METRO-VICK
SUPPLIES LTD.**

Metro-Vick House,
145, Charing Cross
Rd., London, W.C.2



Ask your dealer
for copy of folder
4117/7 fully
describing this coupling
unit and its advantages.

Radio stands now on the threshold of big developments

FOR a whole year that branch of Radio which appertains to the design of Receiving Sets has stood still. Now we are promised epoch-making improvements. During the past few months or so, shrewd technicians have been hammering away at the problem of selectivity. For this lack of selectivity was the one stumbling block which caused the enthusiasm of tens of thousands of wireless enthusiasts to wane. Where was the pleasure in building multi-valve Sets capable of picking up other Broadcasting only during the few hours available when the local station was closed down. Small wonder that comparatively few Sets were built last year. The true wireless enthusiast must enjoy the thrills of long distance reception. For him Radio is not merely the pleasure of hearing but one programme, it lies in his ability to tune in the station of his choice. A gay song from Madrid, an infectious dance tune from Vienna, a swinging chorus from Frankfurt, a haunting melody from Hamburg

—these are the little achievements which add a spice of adventure to many an otherwise colourless evening.

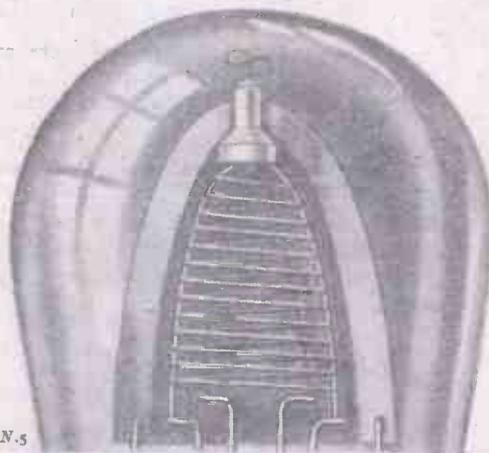
But with the advent of improved methods of H.F. amplification and the use of screened and fieldless coils comes the news of a successful solution to another equally baffling problem. The problem of obtaining absolute uniformity of characteristics between valves of identical type. Co-axial Mounting, as perfected by Cossor, is destined to exert a tremendous influence upon the whole trend of valve design. For the first time there is available a method of securing the filament, the grid and the anode to each other in permanent alignment throughout their whole length. The new Cossor Point One series—the first valve in which Co-axial Mounting is utilised to obtain perfect uniformity—will play a great part in the development of ultra-selective Sets during the coming season. Most of these new Sets will utilise at least two (and sometimes more) stages of

high frequency amplification. Considerable efficiency must be sacrificed if the H.F. valves are not exactly matched. In valves of the ordinary type a sagging filament or a displaced grid inevitably alters the characteristics of that particular valve and, in turn, prevents the Set from functioning as it should. The Cossor Point One is the first valve to utilise a method of construction which guarantees absolute uniformity not only when the valve is new but throughout the whole of its exceptionally long life.

But uniformity of characteristics—although so vital in Sets using two or more H.F. stages—is only one of the many dominating features of this remarkable valve. Lack of space here prevents more than a passing reference to its amazing economy—(seven of these valves consume less than one bright emitter) and its superb tone. Get acquainted with these magnificent Valves at once and enjoy anew pleasures of long distance reception. Give your Set a real chance to show what it can do.

SECTIONAL VIEW OF COSSOR POINT ONE

Here is a picture of the valve as you would see it if it were cut in half. Note the stout electrodes and the seonite insulator securely holding the grid to the anode. Through the centre of the insulator passes a fine wire securing the filament in position and giving it sufficient elasticity to withstand the hardest shock without risk of fracture.



A. C. Cossor, Ltd., Highbury Grove, London, N.5

TYPES AND PRICES

Plain Top: For Detector or L.F.
(Consumption '1 amp.)
Red Top: For H.F. use.
(Consumption '1 amp.)

14/-

STENTOR TWO

For power amplification (with Green Top).
(Consumption '15 amp.)

18/6

All operate at a voltage of from 12 volts to 2 volts.

Cossor Point One

Popular Wireless

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RADIO NOTES AND NEWS.

The National Radio Exhibition—Touring on Two Valves—Interfering With 5 X X—
 New B.B.C. Hours—More For Your Money—Relief by Radio.

National Radio Exhibition.

THERE is going to be an enthusiastic crowd at Olympia on Saturday, when the National Radio Exhibition opens. Amongst others, 2 LO will be there; "Mike" has been granted special leave from 2, Savoy Hill, and up in the gallery at Olympia a studio has been erected for his convenience, from which the broadcast will be done. So if you would like to see 2 LO for once, instead of having only to listen, all you have to do is follow the crowd to Olympia.

The "Awful Revue."

ONE actual turn which all listeners will hear from Olympia (and visitors will see), is an "Awful Revue." So many managers have claimed to present the really perfect revue, that the B.B.C. has gone to the other extreme, and is going to give us something "too utterly utter to utt."

It is by Peter Haddon, of the Winter Garden Theatre, and by all accounts it is just the thing to look well through the glass windows fitted at the Exhibition studio.

All Records Broken.

IN a final word to the promoters of the Exhibition, I asked whether all was proceeding according to plan. The reply was, "Absolutely, and then some, with knobs on!" or words to that effect! Apparently all records for booking, and for keen exhibits, have been broken, and the show is going to be a red-hot, roaring, rampaging success.

By the way, it is no earthly good writing to me for a buckshee ticket, like some of you did last year! I've only got one ticket, and I'm holding on to that so tight that it's all creased now from going under my pillow o' nights.

Street Named After Radio Station.

WHAT is believed to be the first street named after a broadcasting station, has just been christened in Los

Angeles, California. It is called "K N X Boulevard," the letters being the local station's call-sign.

Touring on a Two-Valver.

REPORTING his experiences with a "P.W." two-valver, a Birmingham reader says:

An interesting point about this reception is that the set was not built till last April, so all this was done under summer conditions.

More For Your Money.

ONE excellent feature of the National Radio Exhibition is that it encourages price reductions. A scrutiny of P.W. advertisement pages will reveal the fact that many a pound has been lopped off by the manufacturers. And not only are valves, transformers, etc., cheaper than they were, but they are far more efficient. Nowadays, the transformers transform, the condensers condense, the leaks leak, and the batteries batter with greater zest, zip, and zeal, than ever before.

"Telling the World."

CAPTAIN ECKERSLEY made an interesting prophecy recently in his speech to the British Association. He visualised a near future in which all the world could be linked up by a combination of wire and wireless, so that one voice could talk to hundreds of millions. With all the different broadcasting systems linked together like the B.B.C. stations are, in ten or fifteen years one man might be able literally to "tell the world."

Radio on Transatlantic Flight.

THE Spanish airmen who flew to Buenos Aires some months ago have now published a book on the flight, and it pays a great tribute to the wireless direction-finder, with which the seaplane was fitted.

Both at Las Palmas and St. Vincent fogs were so dense that it is problematical if they could have found their destinations without the radio-compass. Commenting upon its indispensable aid, the airmen say, "the direction-finder is absolutely necessary in this kind of flight, where the destination must be found with precision."

(Continued on next page.)



Mary Pickford with Douglas Fairbanks and Anne Morgan before the microphones in America. Note the call-sign (W.B.O.Q.) placed over the microphone.

"I can get any of the B.B.C. main stations (bar Belfast) at excellent 'phone strength, and about five relays, Stoke and Nottingham being about equal in strength to the local station. As regards foreigners, San Sebastian, Hamburg, Dortmund, Toulouse, Konigswusterhausen (Berlin), and Hilversum are as clear as 5 I T. Rome also is at excellent strength, but I have not been able to get him just lately."

NOTES AND NEWS.

(Continued from previous page.)

A Wily Dodge.

I LEARN that broadcasting audiences in America often hear stage artistes giving lifelike "impersonations" of themselves! Their contracts do not permit them to broadcast—so they do it under different names, as imitations. Shuh! It's a secret that mustn't leak out on this side of the H₂O!

Interfering with 5 X X.

WHO has been upsetting G F A, the Air Ministry Wireless station in Kingsway? Up till a few weeks ago, he seemed to be a decent, quiet sort of fellow, who kept himself to himself, and didn't interfere with anybody. But now he can't let 5 X X alone, and every time listeners get really interested in a programme he butts in on 1,600 metres, and spoils it! I hope that the Air Minister will speak seriously to him about it, and that soon he will be our good friend, G F A again—not Mr. Buttinsky!

New B.B.C. Hours.

I HEAR that the new winter programme hours are to commence at 2 I. O on September 20th. The first News Bulletin will be at 7 p.m.; and the second one at 10 p.m.

As now, the main programme will commence at 8 p.m., but at 9.20 p.m. there will be a talk, lasting about 20 minutes. Following this, there will be a 15-minute musical recital, similar to the series now running at 7.25 p.m.

On the Radio Rocks?

APPARENTLY, South Africa is on the radio rocks. Broadcasting is in jeopardy there, for in the year just concluded, the broadcasting company in Jo'burg lost more than £4,000 and the Durban station was out of pocket to the extent of £9,000. Cape Town also has incurred a loss upon its station, so a conference is being held to discuss a Government subsidy or other alternatives.

A Photo-Electric Valve.

DR. J. H. T. Roberts—Staff Consultant to "P.W."—has caused a sensation in his recent discovery of a new valve that works by light. Its filament operates on the photo-electric principle, and consists in effect of a tiny glass neon tube coated with a special chemical.

"If it proves to be a really practicable proposition," Dr. Roberts says, "it will enable a valve-set to be operated from the electric mains, just as simply as the ordinary electric light."

Three Valves in One Vacuum.

BERLIN also reports a new valve, this time a multum in parvo, which is supposed to contain three distinct valves and all the necessary coupling between them, in one bulb.

It is understood that a number of wireless engineers have co-operated in the discovery, chief amongst them being Von Ardenne, a pioneer in valve-work.

The beauty of this valve is that, although it is a three-in-one, it requires only the normal amount of current.

The Australian Wireless Beam.

RECENTLY, I stated that the Australian beam wireless stations appeared to be almost ready for work. It is now officially announced that they will begin their trials in October and after the necessary period for tests, they will be thrown open for public service. No agreement as to charges has been reached, but it is hoped that these will be well below the cable rates.

Dominion Premiers to Broadcast.

THE B.B.C. is considering special broadcasting arrangements in connection with the Imperial Conference. It is likely that when the Dominion Premiers are over here, some of their speeches will be relayed from 2 L O.

If so, I hope that they will all get together and shake up an agitation in favour of a short-wave B.B.C. station, to carry the British programmes into every corner of the globe. Why shouldn't every capital in the Empire keep in touch with Big Ben regularly?

SHORT WAVES.

A contributor to the "Evening News" writes: "High selective wireless receivers are the rule rather than the exception. Crystal sets are no longer taken seriously."

The consequent slump in cat's whiskers is causing consternation in the feline world.

The "Evening Standard" tells us: "How 2 L O listens to itself."

This is the modern cult of Narcissus, who looked at himself in a clear pool all day.

See Burns (New Version), "If we could hear our'sels as others hear us."

"... The broadcasting manager, when he chooses his company, will have a comparatively simple task. He need not trouble about height, length of eyelash or shape of nose."—"Time and Tide."

Length of tongue and wind capacity will no doubt be important qualifications.

Headline in "Evening News": "Ships that roar in the night. A Japanese habit."

A wakeful friend of ours points out that although he would hardly call his neighbour's small child a "ship," it certainly is a habit of hers.

Lord Birkenhead says: "It's all to the good that men should go on talking." The B.B.C. evidently endorse this.—"Passing Show."

Yes, but why hot air?

Why did the Oxide? Because the Acid. Vide B.B.C. Pronunciation List.

"The Set consisted of three valves—one H.F., one Detector and one L.F., the latter being fitted with variable grid bonus."—Provincial Paper.

A sort of "Sliding Scale" no doubt.

"The capacity of the aerial condenser should be about '6013%' starting price 4'1 mid."—Wireless Note in Provincial Paper.

We should like to test this condenser: but it's an odds-on chance we don't.

"No doubt when the Post Office gets its own way we shall be regaled consistently and conscientiously with much information from the oracles of the G.P.O.

"I can imagine the effect on listeners when a series of talks is announced on such themes as: 'The History of the Pillar Box from the earliest times to the end of the Victorian era,' or 'Modes and Methods of licking stamps,' or 'How Post Office telegraph forms are printed.' These exhilarating items will no doubt festoon the B.B.C. programmes in the near future."—"L.T.B." in "The Star."

"Plants Fertilised by Wireless—Tomatoes Trained on Copper Wires."—Headlines from "The Evening News."

We understand there is no entrance fee and that other fruits (except oranges) may start any time during term. Special training is given to leeks on grid leaks.

Song of the Pirate.

RADIO pirates who will not pay their licence-fees, have recently been active in Australia, so the Melbourne station, 3 L O, broadcast a pirate song, which included the following verses:

There was a jolly pirate once,
Yo ho, my boys, yo ho!
Who sailed upon the ether waves,
Yo ho, my boys, yo ho!
The good ship, "Tuner In," his craft;
A mast was set at fore and aft,
And on the deck the pirate laughed:
"Yo ho, my boys, yo ho!"

One day he brought the "Tuner In"
Beside the 3 L O.
And as he stepped aboard to see
What plunder was below,
There came a ship, a man-o-war,
And when its guns began to roar
The pirate gnashed his teeth and swore,
"Yo ho, my boys, yo ho!"

He is a wiser pirate now,
He is indeed, yo ho!
For he has learned that piracy
Is out of date—yo ho!
"I've joined the great majority
Who pay for what they get," says he,
"So toodooloo to piracy—
"Yo ho, my boys, yo ho!"

Professor Fleming's Portrait.

TALKING to Professor Fleming the other day, I learned that he is not, for a time, absolutely severing his connection with University College. They have persuaded him to lecture as Emeritus Professor next year, and he has chosen "Electro-Communication" as his subject.

By the way, any listener who would like to mark his appreciation of Professor Fleming's wonderful work for wireless, can subscribe to the Fleming Portrait Fund. Any gift, however small, will be welcomed, and should be sent to Professor W. C. Clinton, University College, Gower St., London, W.C.1.

The proposal is to have two portraits painted, one for University College, and another to be offered by Professor Fleming to the Institute of Electrical Engineers.

The Old and the New.

ONE of London's most interesting radio sights is to be seen at the Science Museum, South Kensington. Plenty of historic apparatus is on view there, including experimental gear used by Senator Marconi, Sir Oliver Lodge, Professor Fleming and other pioneers of radio.

There is also an 8-valve reactionless set, designed by the B.B.C., and a hornless loud speaker, which gives a wonderfully faithful rendering of the whole range of musical frequencies.

Relief by Radio.

WORD has just reached W B Z, the Springfield, Mass., broadcasting station that a "life-and-death" message transmitted by them saved the hunters and trappers of a lonely Hudson Bay post from starvation, and possible death. Hundreds of miles away, another Arctic outpost was listening in, and when the call was picked up a rush through the wild by dog-sleds took the food that kept the lonely traders alive.

ARIEL.



—WHAT WE
THINK!
“WE” BEING—
ARNOLD BENNETT,
SIR GERALD DU
MAURIER,
DR. ROBERT
BRIDGES,
JOHN DRINK-
WATER
and “ARIEL.”

DURING the past few weeks there has been a great deal of controversy as to whether the British Broadcasting Company possesses an English dictionary in its quite extensive library. There has also been, in certain “highbrow” quarters, some speculation as to whether Savoy Hill has ever heard of Shakespeare and a few other Englishmen who knew English really well.

Criticism of the B.B.C. method of pronouncing certain words in the English language has been so derogatory that the powers that be decided to compile a pronouncing dictionary of its very own. They have done this with the aid of the Poet Laureate and George Bernard Shaw, who is now a member of the board that is to have control over reckless announcers who say “acowsticks” instead of “acoustics!”



Mr. Arnold Bennett.

The B.B.C.'s Aims.

Just as there are minute to minute changes in women's fashions, so there are everlasting and almost devastating changes in the British language. In consequence of this I am told that the B.B.C. aims at uniformity of pronunciation.

This, I might suggest, is going to be a trifle difficult. In a matter of pronunciation the Leeds and London stations are as the poles apart. In Leeds I have often heard them say “dyrection,” and a few minutes later tuning-in to Liverpool I heard it was “direction,” but the London station towards the end of the evening coolly informed me that it was “derection.”

While Cardiff was sinking a song one evening (look you!) Birmingham was sing-ging, so the engineers began to get worried. They told the board, and then the public and a few others joined in the general clamour and the result, received with somewhat mixed feelings, is the B.B.C. special pronunciation dictionary (related to all stations), but not in its final state of completion. For the help of the listener, here it is:

acoustics
antogiro
gyratory
gyroscope

humour
often
soldier

Courtesy
finis
gala
idyll
opus
privacy
project
respite
precedence
precedent
unprecedented
via

allies
condolence
congratulatory
despicable
hospitable
indisputably
indissolubly
inextricably
obligatory
sonorous
vagary
quandary

Northants
Southampton
Towcester

Words adopted unchanged from a foreign language.
carabiniers
char-a-banc
chauffeur
garage
liaison
piano
questionnaire

Boulogne
Calais
Lyons
Marselles
Rheims

Accents: — ‘, short vowel; ‘, long vowel; ‘, accented vowel.

Technical Words.
acousticks
autojyro
jyratory
jyroscope

Doubtful Consonants.
humour
oil-en
sole-jer

Doubtful Vowel Sounds.
curtesy
fynis
gähla
iddill
ö-pus
prive-acy
prö-icet
résipit
pre-cédencc
précédent
unprecedented
vŷ-a

Problems of Accent.
alize
cöndolence
congratulatory
déspicable
hóspitable
indispútably
indissólubly
inétricably
obligatory
son-órous
vagáry
quándary

Place Names.
North-amptonshire
South-hampton
Toaster

Foreign Place Names.

Boulönn
Cállay
lions
Mar-sáils
Reams

This list has been compiled with the brilliant collaboration of Dr. Robert Bridges, the Poet Laureate, Sir Johnston Forbes-Robertson, Professor Daniel Jones, of the London University, Mr. Logan Pearsall-Smith, representing the Society of Pure English, and Mr. Lloyd James, an expert in phonetics.

Uniformity of Pronunciation.

The British Broadcasting Company could not have chosen a better committee or a more representative one.

One would almost think it were impossible to arrive at uniformity of pronunciation.

A great many people prefer variety of expression and their own old-fashioned and equally acceptable pronunciations. Through the ether, however, there must be no confusion, and the listener must be able to understand every word that comes over the wireless. It must be clear, concise, and simple, as well as in the best language. Consequently the B.B.C. steps in this matter are to be praised.

It is interesting to see what a few famous people think of the English language “as she is spoke” at Savoy Hill and a few other British stations. The following exclusive opinions were given especially to “Ariel,” for POPULAR WIRELESS WEEKLY.

ARNOLD BENNETT
(the famous novelist).

I have followed with interest this controversy on the B.B.C. pronunciation of the English language. I do not think that the pronunciation is too bad. In fact, sometimes it is quite good.

I think, however, that the list just issued by the special committee giving instructions to their announcers on how to pronounce certain words in the English language is an excellent idea. Up to the present I noticed there has been no uniformity of pronunciation among the British stations, and this list should help to attain that object which is most necessary if the B.B.C. is to educate its hearers.



Sir Gerald du Maurier.

I think that broadcasting has done a great deal in the matter of education. Personally I have not much time to listen-in, but whenever I have done so I have realised its value from the educational point of view.

Its great value lies in the home where, without stirring, the Englishman can educate himself at no expense both in the intricacies of the English language and in worldly experience.

If this new board keeps a hard censorship on the announcers' pronunciation of the British language its whole effect on broadcasting should be admirable.

(Continued on next page.)

B.B.C. PRONUNCIATION.

(Continued from previous page.)

SIR GERALD DU MAURIER

(the distinguished actor-manager).

Of course, as you know, I am a wireless "fan," and any new development in the science of broadcasting is of immense interest to me.

I do think, however, that it would be an extremely difficult task to keep a strict censorship on the right pronunciation of the British language. After all, what is right and what is wrong? I suggest that it is almost impossible to tell.

Some people tell me that my pronunciation is excellent; others tell me that I speak the worst Cockney English. I don't know. How do they know? What is the difference between King's English and Shakespeare's. How does anyone know how Shakespeare pronounced his words?

"How Do They Know?"

There are many to-day who congratulate themselves on the fact that they speak the pure, perfect English of the times of the Puritans and the Oats. How do they know they do? I am certain that always there has been diversity of opinion in regard to pronunciation, and like many others I follow my own ideas.

From the point of view that it does away with all obvious mistakes of pronunciations, the B.B.C.'s scheme is a worthy one, and the uniformity of language for all stations is a step nearer better broadcast English.

DR. ROBERT BRIDGES

(the Poet Laureate).

A correct, natural, and pleasant voice is a thing of great charm over the wireless. And when that voice speaks perfect English it gives one even greater pleasure to listen to it.

Everyone has a different method of pronouncing certain terms in the English language, and it was discovered that the announcers at the different B.B.C. stations had various ways of announcing certain words. As the educational value of the B.B.C. programmes is of paramount importance it was decided to compile a list of the official phonetics of the words broadcast most often with different pronunciation.

I am certain that the committee's list will achieve its purpose; the result will be that from now onwards there will be uniformity of pronunciation among the wireless announcers, and that is what is most desired.

The list is not yet complete, and it will be



Dr. Robert Bridges.

some time before the idea is working satisfactorily, as everyone who goes before the microphone will have to comply with the committee's decision, and everyone is not yet aware of the official pronunciations.

MR. JOHN DRINKWATER

(the dramatist).

I think the idea is an excellent one, but I disagree with certain pronunciations. I forget what they are for the moment. It is a list, while fairly comprehensive, that cannot be agreed upon by everyone.

Broadcasting has always interested me. From an educational point of view it is splendid, and it is the best aid to the English language that I know.

No Unbreakable Law.

While realising the good intentions of the committee in getting together this list of new pronunciations (for some of them are new), I cannot say that I am entirely in agreement with its object, which I understand to be the promotion of better English among the announcers.

It is hard to say that perfect English exists, and if it does who is there to say what is correct and what is incorrect? I do think, on the other hand, that such a list of correct announcing and pronouncing could be arrived at to the satisfaction of both the listener and the B.B.C.

Whatever happens there will always be

someone who will object to the pronunciation of many words. There is no unbreakable law in pronouncing, and all that the B.B.C. can do is to try and help in convincing its public how to speak the English language in the way that we



Mr. John Drinkwater.

consider to be perfect.

The B.B.C. is to be congratulated on its effort, however, for it can only give it an added value from the educational point of view.

* * *

And that is what Mr. Bennett, Sir Gerald Du Maurier, Mr. Drinkwater, and Dr. Bridges told me. Now it is for the great listening-in public to decide whether the B.B.C. has improved in the English language. I, for one, think that if it has not already done so by the time this appears in print, it certainly will in the very near future.

TWO USEFUL WRINKLES.

FROM A CORRESPONDENT.

AMATEURS are sometimes advised to add to the acid in their accumulators, if distilled water is not available, boiled water. A little thought soon shows that boiled water is far from being purer than tap-water even.

Suppose a given volume of tap-water be boiled. What happens in the process? Pure water is driven off in the form of aqueous vapour, bacteria are destroyed by the heat; but impurities, whether soluble or insoluble, organic or inorganic, remain. Thus, when the process is finished, a less volume of water remains with practically the same amount of impurities, which amounts to saying that the water is more impure. In any case, there is no excuse for not using distilled water, which is condensed water vapour. It is so cheap that my own chemist refuses to charge me anything for a medicine bottleful that lasts for many months.

Winding Basket Coils.

We are sometimes told that so many turns of wire in a basket coil are necessary for the reception, say, of Daventry. But these number of turns are approximate only, and are varied by the size and type of aerial, the dimensions of the coil former and even, though to a slighter extent, by the gauge of the wire used. Thus, many of us find to our disappointment, that after completing a coil to specification, when we plug it into the set far too much capacity is needed to bring the coil into tune, or else no capacity is needed at all. In the first instance, too much capacity means flatness of tuning and some loss of sensitivity, while in the latter case we are tormented by the

idea that the coil may be too large, and that we are not for that reason getting the most out of the set.

A Simple Test.

The difficulty may be obviated this way. When the specified number of turns have been wound, attach the loose end to the aerial terminal of the set, bare the other end for half an inch, but leave it still connected to the spool of wire, and attach the bared portion to the earth terminal. Don the headphones and switch on the set. If it is found that much capacity has to be added (that is, the dial of the aerial condenser has to be turned more than 60°) to bring in the required station, detach the coil and wind a few more turns of wire on, and then test the coil again as before; repeating the process until a turn of less than 60° of the condenser brings in the station at full strength. Then detach the spool of wire. With its removal, tuning will be found sharper.

If, on the other hand, upon first testing the coil the loudest signals are obtained with a zero condenser reading, then it is highly probable that the coil may be too large. In this case, remove the spool of wire, and after again testing to see whether signals are still loudest with a zero reading, detach the coil from the set and unwind a few turns. Test the coil again, without removing the surplus wire (in case too much has been wound off) and repeat the process if necessary, until maximum volume is obtained when the condenser is turned through a few degrees. Snip off the unwound wire, and complete the coil.

The "P.W." Ultra-Selective One Valver



The Set Designed and Described by
P. R. BIRD
(Assistant Technical Editor)
 Constructional Work by **G. V. COLLE**
(Technical Staff)

NOW that the long evenings are coming again, many readers will be looking for a good one-valve set that will tune-in distant stations. This part of the reception is not the only requirement that is called for in most cases, because what is generally needed is a set that will, at the same time, *exclude the local station.*

In other words, the ideal one-valve set must be sensitive enough to bring in the weak signals, and selective enough to shut out the strong local transmissions.

Obviously, the problem is a very difficult one, but nevertheless several circuits have been evolved which have met with quite remarkable success. Most of them have originated in America, where the difficulty is far more acute than in this country, and one of the simplest and most popular is the "Ultra-Audion" circuit, on the lines of which the receiver described below is based.

The ordinary "Ultra-Audion" receiver has achieved much of its fame because it is noticeably very selective when connected direct to the ordinary tuned aerial and earth circuit. Still further selectivity can be obtained, without loss of sensitivity, by utilising the principle of the Ultra coil, with which most readers of "P.W." are familiar.

Super Selectivity.

Thus, by combining a selective circuit with a selective tuning method, this receiver is made "ultra-selective." The scheme of connections is shown in the theoretical diagram, and the list of parts necessary to build the receiver is given separately on this page.

It will be seen that the components are all of standard pattern. Amongst the accessories required is an Igranic Ultrynic coil, and this can be obtained through any wireless dealer.

The action of the receiver will be quite clear from an inspection of the theoretical circuit.

The aerial is connected to one of the centreappings on the Ultrynic coil, and the earth lead is joined to the opposite tapping. This is a form of auto-coupling, for the twenty turns in the aerial-earth circuit are part of a 60-turn coil, which is tuned by the .0003 variable condenser.

The "grid" coil is not arranged between grid and filament, as in a straight one-valve circuit, but it is joined instead between

LIST OF COMPONENTS.		s.	d.
1 panel 10 in. by 8 in. by 1/4 in., with box to fit		12	6
1 Ormond .0003 variable condenser		13	6
1 Penton 2-way coil holder		6	0
1 Lamplugh rheostat		3	6
1 Lissen grid condenser (.0003) and leak (2 meg.)		3	8
1 Security valve holder		1	0
10 terminals		1	3
Wire, screws, transfers, etc.		1	6

grid and *anode*, which is the distinctive feature of the Ultra-Audion circuit.

A reaction coil is coupled to the grid coil (in a two-coil holder) in the ordinary way, and as there is no variable grid-leak, the set has few controls, and is really quite easy to operate considering its selectivity.

It will be seen from the back-of-panel photographs that the wiring is quite straightforward, and there should be no difficulty in making a good job of this part of the work, especially if the constructor has experience of making a wireless set, or of soldering.

The first thing is to mark out the panel ready for drilling. The

dimensions for this are given in the accompanying panel layout. After the positions have been marked lightly by pencil (or, better still, by a scratch with a fine-pointed scriber, pin, etc.), the marks are transferred into the ebonite by a centre-punch or sharp nail, lightly tapped with a small hammer.

After this the ebonite should be thoroughly cleaned and then held firmly on the work-bench, ready for drilling.

As most readers are aware, the drilling of ebonite is quite an easy operation, especially if a hand-drill is used.

Drilling and Mounting.

It can be done quite easily with the ordinary carpenter's brace, but the hand-drill is easier to hold perfectly upright.

There are not many holes to make, and the most important of these are the valve-holders', which must be in accurate alignment.

The best method of marking valve-leg positions is to use a metal template, which costs very little, and lasts indefinitely.

When all the holes have been drilled—not forgetting the holes for fixing screws which hold the panel to the baseboard—the terminals and valve sockets should be mounted and filed for soldering in the usual way.

Then the rest of the components are mounted in place, and the set is ready for wiring. The best wire for convenient working is square-section tinned-copper wire, No. 16 or 18. In addition, a few feet of flexible wire is required for the coil connections.

The back-of-panel scheme of connections is clearly shown by the wiring diagram. Most constructors have their own method of wiring up, and the plan of connecting up the filament-circuit first is a good one, and is recommended.

All these wires can be kept down close to the panel, but the rest of the wiring must be well-spaced from other components, and from the filament wiring.

There is no need to



The flexible leads to the Ultrynic aerial coil are shown in this view of the complete receiver.

(Continued on next page.)

THE "P.W." ULTRA-SELECTIVE ONE-VALVER.

(Continued from previous page.)

fix the grid-leak and condensers to the panel by fixing screws, as its own stiff wiring will hold it securely in position.

When all the connections have been completed, they can be checked over from the accompanying list of point-to-point wiring.

With a set of this type, it is essential that there should be no "panel leakages," due to dirty contacts, flux, etc.; so great care should be used during the whole of the wiring to keep the panel perfectly clean. It is specially important to guard against loose brass dust, such as accumulates after filing-down terminals, but if a clean duster is used constantly during this part of the work there should be no trace of grease or dust on the panel, when the wiring is completed.

Best Aerial to Use.

The set can now be tested, care being taken that the L.T. and H.T. voltages, and the resistance of the rheostat, are in accordance with the specifications of the valve maker.

The set is not at all critical as to the valve it requires, good results were obtained with all those commonly used for detectors.

The particular valve shown in the photographs of the complete set is of the '06 type (Mullard, White Ring), and of the same class the B.T.H.B.5 gave very good results.

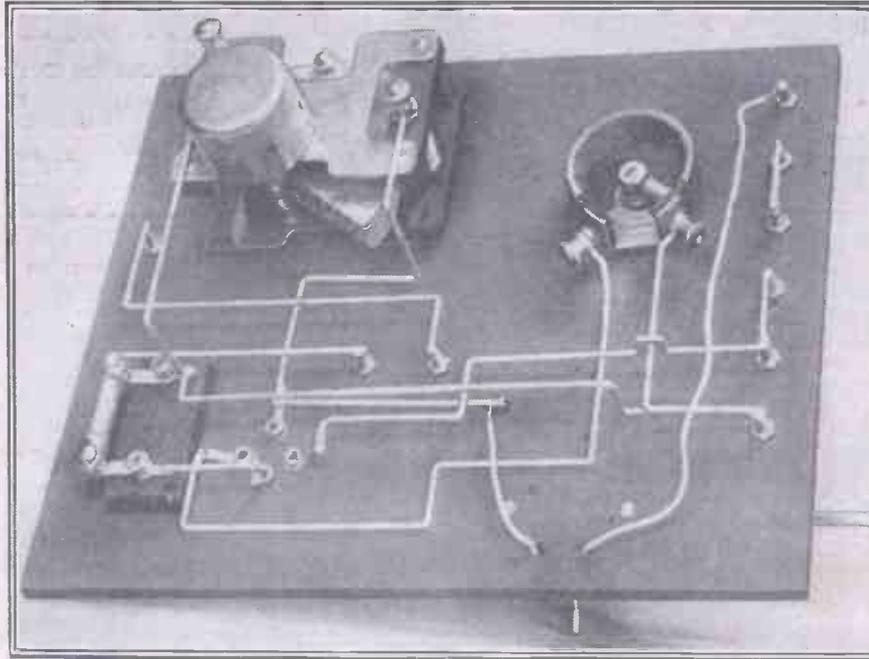
Whether the valve requires a 2, 4, or 6-volt accumulator is unimportant, so long as it is worked within the voltage limits prescribed by its maker.

The set is intended for use with an ordinary outdoor aerial. If the full advan-

cluding the lead-in. An aerial which is unshielded by neighbouring trees, buildings, other aerials, etc., is far more selective, and successful on long-distance working, than if these points are unobtainable or neglected.

Although intended for use with an outdoor aerial, the set gives very good results on an indoor aerial, slung under the rafters or ceiling. Such an arrangement, however, is a tremendous handicap to long-distance reception, and if the indoor aerial happens to be a poor one of its kind it may be impossible to receive any other than the local station.

Like all one-valve sets of the kind, it is intended for headphone reception, and not for working a loud-



From this photograph it will be seen that the wiring below the panel is of the simplest nature, presenting no difficulties to the novice.

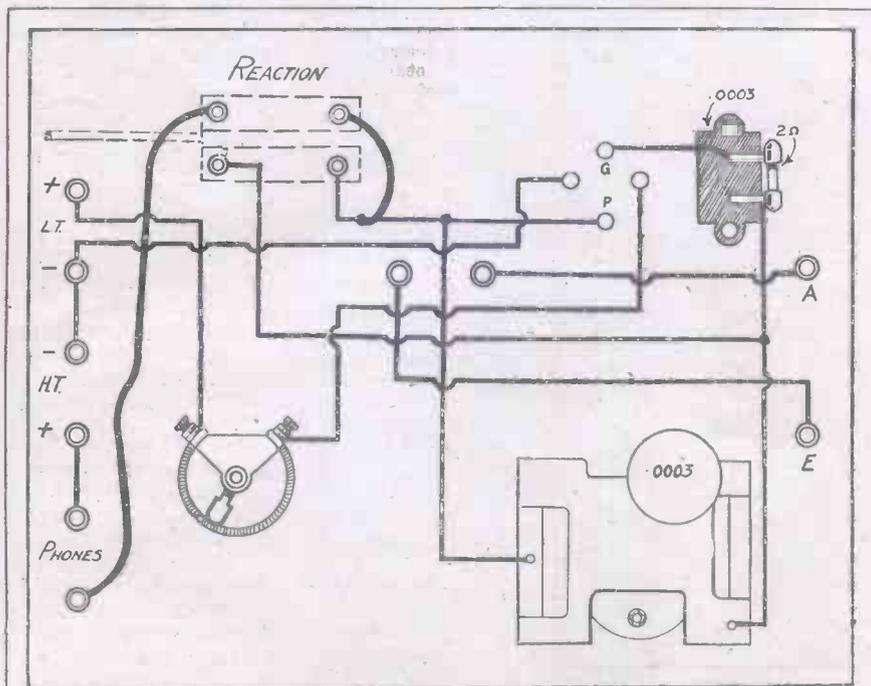
speaker. It is quite possible that skilled constructors will get good results from

further low-frequency amplification, but the set is not really intended for this, and generally speaking if the aim is eventual loud-speaker results (with additional valves) a circuit of this kind is not recommended as a starting point.

the set is not really intended for this, and generally speaking if the aim is eventual loud-speaker results (with additional valves) a circuit of this kind is not recommended as a starting point.

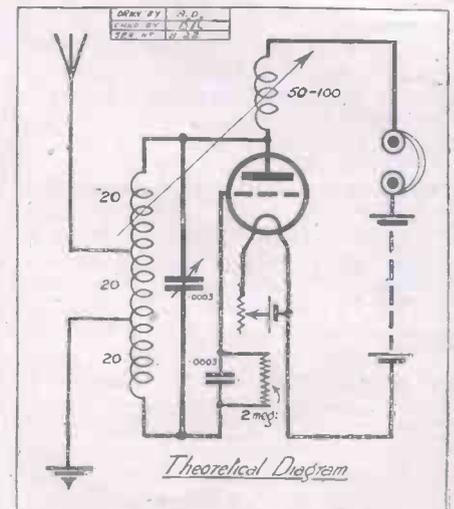
The Wave-lengths Covered.

It is far more successful as a one-valver



WIRING DIAGRAM.

DESN BY A.D.
CHKD BY B.S.
SERIAL NO B 24



Theoretical Diagram

than when used with additional amplification.

The wave-lengths which are covered by the Ultronic coil tuned by the '0003 variable (Continued on next page.)

CLARITY AND VOLUME.

The Editor, POPULAR WIRELESS.

Dear Sir,—After reading about the Filadyne Circuit, in No. 214, July 10th, I made a rough hook-up of the set, and found that results were excellent in both clarity and loudness, and this with the H.F. chokes omitted—not having any by me at the time. I must thank Mr. Dowling for bringing this circuit to our notice. And the best of success to "P.W."

Yours faithfully,
G. W. REEVES.

Fritwell, Nr. Banbury, Oxon.

"ALMOST EQUAL TO TWO VALVES."

The Editor, POPULAR WIRELESS.

Dear Sir,—From your circuit in last week's "P.W." I hooked up a Filadyne out of some components I had got by me, using a two-volt accumulator, a .0005 condenser in parallel, and a B.T.H.3 valve. I am getting splendid results, but I am using two 75 chokes. I have tried 120 chokes, but the results from them are only moderate.

With the 75's I get the local station (about two miles) almost equal to two valves. I got Birmingham and Daventry very clear.

Last Sunday, using aerial 150 and reaction 200, I got Radio-Paris about ordinary crystal strength.

Yours faithfully,
ARTHUR LINNELL,
Flora Cottage, Bright Street, Lenton Sands, Notts.

USING THE D.E.R.

The Editor, POPULAR WIRELESS.

Dear Sir,—Immediately after reading the article by Mr. Dowling upon the Filadyne, in this week's "P.W." I put the circuit together, winding the two chokes of 250 turns with No. 23 wire specially for the purpose. The circuit functions remarkably well—stronger than a straight one-valve—and I think its performance remarkably good.

I find the ordinary D.E.R. valve operates very well; not so others which I tried. I congratulate Mr. Dowling upon another success.

Yours faithfully,
A. J. PAINE
"Headingley," Arnold Road, Clacton-on-Sea.

EFFECT ON VALVE.

The Editor, POPULAR WIRELESS.

Dear Sir,—Several times during the last few days my attention has been drawn to a circuit described in "POPULAR WIRELESS AND WIRELESS REVIEW," by Mr. G. V. Dowling (under the rather cute name of Filadyne) expressing fears as to how long a valve is likely to stand up when wired in this manner, making valve renewals rather an expensive matter, etc. etc.

The argument used is generally put something like this: "Makers are always careful to state the maximum voltage that can safely be put on the anode, the plates being made to stand this and no more. In the same way the grids which in the ordinary way have comparatively minute voltages impressed upon them, are designed with these small potentials in view, and surely it is courting trouble to place the H.T. battery in a grid circuit."

If this sort of feeling is general—I can only speak of my experience, of course—perhaps the author might at some future date deal with the point and allay the fears of the nervous ones.

Yours faithfully,
W. C. C. HUGHES.

16, The Avenue, Twickenham.

[NOTE.—Our correspondent need not fear trouble from this, as the mere reversal of grid and plate has been frequently carried out without apparent ill-effect, notably, by the way, in a well known Marconi receiver.—TECH. ED.]

CONCERNING THE CHOKES.

The Editor, POPULAR WIRELESS.

Dear Sir,—Allow me to point out that the two H.F. chokes, shown in Fig. 3 of your issue of July 10th, in your very interesting article on this new circuit, cannot always be necessary. When my large indoor loop (about 14 ft. high x 30 ft. long) is connected instead of the inverted L, and using an old Cosor bright-emitter valve, without any chokes, 2 LO comes in as loud as usual when the valve is employed in the ordinary way. No earth, and the fact that the accumulators, etc., are very highly insulated, though lying on a table standing on a linoleum-covered floor, probably accounts for the result.

Yours faithfully,
LESLIE MILLER.

"Avonhurst," Rural Way, Stratham, London, S.W.16.

[NOTE.—The italics are ours.—TECH. ED.]

SOME D.X. RESULTS.

The Editor, POPULAR WIRELESS.

Dear Sir,—I have made up the Filadyne one-valve, using B.T.H. type B.5., H.T.35 V. I put in the two chokes, but found I could get better results without them. I have been a reader of "P.W." for nearly three years and have made up a large number of one-valve circuits that you have published, but find the Filadyne the best.

These are some of the stations I have received: Very loud.—5 X X and 2 L O. Loud.—Radio-Paris; 6 B.M.; Hamburg and several other German stations; Madrid; Toulouse; 5 N.O.

HAVE YOU BUILT A "FILADYNE"? A NEW "P.W." CIRCUIT WHICH HAS COME TO STAY. WHAT READERS SAY.

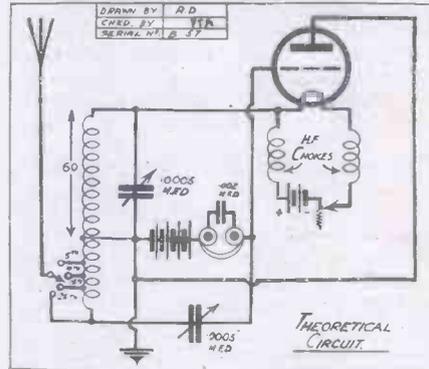
Fair.—Rome; 2 R N; Hilversum; Stoke; 5 I T; Eiffel Tower and a great number of other stations. By Very Loud I mean speech can be followed three feet from 'phones.

Thanking you for a good thing. Yours faithfully, W. R. STUCHBURY. Harvey's Cottage, Southwood, Hildenborough, Kent.

[NOTE.—The subject of the H.F. chokes is dealt with in detail in the further article on the Filadyne which appears in this issue. They assume considerable importance in the development of the circuit, and readers should not be tempted to omit them.—TECH. ED.]

RADIO-PARIS WITHOUT AERIAL OR EARTH

The Editor, POPULAR WIRELESS. Dear Sir,—I am enclosing further experiments with the Filadyne circuit. I am also enclosing details of the circuit adapted for the Reinartz circuit, and it works excellently. I was told that it would be impossible because the plate in the Reinartz circuit goes to the aerial reaction coil. I, however, got over this difficulty by taking the plate to the earth potential, the grid to the 'phones and the filament lead to the grid end of the Reinartz circuit with the result already stated.



Mr. Roberts' Reinartz adaptation of the Filadyne.

I have had excellent results with the Filadyne circuit with reaction. The only difference between this and the circuit published in a recent number of "P.W." is the fact that I have the condenser in parallel and not in series.

I find the Marconi valve in my case better than the B 5 and I have experimented with different values of the choke. I get better results with 200 or 175 chokes than with 250. I also find that I get better results with one choke smaller than the other, that is, the choke connected to the aerial side is a higher value than the one to the minus side; say 200 for aerial side and 150 for the minus side.

I find that all valves that I have tried work, and that it is only a matter of getting the right size of choke for the different valves. I am pleased to say that I think this filament lead direct to the aerial is a far-reaching discovery, as it opens out many roads for investigation.

I am working on this matter, and have, by a very slight alteration, been able to get Radio-Paris on the 'phones without earth or aerial, and, of course, 2 LO comes in at good strength. This is, in my opinion, an important addition, because it is done on one valve and, of course, by adding 1 L.F., etc., the signals could be strengthened.

I think the size of the choke is the most important item and, secondly, the adjustment of the filament resistance, finishing up with the best position for the reaction coil and tuning at the same time the variable condenser.

Another development I hope to study is a choke resistance, which can be tuned to different values for best results. Also, using something different to a choke coil altogether and perhaps less cumbersome.

Yours faithfully,
H. ROBERTS.

10, Elmbourne Road, Tooting Common, S.W.

P.S.—I forgot to mention the purity of the signals re the Filadyne.—H.R.

Following are the details given by Mr. Roberts concerning the Filadyne Reinartz adaption.

Coil.—85 turns on 3 in. dia. former, the first tapping at the sixtieth turn to the earth connection, etc.; 5 turns from the earth tap comes the first aerial tap, the other three aerial taps being at the tenth, fifteenth and twenty-fifth turns, the other end of coil being joined to reaction condenser. A simpler form would be 60 turns to earth, 75 to aerial and 100 turns joined to reaction condenser.

"PURITY OF D.X. SIGNALS."

The Editor, POPULAR WIRELESS.

Dear Sir,—In reply to your request for reports on the above receiver, I have pleasure in stating that I have fairly thoroughly tested the circuit, which I hooked up somewhat roughly on an experimental board. The delay in letting you have this report is due to the intervention of my holidays, during which period I could not, of course, do anything with the set.

I do not happen to possess a B.T.H. B.5 valve, except one that has lost its emissivity, but using this with a 6-volt accumulator as a bright emitter for my first tests, Manchester (1 1/2 miles distant) was sufficiently clear on the loud-speaker to follow speech when the room was quiet. Contrary to your subsequent instructions a week or so later in the article on building a Filadyne 1-valve, I found that a 35 aerial coil and 75 reaction coil were required in my hook-up, as against the 75 aerial and 75 or 100 reaction you recommend. Dublin, Nottingham, Leeds-Bradford, Birmingham, and other stations not identified were received at this first test. I found, however, that the circuit was not very selective, but this is perhaps due to my inefficient aerial, which is poor, but which is the best I can manage under the circumstances in which I am placed. Reaction control is very critical for best results, and I should prefer Reinartz or other form of condenser-controlled reaction to the "swinging-coil" method. Filament control—as is only to be expected—is very critical, best results seeming to be when slightly under-running the valve.

As regards H.T. results increase up to about 30-35 volts, but above this the extra H.T. seems to choke up the set and volume lessens. By accident, I pulled out both the positive and negative H.T. battery wander plugs, but to my amazement I could still receive 2 Z Y at moderate crystal strength, i.e., without using any H.T.! I have done this several times since with the same results.

Two other valves which I have tried are the P.M.2 and the Marconi D.E.2, both of which work from a 2-volt accumulator. To my intense surprise, the D.E.2 valve would not light (the P.M.2 does not glow, so I could not see what happened with this) and coming to the conclusion that my H.F. chokes (a 250 and a 300 honeycomb coil) had too high an ohmic resistance, I replaced them by a 35 and 25 plug-in coil. The set then worked perfectly with both valves, the P.M.2 being very much better for all-round results and volume. The D.E.2, of course, was quite O.K., but the P.M.2 gave more volume, as may be expected, as it is a small-power valve, and the filament would give off more electrons, presumably.

After further experiments, I found that with the two above valves, short-circuiting the 35 and 25 H.F. chokes—such as they were—made no appreciable difference to the results, the set working just as well without them. This, in view of the theory of the circuit, is somewhat remarkable, and even without the chokes and without H.T., crystal strength signals were obtainable.

The remarkable fact I noticed was the purity of DX signals, which had none of the usual distortion generally caused by having to work on the extreme edge of reaction to bring them up to decently audible strength.

I am next going to add an L.F. stage, to see what sort of I.S. results I can get, and also how it affects DX reception.

I then hope to get going on the low waves, and will let you have a report on these two latter points in due course.

This is an extremely long-winded letter, I am afraid, but I wished to give a full report on this remarkable circuit, and trust that the results will be of use to you.

I should like to have an H.F., Det. and L.F. receiver (with neutrodyne H.F. stage), all three sections of which worked on the Filadyne principle. The volume and DX capabilities of such a receiver should equal at least 1 H.F., Det. and 2 L.F. grid rectification circuit.

Yours faithfully,
ERNEST MELLING.
16, Peacock Avenue, Pendleton, Manchester.

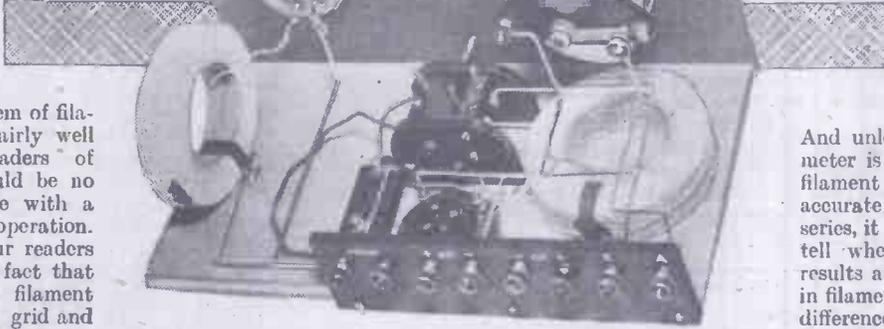
THE FILADYNE CIRCUIT

Further articles concerning the Filadyne circuit and dealing with some interesting new developments are in preparation and will appear in due course. Some weeks, however, may have to elapse before we are in a position to publish full details of

A NEW FILADYNE ONE-VALVE CIRCUIT which marks an important step in the development of the principle. Therefore, readers are advised to

PLACE A REGULAR ORDER FOR "P.W." NOW.

Further Notes on the Filadyne



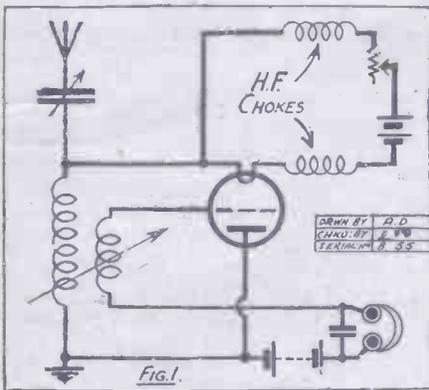
BY now the Filadyne system of filament input will be fairly well known to most readers of "P.W.," so that there should be no need to preface this article with a reiteration of its theory of operation. But it may assist those of our readers who cannot quite grasp the fact that in the Filadyne circuit the filament takes the usual place of the grid and the grid displaces the plate as the anode, if we show a theoretical diagram of the circuit in a somewhat modified form.

Hitherto we have endeavoured to deal with the Filadyne in such a manner that the valve at least retains its conventional position in the diagram from a pictorial point of view. In order to do this, however, it was necessary to distort the aerial-earth connections. Matters can be straightened out by taking the bold step of inverting the valve, and, after all, it is in the circumstances a perfectly logical sort of thing to do.

Without Using Chokes.

Anyway, we have done this in Fig. 1, and now we can clearly differentiate between the filament-plate input circuit and the grid-plate output or anode circuit. Eliminating the reaction coil and the filament chokes and battery we arrive at Fig. 1A and things become even clearer still. It will be unnecessary for us to point out that in effect the purpose of the filament chokes is to make the receiver independent of external influences.

Several of our correspondents report

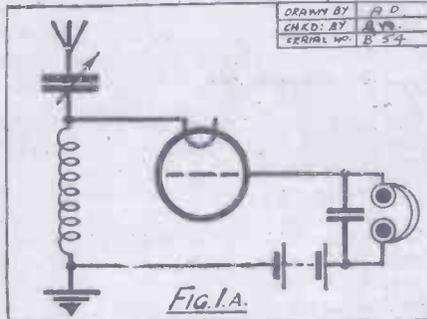


excellent results without using chokes, while others appear to be endeavouring to prove that the sizes of the chokes should be varied to suit different types of valves and other varying conditions.

Mr. Leslie Miller, A.M.I.E.E., of Crystophone and oscillating crystal fame, for instance, says he does not think the two H.F. chokes can always be necessary and that he obtained good results without them, but he makes the reservation that "the accumulators, etc., are very highly insulated through being on a table standing on a linoleum-covered floor, which probably

By G. V. DOWDING, Grad. I.E.E.
(Technical Editor).

accounts for the result." And, in our opinion, he is perfectly correct in this assumption. Even so, without the chokes the filament control is certain to evince bad capacity effects and tuning will prove more difficult. The two H.F. chokes provide complete isolation, and, as we mentioned before, enable the receiver to be handled without reference to external L.T. wiring and battery conditions.



This is not only desirable, but it is essential if the set is to give stable and consistent service, and when L.F. stages are added.

Now, what about those people who find that varying the sizes of the chokes appears to improve results. One reader, it may be mentioned, informs us that after prolonged investigation he found that optimum efficiency resulted when one choke consisted of 75 turns and the other 82 wound basket-coil fashion. Another reader drew up a table in which a number of valves of different types were shown, each valve being accorded chokes of different values.

An Ohmic Resistance Effect.

Unfortunately, we consider this represented wasted labour. The chokes, both of them, are in series with the L.T. battery, the filament resistance and the filament of the valve. Therefore, their combined ohmic values will affect the current flow in this circuit. If either or both of the chokes are changed for chokes of different ohmic resistances to obtain the same current flow as formerly, it will be necessary to vary the setting of the filament rheostat accordingly.

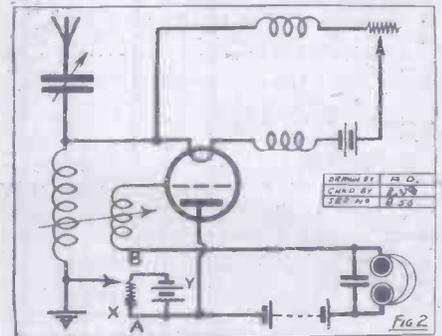
And unless an accurate voltmeter is shunted across the filament of the valve, or an accurate ammeter is placed in series, it will be impossible to tell whether differences in results are due to differences in filament temperature or to differences in choke values.

As a matter of fact, careful tests have proved that reducing the values of the chokes to points where they cease efficiently to choke at the frequencies of the desired stations causes losses. This, after all, is only to be anticipated, although in cases such losses make themselves felt only on weaker signals from the more distant stations.

Design of the Valve.

These points have a bearing on the design of the valve. Undoubtedly the reason why the Marconi or Osram D.E.R. valve is particularly suitable for Filadyne circuits is because it has a shorter filament than most. In the Filadyne circuit the grid of the valve is not a "traffic controller" of electrons, as Sir Oliver Lodge so aptly described the function of this element in ordinary circuits. In the Filadyne we control the traffic at the garage gates before it can get out on to the roads and spread not only through the main highways, but into byways and thus lose some of its power.

Therefore it would seem probable that the shorter filament enables a greater concentration of received energy to take place, and by this means the emission of



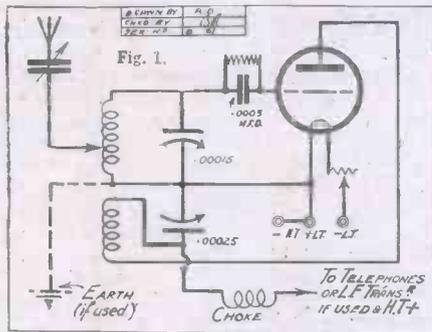
electrons more markedly affected. This leads us to another point. At the ends of a filament, temperature is always lower and emissivity of electron less than in the middle owing to a dissipation of heat that takes place by metallic conduction through the two connecting wires. Visual proof of this is available for anyone who cares to examine closely the filament of any type of valve in operation. It is possible that the Filadyne effect obtains at the or nearer to the terminal points of the filament rather than in the centre. Naturally, in a shorter

(Continued on next page.)

SHORT WAVE RECEIVER NOTES.

By E. J. SIMMONDS, F.R.S.A., M.I.R.E.
(Consultant to "P.W.")

WITH the approach of the shorter days and the greatly improved conditions for long-distance short-wave reception, many enthusiasts will be devoting attention to this fascinating and useful branch of radio reception. As further development is mainly directed towards the use of shorter waves, it is important to use a circuit design for the receiver, capable



secondary coil, and consequently make it difficult to hold the desired signal.

Fig. 1 represents a suitable circuit for this work, and it is possible, with this scheme and suitable proportioning of constants and lay-out, to obtain a condition where the reaction control varies only slightly with changes of frequency, thus allowing a single setting of reaction to maintain adequate oscillation over a fairly wide band of frequencies. This cuts the control of such a receiver practically down to one control, viz., the secondary condenser.

The aerial is direct coupled to the grid coil, and may be clipped on to the bare wire coil one or two turns from the filament end.

Avoiding Harmonics.

The variable condenser in the aerial lead will be useful in avoiding harmonics of the aerial system, which, with some aeri-als, stop the receiver oscillating abruptly as these points are passed in searching through the wave-length band.

The coils should be constructed in solenoid form of bare wire 18 S.W.G., and turns air spaced one diameter, and supported by three thin strips of insulating material placed 120° apart. The grid and plate coil are both wound in the same direction; three inches in diameter is a convenient size.

The condensers should have the rotors grounded to the frame, and should be of the straight line frequency type in order to make the tuning sensitivity equally critical throughout the wave-band. The writer always uses a D.E.4 valve for this work,

and finds it particularly silent in operation provided a suitable grid leak of fairly high value is used.

The Choke Coil.

This leak must be carefully chosen and must be absolutely silent in operation, as much of the noise often heard in oscillating receivers is occasioned by defective grid leaks. This is a very important point often lost sight of.

The choke coil may consist of 100 turns wound on a test tube, but a wire resistance of, say, 25,000 ohms is preferable, as "flat" spots in oscillation of the receiver are often avoided by this arrangement. In a future article the design of inductance coils of high efficiency, suitable for such a receiver, will be discussed in detail.



2ACI, the transmitting station of a short-wave enthusiast, Mr. Williamson, of Bedford.

of smooth oscillation and control down to eight metres at least.

Single Setting of Reaction.

The first consideration is, therefore, the choice of a suitable circuit. The ordinary type of three-coil tuner with movable reaction coil is quite unsuited for use on these H.F., mainly because movements of the reaction coil which are made by the operator to obtain the most favourable point of reaction greatly detune the

FURTHER NOTES ON THE FILADYNE.

(Continued from previous page.)

filament the cooling effect is somewhat more pronounced than in a longer filament, although the suggestion that this has a bearing on the subject is at the moment only offered tentatively.

Filament Bias.

By the way, it is worth while mentioning that the aerial tuning circuit of the Filadyne is quite normal. Parallel aerial condenser tuning can be employed just as well as in ordinary circuits, although for the shorter wave-lengths we prefer the series method.

It is interesting to note, too, that the Filadyne system can be extended to other than the conventional magnetically coupled reaction circuits. For instance, several readers have obtained excellent results with Filadyne circuits incorporating Reinartz types of "feedback."

Naturally, the question is sure to arise: "What are the effects of grid bias?" so that we may as well deal with that interesting point before we conclude this article. First of all grid bias can hardly be

added, as the grid is already biased to the extent of the full H.T. positive. The filament, it must be remembered, now functions as a controlling element. Therefore it is filament bias which will control the input-output (fil. volts—anode current) characteristics of the valve.

If filament bias is to improve results it must be negative bias, for a reversal of L.T. connections causes complete loss of signals. Of course, we tried positive biases, but merely obtained nice graduations from full sensitivity to a complete "wash out." For the purpose of trying additional negative bias, the circuit shown in Fig. 2 was a hook-up, X being a 300-ohm potentiometer and Y a battery varying from 1½ to 9 volts. in steps of 1½ volts. With the slider of the potentiometer at A full signal strength was registered, and this fell off gradually as the slider was moved towards B. Nevertheless, the potentiometer gave a very fine control of reaction and for this reason might prove useful for DX work.

More Developments.

Applying biases of either sign to the plate caused diminishment of signal strength. Therefore, it would seem that best results obtain when the filament and plate are at neutral potentials with regard to each other.

Research work in connection with Filadyne circuits is still proceeding and considerable progress is being made. Since the above words were penned we have, in fact, discovered an entirely fresh line of development.

A new Filadyne has been evolved which is much more sensitive and much more stable. The original Filadyne was inclined to be unstable, while its filament adjustment was very critical. The new circuit is a vast improvement from both these points of view.

The New Filadyne Circuit.

At this stage we do not want to say too much about this new one-valver, but readers may rest assured that full details will be placed before them at the very earliest opportunity.

Preliminary tests have proved most gratifying, and while this one-valver comfortably operates a small loud speaker on the local station under average good conditions, it brings in distant stations on 'phones with the utmost ease.

Readers who have built one and two-valve Filadynes in accordance with the constructional articles recently published in "P.W." need not fear that their labour has been wasted. Full instructions as to how either type can be modified in accordance with the new circuit will be published when, or shortly after, the first article describing the circuit appears.

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OF THE CELEBRATED
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J. H. Squire
THE J. H. SQUIRE CELESTE OCTET.

June 22nd, 1926.

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Low & High Tension from A.C. Mains

FOLLOWING my previous article in "P.W." No. 200, entitled "Taking L.T. and H.T. from A.C. Mains," I shall now describe how this may be done, using full wave rectification with 2-volt power valves. It is intended to present this article in as non-technical a manner as possible.

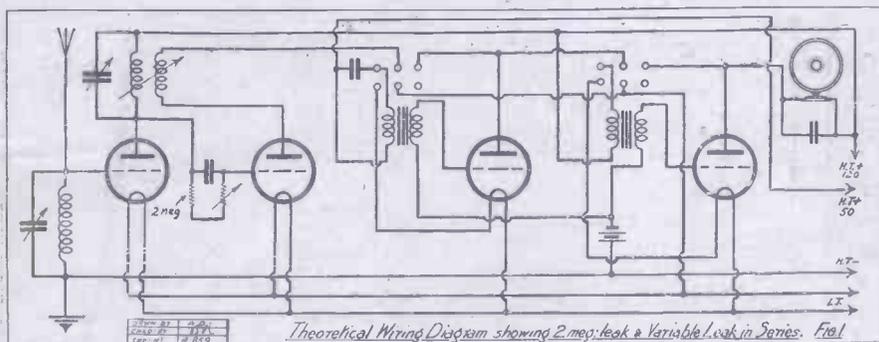
Let us consider the wiring diagram of the four-valve panel (Fig. 1). It will be noticed that the filament leads are not connected to anything except the filaments of the valves. The H.T.- lead is connected to earth instead of being connected to L.T.+ as is usual with sets working from batteries.

A valuable and informative article on the important question of low and high tension supply from alternating current house mains.

By E. JACKSON.

H.T. + connection was adopted after a great amount of experimenting and disappointments, as this connection reduced the result obtained from a nuisance to a very passable result. This method of rectification was used in my previous article.

Now for a few remarks on the wiring diagram (Fig. 2) which is of the control panel. All the meters can be cut out if constructors do not wish to instal them. If the volt milliamper meter is cut out, the connection should be as shown dotted. The transformer primary is coupled through fuses and switches to the mains, a 5 amp. switch in the live main being all that is necessary. The rheostat across the filament winding which supplies the valves in the wireless panel should have a stop fixed at about four-fifths of the way out, otherwise the rheostat winding may be burnt out besides shorting the transformer winding.



The grid returns from L.F. valves are connected to the negative side of two flash-lamp refills which are in series; the positive ends of these cells are connected to H.T. -. The grid of detector valve is connected through a 2 megohm Dubilier grid leak and a variable leak in series with each other, the return wire from these leaks being connected to H.T. +, across the grid condenser and through the anode coil. The variable leak may be dispensed with, but it helps tremendously when trying to get distant stations.

No insulating condenser is required in the earth lead, as the H.T. is taken from the transformer, therefore there is no risk of earthing the mains, besides, the danger of getting a very nasty or even serious shock is ob-

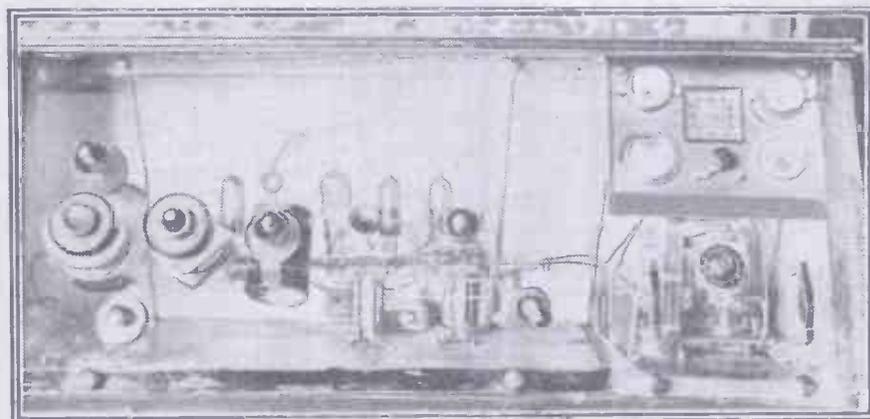
Details of Control Panel.

The rheostat is of the bright emitter type, and about 6 ohms resistance. This rheostat works on the absorption principle; the voltage regulation is about 1 volt. The rheostat on the rectifying valves is in series as it is advantageous to be able to bring the H.T. voltage from zero to maximum; this is useful for volume control, although as far as the hum is concerned it would be better across the winding. This is also a 6-ohm rheostat. The filaments of the two rectifying valves are wired in parallel, as this enables single-wave rectification to be used if one valve should burn out. These valves may be also wired in series when the H.T. + can be taken from the loop wire between the two valves. This arrangement means a little less hum, but the life of the valves will be longer if wired in parallel,

Grid Leak Rectification.

It is not generally known that the grid-leak method of rectification can be used when working from A.C. mains; in fact, it has often been printed in various wireless papers that the method is not workable owing to the amount of hum getting on to the grid of the detector valve. A few experimenters' diagrams show it coupled to the centre tap of the filament winding, but the writer would like to state that this method of connection is one of the failures to work a valve set from A.C. mains. Some experimenters use a crystal detector to overcome this difficulty.

The writer realised that this was one of the technical difficulties that must be overcome if at all possible, therefore the



A photograph of the receiver and A.C. Unit. Glass panels are used throughout, though this is not necessary.

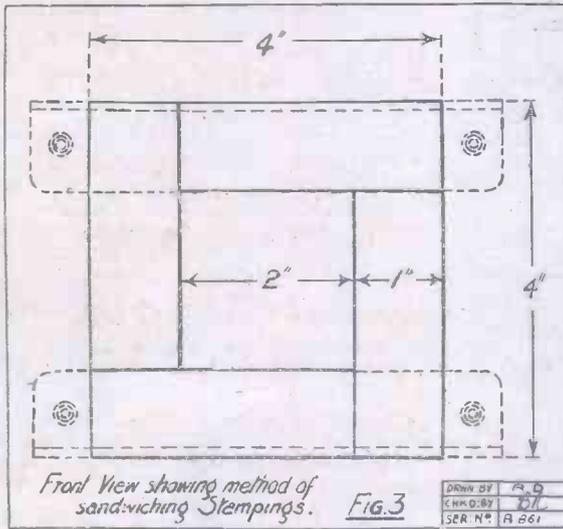
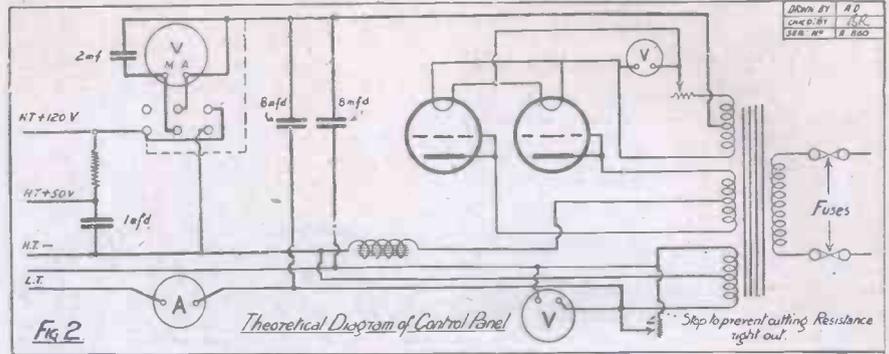
viated. With the above exceptions it should be noted that the other parts of the set are normal, condensers for tuning, grid condenser, condensers across the inter-valve transformers and loud speaker being the usual sizes.

as the H.T. current will be taken from both ends of the filament. When the valves are in series the H.T. is taken from one end of each filament, therefore weakening that
(Continued on next page.)

LOW & HIGH TENSION FROM A.C. MAINS.

(Continued from previous page.)

end of the filament before the other end. The winding, if the valves are in series, is a 4-volt winding. The plate and grid on each valve are joined together to reduce the impedance. It is possible to use one valve and still obtain full-wave rectification by coupling the grid to one of the outer ends of the H.T. winding and the plate to the other end of the winding. This would be all right to supply a two-valve set where the consumption of H.T. and the voltage would be lower, but with a three- or four-valve set the



rectifying valve would get hot. The H.T. + feed is taken from the centre point of the filament winding. Potentiometers may be used across both of the filament windings, the H.T. + on one winding and the H.T. -

on the other winding, taken from the moving arm on their respective potentiometers.

This would do away with the centre tap on the windings, and would in all probability be a refinement, as the arm could be rotated to find the best position or nodal point of the winding. The choke is in the H.T. -, as it is much more effective than when in the H.T. +. It may also be stated that the milliammeter meter constitutes a very good choke, but a 2 mfd. condenser is required in shunt with the meter. The filter condensers are in two banks of 8 mfd. each. These two banks are connected to the filament winding (winding supplying valves in set). One bank on each filament lead.

Variable Mains.

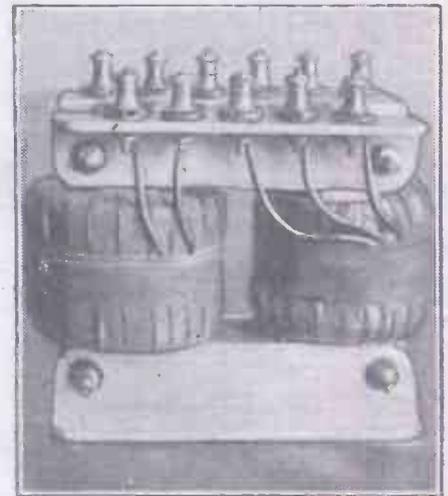
This is equivalent to putting 4 mfd. across each filament lead, besides at the same time it puts 16 mfd. across the H.T.

leads. The other end of the condensers is shown coupled to H.T. + (input to milliammeter); if they are on the output side of meter it will be impossible to get a steady reading, as the current fed to the milliammeter would be of a pulsating nature. If the meter pulsates very badly when no signals are being received the current is not smoothed enough, the remedy is more condensers in the filter. Some mains are worse than others in this respect—in fact, the mains from the same power station vary in different parts of the same town, this being owing to the difference in inductive loads on different feeders.

If X-ray apparatus is worked from the same feeder it will make itself heard as mush, etc., to anybody used to listening-in to the mains with a pair of 'phones.

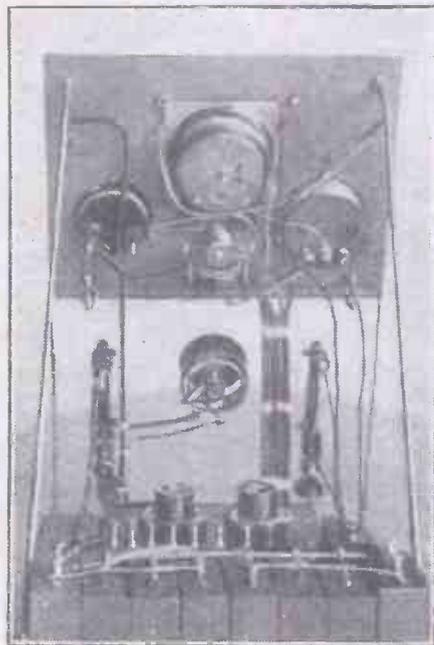
Another item which may be worth mentioning here is, sometimes a dull pop may be heard in the loud speaker: this is the result of switching off or on of lights, cookers, etc., which are fed from the same feeder. Sometimes H.F. mush is brought in; if the mains are overhead type, this can usually be reduced by an H.F. choke in the live main feeding the transformer. D.C. mains, however, are the worst offenders in this respect. The resistance for the first

two valves may be easily made, all that is necessary is half an ounce of 36 gauge "Eureka" resistance wire wound on an empty spool; this should be taped up and two leads brought out. A 1 mfd. condenser is connected from the low voltage end of the

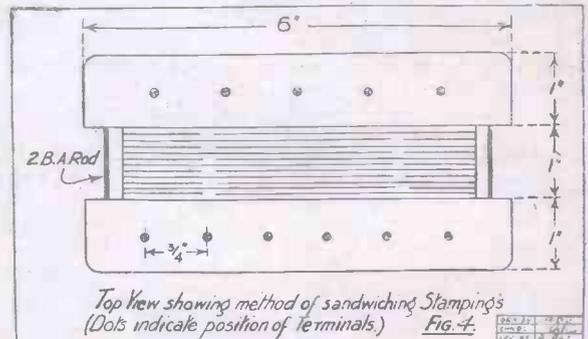


The completed transformer.

resistance to H.T. -. The milliammeter is in reality a "Sifam" high resistance moving coil instrument. A D.P.D.T. "Utility" switch connects the meter in series (for milliamps) and in parallel (for volts). The resistance of the meter was tested by an ohm meter and found to be



A rear view of the control panel. The mainbridge condensers are in the foreground.



10,000 ohms, therefore, according to Ohm's law:

$$V = IR$$

With the meter connected as voltmeter, (Continued on next page.)

LOW & HIGH TENSION FROM A.C. MAINS.

(Continued from previous page.)

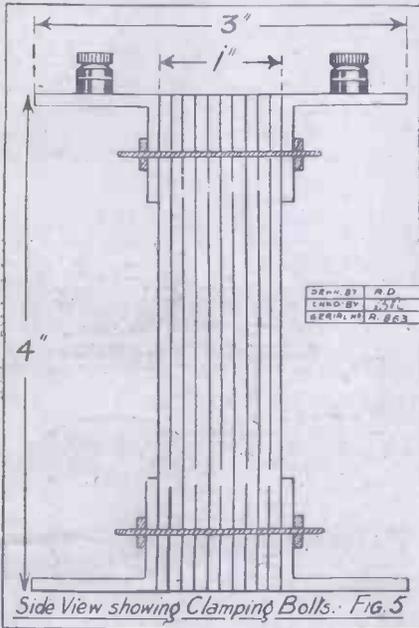
If the needle reads 100 volts, and the resistance of the meter being 10,000 ohms, therefore,

$$V = 100$$

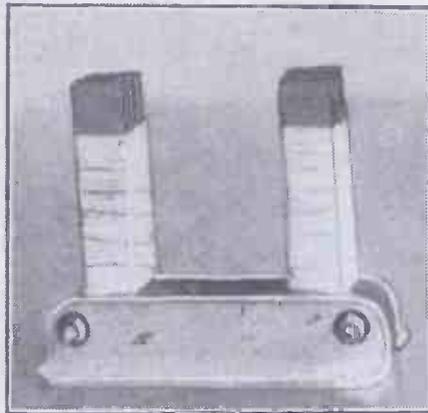
$$R = 10,000$$

$$I = \frac{V}{R} = \frac{100}{10,000} = 0.01 \text{ amps or 10 milliamps.}$$

Therefore, when in series it is only necessary to knock the last 0 from the reading given



To start with, the core is the first consideration. In the transformer used, the core is one square inch cross-sectional area; that is, stampings of one inch wide, built up to one inch in depth; the lengths of the stampings are three inches, therefore the

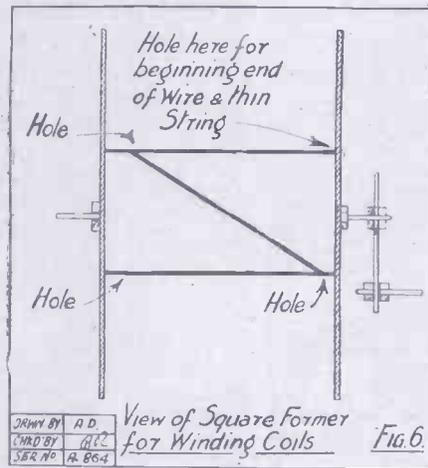


Commencing the building up of the transformer.

overall height and length of the core is four inches, when stampings are sandwiched as shown in Figs. 3, 4, and 5. The stampings may consist of soft Swedish iron, or stallo. One side of each stamping must be shellacked and a piece of tissue paper stuck on; this is to prevent eddy currents. Stallo may be obtained from Joseph Sankey & Sons, Ltd., Bilston, Staffs.

Constructional Details.

It is suggested that three legs of the core be built up and the bottom clamps (these are 1 in. angle aluminium) put on. The clamps are fastened with 2 B.A. screwed rods, with a nut and washer at each end, the rods being outside and not through the



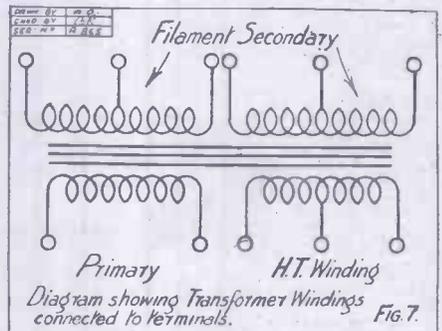
core. See Figs. 4 and 5. After the three legs are built up the portion where the coils will rest should be taped with white tape to prevent the corners of the core cutting the insulation of the coils (see photo). The core is now ready for the coil to be slipped on and will work on frequencies from 50 to 100.

The centre part is made from hard wood, 1½ in. square by 2 in. long, with a hole drilled through to take a piece of 2 B.A. screwed rod. After drilling this hole the former is cut through diagonally to facilitate getting out of the wound coil; two end

cheeks from stiff tin, iron, etc., or even three-ply wood about 4 in. square completes the former. The former and end cheeks are held together with the screwed 2 B.A. rod which also acts as a spindle. Fig. 6.

Winding the Coils.

Before winding the coils, two pieces of thin string or silk, as used by ladies for knitting purposes, should be threaded through the holes in the ends of the former, leaving a few inches spare at each end; these ends may be tied together if in the way. These are for tying round the coil before taking the former to pieces. Over the string should be wrapped three or four layers of Empire cloth, or stiff paper. Wind primary with twelve turns per volt—i.e. 230 volts by 12 equals 2,760 turns. Make sure that the proper number is wound; if no counter is available put a mark for every hundred wound. The following



gauges of D.C.C. copper wire are recommended.

For supply voltages 100 to 120, use No. 24.

For supply voltages 200, use No. 28.

For supply voltages 220 to 250, use No. 30.

The shellac brush can be applied between each layer if desired. Before taking the coil off the former tie the aforementioned strings over the coil. Two pieces of sleeving should be slipped on the leads before taping up. The taping up should be carried out with Empire tape, finishing off with a piece round the centre.

Commence as with the primary in regard to string and insulation. Wind the H.T. secondary with No. 34 enamelled copper wire. There is no need to try to wind this even, as too tight a winding is liable to damage the insulation by the turns being squeezed against one another. Just hold the wire taut and wind on as level as possible without letting it pile up more in one place than another. Wind on 3,000 turns, then bring out a loop near one end of the winding; this loop will afterwards be the centre tapping.

Now wind on two layers of insulation, then wind on the other 3,000 turns. Bring all leads out at the same end of the winding. Level this winding up with very stiff paper. Wrap two layers of Empire cloth round the coil. We can now wind on the two filament secondaries over the H.T. coil. Both these windings are identical. Wind with No. 22 D.C.C. copper wire 26 turns, with a loop at the thirteenth turn in each case. These two coils can be wound on side by side, the ends of these windings being brought out on the other side of the coil from the H.T. leads. The coils can now be tied up and taken from the former. The leads from the H.T. coil should be thicker than the wire used for

(Continued on page 54.)

and the answer is in milliamps. On the photographs which shows the back view of the control panel may be seen the two banks of Mansbridge condensers for the filter circuit; the choke may be seen on the front view photograph—it is laid on the baseboard at the right-hand side of the valve shelf. This choke is one of surplus government variety of a 1,000 ohms resistance obtainable from Thompsons, London. The rheostat in the centre of the glass panel is in series with the rectifying valves.

The Transformer.

There are terminals on the edge of the valve shelf for connecting up to the transformer output terminals. The transformer stands on the baseboard between the condensers and the valve shelf. The two primary terminals of the transformer are connected through the fuses to a two-pin plug in the back of the cabinet. The fuses may be seen on both front and back view photos. The knob under the clock on the meter panel is for the change-over switch from volts to milliamps. The other meter seen from the back is the filament ammeter. The condenser across the milliammeter is seen just in front of the filter condensers.

The rheostat controlling the receiving valves is on the right-hand bottom corner of the wireless panel. The resistance and the condenser for the H.T. + tap is inside the wireless panel, there are four sockets on the end of the valve shelf to act as feeds to the wireless panel.



Conducted by our Staff Consultant, J. H. T. ROBERTS, D.Sc., F.Inst.P.

ALTHOUGH there is a pronounced tendency towards shorter and shorter wave-lengths in this country and, in fact, in Europe generally, the tendency in Australia seems still to be in favour of long wave-lengths. In Australia the broadcast band is, of course, higher than in this country. Experts on the other side maintain that, using a given power, a 500-metre station would have a possible daylight range equal to three or four times the range of a 350-metre transmission, although they think the latter more effective in the darkness.

The employment of broadcast wave-lengths between 296 and 1,250 metres imposes considerable difficulties upon the manufacturers of radio sets, and it is not surprising that a strong movement should be on foot to have the broadcast lengths standardised within a reasonably small band. This band is likely, however, to be somewhat higher than our broadcast band, since the present long-wave stations at Perth and Sydney cover, it is claimed, the whole of Australia in daylight. According to experiments which have been carried out, the shorter wave-lengths do not do this, or at any rate, they are not so reliable.

A Small Power-Transformer.

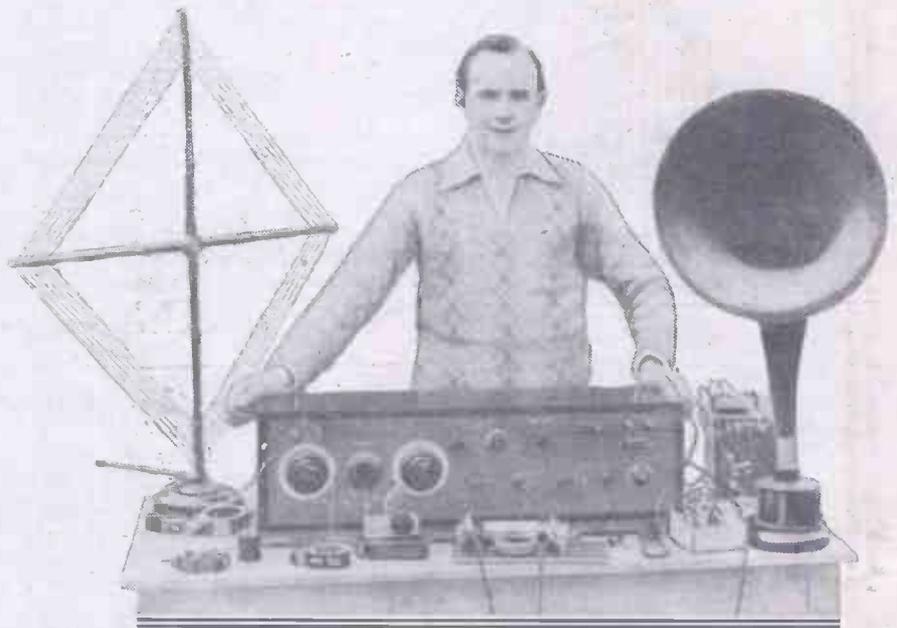
A correspondent has written to me in great despair about a small power-transformer which he has designed and constructed for the purpose of handling about 25 watts on the low-tension side, the transformer being for the purpose of stepping-down the voltage from the mains from 200 volts to about 8 volts.

From what I can gather, he has employed a closed laminated magnetic circuit (similar to that commonly used for low-frequency transformers), but has wound the primary entirely on one limb and the secondary on the other limb. The result of this is that the transformer is very inefficient and the voltage developed in the secondary is much below that which would be expected from the usual simple calculations.

Magnetic Leakage.

I have often noticed that there seems to be a general impression amongst beginners that the voltage generated in the secondary simply bears the turn ratio to that in the primary, irrespective of the manner in which the two windings are put on the core. This, of course, is very far from being the case. I have even found this misapprehension when lecturing to University engineering students, and I believe that the text-books are to blame.

Sufficient stress is not laid upon the fact that it is assumed that all the magnetic flux generated by the primary passes through the secondary. Actually this ideal condition is never reached, and the discrepancy is accounted for by what is known as "magnetic leakage." The greater the magnetic



Mr. Jones of the Hackney and District Radio Society, and his super-heterodyne receiver.

leakage, the more will the voltage developed in the secondary fall short of that which would be expected from the simple calculation referred to above.

The Simplest Method.

With a transformer in which the primary is wound on one limb and the secondary on the other, the magnetic leakage would be enormous and very little energy would be generated in the secondary. The proper way is to have the secondary wound as close to and as intimate with the primary as is mechanically possible.

The simplest method is usually to wind the primary on the top of the secondary, or vice versa, but an alternative method is to wind the primary in sections, with the sections of the secondary between. Any method which ensures that practically all of the flux passes through the secondary will

be suitable. If a closed iron core be used half the primary should be wound on each limb, and half the secondary on each limb on the top of the primary.

Provided this simple precaution in design be observed, there is really nothing difficult about constructing a small power-transformer. Attention should, of course, be given to the necessity for a sufficient cross-section of iron core, and for sufficient copper to prevent the resistance becoming unduly high. A full account of small transformer design and construction, however, would take me far beyond the very short limits available in these notes. If any readers have any queries in this connection, perhaps they will write to me.

American "Double-Barrel" Rheostats.

I was examining one of the new American "double-barrel" rheostats recently, and I must say that it is a remarkably well-designed and well-constructed piece of work. Some people might criticise it on the ground that it was too elaborate for a rheostat, but I am of the opinion that the idea that "any old thing" will do for a filament rheostat is quite wrong, and that a rheostat that is a

precision instrument is well worth having, even though it cost a little more. In many types of circuit, the filament adjustment is one of the critical controls, and proper use of this control can never be obtained by the use of a cheap rheostat, with bad contacts and big jumps in its resistance value.

Two Parallel Cylinders.

In case some of my readers may not be familiar with the rheostat referred to as the "double barrel," this consists essentially of two parallel cylinders, each about an inch long and half an inch in diameter, a fine spiral groove of small pitch being cut in the cylindrical surface of each. One of the cylinders is made of ebonite, or other suitable insulator, and the other of brass. The resistance element consists of a length of german silver, or such-like

(Continued on page 56.)



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"Please don't do it." Time and again Captain Eckersley has made this radio appeal to owners of "oscillating" sets that cause interference with neighbours. Yet, until Sir Oliver Lodge invented the wonderful "N" circuit the only way to eliminate the "oscillating"—or "howling"—was to halve the volume of reception.

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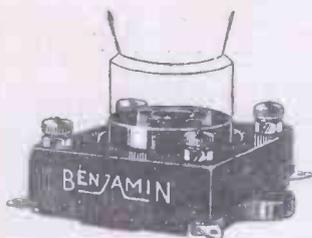
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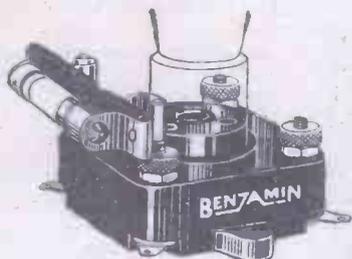
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This is the usual view of the Benjamin Valve Holder without attachments.

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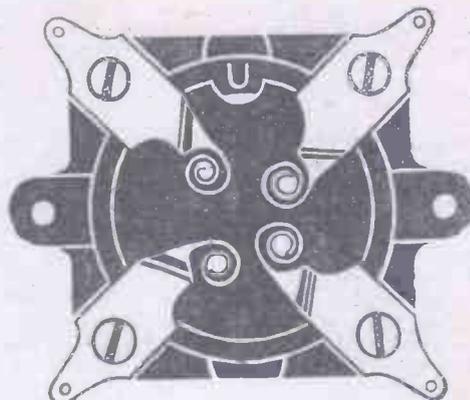
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VALVE HOLDER, GRID LEAK AND CONDENSER

The same as above but with the addition of a Dubilier Fixed Condenser (.0003 mfd.). Grid Leak can be in series or parallel. Wiring entirely dispensed with, space saved, installation simplified, connection troubles banished.

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The one-piece spring feature

This is a BENJAMIN Anti-Microphonic Valve Holder turned upside down. The four metal strips you see are the patent BENJAMIN one-piece springs—each a complete length of tempered metal, cut and shaped to form the soldering tag and the valve pin socket, and the spring.

Most anti-microphonic valve holders have in place of this two or three strips of metal soldered or rivetted together. In time, the joints work loose and become 'noisy.' The BENJAMIN Valve Holder with its one-piece spring feature overcomes this difficulty.

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- (1) It allows the valve to float in any direction.
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This world-famous component, which trebles the life of your valves and completely disperses all microphonic noises, can be purchased either alone or with the attachments shown on the left. Sold by radio retailers everywhere.

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STAND No. 105 AT THE NATIONAL RADIO EXHIBITION

BROADCAST NOTES.

By O. H. M.

"P.W." Radio Sounds—Revising B.B.C. Auditions—The Albert Hall Concerts—Trouble in Manchester—Mr. Filson Young for the B.B.C.—No, No, Nanette—Forthcoming Features.

THE whole subject of announcing is under review, and important changes are about to be introduced. Further efforts are being made to improve the transition between programme items. Although this transition is a great deal better than it used to be, there is still a good deal to be done before it can be regarded as satisfactory from the artistic standpoint. The minimising of programme halts is not enough. The switching off of the microphone even for the few moments necessary in changing from one studio to another is apt to spoil the effect of the item following on. Improvement will be sought through reducing the length and frequency of announcements, and in superimposing some of the announcements on the items themselves. The latter expedient will have to be used with great circumspection. I am inclined to depend more on the former.

P.W. Radio Sounds.

The valuable results of the POPULAR WIRELESS Radio Effects competition last year are only now being realised. The B.B.C. based a series of experiments on the information secured from the competition. The result is that sound effects are approaching a standardisation. Progress in this country is a good deal more rapid than it is abroad, even in the United States. The sound effects and "noises off" of the special Territorial Programme from London were exceptionally convincing. Radio drama in particular will benefit from these developments, largely inspired by POPULAR WIRELESS.

More Rumours.

There is little change in the betting on the Corporation Stakes as quoted here a fortnight ago. The rumour about Sir Herbert Blain caused a little flurry, and there was some readjustment of odds for a day or two. But there was no substance in this rumour, and matters remain where they were. Among those who are actively engaged behind the scenes is Mr. Sydney Walton, the publicist. I understand that Mr. Walton is a great believer in the ethical possibilities of broadcasting. I was told the other day that he is likely to take over the publicity and publications of the Corporation in January. His idea would be to run these in co-operation with Sir Charles Higham.

Revising B.B.C. Auditions.

The B.B.C. has been endeavouring for some time to apply the policy of giving an audition to everyone who requested it. This was in line with its democratic conceptions, and, in theory, has much to be said for it. The average number of auditions in a week has now reached the considerable total of 750. Less than one per cent proved productive, and 99 per cent of these were specially commended by some competent outside authority. The cost of the vast number of unproductive auditions has now become quite disproportionate. The policy has been revised. When present commitments have been liquidated, auditions will be granted only to those who produce reasonable credentials. Credentials from any of the following will be considered satisfactory: Theatrical manager, prominent

actor or actress, well-known producer, music, singing, or elocution instructor, guild or association, academy of music or dramatic art, other recognised authority. The net seems sufficiently wide to catch most likely talent.

The Albert Hall Concerts.

The arrangements for the B.B.C. season of twelve Albert Hall Concerts are now well in hand. Conductors and artistes are being drawn from all over the Continent and from the United States. There seems little doubt that this series will be very much more distinguished than any other concert series ever given in London. The names of the conductors and artistes are being kept



Mr. John Ansell, who has taken the place of Mr. Dan Godfrey, Jr., at the London Station.

secret for the moment, but I have heard quite enough to convince me that the B.B.C. is going to outdo all previous successes in this venture. What a pity they are being called National, and not International Concerts. The first will be given late in September.

Broadcasting House.

The proposal for Broadcasting House in Aldwych, first announced in this page, has advanced as far as agreement on plans; but lack of funds and financial authority is delaying the conclusion of the deal for the site. But I imagine that the building will be put in hand this winter and will be ready for occupation early in 1928.

Trouble in Manchester.

There is a revival of trouble in Manchester about too much London programme being forced down locally. This agitation is a

hardly perennial; but this time it looks like being more serious than in the past. I hear a citizens committee is approaching the Lord Mayor and Corporation with a view to establishing once and for all Manchester's artistic and musical autonomy in the ether. They don't want any of the London

programme. I shall be interested to see how the B.B.C. handle this new agitation. My own plan would be to give Manchester a trial run of their own material only, and then wait for the pendulum to swing back as it undoubtedly would.

Scotland Wants More Programmes.

While Manchester resents having any London programmes, the listeners north of the Tweed are clamouring for more southern programmes and particularly for more of London. In Scotland they are tired of local atmosphere at B.B.C. stations, and want the superior artistic material provided by London. Now, with its present straightforward and resilient organisation, the B.B.C. is perfectly well able to handle all these agitations. They are sifted and analysed, and, where reasonable, are gratified. I hope that the new Corporation will be as amenable to reason in these matters as is the B.B.C. to-day.

Mr. Filson Young for the B.B.C.

I heard the other day, on good authority, that Mr. Filson Young has accepted a post at Savoy Hill. He will be a builder of special programmes, and will also concern himself with general artistic supervision and administration. My informant seemed to be of the opinion that Mr. Young would shortly become head of the whole programme organisation. I doubt this because Mr. R. H. Eckersley has done very well in this job, and hardly deserves to be scrapped in this way.

"No, No, Nanette."

A farewell broadcast of "No, No, Nanette," will be given on September 18th. This reminds me that George Grossmith is taking an increasingly active part in the B.B.C. He has become much more than a programme adviser. His vast experience and sound common sense are reflected in many of the best programmes that are produced both in London and in the Provinces.

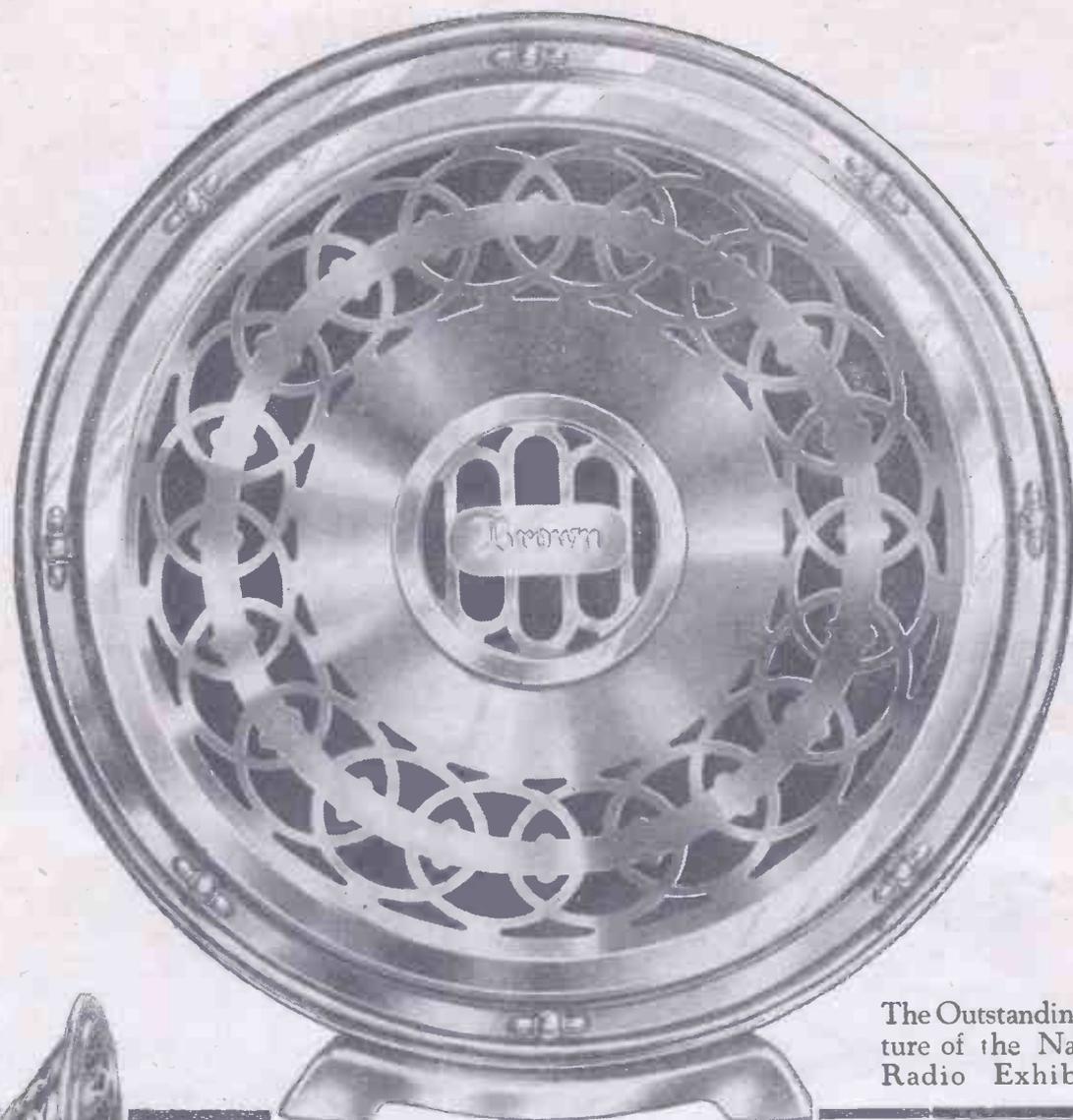
The St. Francis Anniversary.

The special programme on Sunday, October 3rd, to mark the 700th anniversary of St. Francis of Assisi, is to be introduced by Mr. G. K. Chesterton.

Forthcoming Features.

The following are among the artistes that will be heard in feature programmes during the autumn: Doucet and Weiner in co-operation with Maurice Chevalier, William Primrose, Howard Carr, and Gasparini, the 'cellist.

PHOTOGRAPHS. Readers are invited to submit photographs of wireless interest for publication in "Popular Wireless." Every photograph published will be paid for at the rate of 10/6 per insertion.



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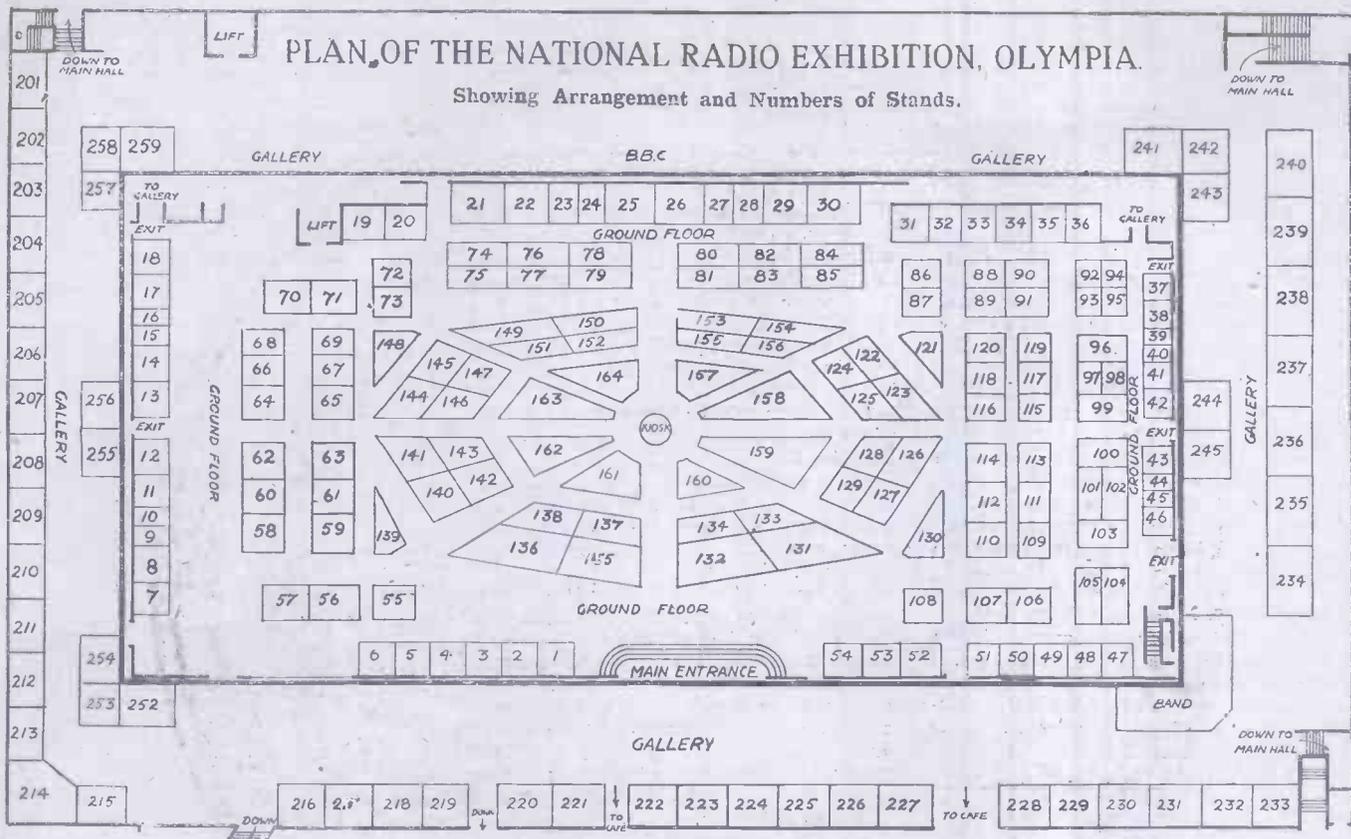
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Auto Sundries, Ltd.	133	Edison Swan Electric Co., Ltd.	134 & 3	Peto Scott Co., Ltd.	161 & 259
Autoveyors, Ltd.	20	Electron Co., Ltd.	38	Pottigrew & Merriman (1925), Ltd.	96
Automatic Coil Winder & Elec. Equipment Co.	249	Bricsson Telephones, Ltd.	137	Portable Utilities Co., Ltd.	107
Batteries, Ltd.	249	Ever Ready Co. (Gt. Britain), Ltd.	100	Primus Manufacturing Co., Ltd.	113
Beard & Fitch, Ltd.	83	Falk, Stadelmann & Co., Ltd.	114	Pyo & Co., W. G.	91
Belling & Lee, Ltd.	207	Fallowfield, Ltd., Jonathan	1	Quartermaine, H.	45
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Blackadda Radio Co.	15	Fellows Magneto Co., Ltd.	110	Radiax, Ltd.	32
Bowerman, Ltd., George	205	Finston Manufacturing Co., Ltd.	206	Radio Communication Co., Ltd.	149
Bowyer-Lowe Co., Ltd.	126	Formo Company	78	Radio Instruments, Ltd.	145 & 147
Brandes, Ltd.	157	Galliers, H. J.	53	Radio Press, Ltd.	57
Bretwood, Ltd.	93	Gamage Ltd., A. W.	156	Radio Reception Co.	208
Britain's Best Crystal, Ltd.	139	Gambrell Bros, Ltd.	90	Radolian Co., The	49
British Ebonite Co., Ltd.	81	Garnett Whiteley & Co., Ltd.	84	Raybould, M.	227
British Electrical Sales Organisation	58	General Radio Co., Ltd.	103	Rectalloy, Ltd.	202
British Radio Corporation, Ltd.	17	General Electric Co., Ltd.	61, 63 & 214	Redfern's Rubber Works, Ltd.	94
British Thomson-Houston Co., Ltd.	127 & 130	Gent & Co., Ltd.	115	Reflex Radio Co., Ltd.	215
Brown, Ltd., S. G.	128 & 129	Gillfillan Bros, Ltd.	106	Reid & Co., Louis H.	211
Brown Bros., Ltd.	120	Graham & Co., Alfred	131 & 132	Retrosonic, Ltd.	62
Brownie Wireless Co. (of G.B.), Ltd.	143	Graham & Co., R. F.	223	Ripaults, Ltd.	92
B.S.A. Radio, Ltd.	13 & 163	Goswell Engineering Co.	256	Rooke Bros.	254
Bullen, William	42	Halcyon Wireless Supply Co., Ltd.	59	Rotax (Motor Accessories), Ltd.	146 & 212
Burdapet Wireless Ltd.	140 & 141, 144 & 209	Hart Accumulator Co., Ltd.	56	Radio Times	260
Burne-Jones & Co., Ltd.	111	Hart Collins, Ltd.	118	See & Sons, J. W.	11
British Radio Mfrs.	234	Henderson & Co., Ltd., W. J.	242	Sel-Ezi Wireless Supply Co., Ltd.	88
Bedford Elec. & Radio Co.	70	Hinderlich, A.	203	Selfridge & Co., Ltd.	153
Cable Printing & Publishing Co.	4	Hobday Bros, Ltd.	21 & 22	Service Radio Co., Ltd.	48
Cables & Electrical Supplies, Ltd.	151	Houghton-Butcher (Gt. B.), Ltd.	69	Siemens Bros & Co., Ltd.	155
Cahill & Co., Ltd.	85	Igranic Electric Co., Ltd.	72 & 73	Spring Washers, Ltd.	222
Camden Engineering Co., Ltd.	95	Iliffe & Sons, Ltd.	108	Stevens & Co., Ltd., A. J. (1914)	116 & 43
Cantophone Wireless Co.	255	International Electric Co., Ltd.	240	Stratton & Co., Ltd.	71
Cassell & Co., Ltd.	90	Jackson Bros.	235	Sun Electrical Co., Ltd.	33 & 34
Celestion Radio Co.	28	Jones & Co. (London), Ltd., Sydney	218	Sylveux, Ltd.	77
Chloride Electrical Storage Co., Ltd.	158 & 233	Lamplugh Ltd., S. A.	253	St. Helens Cable & Rubber Co.	217
Clackson, Ltd., A. H.	238	Langham Radio	257	Telegraph Condenser Co., Ltd.	109
Clarke Bros. (Leicester), Ltd.	225	Lissenin Wireless Co.	40	Trader Publishing Co., Ltd.	8
Clarke H. & Co. (m/c.), Ltd.	80	Lissen, Ltd.	160	Trelleborg Ebonite Works, Ltd.	81
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Cole, E. K.	9	London & Provincial Radio Co., Ltd.	6	Varley Magnet Co.	30
Collinson Precision Screw Co.	51	Le Carbone	252	Prop. Oliver Pell Control, Ltd.	164 & 210
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Cossor, Ltd., A. C.	86 & 87	Manufacturers' Accessories Co., Ltd.	221	Webb Condenser Co.	230
Curtis, Ltd., Peter	150	M.A.P. Co., The	223	Wates Bros., Ltd.	19
C.A.C. Valve Distributing Co., Ltd.	14	Marconiphone Co. Ltd.	121, 122, 123, 124, 125, 220	Watmel Wireless Co., Ltd.	50
"D.P." Battery Co., Ltd.	104	Masson, Seeley & Co., Ltd.	52	Westam Accumulator Co.	23
Darimont Electric Batteries, Ltd.	243	Metro-Vick Supplies, Ltd.	162	Whittingham, Smith & Co.	30
Detex Distributors, Ltd.	2	M. P. A. (Wireless)	67, 68 & 18	Wilkins & Wright, Ltd.	244 & 245
Dew & Co., A. J.	25 & 26	Mullard Radio Valve Co., Ltd.	130 & 138	Wireless Association of Gt. Britain Ltd.	244 & 245
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Dubilier Condenser Co. (1925), Ltd.	154	Odhams Press, Ltd.	47	Wright & Weaire, Ltd.	224
Eagle Engineering Co., Ltd.	55	Oxford Wireless Telephony Co., Ltd.	112	Wireless Apparatus, Ltd.	229
East London Rubber Co.	29 & 30	Ormond Engineering Co., Ltd.	70	World Radio	261
Eastick & Sons, J. J.	54 & 231	Ormsby & Co., Ltd.	35	Webster, William King & Co.	236

THE NATIONAL RADIO EXHIBITION. AN INTRODUCTION.

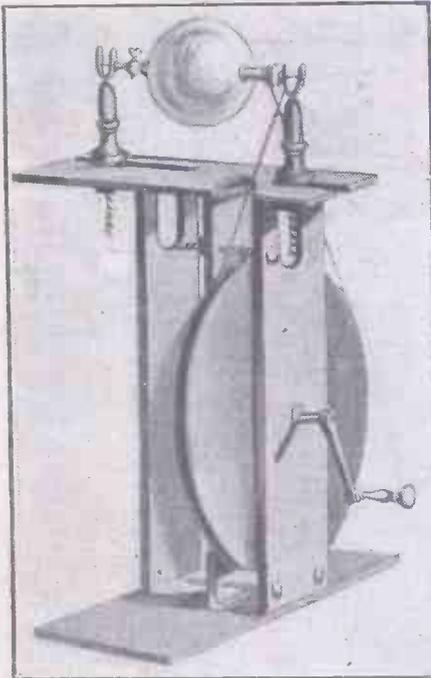
(By "ARIEL.")

AT the end of this week, on Saturday, September 4th, the doors at Olympia will open on Britain's first National Radio Exhibition. They will close a fortnight later, on Saturday, September 18th. We have had wireless shows in this country before, but never one on the scale of this latest London exhibition.

For the first time since broadcasting began the public will have an opportunity of seeing how all the British radio traders are catering for their customers. The whole wireless industry of the country is to be represented at Olympia, for the exhibits are not derived from the members of any one association, but are truly representative of the trade.

Surprises in Store ?

What surprises have the manufacturers in store for the man in the street? Will developments in design mean better broadcasting entertainments? Are cheaper components coming?—simpler sets?—radio revolution or revelation?



An old-time Generator, which was in use as long ago as 1775!

As a matter of fact, nobody knows! All the summer there has been patient radio research, each trader trying to "go one better" than his rivals. Here and there hints have been dropped, but in general the various firms have kept their own counsel, waiting for "the season" to begin. That is why Olympia will see the last word in British radio development. The cards will be "on the table." The 1926-27 wireless season will be here!

Probably the most spectacular display, as far as the general public is concerned,

will be that of the British Broadcasting Company. They occupy the whole of one end of the gallery. Visitors, looking through glass windows, will actually see one of those "studios," from which they so often hear. The broadcasting of the actual London programmes will be in full swing, and the public will thus be able to "look-in" on 2 L O's entertainment.

Then there will be the new sets. They will vary from handsome articles of furniture to the "put-in-your-pocket" type. And the multi-valve tune-in-anything kind will share the shelves with simplified sets where everything has been cut down as far as is consistent with volume—including the price!

One manufacturer will show two 4-valve sets, mounted on glass—and he claims great "clarity" for this arrangement, as well as increased efficiency in range. Another has concentrated on "Push-Button" receivers, with controls that would not puzzle a child. One switch marked "Daventry" and "Local Station," gives the choice of programme, and the output plug can be placed in the "soft" or "loud" socket, and then left alone.

Some Amazing Exhibits.

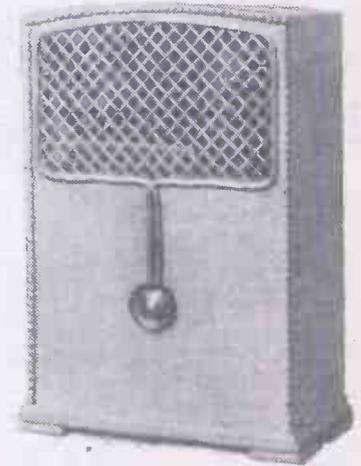
Apart from the sets themselves, there will be a distracting display of components and accessories. Loud speakers, valves, transformers of all kinds, units, gadgets, and doo-hickeys of every type, will tempt the home-constructor from every stand.

Knock-about valves will be on view that can be thumped on the back with impunity, in a way that will stagger those who remember the ease with which the earlier dull-emitters gave up the ghost if knocked or jolted.

Amongst the novelties is an instrument which transmits and receives photographs by radio. It measures only six by eight by nine inches. Another innovation is a one-inch square piece of quartz, capable of controlling the wave-length of a powerful transmitting station.

The Hanging Loud Speaker.

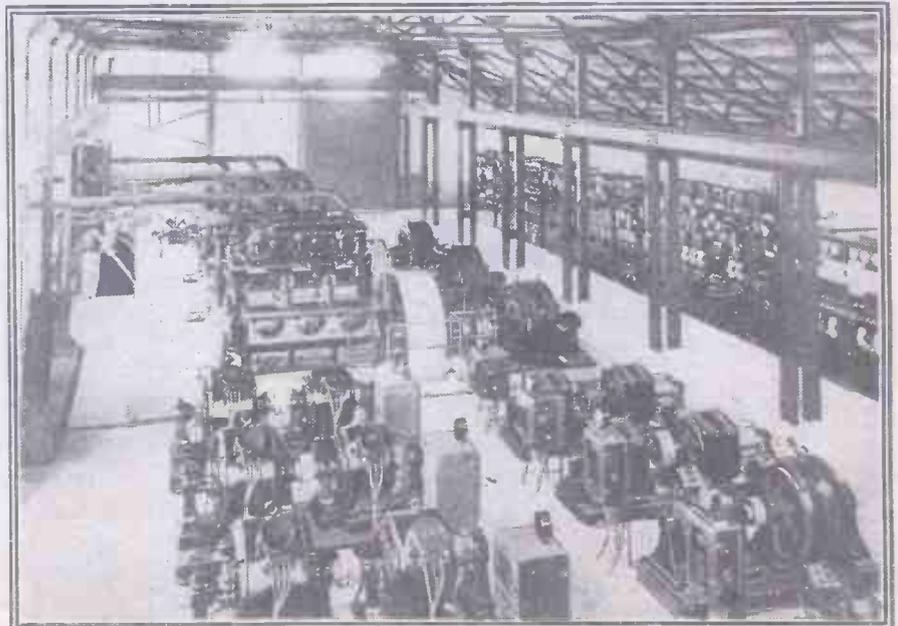
Yet another novelty is a plug-in amplifying unit. This is in the form of a neat cylinder (about 3 in. in height and diameter), which is attached to the last valve-holder. On top of the cylinder are two valve-



An interesting example of a modern loud speaker (Tangent), a feature of which is the wide compass obtainable.

holders, and instead of a complicated amplifier the extra valve is just plugged in alongside the other one.

As for loud speakers, 'phones, units to replace batteries, etc., their name is legion. One well-known firm claims to have produced a loud speaker capable of rendering low notes as clearly as the high notes. And if that doesn't appeal to you as novel enough, there is another loud speaker in the form of an ordinary picture to hang on the wall!



Modern Generators. A view of the Machinery Hall in the Wireless Beam Transmitting Station at Bodmin.

GO
TO —



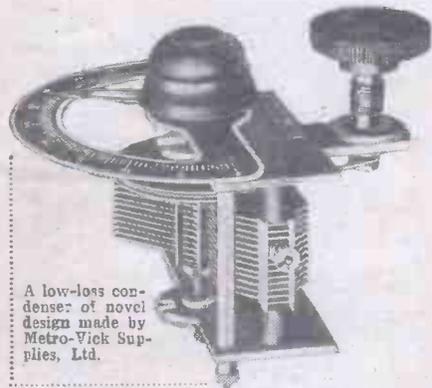
The Wireless Exhibition

AUTOVEYORS, LTD.
Stand No. 20.

We are exhibiting our new Thermionic Relay, and our now famous Bridge Condenser. Others of our lines which will be on view are "Condit," Clix Taper Adapters and Clix Taper Plug Sockets, Clix Parallel Plugs, Clix Parallel Sockets, Clix Spade Terminals, Clix Pin Terminals, Clix Non-Micro Valve Holders, Clix Multi Plugs and Multi Cords.

BEARD & FITCH, LTD.
Stand No. 83.

It is our intention to show the following lines: "Success" Super III. Receiver.—This receiver is tunable from 60 to 3,000 metres with our new patented inductances. Complete with wave trap, loud speaker, and all accessories, royalties paid, £17 10s. "Success" Super-Condenser.—This condenser is designed for straight line tuning, laquered brass vanes and end plates, skeleton design, low loss, earthed rotor, direct movement in spindle or 100 to 1 over full 180 degrees at will, three pint suspension. "Success" Plug-In Inductance.—These patented inductances change the circuit in the lower wave-lengths, viz., 60 to 800 metres, which is a Reinartz, to aerial reaction in the higher. Complete with three coils and socket, covering from 60 to 2,500 metres, complete with circuit diagram and full particulars. £1 7s. 6d.



A low-loss condenser of novel design made by Metro-Vick Supplies, Ltd.

In addition to these lines, we shall exhibit our "Success" Super Audio Chokes, "Success" Standard Audio Chokes, "Success" Radio Frequency Chokes, "Success" Frame Aerials (All Models), "Success" Intermediate Frequency Transformers for Super-Heterodyne, including 1 Filter and 3 I.F.

BELLING & LEE, LTD.
Stand No. 207.

Our speciality is terminals and panel fittings, and we are showing particularly: Type B.—Insulated indicating terminals, with non-rotating names, best polished black Bakelite. Twenty-eight different titles, 9d. each. Type M.—Similar to type "B," but smaller and not insulated, 6d. each. (Nickel plated.) Type L.—Large Bakelite insulated terminals (not engraved), polished black, red, brown, or grained to resemble mahogany, 6d. each. Type M.K.—Low-loss plugs and sockets. Plugs, 6d. each;

Every wireless amateur and listener should make a point of visiting this year's Wireless Exhibition, organised by the National Association of Manufacturers and Traders, and held at the New Hall, Olympia, West Kensington. Undoubtedly it is the finest exhibition of wireless apparatus ever held in this country, and gathered together in the exhibition hall the amateur will find the latest novelties in all branches of radio work.

This exhibition has been opened to all British Manufacturers of wireless goods—whether they belong to the N.A.R.M.A.T. or not, and consequently it is absolutely representative of all that is best in British radio.

Below we publish the first instalment of notes, sent to us by stand holders at the Exhibition. This will be continued next week, followed by a special critique of the various stands at the Exhibition.—THE EDITOR.

sockets, 2d. each; indicating washers, 1d. each. Dial Indicators.—Solid cast metal, with raised, polished letters and black background. Simple-hole fixing. All useful wireless control titles, 6d. each. Sub-Connectors.—To eliminate soldering, 1d. each.

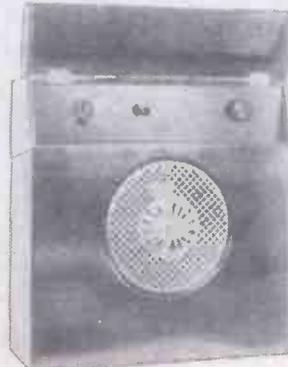
BENJAMIN ELECTRIC, LTD.
Stand No. 105.

Our exhibits are of particular interest this year on account of the several new components we are placing on the market. The well-known Clearatone Valve Holder is now offered with two ingenious attachments—the grid leak and a fixed condenser and grid leak, the object, of course, being to supply a compact unit that does away with wiring and considerably saves space. Another most interesting exhibit is the new Benjamin Self-Contained Rheostat, in which the whole of the resistance wiring is incorporated within the dial itself, and with nothing to go behind the panel but a short length of spindle and a lock-nut with soldering tags.

We are also exhibiting for the first time a complete new range of valves, which are sure to excite considerable interest.

BLACKADDA RADIO CO., LTD.
Stand No. 15.

We shall be demonstrating the Blackadda Radio Building System. This enables the



The "PYE" Portable 5-valver with self-contained Amplion loud speaker forms an interesting exhibit.

amateur or the advanced experimenter to set up circuits of simple or elaborate construction, and to vary and extend them with an absolute minimum of time, labour, and cost.

It appeals essentially to the amateur building his first set, who may commence building and obtain the results of the expert without having to learn the operation or principles involved in wireless.

Those more advanced in the science will appreciate the ease and simplicity with which

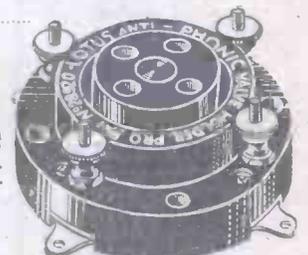


A well-constructed low-loss variable condenser made by the Radio Communication Co., Ltd.

the circuits may be erected and dismantled, enabling notes and remarks to be recorded of all circuits and new ideas.

GEORGE BOWERMAN, LTD.
Stand No. 205.

Our chief exhibits are: Bowerman's Super-Power Headphones, first British-made headphone placed on the market at 12/6, superfine first-class guaranteed British materials, latest improvements, highest workmanship, every technical perfection, guaranteed to stand all tests, 4,000 ohms, every phone guaranteed for 12 months, made with All-British capital. Bowerman's



The latest form of "Lotus" Anti-Microphonic Valve-Holder.

Loud Speaker, patented and registered design, an entirely original and attractive article, hornless, adaptable to hang in any position, diaphragm of special metal alloy supported in circular mahogany frame, aluminium cast base, with integral arms for frame support.

BOWYER-LOWE CO., LTD.
Stand No. 126.

Two and Three-Valve Vox Populi Receivers; seven, eight and nine-valve super-heterodyne receivers, variable condensers "Standard" single, dual and triple, "Four Square" single, dual and triple, "Popular," single and dual.

(Continued on next page.)

GO TO THE WIRELESS EXHIBITION.

(Continued from previous page.)

high-frequency transformers (plug-in type), "Antipon" valve holders, super-heterodyne transformers and oscillators, super-heterodyne kits, frame aerial, switches, ebonite panels, wavemeters, jacks and plugs, interchangeable H.F. chokes, fixed resistors for filament control,

A neat exhibit is the Polar two-valve set, illustrated here.



balancing condensers, coil-screening boxes, screened coils and transformers, Gang Control Condensers, for single control receivers with balancing adjustment, Vernier dial, aerial to earth switch, high-efficiency H.F. transformer.

BRITAIN'S BEST CRYSTAL, LTD.
Stand No. 139.

We shall be exhibiting our "Mighty Atom" Crystal.

BRITISH EBONITE CO., LTD.
Stand No. 81.

The outstanding feature on this stand will be the attractive cartons in which "Beacol" Panels in standard sizes will in future be packed.

Other interesting exhibits will be cartons containing the "Beacol" Low-Loss Former, which has played such a prominent part in the development of the low-loss coil; a large range of time and labour-saving extruded sections, "Beacolites"—those wonderful little packets of pieces of rod and tube and sheet, which have proved a boon to the experimenter; and, last, but not least, a display of those lovely hand-polished "Beacol" sheets in black and grained ebonite.

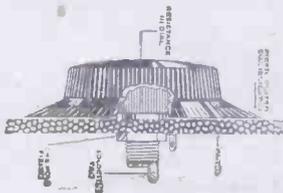
BRITISH THOMSON-HOUSTON CO., LTD.
Stand Nos. 127 and 130.

Among our usual sets and components we are showing these new B.T.H. valves:

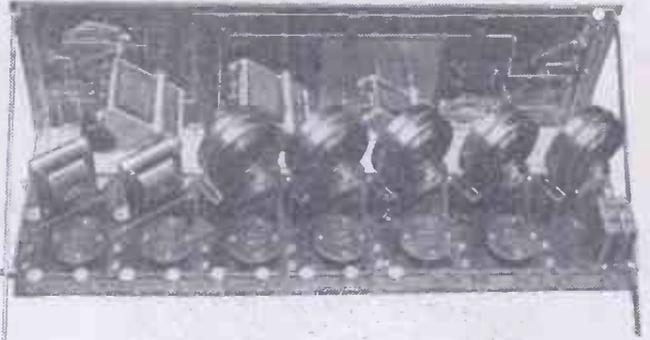
Type B2.—The B2 Valve is a general purpose valve, and will function with marked efficiency in Detector, H.F. or L.F. stages. It is particularly suitable where first cost is a consideration, and where a 6-volt accumulator is used. A minimum of grid-bias is required to obtain undistorted low-frequency amplification of a high



A new type of Benjamin dial indicator which greatly enhances the appearance of any wireless panel.



The rear view of a set made up from the Igranite kit of super-het parts. The illustration shows the set with the valves removed.



value. It is of robust construction, and will give long service. Filament volts, 5; filament current, 0.7 amp.; anode voltage, 40 to 120 volts. Price: 8/.

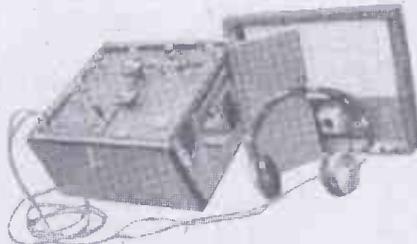
Type B5H (Dull Emitter).—This valve is similar to the B5, but has a higher amplification factor. It should be employed in H.F. stages, where a tuned anode coil or high resistance or low self-capacity is used. The valve is also designed for use in detector and L.F. stages with a high resistance or a low ratio transformer coupling, 100,000 or 150,000 ohms. are suitable values of anode resistance. Filament volts, 2.3, filament amps., 0.06; anode voltage, 40 to 120 volts. Price: 16/6 each.

Type B4H (Dull Emitter).—Recently produced as a companion valve to the B4, the B4H should be used in H.F., Detector, and early L.F. stages with the B4 in the final L.F. stages. It will give maximum amplification when the external anode impedance is of high value, such as when tuned anode, resistance choke or low ratio L.F. transformer coupling is employed. A suitable value of resistance for use with this valve is 100,000 or 150,000 ohms. Filament volts, 4; filament amps., 0.25; anode voltage, 60 to 120 volts. Price: £1 2s. 6d. each.

THE BROWNIE WIRELESS CO., LTD.
Stand No. 143.

The majority of our products are already well known, but we wish to draw particular attention to the following lines we are exhibiting: No. 2 Model Brownie Crystal Set, the Permatator (permanent crystal detector), a patent distribution board, the B.L.S. Crystal.

With regard to new lines, we are exhibiting a



The Siemens type C.V. receiver.

new two-valve amplifier, which is particularly suitable for coupling to the Brownie Crystal Set.

BURNE, JONES & CO., LTD.
Stand No. 111.

In addition to a wide range of complete receiving sets, we are showing a selection of the "Magnum" Radio Products.

These include H.F. transformers, tapped resistances, tapped H.F. chokes, screened coils, neodyne condensers, and many other gadgets for the home constructor.

CAMDEN ENGINEERING CO., LTD.
Stand No. 95.

This firm is the sole manufacturer and distributor of Centroid Wireless Components. The principal items now being shown comprise the Centroid Variable Condenser and the Centroid Slow-Motion Dial. The variable condenser is of the square-law low-loss type.

The Centroid Slow-Motion Dial consists of a specially arranged dial, knob, and slow-motion knob, the last two being in frictional contact. A ratio of about 10:1 is given.

Other items which are being placed on the market, and of which examples are shown, are Centroid Coils and Transformers for special Elstree Six, screened coils and transformers, anti-vibration valve-holders, and a combined lead-in and earthing switch.

CELESTION RADIO CO.
Stand No. 23.

On show, in addition to the Celestion Loud Speakers, is a range of magnificent radio

receivers. These instruments are entirely self-contained in handsome cabinet or case, and are exceedingly easy to operate.

Sensitivity and volume are surprising, although no reaction is employed and transformers are not used. Howling and oscillation cannot be produced.

The low-frequency stages in the Celestion are resistance-capacity coupled, and being of excep-



The Formo L.F. transformer is being exhibited in five different ratios, ranging from 1-1 to 1-5, and forming a very comprehensive series.

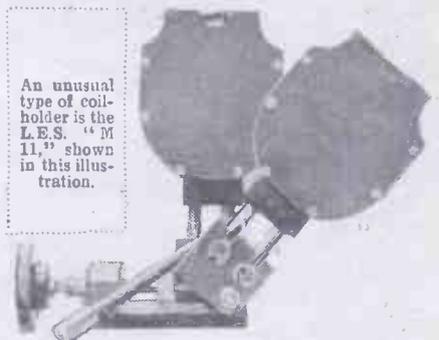
tional design ensure remarkably efficient results. Embodied in these receivers is the celebrated Celestion Radiophono, thereby securing the most realistic response with marvellous fidelity.

A. H. CLACKSON, LTD.
No. 238.

Our exhibit will consist of the "Triumph" Straight Circuit 2 and 3-Valve Receivers, "Triumph" Lowforma Crystal Set, "Triumph" Anti-Microphonic Valve Holder, "Triumph" Baseboard Mounting Valve Holder, "Triumph" 2-Coil Stand, and "Triumph" Rheostat.

CLARKE BROS. (LEICESTER), LTD.
Stand No. 235.

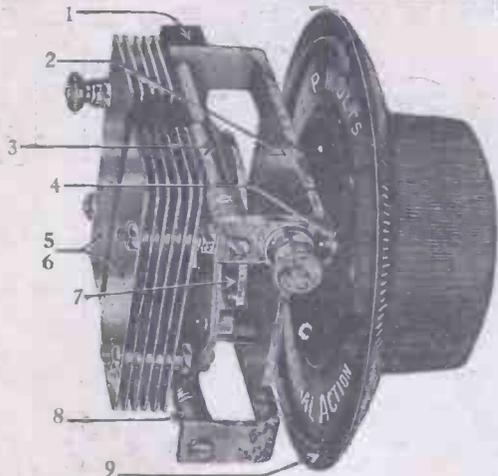
Our display will be a general one, particularly appealing to the wireless trader. We shall feature (specially) the Home Player Receiving Set, the Tungar Accumulator Charging Set, Exide H.T. Accumulators, T.E.C. and Siemens' H.T. Batteries, Gent's Battery Eliminator, Lotus Coil Holders and Lotus Valve Holders, Gemrack for Spare Coil, condensers and tuning attachment, a mounted earthing switch, Omniphone headphones, B.T.H., Radiolux and Amplion Speakers, telephone distribution board (retail 2/6), Cleartron Valves.



An unusual type of coil-holder is the L.E.S. "M 11," shown in this illustration.

(Continued on next page.)

A real Engineering Job!



An entirely new principle in Condenser construction—gives S.L.F. characteristic with remarkable saving of space.

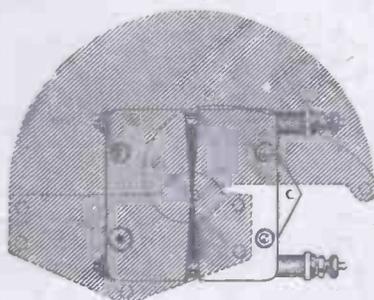


Diagram shows the comparative area taken up by the "sweep" of the old type Straight Line Frequency Condenser and that occupied by the uniquely constructed Ripault Straight Line Frequency Condenser.

Special Constructional Features.

1. High Grade Ebonite Insulating Bar.
2. Rigid Heavy Gauge Main Frame placed out of the magnetic field, avoiding eddy current losses.
3. Slider contact, silent in action and making permanent connection to terminal.
4. One Hole Mounting.
5. Solid Heavy Gauge Brass Plates giving true lateral action.
6. Minimum space occupied at back of panel. 4" Dial covers whole condenser.
7. Specially shaped Driving Cam, by which Straight-Line Frequency characteristic is obtained.
8. Special Compensating Springs, ensuring permanently smooth movement. Backlash cannot develop.
9. 4" Dial, divided into 360 degrees for most precise control and easier tuning.

While every up-to-date advantage is built into the Ripault Condenser, its revolutionary design and construction place it far ahead of all previous instruments.

It incorporates the three important features that stamp a condenser of high quality, namely, very low dielectric loss, complete absence of backlash, smooth and silent action. But study the illustration.

Note the vital differences in the construction of this condenser over all others with a Straight Line Frequency characteristic. The long narrow plates, needing so much space on the panel, are eliminated by a cam moving the plates with a lateral action. This is a Ripaults patent.

The whole component is mounted centrally behind a handsome 4 in. dial, which completely covers the area occupied at the back of the panel. There are no swinging plates to get out of alignment. The Dial scale reads to 360 degrees, which, in conjunction with the Straight Line Frequency characteristic, gives exceptionally wide spacing on the lower wave-lengths. Separate vernier movement is quite unnecessary.

The Wireless World, of August 4, wrote: ". . . A straight-line frequency condenser which does give us dial readings proportionate to the frequency, or true separation between stations, is really the only logical instrument to use. . . . It is to be noted, however, that the usual elongated plate construction of an S.L.F. condenser results in a large amount of room being taken up on the panel. . . . Doubtless British manufacturers will in time produce a more compact form of straight-line frequency condenser than is at present available."

Ripaults Lateral Action Condensers meet this vital condition. They can be incorporated in your present set with but little alteration, and will take up no more room. Test them for yourself and note how infinitely easier tuning becomes. Selectivity is increased and longer range assured, owing to the increased efficiency of the tuning circuits.

Try your skill at this interesting free Competition. Valuable Prizes. Particulars at Ripault Stand No. 92, Main Hall, National Radio Exhibition, or in return for postcard, from address below.

All you have to do is simply this: Ask for an entry form either at Stand or by post, and place to special features possessed by Ripault Lateral Action Condensers in what you consider their order of merit. This is not a "popularity" contest but a straightforward competition, in which your opinion is as good as that of the next man. The technically correct

order of merit has been worked out by a well-known Radio Engineer, who alone knows the solution.

PRIZES:

1. Four Valve Set.
2. Two Valve Set.
3. Two Ripaults Lateral Action Condensers.
- Six Consolation Prizes of Ripaults Low Frequency Transformers.

Ripaults

(Patent)

LATERAL ACTION CONDENSER

PRICES:

•0005...18/6 •00025...17/6

Complete with 4" Knob and Dial.

You can see for yourself what a real Engineering job these Ripault Condensers are. Inspect them at Stand No. 92, Main Hall, National Radio Exhibition.

Television and **Osram** **Valves** *at Stand No. 63*

Here you will have the opportunity
of inspecting the world-famous
BAIRD TELEVISION APPARATUS

In this apparatus, in all experimental work
and at the Television Broadcasting Station,
2.T.V., Osram Valves only are used.

Modulation free from distortion is imperative for the
operation of successful Radio Television. **OSRAM**
Valves give true reproduction, free from distortion, and
are therefore used in the world's first Radio Television
Broadcasting Station.

*You obtain efficient, distortionless,
reproduction of exactly the same
high standard as is required for
Television by using OSRAM Valves
in your receiver.*

The G.E.C.-your guarantee

GO TO THE WIRELESS EXHIBITION.

(Continued from page 30.)

THE CLAYTON RUBBER CO., LTD.
Stand No. 27.

Among our exhibits will be ebonite sheets and ebonite panels, black, mottled, polished, and matt, ebonite rods, tubes, blocks, discs,



One of the Radolian Musical Model receivers that will be a feature of Stand No. 49. It has few controls, and is made upon fool-proof lines.

and wedge-shape rod (moulded), component parts, manufactured from Clayton Ebonite by leading manufacturers, and a process exhibit, showing ingredients and photos of manufacture of Clayton Ebonite.

CLIMAX RADIO ELECTRIC, LTD.
Stand No. 148.

Probably our most interesting exhibit is our new loud speaker, the Climax Chello, a new hornless loud speaker, which reproduces speech and music exactly as transmitted, without any distortion, suppression, or addition. This unique purity in reproduction gives a wonderfully natural and intimate impression.

The sound emission of the Climax Chello occupies almost the whole face of the cabinet. The unusually large diaphragm and powerful magnetic reproducer ensures a pleasurable volume of sound even from small receiving sets, while it enables the large receiver to give an excellent account of itself.

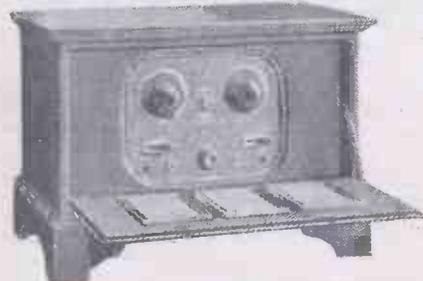
Among our other exhibits will be the Climax Copper Earth, Galloy Earth, Low-Loss Insulators, Insulated Shock Absorber Set, Lightning Arrester, Folding Frame Aerial, Anti-Microphonic Valve Sockets, Popular Crystal Set, Metal Cooled Rheostat, Potentiometer, Popular L.F. Transformer, Anti-Capacity Valve Holder, and Valve Receiving Set.

Among our new productions are the Climax Auto-Bat series of components and complete units for H.T. supply from electrical mains A.C. or D.C., Climax Auto-Bat Transformer, Climax Special Choke, and Potential Divider.

E. K. COLE.
Stand No. 9.

The "Ekeo" H.T. Units on show here are for deriving H.T. current from the household electricity supply, by just attaching an adaptor to the electric light lamp-holder or wall-plug.

The units are complete in themselves, and the voltages needed are obtained by simply plugging into sockets correspondingly marked.



The Curtis Imperial Eight, exhibited by Messrs. Peter Curtis & Co., Ltd.

COLONIAL TECHNICAL PRESS, LTD.
Stand Nos. 44 and 232.

On our stands will be displayed the many foreign and colonial wireless journals which we represent.

Two years ago our stand at the Albert Hall displayed no more than a dozen papers—this year the number will be increased to between sixty and seventy.

PETER CURTIS, LTD.
Stand No. 159.

Many powerful receivers will be on view at this stand, including the Curtis Imperial 8-Valve, Curtis "Popular" 8-Valve, Curtis Portable 8-Valve, Duodyne Imperial 5-Valve, Duodyne "Popular" 5-Valve, and the Duodyne Portable 4-Valve. There will also be a big show of components and accessories at popular prices.

DARIMONT ELECTRIC BATTERIES, LTD.
Stand No. 243.

We shall be showing our speciality and sole manufacture—the Darimont "Home-Service" Battery.

This battery has been on the market for some months, and is meeting with great success wherever it is used.

Some of its striking characteristics are: Constant Current and Internal Resistance on continuous or intermittent discharge; no loss while standing; ease and rapidity with which it can be recharged anywhere without any electrical connection; it is not damaged by short circuit.

Four sizes will be shown, with ampere-hour capacities ranging from 12½-14 to 63-67.

A. J. DEW & CO.
Stand Nos. 25 and 26.

We shall display a representative and comprehensive range of receiving sets and accessories suitable for stock lines for the radio retailer.

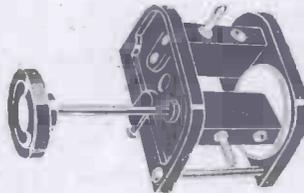
The selection of goods will embrace valve and crystal receiving sets, aerials and aerial sundries, high and low-tension accumulators, batteries, battery eliminators, cabinets and cases, coils and coil holders, crystal detectors, condensers (fixed and variable), grid leaks, headphones, loud speakers, potentiometers, resistances (anode and filament), switches, transformers, variometers, valve holders, etc., etc. These will include all the latest and up-to-date lines available.

In addition a range of stock sundries for constructors, including knobs and dials, terminals, panel labels, baseboard brackets, screws, nuts, washers, etc., and a selection of useful tools for radio constructors will be shown.

EAGLE ENGINEERING CO., LTD.
Stand No. 55.

Two models of "Chakophone" Crystal Receivers are shown, one, the No. 3a, being in cabinet with lid, and the other an open model,

An example of the many types of "Lotus" coil holders shown by Messrs. Garnett, Whiteley & Co., Ltd.



condenser-tuned, with coils enclosed, covering up to 2,000 metres; the prices of these sets have recently been reduced.

The now famous No. 9 Two-Valve Loud-Speaker set is shown in its new and improved form, its usual features having been improved by making the cabinet wider, and placing the components on a base board, wiring is improved, and altogether the set is now priced at £6 15s.

In three-valve sets, three models are shown: The No. 7 Long-Range H.F., Detector and L.F. set, which is an open vertical panel type with coupled aerial circuit, the No. 1b Detector and 2 L.F. Loud-Speaker Receiver, in oak and mahogany folding-door cabinets, and the No. 1c Vertical Open-Panel Loud-Speaker Receiver, with compartment in base for H.T.'s.

The now well-known No. 7 Long-Range Four-Valve Receiver is shown in two new types—one in Jacobean oak cabinet, and the other in a mahogany cabinet, both of which have a compartment in the base for the H.T. Batteries, the doors opening at the back.

A new eight-valve super-heterodyne portable set in leather carrying-case is shown complete, and is designed to loud speak stations working on wave bands of 300 to 500, and 1,200 to 2,000 metres.

J. J. EASTICK & SONS.
Stand Nos. 54 and 231.

Entirely new apparatus will include the following: Elex Safety Switch and Combined Lead-in Tube. This instrument is manipulated from inside the house by the push-pull method of switching.

We have also introduced the Elex Multiple Connector to the Elex Plug and Socket System. Other exhibits include the following: Elex Standardised Plugs and Sockets, Elex Anti-Capacity Coil Mounts, Elex Patent Knife Switches, Elex Treble Duty Terminals, Elex Moisture-retaining Earth, H. T. battery boxes, folding frame aerials, valve holders, variometers, coil ends.

EDISON BELL, LTD.
Stand No. 75.

Trade and public can be assured that the historic house of Edison Bell exhibits, which will comprise many distinctive accessories of original design, including coil-holders, rheostats, terminal boards, etc., will prove of extreme interest. Also on view will be a very exceptional example of Micro Vernier Dial—something quite different from anything else ever marketed. A full range of "up to the moment" Edison Bell 1, 2, 3 and 4-valve receivers will also be shown.

ERICSSON TELEPHONES, LTD.
Stand No. 137.

The recently introduced enclosed receiving sets should prove to be an attractive feature of the stand, judging from the popularity these instruments have received during the short period they have been on the market. The four-valve set is provided with a wave trap, so that it should be in great favour with listeners who, living within a short distance of a broadcasting station, wish to receive distant concerts. The two-valve enclosed set is known as the "Family Set." It is admirable for loud-speaker work on the local station, tuning being so simple that anyone can use it. In all types of enclosed receiving sets the panel is made of timber corresponding to the cabinet, while the wooden panel greatly enhances the appearance of the set. The use of ebonite bushes ensures that insulation is perfect.

Among the components the following might be specially mentioned:

Filament Resistances. Transformers.—These instruments, which are in part responsible for the pure reproduction of Ericsson Receiving Sets, are notable for their neat appearance and robust working. They are ideal for all classes of sets, but particularly so in the case of portable sets, owing to their small size. Variable Condensers.—Mounted between ebonite and plates. Microphone Transmitter.—This is an excellent instrument for the amateur transmitter, giving good results over the full scale. Wave Trap.—A useful accessory, which, added to almost any receiving set, will cut out the local station and allow the reception of others.

JONATHAN FALLOWFIELD, LTD.
Stand No. 1.

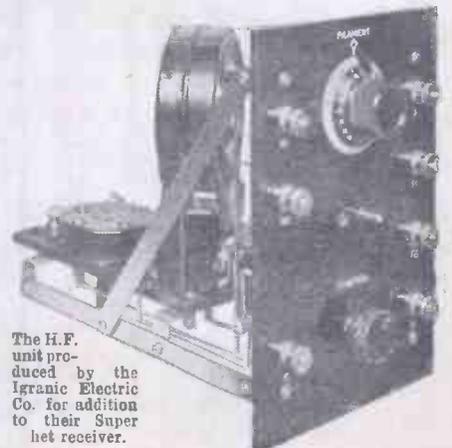
We have pleasure in giving below the details of our two specialities, which will be shown for the first time:

Fallowfield's Oak Corner Cabinet Four-Valve Receiving Set, complete with all royalties, valves, and spare accumulator, in carrying case. Price £63. "Fallowfield" Two-Valve Cum Crystal Set, in mahogany case, with doors, complete, ready for fitting up. £15 15s.

FALK, STADELMANN & CO.
Stand No. 114.

This firm is showing a range of centre-tapped coils for neutralised circuits, including aerial coil, anode coil, and H.F. transformers. These coils are totally enclosed in a metal screen to obviate interaction between them. All are mounted with six pin plugs designed to be interchangeable when used with the Efesca Coil Base and Screens.

Dual condensers, neutralising and balancing condensers are also to be seen.



The H.F. unit produced by the Igranic Electric Co. for addition to their Super het receiver.

(Continued on next page.)

GO TO THE WIRELESS EXHIBITION.

(Continued from previous page.)

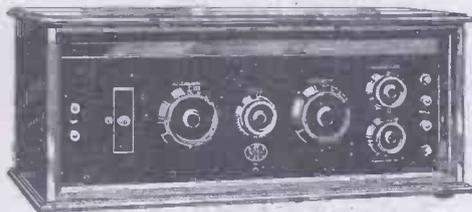
There are two new models of the Efesca Anti-Capacity Switch, both are one-hole fixing, and obviate the usual large hole necessary when mounting switches. They are of the push-pull and turn type, and by nature of their construction particularly suitable for use in high-frequency circuits where self-capacity must be avoided.

A particularly interesting new departure is the Efesca "Variform" Low-Frequency Transformer with interchangeable primary windings. This component permits of the impedance of the primary being accurately matched with the impedance of the anode circuit in which it is employed by plugging in the correct primary winding. Furthermore, by rotating the constant secondary winding, it is possible to vary the magnetic coupling, providing a very efficient means of tone control.

The Efesca Regenerative Aerial Tuner, while remaining similar in construction, has been improved in external appearance and fitted with a knob and dial.

The Efesca Anode Tuner, a popular method of high-frequency coupling, is further improved by a modification of design whereby the coil is wound on two concentric formers.

Another form of variable high-frequency coupling is the Efesca "Maxitance." This com-



One of the latest McMichael super heterodyne receivers.

ponent is designed to take the place of the usual plug-in high-frequency transformer, and is fitted with a frequency adjuster, enabling optimum value of all wave-lengths from 275 to 550 metres to be obtained without the use of a variable condenser.

Among a full range of smaller accessories are the Efesca "Vernistat," dual rheostat, coil holders, Efesca Fixed Condensers, fixed grid leaks, etc.

THE FORMO CO.

Stand No. 78.

On this stand is exhibited the Formo Shrouded Transformer.

We notice that the familiar terminal board is now placed inside the case, instead of on the top, the makers claiming that breakages in the post are reduced thereby.

In order to increase its usefulness it is made in ratios of 1-1, 1-2, 1-3, 1-4, and 1-5, but, in ordinary circumstances, 1-3 and 1-5 are recommended for the first and second stages.

The transformer retails at 10/6. The Formo Straight Line Frequency Condenser is stated to be designed on low-loss principles, and its construction is such that all superfluous material is eliminated.

Without dial, the condenser retails at 9/-, but is also sold complete, with a well-finished dial, at 10/6.

The Formo Vernier Dial is claimed to incorporate several interesting features, in order to make it a useful addition to receivers generally.

H. J. GALLIERS.

Stand No. 83.

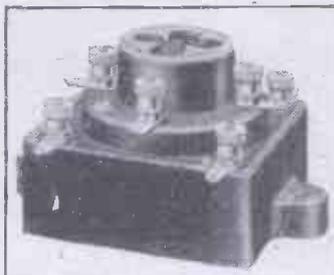
The components on view include an entirely new aerial switch, automatically switching valves with aerial, anti-vibration device for valves in rigid holders, and a kit for all-wave super-heterodyne loud-speaker receiver. Great interest will, no doubt, be aroused by the combined aerial battery switch, which automatically cuts off the valves, and at the same time earths the aerial.

A. W. GAMAGE, LTD.

Stand No. 156.

We are this year making a special show of wireless sets, covering crystal sets, valve sets from one to four valves, and a special 5-valve portable receiver. These, with our new "Ideal Home" Self-Contained Receiver, are the outstanding exhibits on this stand.

Undoubtedly the "Self-Contained 3-Valve Receiver," employing frame aerial, is one of the



The new Cosmos combined valve-holders and resistance coupling units are a feature of the Metro-Vick Supply Co. stand.

biggest steps made towards the simple but serviceable receiving set. Its principal features are simplicity of control, coupled with consistent reliability. The receiving range of the frame aerial provided is 18 to 20 miles.

The Five-Valve Portable Set is a highly satisfactory instrument, giving effective loud-speaker range on Daventry up to 200 miles. The loud speaker is of ample dimensions, and is contained in the receiving set itself.

Besides the above, as is usual, our stand will contain a host of interesting components, including our famous "Permanite" Crystal.

GARNETT, WHITELEY & CO., LTD.

Stand No. 84.

The two well-known "Lotus" specialties, the "Lotus" Vernier Coil Holder and the "Lotus" Anti-Microphonic Buoyancy Valve Holder, will be exhibited by this company. The "Lotus" Vernier Coil Holders are now made in five different types, two-way and three-way for outside panel mounting, two-way and three-way for inside baseboard mounting, and in the two-way type with the moving block on the left-hand side.

The latter type of coil holder has so increased in demand that it has been decided to supply same in the moulded Bakelite form as the right-hand type. This range of coil holders is increasing in popularity, and the sales this year to date are twice those for the same period during 1925.

The "Lotus" Buoyancy Valve Holders were only introduced in the early part of the year, but owing to efficiency, good workmanship, and publicity, they are now in vast demand. These valve holders are made in two types—with and without terminals.

There will also be exhibited for the first time a new range of Bakelite Jacks and Jack Switches. The "Lotus" Jack Plug will also be shown for the first time. This, in outward appearance, is of the conventional type, but in action has the outstanding feature of being able to grip any size wire by a simple half-turn of the cams without the necessity of having to take the plugs apart.

GENT & CO., LTD.

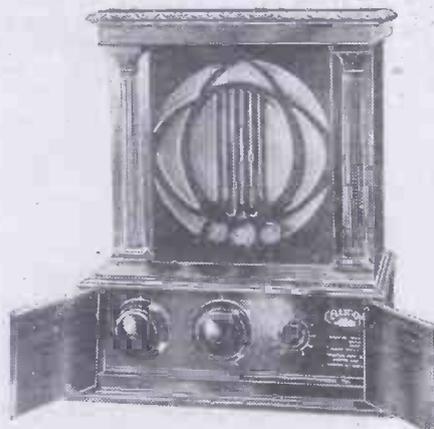
Stand No. 115.

Our exhibits will include the new "Tangent" Headphone, "Tangent" Radiomatic Receivers, "Tangent" Tuning Coils, "Tangent" High Tension Eliminators, "Tangent" L.F. Transformers, "Tangent" Filament Rheostats, "Tangent" Crystal Receivers, Radiomatic Constructors' Sets, "Tangent" Pan Switches, "Tangent" Terminals.

HALCYON WIRELESS SUPPLY CO., LTD.

Stand No. 59.

This firm specialises in the manufacture of Portable Receivers, and are exhibiting a wide range of models, both with and without self-contained loud speakers.



The makers of the Celestion Loud Speaker are also showing their cabinet-receiver, the Radio four.

In addition to the 1926 models, which the Halcyon Wireless Supply Co. have been supplying with great success during the past months, this firm is now offering a new Five-Valve Portable Receiver De Luxe. This embodies many new features, and it is claimed that it represents a very great advance on any portable receiver that has been produced in this or any other country.

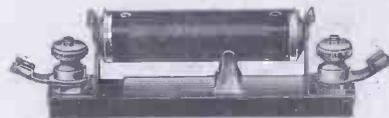
HART ACCUMULATOR CO., LTD.

Stand No. 56.

For the fifth year in succession representative samples of the products manufactured by the Hart Accumulator Co., Ltd., will be on view, all of which should make a strong appeal to "the man in the street"; particularly as the prices at which such "Hart" exhibits are listed are well within the reach of most wireless users.

For Low Tension Circuits the types designated respectively "Magno," "Enduro," and "Rme," should have many admirers.

The Hart Accumulator Co., Ltd. is also displaying a particularly attractive range of High



A new Lamplugh product, the Varic-mx rheostat.

Tension Batteries, including the type known as the "PLRG," the patent for which is held by the Hart Co. This battery is particularly suitable for accurate scientific work, and for use under conditions in which the question of insulation is of exceptional importance.

For more general use is the "RAO" type of high tension battery. The cost is particularly low, though the material and the workmanship leave nothing to be desired.

Other exhibits of the Hart Co. will include samples of the component parts of their different types of batteries which will, no doubt, be of special interest to many wireless enthusiasts, whose acquaintance with such details must, of necessity, be more or less limited.

W. J. HENDERSON & CO., LTD.

Stand No. 242.

We are exhibiting high tension supply units operating from alternating current and direct current mains, valve and crystal receivers, head telephones, coilholders, dry batteries, and our well-known Neon Tester. Among the new apparatus we will be showing are an H.T. supply unit for alternating current mains, and Nos. 3 and 4 H.T. units for direct current mains.

HOBDDAY BROTHERS, LTD.

Stand Nos. 21 and 22.

At these stands may be seen a most comprehensive range of receivers, both crystal and valve. Amplifiers, loud speakers, and all the latest components of all types. A very complete range of tools of great interest to the constructor will be on view. Other interesting lines will include accumulators, H.T. batteries, aerial equipment, cabinets and panels, valves, valve-holders, voltmeters, terminals, condensers, coils, transformers, etc., all being latest products of the leading manufacturers.

These stands will be thoroughly complete and very attractive, and will include everything calculated to be in demand by the radio dealer, to whom a very cordial invitation is extended.

HOUGHTON-BUTCHER, LTD.

Stand No. 69.

The presentation of Houghton's Service Programme to the Radio Dealer will be the main feature. The items included in this programme will be displayed for inspection.

Dealers are invited to use this stand as a meeting place, and it will be appropriately arranged for this purpose.

Dealers will be asked to accept a copy of "Houghton's Contract of Service to the Radio Dealer," a presentation book which, among other matters of general policy and interest, describes the various features of Houghton's programme.

IGRANIC ELECTRIC CO., LTD.

Stand Nos. 72 and 73.

Amongst our well-known products on view will be new types of coil holders, square-law condensers, and the Unitune Aperiodic Fixed Coupler.

The new triple honeycomb coils and short-wave coils already advertised will also be on show.

Other components with which the public are already familiar, and which will be given special prominence, are the "Xilos" (Extra Low Loss) Coils, at the reduced prices already announced, the well-known "E" Type Transformers at

(Continued on page 52.)

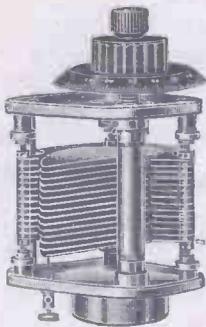
PYE BRING THE CAMBRIDGE TRADITION TO OLYMPIA



THE SCIENTIFIC world revolves around Cambridge. So it is not surprising that the most scientific radio sets and components will be found at W. G. PYE & CO.'s Stand at Olympia.

This Cambridge firm has been famous for years for its Scientific Instruments. Its radio products are designed and manufactured with the same care and precision as used, for instance, in the making of a microscope.

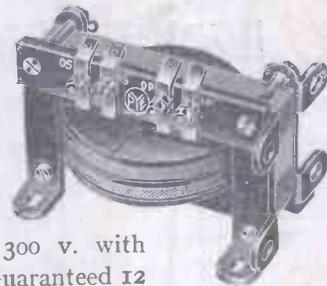
Below are shown four typical products. Visit Stand 91 and examine the whole range.



PYE VARIABLE CONDENSER

Very smooth 200-1 geared vernier control. Absolutely no backlash. Solidly built of brass with porcelain insulation. Stout stamped end-plates, dust proof cover for gear mechanism. Hand capacity negligible.

Definite stops. One hole fixing. .0001 mfd., .0002 mfd., .0003 mfd., .0005 mfd., £1 2s. 6d. .00075 mfd., £1 7s. 6d.



PYE TRANSFORMER

No distortion. No noise No crackling. Can be mounted in two positions. Voltages up to 300 v. with perfect safety. Guaranteed 12 months. Intervalve: Ratios

2.5:1 and 4:1 £1 2s. 6d. 6:1 £1 7s. 6d. Telephone: 120 ohms, 2000 ohms, £1 Western Electric: 350 ohms £1.

PYE

DUAL RHEOSTAT

Very smooth action. Resistance wire wound tightly on fibre and the element on heat-resisting compound. Total resistance 25 ohms. Bright Valve resistance 3.5 ohms. One hole fixing - 4/6 each.



PYE

ANTI-PHONIC VALVE HOLDER

A very efficient ANTI-MICROPHONIC Valveholder. Soundly designed and constructed. Price 3/-.



W. G. PYE & CO., LTD.
Granta Works, Montague Road, Cambridge.

Cosmos

WIRELESS VALVES

VISIT
STAND No. 162

RADIO EXHIBITION
OLYMPIA,
SEPT. 4th to 18th

Two New Shortpath Valves are now available of the 6-volt class; they have the same remarkable characteristics that the public have so much appreciated in the S.P.18 2-volt class.

"COSMOS" S.P.55/R (RED SPOT) 18/6
The 6-volt Loud Speaker Valve Supreme. It will handle a very large output, while owing to its exceptionally low impedance it eliminates the imperfection and resonances of the loud speaker. The connoisseur's valve for perfect reproduction.
Extract from the "Sunday Chronicle," August 8th:
"I have discovered whilst designing, assembling and testing a new Reflex set for the forthcoming edition of the Wireless Guide, that there was one valve which gave about double the volume of any other."

"COSMOS" S.P.55/B (BLUE SPOT) 18/6
A 6-volt shortpath valve which gives enormous amplification and is specially designed for H.T. tuned anode, detector, and resistance capacity coupling amplification. Its unique features are:
1. Very high amplification. Its coupling factor of 35, which in conjunction with its low impedance, gives more amplification than any other receiving valve known.
2. Designed to operate on 60-120 volt H.T. in the H.F. and detector stage—this eliminates the need for two H.T. supplies.
3. It consumes only 0.09 amps. filament current.

OTHER COSMOS VALVES INCLUDE:

D.E. 55. 18/6. A	D.E. 11. 14/- . A	A. 45. 8/- . A
6-volt General Purpose valve.	1.1-volt Dull Emitter valve.	4.5-volt Bright Emitter valve.

"COSMOS" S.P.18/G (GREEN SPOT) 14/-
A 2-volt valve which gives much more amplification than any other 2-volt valve (except the S.P.18 Blue Spot) owing to its high amplification factor (15) and low impedance. It is for use in the H.F. detector and L.F. stages, and should be followed by an S.P. 18 Red Spot.

Ask for copy of folder 4117/3

"COSMOS" S.P.18/R (RED SPOT) 14/-
A real 2-volt power valve, suitable for supplying a powerful loud speaker without distortion. Equal to an average 6-volt power valve. Consumes only 0.3 amps.

"COSMOS" S.P.18/B (BLUE SPOT) 14/-
This valve, which has an amplification factor of 35 and a mutual conductance of 500 microhms, gives much more amplification than any other 2-volt valve. It is specially designed to operate on 60-120 volt H.T., thus eliminating the need for two H.T. supplies when 120 volts is required on the last valve. Especially for use with resistance capacity coupling (when it gives as much amplification as ordinary valves with transformer coupling). H.F. tuned anode and detector. 80/120 volts is not available a Green Spot valve should be used. Filament current 0.09 amps.

The following table shows which types of Cosmos Valves are suitable for use in the different positions or stages in various circuits.
(1) When a H.T. Voltage up to 60 or 80 Volts is available.
(2) When a H.T. Voltage up to 120 Volts is available.

The combination recommended for best results in each case is indicated by heavy type.

	L.F. Battery	Recommended Valves			
		2 Volts		6 Volts	
	H.T. Battery	20-80 V.	80-120 V.	20-60 V.	60-120 V.
H.F. Amplifier	Tuned Anode (stabilised by neutrotype or otherwise)	S.P.18/G	S.P.18/B	D.E.55*	S.P.55/B
	Tuned Anode (non-stabilised)	S.P.18/G	—	D.E.55*	—
	Transformer tight-coupled (stabilised)	S.P.18/G	S.P.18/B	D.E.55*	S.P.55/B
	Transformer tight-coupled (non-stabilised)	S.P.18/G	—	D.E.55*	—
	Transformer loose-coupled	S.P.18/R	—	S.P.55R	—
Dual or Reflex Stage	Resistance-coupling (for long waves above 2,000 metres)	S.P.18/G	S.P.18/B	—	S.P.55/B
	Loose H.F. Coupling	S.P.18/R	S.P.18/R	S.P.55R	S.P.55/R
Detector (Grid-Leak)	Tight H.F. Coupling	S.P.18/R	S.P.18/R	—	D.E.55
	Resistance Coupling	—	S.P.18/B	—	S.P.55/B
Detector (Anode Bend)	L.F. Transformer or Choke Couplings	S.P.18/G	S.P.18/B	D.E.55*	S.P.55/B
	Resistance Coupling	—	S.P.18/B	—	S.P.55/B
L.F. Stages (except last)	L.F. Transformer or Choke Couplings	S.P.18/G	S.P.18/B	—	S.P.55/B
	Resistance Coupling	S.P.18/G	S.P.18/B	—	S.P.55/B
Last Stage Loud Speaker	Choke Coupling	S.P.18/G	S.P.18/G	D.E.55*	S.P.55/B
	L.F. Transformer Coupling	S.P.18/G	S.P.18/G or S.P.18/R	S.P.55/R	S.P.55/R or D.E.55*
		S.P.18/R	S.P.18/R	S.P.55/R	S.P.55/R

*NOTE.—Type A.45 (Bright Filament) may be used wherever type D.E. 55 (dull emitter) is recommended, their characteristics being similar. Type D.E.11 is a 1-volt General Purpose Valve, and is suitable for most of the purposes mentioned in the above table.

METRO-VICK SUPPLIES, LIMITED
(Proprietors: Metropolitan Vickers Electrical Co., Ltd.)
Metro-Vick House, 145, Charing Cross Road, London, W.C.2

The IDEAL LOUD SPEAKER

THE perfect loud speaker has not yet been invented, or at any rate has not made its appearance; which, after all, is but another way of stating that present-day instruments still leave something to be desired. The writer does not wish to suggest that loud speakers in their present state of development are altogether bad and undesirable, for such is certainly far from being the case.

As most wireless enthusiasts know or should know, it is quite possible to obtain really excellent music and speech with ample volume for ordinary purposes from many of the well-known makes of speakers now on the market, providing, of course, a suitable distortionless set (that is, as reasonably free from distortion as possible), is employed and carefully handled. In most cases the outfit need not necessarily be expensive if pure reproduction alone is desired.

How the Energy is Converted.

All the same, there is still scope for improvement, and no doubt our scientists and inventors will gradually evolve better devices and methods which will eventually give us perfection. In this article, however, we are concerned with the loud speaker problem only, the object being to consider its present defects and to try and discover the probable direction in which improvements will take place as time goes on.

The particular work that a perfect receiver or loud speaker would be expected to perform is to convert electrical wave energy into acoustic energy or sound, with little or no loss and with absolute fidelity; or in other words, to transform electrical waves or vibrations possessing a given quantity of energy into sound waves or air vibrations with a corresponding quantity of energy without any distortion of the wave form.

Practically all receivers now in use employ the electro-magnet principle, which is too well-known to need elaborate description here. Sufficient to say that it consists of a form of electro-magnet, the magnetic flux of which is varied in accordance with the received electric impulses, which let us refer to as the speaking current. This magnet operates a diaphragm, directly or indirectly as the case may be, causing same to vibrate in sympathy with the speaking current, and in turn the diaphragm imparts its movements or vibrations to the air and so produces, or rather, reproduces sound.

59 per cent Loss.

This device has been termed both efficient and inefficient. It is efficient inasmuch as it is capable of responding to exceedingly minute currents, and is generally considered to be a very sensitive instrument when used in this way, but for loud-speaker work, where comparatively heavy currents are employed, it is far from efficient; in fact, it has frequently been stated by competent investigators that it gives less than "one per cent" efficiency, whilst some affirm it is as low as "one-tenth of one per cent."

It would seem that the efficiency falls off rapidly as the strength of the speaking



Some Reflections on the Perfect Loud Speaker—Yet to Come.

By **HARRY A. GAYDON, A.M.I.A.E., A.I.P.I.**

current increases, and this is borne out by the fact that two or more speakers working off the same current will give a greater volume of sound with more purity of tone than can usually be obtained from one. This is, of course, when dealing with a big

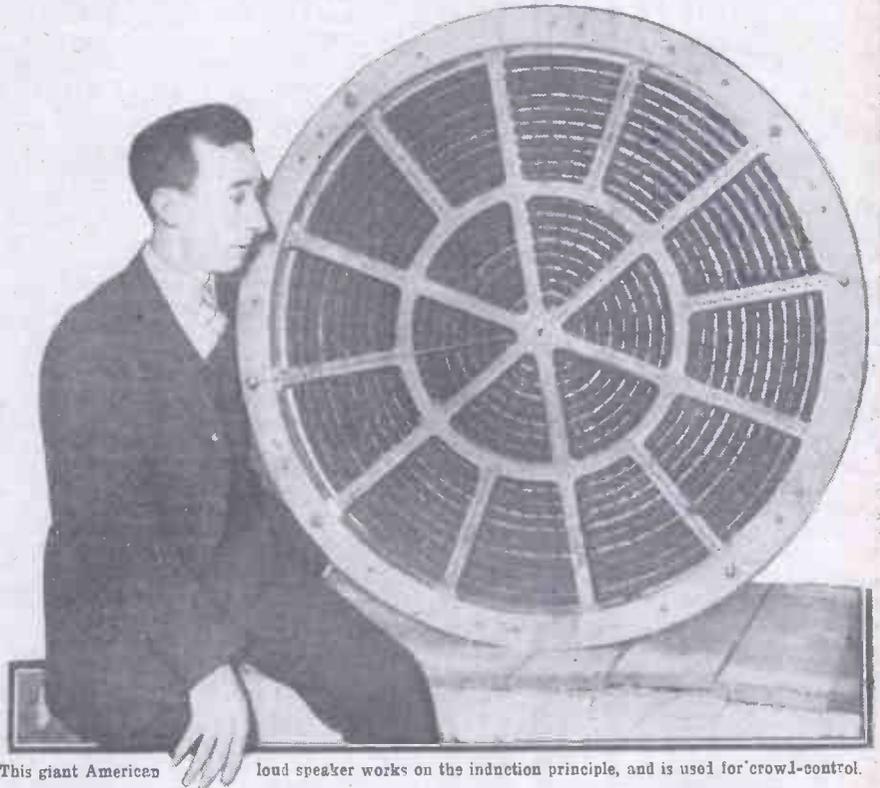
30 gauge, across the poles, and hang a light receptacle such as a large pill box on same.

Place small weights in the box, one at a time, such as lead shot, small steel balls, anything will do, and continue until the iron keeper, or armature, as it is called, is pulled away, taking note of the weights required. Now place a much thicker piece of iron, say 16 gauge, across the poles, and repeat the operation. It will be found that much more weight will be needed to pull same off the magnet than in the previous experiment.

Thickness of the Diaphragm

The thickness of a flat diaphragm as used in the majority of horn-type loud speakers is strictly limited, and it is impossible to employ a diaphragm of sufficient thickness to take full advantage of the pull of the magnet. Here, then, is loss number one.

A magnet exerts its greatest pull when the armature or diaphragm is actually touching the poles, and the pull becomes



This giant American loud speaker works on the induction principle, and is used for crowd-control.

volume of sound; with lesser volumes, this effect is not so marked and a point can be reached where there seems to be little or no advantage, but a great deal depends on the size and type of the speakers employed.

Now let us consider some of the causes of this appalling lack of efficiency. Take an ordinary common permanent magnet, a horse-shoe one for preference. Or you may, if you wish, use the magnet of a headphone, after first removing the diaphragm. Suspend with the magnet poles downwards, and place a piece of thin iron, say about

rapidly less as the distance separating the two is increased. If a diaphragm is so adjusted that it touches the poles, it is obvious that it will not be able to move. Consequently, it must be placed a sufficient distance away to allow it to vibrate over its maximum amplitude without actually touching the poles, otherwise an objectionable rattling noise will result, especially when reproducing loud low-pitched notes. This distance is considerable and is responsible for loss number two.

(Continued on next page.)

THE IDEAL LOUD SPEAKER.

(Continued from previous page.)

It will be seen here that the greater the volume of sound a speaker is required to give, the farther from the poles must the diaphragm be, resulting in a corresponding loss of efficiency. These remarks will still further help to explain why two speakers on heavy speaking currents can be made to give more volume than one. Also to show how a speaker can easily be overworked, and why a speaker is more efficient when operated on small currents, for the diaphragm may then be much closer to the poles. In those instruments employing reeds, balanced armatures and similar devices with a separate diaphragm, the foregoing, in general, holds good.

Supposing now we consider to a certain extent the question of the diaphragm or



The Shell Loud Speaker, an interesting attempt to obtain faithful reproduction.

its equivalent. Whether it be a soft iron disc of small diameter operated directly by the magnets, a flat mica disc, a small cone made of aluminium, or a corrugated disc of any material operated indirectly by a tuned reed or other device; or whether it takes the form of a large pleated paper disc, large cone, single or double, all must possess more or less weight which requires energy to operate. The heavier the diaphragm—let us name them all diaphragms for the time being—the greater will be the amount of energy required to vibrate it over a given amplitude.

The Perfect Diaphragm.

There are certain limitations to the thickness outside which a diaphragm cannot function properly, and this determines the weight. If too thin, it will not be able to move fast enough to follow the quick vibrations of the high-pitched notes and the higher harmonics, consequently these will be more or less lost and a low tone result; but there will usually be more volume because there is less weight to move, and the diaphragm being more flexible, is therefore capable of moving a greater distance, and so the low-pitched notes, with their slow vibrations, will be too loud in proportion.

On the other hand, if too thick, it will be too stiff to respond sufficiently to the low notes and the high ones would predominate, giving a thin, high-pitched tone with less volume of sound. To a certain extent, this effect is counterbalanced by the greater magnetic pull on the thicker diaphragm.

It will now be seen that a flat diaphragm of larger diameter than, say, 4 in., is impracticable, owing to the fact that the larger it is the thicker it must be in order to possess sufficient speed.

So it follows that there is within small limits a critical weight for all diaphragms, and to depart from this means that we shall lose one way or another. A perfect diaphragm in the present stage of our knowledge is an impossibility, for the simple reason that it would have to be weightless, or practically so, and not only the diaphragm but all other moving or vibrating parts as well. Here is another serious loss.

More Losses.

So far, we have dealt principally with the question of efficiency of the receiver mechanism, but there are many other things that affect both the efficiency and tone quality, such as the magnetic lag, which is not the same for all notes, the natural tone or tones of the diaphragm, the tone or natural note of the air space on both sides of the diaphragm, to mention but a few. These, although exceedingly interesting, would occupy too much space to discuss here.

In those speakers employing horns, a certain amount of loss again occurs. All horns will respond to one or more notes—that is, will be set into sympathetic vibration when reproducing certain notes, and this vibration will reinforce and prolong the notes in question by adding their own to the reproduction. This also applies to diaphragms. Also they always absorb some of the energy which, therefore, must be lost. Horns constructed in a thick, solid hard material are usually the best in this respect, as they naturally absorb less. Then, again, the air column contained within the horn also has a note of its own, which is often different from that of the horn itself.

New Principle Required.

Now that we have considered some of the faults of the present-day loud speakers, it should be rather interesting if we try to imagine what the perfected instrument of the future may be like and its probable capabilities. Assuming that the efficiency now available is one per cent (a very generous allowance) a perfect instrument, able to convert all the electrical energy into acoustic energy, would produce a volume of sound one hundred times greater. Think what this would mean to the crystal user. It makes one wonder whether anybody will use valves at all except for distance work and special purposes. This is too much to hope for, at least for a very long time, but a ten per cent efficiency should not be beyond the bounds of possibility in the very near future.

To obtain absolute perfection, or anything approaching perfection, it would seem that a new principle will have to be evolved. It may appear ridiculous to many for the writer to prophesy that in time a practical method will be discovered by which air may be set into vibration by direct means, but from his own personal

knowledge and experience he is convinced that it will be accomplished, and that all vibrating mechanism possessing weight and the usual magnetic system with all their attendant faults will eventually become obsolete and unnecessary.

How this will be done we would all like to know, but it is not so impossible as some may think, for something has already been achieved in this direction.

A Dutch Device.

There is a receiver known as the Thermo-*phone*, a Dutch invention, which is about as large as a small thimble, and is intended to be inserted right inside the ear passage. It contains no mechanism whatever, no coils or magnets; simply a dozen or so minute loops of exceedingly thin platinum wire, too fine to be seen by the naked eye. The speaking current passing through these in series, raises the temperature of the filaments to a dull red heat, which in turn heats the air within the small container, causing the air to expand.

As the current varies, so does the temperature of the filaments, and also the air, which contracts and expands accordingly, thus setting it into vibration. Few people have heard this wonderful device, although it was invented some years ago; but those who have will never forget the extraordinary naturalness of the reproduction, for it is far ahead in this respect of any other method now in general use.

Possibilities of Crystal Control.

One might think by this that that perfection really had arrived, and so far as the actual reproduction is concerned it would seem that it has; unfortunately, however, it suffers from one very bad fault. It is many times less efficient than the cheapest of headphones at present on the market. Whether this principle can be developed and improved to make it applicable to loud speakers or even to headphones for wireless purposes, time alone will show.

At the present moment, experiments are being carried out with certain crystals that have the property of elongating and contracting under the influence of variable electric currents. Here is another possible road to improvement and great things may in time come about from this.

Besides these, there are quite a number of other methods, some of them fairly well known, but they all appear to have their own peculiar faults which have so far not been overcome.

We are all waiting for yet another principle, without any faults at all. Will it arrive? The writer ventures to say that it will, and all listeners-in most assuredly hope it will, and the sooner the better.

NEXT WEEK

The preliminary review of the exhibits at Olympia will be continued and this issue of P.W. will be

ANOTHER SPECIAL EXHIBITION NUMBER.

Further news concerning this season's wireless sets and components will be given together with another selection of interesting photographs.

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3	Three	£3: 7: 6	£7: 5: 0
V2A	1 Variable, 1 Fixed	£4: 5: 0	£7: 15: 0
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No. 9. OLYMPIA
SEPT. 4th—18th, 1926**

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Note the saving in original costs: The British-Made Lustrolux .06 amp H.F. Det., or L.F. Valves cost 9/- each. The Lustrolux 3.4 amp Power Valve costs only 11/-. Then bear this in mind—Each of the Valves works efficiently on 1.8 to 2 volts! Think of the current economy thus made possible! Arrange your accumulator cells in parallel; get double or treble the life per charge, and waste no current in warming up Rheostats.

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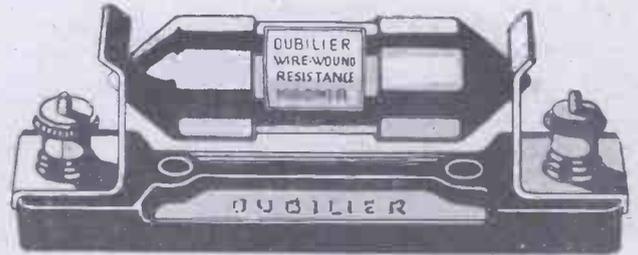
Lustrolux Valves also obtainable from Lewis's Ltd., Liverpool and Manchester, and

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Send for Catalogue A.



A New Dubilier Product



The Dubilier wire-wound resistance

No new Dubilier Product is placed on the market until it has undergone prolonged tests under working conditions.

In this manner you can always be assured of the perfect reliability of any product bearing the Dubilier name.

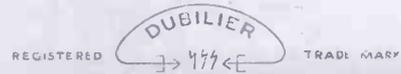
The new Dubilier Wire-Wound Anode Resistances will be found to be ideal for resistance capacity circuits.

Self induction and self capacity effects are virtually non-existent, and the resistance values remain constant throughout all variations of climatic conditions.

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20, 30, 40, 50, 60, 70, 80, 90 and 100 thousand ohms - - - 5/- each,
200 thousand ohms - - - 8/- each,
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WE published in our last issue an interview with Captain Eckersley, in which that gentleman expressed his satisfaction with the Geneva Radio Wave Scheme. Captain Eckersley pointed out to "Ariel," who interviewed him; that, although he did not think the Geneva plan ideal, he did at least consider it the most practical solution of the problem.

As our readers know, there are ninety-nine available wave-lengths on the broadcast wave-length band, and yet there are at least two hundred stations which have to be allocated wave-lengths. The question which every amateur is naturally asking himself is: "What is going to happen when these two hundred broadcasting stations conform to the new wave-length scheme on September 15th?"

Cardiff is the only British station, with the exception of 5XX, which will retain its present wave-length; changes will be made in all the other stations. There is no doubt that the British Broadcasting Company are fully aware of the delicacy of the situation with regard to these changes in wave-lengths, but it is reassuring to know that they are making elaborate plans so that the introduction of the new system will be as perfect as possible, and that it will be given every chance of working smoothly and without undue annoyance to amateurs.

The New Waves.

We are given to understand that between now and September 15th the B.B.C. will carry out a number of tests, and that they will also do their best to advise listeners as to the best methods of adapting themselves to the new regime.

We suggest that local B.B.C. engineers at various broadcasting stations could do a lot of good and be of considerable assistance to amateurs if they devoted a little time to broadcasting straightforward instructions in connection with this matter. Further, the B.B.C. would be well advised to give as much publicity as possible to the times when they propose testing the various B.B.C. stations on the new wave-lengths.

These tests, if given at suitable times during the day and night, would enable listeners to have a little experimental practice with their receivers, and to get them in approximate working order and adjustment for the new wave-lengths when they are officially adopted on September 15th.

We also understand that the B.B.C. consider that their normal programme service should not be interfered with by these tests, but we think this is a case where an exception should be made in view of the fact that hundreds of thousands of listeners throughout the country will be affected by these wave-length changes, and that, unless they are given adequate chances of becoming accustomed to the new wave-lengths, many of them may be seriously inconvenienced by the abrupt change on September 15th.

There is nothing very much more to be said about the Geneva wave plan. It has been criticised, discussed, and talked about in general, for some days now. But all the criticisms and all the discussions are purely theoretical, because if one thing is certain it is this: that nobody can really say how the scheme is going to work out until there has been a real trial.

That may sound like a truism, but amateurs with any experience know how in many phases of wireless work something

CURRENT TOPICS.

The New Waves—A Suggestion—Interference by Ships—The "Split-Wave" Theory—Effect of Weather on Reception—Some Investigations into Fading.

By THE EDITOR.

which looks so well on paper, and which in theory is so admirable, very often gives disappointing results when adopted in practice.

We are not trying to throw cold water on the Geneva scheme, or to convey to our readers any expression of pessimism with regard to the practicability of the work and the decision of the Radiophone Bureau.

A Suggestion.

If we are inclined to give an opinion at all, it is that we have great hope and faith in this new scheme, and can only express the hope, which we feel sure is shared by every listener and amateur in the country, that this scheme, when it is put into practice, will prove a really satisfactory solution to the interference problem which has in the past (and, for that matter, in the present) proved so disastrous to the amateur who wishes to receive distant stations without interference, and to the listener who, situated under adverse circumstances, cannot receive a broadcasting programme without it being interfered with by other broadcasting stations.

And we hope, also, that in the near future those in authority will take steps with regard to interference in the Morse code by ships at sea. There is no doubt that many of the ships passing along Channel create a terrible interference to listeners living near the coast, and that whatever methods the ingenious amateur may adopt, this interference is well nigh impossible to eliminate.

Interference by Ships.

Many of the ships equipped to-day with wireless apparatus have first-class gear, but there are also many ships still equipped with antiquated spark transmitters which are undoubtedly not only inefficient, but an absolute curse to thousands of people who want to enjoy broadcasting.

We can only hope that some remedy will be found for this branch of interference which, of course, is outside the scope of the International Radiophone Bureau.

The "Split-Wave" Theory.

Our readers have heard from time to time of the "split-wave" theory. According to this theory, a transmitted wave passes partly along the earth and partly into the air, approximately one hundred miles above the earth's surface, where it continues until it is reflected down to the receiver by a semi-conducting layer present in the atmosphere. Also, according to this theory, the ground waves weaken rapidly and become infinitesimal about two hundred miles or so from a broadcasting station, and reception at any considerable distance is chiefly due to the "sky wave."

It is interesting to note that a certain amount of substantiation of this theory that radio waves split into a ground wave and a sky wave when passing from the transmitter to the receiver, has been offered by the compilation of certain data secured by the General Electric Company of America.

This data was secured in broadcasting tests conducted from January 1st to May 8th, 1926.

In conducting these tests the co-operation of listeners was engaged in every part of the country, and the engineers made a point of securing information regarding the possible relation of radio reception to the condition of the weather, which was thought to depend very largely on the barometric pressure over various parts of the country. In pursuing this point, the engineers also endeavoured to find relation between reception records and the barometric pressure throughout which the propagated waves passed.

Effect of Weather on Reception.

According to the "Electrical Review," we understand that the present analysis of data shows that it is probable that barometric pressure and the weather have only a minor effect on radio conditions, but it does seem clear that signals received at short distances are stronger when they come along a region of even pressure than when they come from a low pressure to a high pressure area, or vice versa.

At distances of more than four hundred miles, the conditions on the surface of the earth seem to exercise little or no effect, and on the basis of the split wave theory it seems fairly obvious that if the sky waves go through an arc reaching one hundred miles or more above the surface of the earth, weather conditions, which go up less than ten miles, can have little effect upon them.

The General Electric Company's reports were based on all stations operating on wave-lengths covering the entire wave-length band reserved by the United States Department of Commerce for broadcasting, and these stations operated on powers from fifty to five thousand watts.

Some Investigations into Fading.

Investigations of fading show that there had been a change in conditions from January to February. In January most of the bad fading reports came from a definite region between two hundred and four hundred miles from the transmitter, while in February equally bad fading was reported at all distances beyond two hundred miles, and was not strictly confined to any particular zone.

Further, 10 per cent of the reports recorded bad fading, 35 per cent slight fading, and 55 per cent no fading, while in studying the average signal strength at various distances from a broadcasting station it was found, so says the report, that signals decreased rapidly in volume for the first three hundred miles, but the high-powered stations, while they decreased just as rapidly, gave stronger signals at all distances from three hundred to eight hundred miles away; it would seem that the signals remained fairly consistent in strength, this depending largely on radio conditions.

In January signals were strong at six hundred miles from the transmitter, stronger even than at three hundred miles, while in February this was no longer borne out in practice. On the whole, this report indicates that there is considerable evidence that wireless reception was generally poorer in February than in January, this being primarily due to some change in the upper atmosphere rather than to a change in the weather conditions within ten miles of the surface of the earth.



Traders and manufacturers are invited to submit wireless sets and components to the "P.W." Technical Dept. for test. All tests are carried out with strict impartiality in the "P.W." Test room under the supervision of the Technical Editor, and the general reader is asked to note that this weekly article is also intended to provide a reliable and unbiased guide as to what to buy and what to avoid.—EDITOR.

TWO NEW METRO-VICK COMPONENTS.

MANUFACTURERS who specialise in the production of one or more specific components generally contribute something to the progress of wireless science—that is, if they go about their business in a clear-sighted manner, and with the resources of well-equipped and well-staffed laboratories behind them. But their productions are handicapped if they are not designed with a full knowledge of the capabilities and limitations of those other components with which they will have to co-operate when built into a wireless receiver. And the firm that produces a wonderful "so-and-so" together with a "this and that" specially designed to operate with it, is at least making a gallant attempt to prevent one of its "chefs d'œuvre" from being used with unsuitable partners.

We are reminded of these very obvious

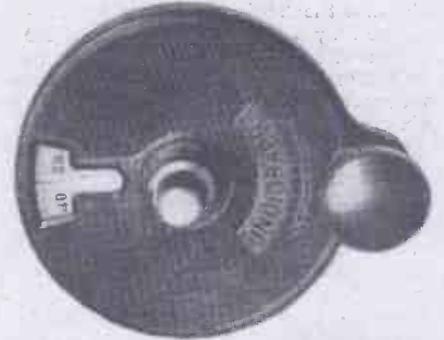
facts by Messrs. Metro-Vick Supplies, Ltd., who recently sent us a number of "Cosmos" Resistance Coupling Units for test, because with these they also submitted several "Cosmos" SP 18b valves. Let us deal with the valve first—it deserves this priority for it is a most interesting little device. First of all, it is an addition to the Short-path group, and has beautifully-assembled electrodes, so closely situated to each other that the result is a triumph of precision work. It is a "two-volter" consuming some .09-amps at 1.6-1.8 volts. Its voltage amplification factor is 35 and its anode impedance 70,000 ohms. In case the significance of these figures is not apparent to all our readers, let us state that for years valve makers have been striving to produce a valve with a really high-amplification factor that has not a proportionately high impedance. And, as far as we know, Metro-Vick have more nearly approached

the ideal than any other makers of valves in the world. Having done this they quite rightly claim that L.F. resistance capacity coupling is now a serious rival to the transformer method from the point of view of volume production, while yet being miles ahead in respect of purity. And that is why they submitted the above-mentioned two items for test together.

The "Cosmos" coupling unit is a neat little black box supplied with four terminals and soldering tags and two moulded "feet" for baseboard mounting purposes. It costs 8s. 6d., but for another 2s., making 10s. 6d. in all, Metro-Vick supply the same unit fitted with an anti-microphonic valve holder.

The SP 18b valve requires from 80-120 volts H.T. and it can be used for H.F. amplification, detection or for choke coupling L.F. work, but it must have its full 80-120 volts. It does not need grid

(Continued on next page.)



The "Indigraph," Messrs. Igranics' new vernier knob and dial.

EDISON BELL RADIO

A MAGNIFICENT 2-VALVE SET SHOWN AT OUR STAND, No. 75, NATIONAL RADIO EXHIBITION, OLYMPIA.

EDISON BELL "PRINCE" 2-VALVE SET.

This very attractive set is shown with the doors of cabinet open. Size 13 by 12 by 10 inches deep, chrome engraved panel, fitted in solid oak cabinet with folding doors of Jacobean design. Simple and selective control of Reaction and Filament Rheostat. This set comprises one Detector and one stage of Low Frequency, Patent Rotary Coil Holder, giving smooth and efficient reaction. Leads are supplied for H.T. and L.T., also Grid Bias, which should be 43 volts with tapings to obtain the "best" musical quality. The well-known Edison Bell Coils are supplied for 300-500 metres. Undoubtedly the "Prince" represents one of the finest 2-valve sets on the market.



THE EDISON BELL "PRINCE" 2-VALVE SET. PRICE £4: 10: 0

(Valves, Batteries and Marconi Licence extra.)

EDISON BELL, LIMITED,
LONDON, S.E.15, AND AT HUNTINGDON.

This and many other attractive and efficient Valve Sets, Components, etc., all guaranteed British manufacture, will be exhibited at our Stand, No. 75, at the National Radio Exhibition, which takes place at Olympia from September 4th to 18th. You are cordially invited to attend there and personally inspect these models. If you are unable to do so, ask your dealer for fully illustrated catalogue, or write direct to the Company, when same will be willingly forwarded, post free.

TESTED 500 VOLTS
FLAT TYPE



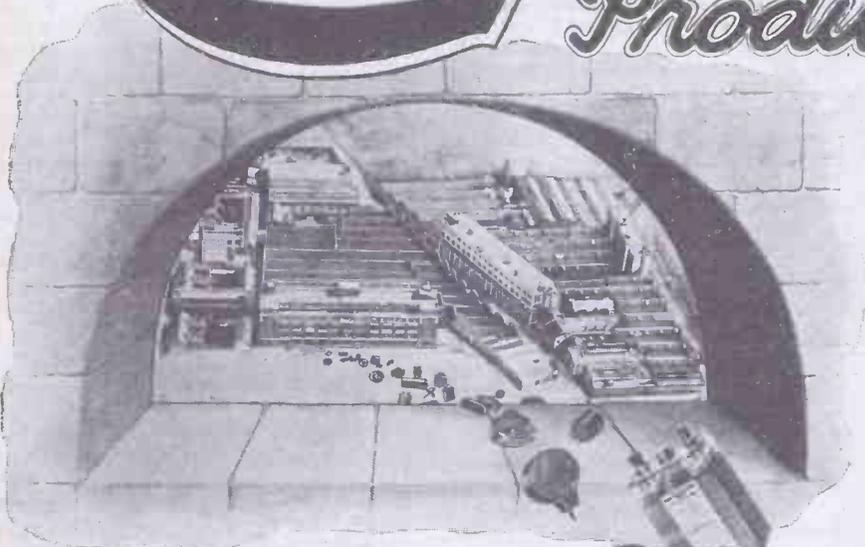
TESTED 500 VOLTS
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INSIST ON EDISON BELL CONDENSERS

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WITH the advent of the new radio season we are able to announce price reductions in certain of C.A.V. radio components. We are confident that the new season's lines will more than maintain the high reputation for which the name C.A.V. stands.

Our radio manufactures emanate from the same factory from which the world-renowned C.A.V. car electrical equipments have been produced for the past 35 years, which is in itself your guarantee for dependability.

C.A.V. HIGH TENSION ACCUMULATOR. MODEL H.T.3.

This 60-volt H.T. Accumulator is a most popular assembly for all amateur Radio Equipment. Price 60/- per 60 volts. Also made in 30 and 90-volt assemblies.

C.A.V. ACTON CELLULOID L.T. ACCUMULATORS.

2 volts 60 amps. "Ign.," Price 13/6.
2 volts 80 amps. "Ign.," Price 16/-.
4 and 6 volts at practically pro rata prices.

C.A.V. "ALL PURPOSE" TRANSFORMER.

This I.F. Transformer is strongly recommended for use with power valves. It will work equally well as a 1st or 2nd stage amplifier. Price 15/-.

THE "MUSICOLA" LOUD SPEAKER.

The "Musicola" is the latest addition to the well-known range of C.A.V. Loud Speakers, and is a revelation in both price and performance. Price £2 2 0.

C.A.V. "ACTON GLASS" L.T. ACCUMULATOR.

2 volts 60 amps. (Ign.), Price 13/6.
2 volts 80 amps. (Ign.), Price 16/-.
4 and 6 volts at practically pro rata prices.

C.A.V. CABINET LOUD SPEAKER.

For those requiring an instrument to harmonise with the furnishings of a room, this Cabinet Loud Speaker is ideal. Three finishes. Price £4 10 0.

C.A.V. HORN TYPE LOUD SPEAKERS.

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STANDARD. 2,000 ohms, Black or Brown Finish	4	10	0
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"NEW JUNIOR." Black or Brown Finish	2	5	0
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"TOM TIT." 2,000 ohms, Black Crystalline Finish	1	7	6
Do. Imitation Tortoiseshell Flare	1	10	0



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STANDS Nos. 164 & 210

APPARATUS TESTED.

(Continued from page 42.)

bias under any conditions. It is, in fact, a valve designed to do certain work without being manoeuvred.

We tested these two "Cosmos" components together in a three-valve set, det., 2 L.F., both "Cosmos" resistance coupled, using blue spots (SP 18b) in the first two stages, and a "red spot" in the last. The combination was excellent and the volume obtained was equal to that given by most sets employing three stages of resistance coupling. Tone was exceptional in its purity. We must interpolate here that we never did believe that the transformer was as bad as many would appear to consider. But the Cosmos "team" gained a lot, owing to the fact that the matching of specially-designed components has made it possible to obtain practically three stage resistance volume with but two stages. And consequently there is a reduction of those wave distortion cumulations incidental in some degree to all valves—especially rectifiers.

We are sure all those of our readers who use the new Cosmos SP 18b and the Cosmos Resistance Coupling unit in the above manner will agree with us that Messrs. Metro-Vick are to be congratulated on having effected a noteworthy improvement in resistance coupling amplification, and one that may well increase its popularity to the extent of jeopardising the so-far almost invulnerably-placed transformer.

NEW LISSEN POLICY.

We are informed that Messrs. Lissen, Ltd., are adopting a new policy from August 16th, 1926. From that date, Lissen apparatus will be going direct from the factory to the retailer instead of through the usual trade channels.

Messrs. Lissen, Ltd., state that they desired to give retail trade bigger profits than before and also to reduce the prices of their goods. Messrs. Lissen, Ltd., are determined that the trade should have something generous from them in the way of terms as well as keener competitive prices for the products bearing their name; they felt there was no alternative but to make a vital decision and institute this new policy forthwith.

Lissen apparatus already enjoys a widespread demand and with the forceful advertising campaign which Messrs. Lissen, Ltd., intend to undertake this year, it is anticipated that sales will increase rapidly.

Dealers are invited to get in touch with Messrs. Lissen without delay, so as to secure immediate advantage.

RAYMOND ANTI-MICROPHONIC VALVE-HOLDER.

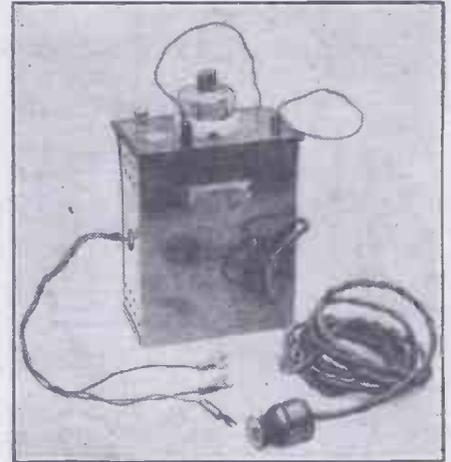
We recently received an anti-microphonic valve-holder from Messrs. K. Raymond. It is a neat little component, and is designed for base-board mounting. The suspension is by four metal springs arranged in such a form that ample length is obtained. It is more efficient than the stiffness of the springing would lead one to believe, and it is quite good value for money at the price of 1/6.

TUNGSTALITE BLUE LABEL CRYSTAL.

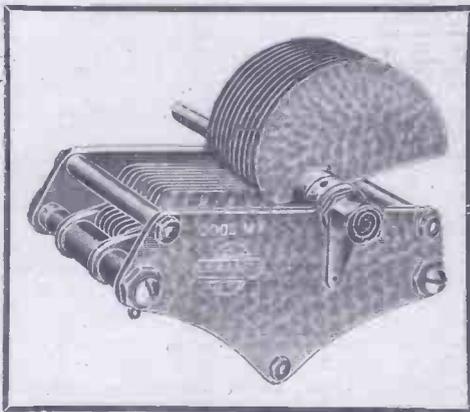
Messrs. Tungstalite, Ltd., inform us that they are reducing the price of their famous Blue Label Tungstalite crystal from 1/6 to 6d. As previously, every specimen will be fully guaranteed.

"NO-NOISE" VARIABLE GRID LEAK.

This is a speciality of the American Radio Corporation Ltd., of 18, Conduit Street, London, W.1. It consists of a small metal-capped glass cylinder containing a small quantity of a yellowish, viscous fluid and a bent metal wire. As the cylinder is revolved so this wire makes contact with more or less of the fluid. A very positive, smooth variation of resistance is thus obtained. The component must be mounted horizontally.



A "Goltona" H.T. battery eliminator which was recently reviewed in these pages.



IGRANIC— the choice of experts

IGRANIC Variable Condensers and other Igranic Radio Devices have been used so often in receivers described in the leading Radio journals that they have become known as the "choice of experts."

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Igranic Low-Loss Square-Law Variable Condensers have stout brass plates, combined ball and friction thrust bearings, flexible connection to moving plates, extremely low losses, very small minimum capacity, and highest class workmanship throughout.

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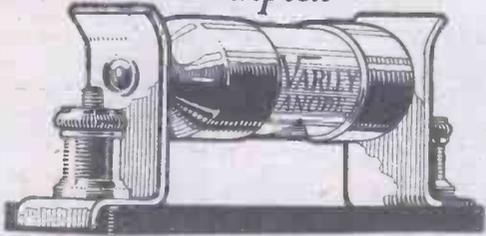
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STANDS Nos. 72 & 73

Be sure to see the full range of Igranic Radio Devices on Stands Nos. 72 and 73 at Olympia, September 4th to 18th.

The Varley Constant Bi-duplex



Wire-wound Anode Resistance

It's the perfect design and construction of the interior—the part that really counts—that we are proud of. Varley Wire-Wound Anode Resistances have upheld our reputation as coil winding specialists; they have been chosen by the scientific experts of all the leading wireless journals to play their part in the construction of all the big sets of 1926, including the "Eutree Six."



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Lastly, Varley Wire-Wound Anode Resistances are absolutely constant and unaffected by atmospheric conditions. A little dearer perhaps, but if you value constancy—and constancy means that you can rule out all falling off in your wireless reception—you will insist on a Varley, the perfectly constructed and scientifically designed Anode Resistance.

	PRICE
Up to 50,000 ohms	5/6 each
Without clips and base	4/- each
60,000, 80,000 and 100,000 ohms	7/6 each
Without clips and base	6/- each
150,000, 200,000 and 250,000 ohms	9/6 each
Without clips and base	8/- each

Write for particulars of our new Multi-cellular High Frequency Choke—wire wound on the famous Varley Bi-Duplex System.

Visit our Stand, No. 36, at the National Radio Exhibition, Olympia, September 4th—18th



Constant always

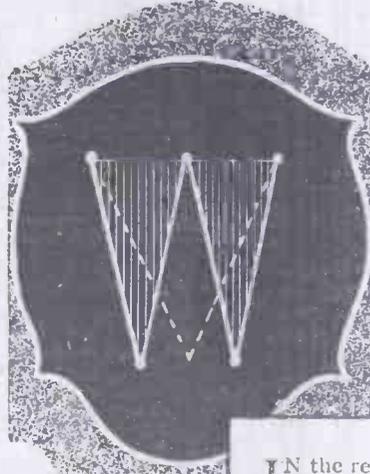
THE VARLEY MAGNET CO.

(Proprietors: Oliver Pell Control, Ltd.)

Granville House, Arundel St., London, W.C.2.

Telephone: City 3393.

Duo-triangular-filament suspension



The New SIX-SIXTY Point One Valves!



IN the record of the development of scientific valve design, DUO-TRIANGULAR FILAMENT SUSPENSION will always be hailed as "The Achievement of 1926."

The phenomenal advantages arising out of this unique, yet simple construction are amazing. To begin with, it is obvious that the length of filament employed in our new Point One Valves is almost double that in the usual type—represented by broken lines—with the result that a much greater electron emission is ensured, and further, none of this valuable electron stream is wasted, since the entire filament is wholly enclosed within the grid and anode. And remember, the special Six-Sixty filament itself is wonderfully economical. Its current consumption is barely 1 amp, and when operating at the rated voltage there is absolutely no sign of "glow."

Then, too, the stability and perfect alignment resulting from the additional supports render it unnecessary to assemble the filament in tension, and ensure a constancy of perfect reception. Engineers for years past have realised the stability of the Warren Girder, but it was left to Six-Sixty to apply this to the design of the radio valve.

The story of success cannot always be told in a few words. Our subsequent advertisements will reveal the structure of the perfect valve, built on the foundation of Duo-Triangular Filament Suspension.

Descriptive leaflet S.S. 9-26 free on application.

- S.S.1. Bright Emitter General Purpose Valve ... 8/-
- S.S.2 H.F. D.E., H.F. & Detector, 14/-
- S.S.3 H.F. and L.F. D.E., .06 amps., H.F., L.F. & Detector, 14/-
- S.S.4. D.E. Power Amplifier, 18/6
- S.S.5. D.E. Power Amplifier, 18/6
- S.S.6. D.E. Power Amplifier, 18/6
- S.S.7. D.E. .1 amps. Power Amplifier ... 18/6
- S.S.2a H.F. and L.F. D.E. .1 amps. H.F., L.F. & Detector, 14/-
- S.S.8. D.E. .1 amps. General Purpose ... 14/-
- S.S.9. D.E. .1 amps. Power Amplifier ... 18/6
- S.S.10. D.E. 2 volts -15 amps. Power Amplifier, 18/6
- S.S.11. D.E. Power Amplifier, 18/6

These prices do not apply in the Irish Free State.

Visit our Stand No. 33 at the National Radio Exhibition, Olympia, September 4th—18th.

SIX-SIXTY VALVES

Better by Six Times Sixty

The Electron Co., Ltd., Triumph House, 189, Regent Street, London, W.1. 1A



RADIOTORIAL

All Editorial Communications to be addressed to The Editor, POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

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The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts and photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

As much of the information given in the columns of this paper concerns the most recent developments in the Radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

Readers' letters dealing with patent questions, if sent to the Editor, will be forwarded to our own patent advisers, where every facility and help will be afforded to readers. The envelope should be clearly marked "Patent Advice."

TECHNICAL QUERIES.

Letters should be addressed to: Technical Query Dept., "Popular Wireless," The Fleetway House, Farringdon Street, London, E.C.4.

They should be written on one side of the paper only, and **MUST** be accompanied by a stamped addressed envelope.

Queries should be asked in the form of the numbered questions: (1), (2), (3), etc., but may be accompanied by a short letter giving any necessary additional particulars as briefly as possible.

For every question asked a fee of 6d. should be enclosed. A copy of the numbered questions should be kept, so that the replies may be given under the numbers. (It is not possible to reproduce the question in the answer.)

BLUE PRINTS. A series of 20 Blue Prints can be obtained from the Query Dept., price 6d. per Blue Print.

Only a limited number of circuits are covered by this series, and full details of the circuit arrangements available in Blue-Print form are published fortnightly in the advertisement columns of this journal.

All other back-of-panel diagrams are specially drawn up to suit the requirements of individual readers at the following rates: Crystal Sets, 6d.; One-Valve Sets, 6d. One-Valve and Crystal(Reflex), 1s. Two-Valve and Crystal(Reflex), 1s. Two-Valve Sets, 1s. Three-Valve Sets, 1s. Three-Valve and Crystal(Reflex), 1s. 6d. Four-Valve Sets, 1s. 6d. Multi-Valve Sets (straight circuits), 1s. 6d. Except SUPER-HETERODYNE DIAGRAMS, all of which, irrespective of number of Valves used, are 2s. 6d.

If a panel lay-out or list of point-to-point connections is required, an additional fee of 1s. must be enclosed.

Wiring diagrams of commercial apparatus, such as sets of any particular manufacture, etc., cannot be supplied. (Such particulars can only be obtained from the makers.)

Readers may submit their own diagrams, etc., for correction or for criticism. The fee is 1s. per diagram, and these should be large, and as clear as possible.

No questions can be answered by 'phone. Remittances should be in the form of Postal Orders.

Questions and Answers

THE FIRST AERIAL.

"CURIOUS" (Wembley).—Who first used an aerial and earth for wireless work?

Senator Marconi discovered the advantages of an "aerial" and of an "earth" connection, and his early successes were largely due to these discoveries.

COILS TO USE.

W. M. C. P. (Stratford-on-Avon).—I have just completed a four-valve set, using single
(Continued on page 48).

Preliminary Announcement of CENTROID WIRELESS COMPONENTS

Manufactured by:

THE CAMDEN ENGINEERING CO., LTD.,
BAYHAM PLACE, CAMDEN TOWN, N.W.1

Telegrams: Metallifer Norwest. Telephone: North 1920 and 1921

STAND 95, RADIO EXHIBITION

THE CENTROID VARIABLE CONDENSER

A perfect and unique example of British Workmanship and Design.

- Square law wave-length.
- Low loss.
- Aluminium blades die cast by a special process into a high conductivity alloy.
- Rotor plates earthed with pig-tail connector.
- Stator plates insulated with guaranteed high grade ebonite and no solid dielectric in the field.
- One-hole fixing.
- Low capacity.
- VALUES: .0005 mfd. and .0003 mfd. Price with plain dial and knob. Each 13/6

THE CENTROID SLOW MOTION DIAL

A. Simple straightforward friction drive.

- No special drilling of panel, fixing being done by the one-hole fixing nut of condenser.
- Ample size knobs and dials.
- Scale of engraved aluminium with wide divisions, very easy to read.
- Reduction rates 10 : 1. Price of slow motion dial only. Each 4/9
- Price of condenser complete with slow motion dial. Each 17/6

OTHER ITEMS SHORTLY READY:

- The CENTROID combined lead-in earthing switch and lightning protector.
- The CENTROID anti-vibration valve holder.
- The CENTROID screened Split tuning coils and H.F. transformers of unique design.
- The CENTROID Split Condensers.

Made and designed in London by Englishmen.

THE "SFERAVOX" LOUD SPEAKER

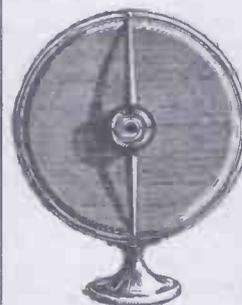
—is the best on the market—

Obtainable from all Stockists, Dealers and Stores.

Read the remarkable Press notices printed below—these speak volumes for the "SFERAVOX," and are the unbiased opinions of these well-known publications.

THE DAILY TELEGRAPH: "There is charm about a disc Loud Speaker that forms an attraction which is quite absent in the horn type instrument. This device combines to a most remarkable degree ultra-sensitivity with absolute purity of tone in all pitches, and yet gives such volume as to compare very favourably with the most expensive types of horn instruments."

POPULAR WIRELESS—APPARATUS TESTED: "The sensitivity of the instrument is of an extraordinary high degree, both speech and music came with most satisfactory purity. Rattling and buzzing were not apparent in the 'SFERAVOX'."
TOWN & COUNTRY HOMES: "The 'SFERAVOX' is a new departure and gives the three essentials which are purity of tone, sensitivity and volume. It is a distinct improvement on the disc Loud Speaker class."



£2:10:0

"SFERAVOX," 130, Fenchurch St., London, E.C. Phone: Avenue 2481 (2 lines).

GRAHAM SERVICE



ULTRA LOW-LOSS

Straight Line Frequency Condenser

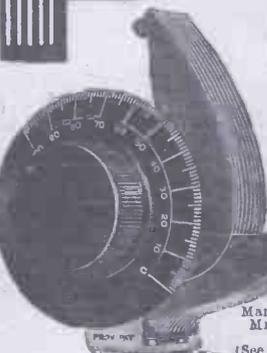
Cone Bearings, Braced Vanes, Positive Collector. A real precision job.

Condenser only, .0003uF., .0005uF. 9/-
Condenser, with plain Dial. Standard 10/6
2" dia. shaft

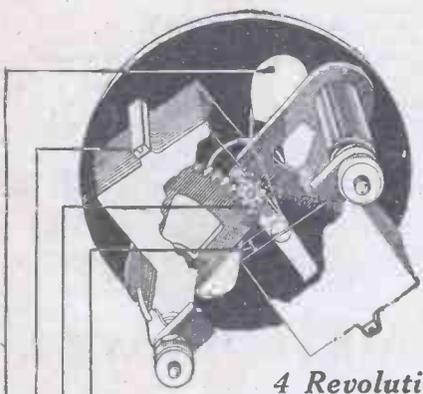
Send for Catalogue and Descriptive Literature of complete Formo Range

THE FORMO COMPANY
Crown Works, Cricklewood, N.W.2
Phone: Hamstead 1787.

Manchester:
Mr. J. B. Lovee, 23, Hartley St., Levenshulme.
Phone: Heaton Moor 475.
(See page 55 for Formo Transformer.)



THE Newey "4 Point" Condenser



This perfectly designed and constructed Condenser works on the Square Law principle, and is made by all-British Labour in all-British Factories from the finest available material.

PRICE, complete with knob and Dial
 .0005 mfd. . . 17/6
 .0003 mfd. . . 15/-

4 Revolutionary Points

① **NO HAND CAPACITY:** The Bakelite plate on which the Condenser is mounted is especially designed to minimise self-capacity, eliminate dielectric losses, and isolate the vanes from the control knob.

② **ZERO LOSS.**—All plates are bonded into a slotted equaliser bar to ensure true zero loss conditions. No rubbing contact is employed.

③ **360° CONTROL.**—No Vernier is necessary since the condenser drive is calibrated over a range of 360°.

④ **MINIMUM CAPACITY NEGLIGIBLE.**—The lowest capacity position gives only .000003 mfd., as certified by the National Physical Laboratory.

THE NEWY VERNIER COIL HOLDER

A perfectly constructed coil holder, designed for Back of Panel One-Hole fixing, and in addition provided with lugs for fixing in any position on panel. Bakelite moulding throughout. Worm geared by means of metal segment and worm, and fitted with patent stop plate to prevent overwinding in extreme positions—gearing ratio 8-1 giving fine critical tuning and permitting the use of the heaviest coil. **PRICE 7/6**

NEWY SNAP TERMINALS. The terminal with 1000 uses. 1d. each Brass. 1½d. Nickel Plated.

Complete sets in boxes:
 Brass 1/6 per box. Nickel Plated 2/- per box.
 Ask your nearest dealer for the Newey Catalogue of Radio Components. If you have any difficulty, write direct. Sole Distributors:

PETTIGREW & MERRIMAN (1925) Ltd.,
 Phonos House
 2 & 4, Bucknall Street, New Oxford Street,
 London, W.1 (and Branches).

Telephone: Gerrard 248-49.
 Telegrams: Merrigrew, Westcent, London.



See 2LO at work

One of the most interesting features of the great Radio Exhibition, which opens at Olympia on September the 4th, will be, without doubt, the reproduction of the 2LO Studio. During the run of the Exhibition, frequent broadcasting will be done by the B.B.C. from this studio, so that you may actually see your favourite artistes before the microphone.

For the first time in the history of British Radio, it has been possible to arrange an exhibition that will be complete. No British manufacturer of standing but will be represented, so that within the New Hall, Olympia, will be found everything that is worth while in Radio.

All lovers of wireless should set aside at least one day for a visit. Each exhibit will have something of interest for them—something new, distinctive or novel. The great strike demonstrated the fact quite plainly that wireless—simplified as it is—is still the eighth wonder of the world. You cannot afford to be absent from its first really complete manifestation.

THE NATIONAL
RADIO EXHIBITION
 NEW HALL
 OLYMPIA

SEP. 4 to 18

10.30 A.M. TO 10 P.M.
 ADMISSION INCLUSIVE 1/6

RADIOTORIAL QUESTIONS & ANSWERS.

(Continued from page 46.)

coil aerial tuning, and tuned anode coupling with reaction on the anode. Wishing to use duolateral coils (Igranic make), I should be obliged if you would tell me what coils are needed for the following stations: B.B.C. stations, 5 X X, Paris, Barcelona, and Madrid.

For the ordinary B.B.C. stations the following coils will probably be necessary, and as you do not state whether series or parallel tuning for the aerial is given, we give the values for both, denoted by S and P after the coil number, first for a .001 mfd. condenser and then for a .0005 mfd. condenser. (We presume that a .0003 mfd. is used for the anode tuning.)

B.B.C. Stations (300/400 m.) (aerial) 50 S., 25 P., 50 S., 35 P.; (anode) 50, (react.) 75.
400/500 m.; (aerial) 75 S., 50 P.; 75 S., 50-75 P.; (anode) 75, (react.) 75.

As there are four Paris stations we will give them according to the wave-length.

Petit Parisien (see 300/400).
Ecole Supérieure (450 m.). See 400/500.
Indiola (1750 m.). (Aerial) 200 S., 150 P., 250 S., 200 P. (anode) 200, (react.) 150. (This will cover 5 X X also.)

Eiffel Tower (2600 m.). (Aerial) 300 S., 200 P.; 400 S., 250 P.; (anode) 300, (react.) 200.

Barcelona (325 m.). (Aerial) 35 S., 25 P.; 35-50 S., 25-35 P.; (anode) 50, (react.) 75.

Madrid (392 m.) See 300/400 metres.

WAVELENGTHS OF GERMAN STATIONS.

J. L. N. (Cranbrook Park, Ilford, Essex).—Our four-valve set seems to be simply alive with German stations, and I am anxious to try and identify them. Can you give me a list of the chief German broadcasting stations, with the wave-lengths at present in use?

The following list gives the wave-length of the German stations, as published officially a few weeks ago:

Berlin, 504/571; Bremen, 279; Breslau, 418; Cassel, 273, 5; Dresden, 294; Dortmund, 283;

Elberfeld, 259; Frankfurt a. M., 470; Gleiwitz, 251; Hamburg, 302, 5; Hannover, 297; Kiel, 234, 5; Königsberg, 469; Königswusterhausen, 1300; Leipzig, 452; München, 204, 1, 435; Münster, 410; Nürnberg, 340; Stettin, 241; Stuttgart, 440.

REACTION AND RE-TUNING.

F. A. I. (Peterborough).—Why is it necessary to retune when the reaction coil is varied on a two-valve receiver?

The relative positions of the reaction coil and the coil to which it is coupled will vary the inductance of the circuit in which the latter is included, so that a tuning readjustment will be necessary every time the reaction coil is moved.

THE ONE-VALVE REINARTZ.

P. B. S. (Newmarket, Cambs.).—The week before the General Strike you advertised the next week's special feature would be an efficient "Reinartz" single-valve circuit. The Strike, of course, stopped publication of that week's issue.

I have been patiently waiting for the circuit to appear, but so far it has not materialised. I hope you have not abandoned the idea of publishing it, as I am sure there are many others like myself who would welcome it, being interested particularly in getting the most out of one-valve circuits.

Particulars of this receiver duly appeared in POPULAR WIRELESS No. 206.

Back numbers of "P.W." are obtainable from The Amalgamated Press (1922). Ltd., Back Number Dept., Bear Alley, Farringdon Street, E.C.4. Price 4d. per copy, post free.

WHAT SET SHALL I USE?

T. H. (London).—Some two or three years ago you published the details of a receiver called the "P. W." Combination Set. This I made up at the time and found that it gave excellent results in practically all the combinations.

The results in the reflex position especially were wonderfully loud and clear (the volume

from 2 L O being sufficient to operate a medium-sized loud speaker, at a strength sufficient to fill my house). I now propose to rebuild the set as a reflex one-valver. Will you kindly recommend me a back number of "P. W." in which this appeared in the simplified form?

We regret the "P. W." in which the constructional details of the "P. W." reflex receiver appeared, is now out of print, but a blue print of this set may be obtained from the "P. W." Queries Dept., price 6d. (as advertised in this paper fortnightly). The blue print in question is No. 7, and this includes the theoretical circuit, pictorial and wiring diagrams, and full list of the parts required.

(NOTE.—When applying for the blue print, you should include a stamped addressed envelope.)

H.T. FROM D.C. MAINS.

S. P. F. (Ilford, London).—Having heard many excellent reports on the use of D.C. mains for the H.T. supply, I now wish to invest in one, but am in a quandary as to knowing the best make to buy. Could you please also enlighten me on some of the points to look to when purchasing one of these units, as I understand some makes are given to making an unpleasant hum when used on certain mains.

We have had personal experience in your district of two particular makes of H.T. battery eliminators, both having been tried on various D.C. mains, and both giving very satisfactory results.

The units in question are the ones made by Messrs. Ward & Goldstone (of Pendleton, Manchester), and E. K. Cole (Dept. A), 505, London Road, Westcliff-on-Sea. Both firms supply units suitable for mains of various voltages, and each allow the use of different voltages for the various valves on the sets. The unit made by the former firm incorporates an arrangement for telling if the polarity is correct or not, without the aid of pole-finding paper, etc., and allows the use of two H.T.appings, both of which can be varied between approximately 30 and 130 volts. If any hum is experienced such as heard on mains having a very "ragged" supply, a separate smoothing unit can be obtained, to work in conjunction with the main unit, and thus ensure freedom from unpleasant noises.

(Continued on page 50.)



Where there's a child there should be cocoa

CHILDREN are brain-workers and manual-workers too, and many overgrow their strength at school and play. Now Cocoa is food, and gives the children extra strength to keep pace with their growing bodies. It is the children's idea of a really delicious drink for breakfast and supper.

"Keep fit on cocoa" **BOURNVILLE**
By test the best

See the name "Cadbury" on every piece of chocolate

TESTED PANEL GUARANTEED FREE FROM SURFACE LEAKAGE

Ready for use

Your Panel Size 16" x 9" Price 6/11

RADIO BECOL PANELS

BRITISH **EBONITE** MADE

THE BRITISH EBONITE CO. LTD. MANWELL LONDON W.7.

STANDARD SIZE PANELS.

We are exhibiting at Olympia, Sept. 4-18, Stand 81.

NIFE STEEL PLATE
ACCUMULATORS
FOR
HIGH TENSION

only 1/- per Volt.

Absolutely Noiseless. No Acid.
No Fumes. Last a Lifetime.

BATTERIES LTD., REDDITCH

That's the Spot!

—to see the most unique and up-to-date exhibit of loud speakers the world has ever known . .

BECO

Hornless Loud Speakers

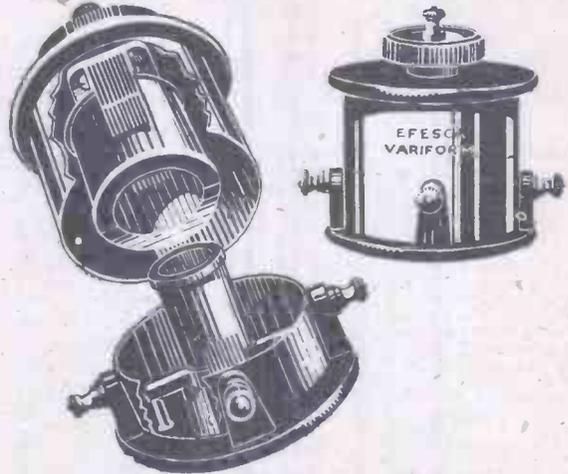
BRITISH ELECTRICAL SALES ORGANISATION
623, Australia House, Strand, W.C.2

Telephone: CITY 7665.
Telegrams: Becospeker, Etrand, London.

**STAND
58**

National Radio Exhibition
Olympia—September 4—18

EFESCA



VARIFORM

PATENT

An epoch making departure in low frequency transformer design.

THE wide variety of valves has inspired the production of the EFESCA "VARIFORM" LOW FREQUENCY TRANSFORMER, the primary impedance of which can be altered to suit different types of valves. This is achieved by winding the primary on a separate bobbin which is detachable and interchangeable with others of different impedance values. A series of five primary windings is available, giving ratios of 2 to 1, 3 to 1, 4 to 1, 5 to 1, and 6 to 1, enabling the transformer to be adjusted to any type of valve or circuit. The interchange is effected without disturbing the permanent transformer connections.

An incidental advantage is the ability to replace a burnt-out primary—the vulnerable part of all transformers—for a few shillings, instead of scrapping the lot.

With one primary bobbin 30/- Or with complete set of 5 interchangeable primary bobbins 40/-
(Specify Ratio required) Price, each
Spare interchangeable bobbins, 3/6 each.

Ask your Wireless Dealer for EFESCA COMPONENTS, or write for catalogue.

Wholesale only:—

FALK, STADELMANN & CO., LTD.,
83/93, Farringdon Road, London, E.C.1.

NATIONAL RADIO EXHIBITION OLYMPIA LONDON Stand 114.



A Puravox Loud Speaker for purity & Volume

RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 48.)

The latter firm supply their units to suit individual requirements, or according to particulars given in their catalogue.

This firm also claim freedom from hum on the D.C. unit, and as far as actual experience goes, we have found this correct. Both compare favourably in price as regards other forms of H.T.

It is important, however, that the maker's instructions in either case are strictly adhered to, especially with reference to earth connections to the set.

AMPLIFIER OR VALVE SET.

A.M. (Norbury).—I own a crystal set, and wish to increase the volume. This, I know, will entail the use of an L.F. amplifier. Would you advise me to make such an addition, or would you suggest a two-valve set?

It depends on what you wish to receive. If you only desire the local station we consider the two-valve L.F. amplifier would be the most suitable. On the other hand, if you are more ambitious and wish to receive stations further afield, we would suggest the two-valve set which, while allowing you to receive the local station on the loud speaker, would also allow the use of phones (or loud speaker) on other transmissions.

HOWLING.

B.L. (Watford).—I own an ordinary two-valve set consisting of Det. and L.F. valve which up to a week ago gave excellent results. Recently, however, it has given rise to a howl which, despite my efforts to stop it, still persists. Reducing the H.T. voltage on the valves partially cures it, but this also cuts down my volume. To what can I attribute the trouble, and how can it be overcome?

We consider the howl is probably due to the H.T. battery (which we assume is of the "dry" type) running down. It can be tested by placing a very high-resistance voltmeter across it, or else compared against another battery of exactly similar make and of the same voltage.

The earth-lead should also be carefully inspected

for breaks or poor connection, and should, if possible, be tried for continuity by means of a lamp and battery connected in series.

CHOKES FOR THE FILADYNE.

T.B. (Romford).—Where can I obtain suitable choke coils (unmounted) for the Filadyne?

The Reflex Radio Co., 102, High Street, London, N.16, are undertaking to supply suitable coils for the Filadyne. These are wound on the well-known Burndept principle under their patent (No. 168249) and are retailed at 6s. each.

When applying for these coils readers are desired to specify "Filadyne coils" and mention "P.W."

CAPACITIES OF VARIABLE CONDENSERS.

T.S. (Southampton).—I have purchased several variable condensers which have no capacities stated on them. Can you oblige me by giving a rough table showing the number of vanes required for various capacities, as I shall be able to gauge from such a table the approximate capacities of my condensers.

Assuming the spacing of the vanes to be 1/4 inch, the following numbers of plates will be required for the capacities stated:

No. of Fixed Plates.	No. of Moving Plates.	Capacity in microfarads approx.
29	28	.001
22	21	.00075
15	14	.0005
10	9	.0003
7	6	.0001

GRID LEAK.

"Curious" (Cardiff).—What is the purpose of a grid leak?

A grid leak is included in the circuit so that the electrons which collect on the grid (usually of the detector) may return to the filament. Without this leak the accumulation of electrons on the grid would interfere with reception.

The actual composition of a grid leak varies, but usually it takes the form of a graphite-coated paper or gut having a resistance of 1 to 3 megohms (one to

three million ohms), enclosed in the suitable container the shape of which is familiar to all readers.

RANGE OF CRYSTAL SETS.

A. E. T. (Northampton).—What is the usual range of a crystal set?

Using a standard outdoor P.M.G. aerial not too screened, the average range of a crystal set is about 15 miles for telephony from a main B.B.C. station, and up to 5 miles from a relay station. Good reception can be had up to 100 miles from 5 X X. In some exceptional cases these figures have been greatly exceeded, but the above can be depended upon to be correct for the majority of cases.

The range of reception from telegraphy stations is much greater, and is chiefly governed by the power of the transmitter, local and atmospheric conditions.

For the Constructor

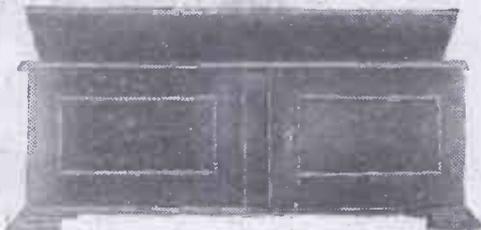
No. 6.—Cutting Out an L.F. Valve.

The method of cutting out the last stage of low-frequency amplification (transformer-coupled) by means of an S.P.D.T. switch is shown above. The plate lead of the preceding valve is disconnected between the reaction coil and the L.F. primary. The side nearest the valve is taken to the centre of the switch, whilst the primary side goes to the lower switch contact, so that when the switch is "Down" this lead is restored.

The top switch contact is joined to a point between phones and the plate of the last valve, so when the switch is "Up," the transformer is put out of circuit and the preceding valve's plate current flows through the phones instead of through the primary.

CAXTON 4-VALVE CABINET

Made for Sets "All Concert Receiver,"
"Fieldless Coil Three Valve Set."
"Any Valve Low Frequency Amplifier."
Special Cabinets made to customer's measurements.
Prices Quoted.



Cash with Order. Fumed Oak ... £1 5 0
Dark or Jacobean Oak ... £1 10 0
Real Mahogany ... £1 14 0

Detachable 7" deep Base Board to mount 16" by 8" panel to slide out of Cabinet front.

The two beaded front doors as illustrated, placed 2 ins. in front of the enclosed panel at 10/- extra.

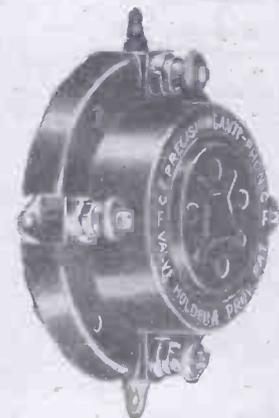
Ebonite or Radion Panels Supplied and perfectly Fitted at low extra cost.

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Packed and delivered free in U.K.

No. 62

CAXTON WOOD TURNERY CO., Market Harborough



OUR latest production, the C.E. PRECISION FLOATING VALVE HOLDER, shows great improvements upon others. By its use, the distortion due to vibrations transmitted to valve filaments is entirely eliminated and a receiver fitted with it acquires a perfectly clear background which facilitates the reception of distant stations. Of very low capacity and entirely non-microphonic, the C.E. PRECISION FLOATING VALVE HOLDER is ideal for its purpose. Made from Bakelite and fitted with soldering tags and terminals.

2/3 each.

C.E. PRECISION RHEOSTATS AND POTENTIOMETERS have so frequently been specified by the Wireless Press that they need little description. The special care taken in their production ensures a perfectly smooth and silent action. Bakelite formers; silvered dials; fitted with soldering tags and terminals.

7 and 15 ohms - 2/9 each
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Dual Rheostats & Potentiometers - 3/9 each

FOR UTMOST
C.E. PRECISION
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C. EDE & CO., LTD., BYFLEET, SURREY

Telephone: Byfleet 226.

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“Goltone”TM HIGH TENSION BATTERY ELIMINATORS

British Made.
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IN A SHORT TIME.

A REFINEMENT AND
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Entirely dispenses with the use of High Tension Dry Batteries or Accumulators and provides a ready, convenient and cheaper method of High Tension Supply, with greatly improved reception.

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See us at
STAND No.
50
AT THE NATIONAL
RADIO EXHIBITION



THE Watmel exhibits will comprise the well-known Watmel Auto-choke, Watmel Variable Grid Leak, and the combined Fixed Condenser and Fixed Grid Leak. Everyone interested in the Watmel Auto-choke should write for N.P.L. Curve 103/1 (or ask for it at Stand 50).

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WIRELESS CO., LTD.,
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The L.F. TRANSFORMERS that give maximum volume without distortion.

Other types:—
Standard Open “ACE” = 14/-
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All models in ratios 5-1, 3-1, and Guaranteed for 12 months.

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Shrouded Popular 15/6

Soldering simplified

The Fluxite Soldering Set will solve your soldering problems for ever.

Everything from an aerial connection to a big multi-valve set may be soldered quickly and successfully with this simple soldering set.

The Fluxite Soldering Set is exceptionally suited for Wireless; it is simple and compact, and will last for ever. It contains a special “small-space” soldering iron with non-heating metal handle, a really efficient pocket blow-lamp, Fluxite, solder and full instructions.

All Hardware and Ironmongery Stores sell the Fluxite Soldering Set, 7/6 complete. Fluxite can also be had in lbs price 8d., 1/4 and 2/6.

FLUXITE LTD.,
(Dept 324.)
Rotherhithe, S.E.18.

7/6
complete



FLUXITE

Buy a
BROWNIE
WIRELESS
CRYSTAL
SET 10/6
Complete



The simplest way of listening-in is to get a Brownie Crystal Set. Loud, crystal-clear reception at all hours without the slightest trouble. Brownie have specialised so that all may have the advantage of this expert-built set for 10/6

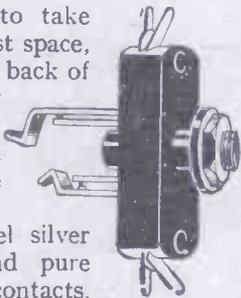
All good stores and wireless dealers feature Brownie Wireless. Write to-day for FREE BOOKLET No. 22, “Wireless Without Worry,” to—
BROWNIE WIRELESS CO. (G.B.), LTD.,
Nelson Street Works, LONDON, N.W.1.

Stand 84. Olympia Radio Exhibition

The name 'LOTUS' is your guarantee of sound results and solid satisfaction

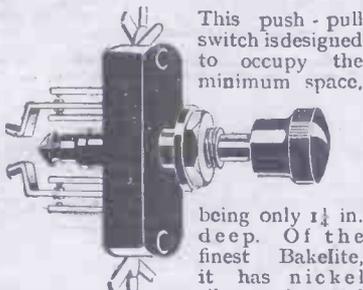
The 'LOTUS' JACK

Designed to take up the least space, the depth back of panel being 1 1/4 in. Made from best Bakelite mouldings, with nickel silver springs and pure silver contacts. One-hole fixing. Soldering contacts can be brought into any position.



Prices
No. 3, as illustrated 2/6
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The 'LOTUS' JACK SWITCHES



This push-pull switch is designed to occupy the minimum space.

being only 1 1/4 in. deep. Of the finest Bakelite, it has nickel silver springs and contacts of pure silver. Soldering contacts can be made to suit any wiring.

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Designed for use with Lotus Jacks. Made from best Bakelite mouldings and nickel plated brass. To fix, the wires are placed in slots and gripped in position by a turn of the screw cams.

Price
2/-

Made by the makers of the famed 'LOTUS' Vernier Coil Holders and 'LOTUS' Buoyancy Valve Holders
Garnett, Whiteley & Co., Ltd.,
LOTUS Works
Broadgreen Road, Liverpool

GO TO THE WIRELESS EXHIBITION.

(Continued from page 34.)

reduced prices, and the Igranic Low-Loss Square-Law Variable Condensers, which have achieved such popularity on account of their extreme efficiency and high finish.

A full range of literature will be available for visitors, and this will include the attractive new catalogue, the ingenious Multi-Circuit Folder, and useful leaflets describing "Short Wave Reception," "Jack Switching," "super-Heterodyne Outfit, and others.

S. A. LAMPLUGH, LTD.
Stand 253.

We are showing our aerial reaction unit—which covers a wave-length of 250-2,000 metres, and retails at 15/6; also our slow-motion straight-line tuning condenser, which retails at 13/6 for '0005; also a special filament rheostat, which will be marketed under the name "Vario-fix." This is for mounting by the side of valve holders inside cabinet, the beauty of which is that the resistance elements can be changed at will, and the value of each element also changed by a slider. This, we think, is a considerable advance over relying upon an automatic device. We are also exhibiting our 2-valve receiver, which has been specially built and designed for the future radio listener. By this we mean that section of the public who do not want to bother with anything radio, but are on the look-out for what we may term "a radio musical instrument."

THE LITHANODE CO., LTD.
Stand No. 204.

We intend placing the "Lithanode High Tension Battery" before the public at the forthcoming Wireless Exhibition.

This battery is quite unique, in that it is the product of over 45 years' experience in accumulator manufacture, the substance Lithanode, of which the active material of the plates is constructed, having the peculiar properties inherent in its constitution so much desired by all battery users, especially for wireless H.T., namely, absolute freedom from leaking of current when the battery is out of use, and complete noiselessness on the valve. The guarantee given is quite unique, and is as follows:

Any section of a Lithanode High or Low-Tension Wireless Battery thrown out of action within a period of one year through the buckling or disintegration of a Lithanode Long-Life Positive Plate caused by any ordinary electrical means, including short circuit, will be replaced free of charge.

We shall also have on exhibition the Lithanode and Cathode Low-Tension Accumulators.

LONDON ELECTRIC STORES, LTD.
Stand No. 258.

As one of the first wholesale radio distributors, we shall naturally be showing a selection of the lines offered by the leading radio manufacturers.

We shall, however, add to this several special lines, which we manufacture ourselves, and one brand of radio components for which we are concessionaires.

The I.F.S. Elot Polywave Coil.—This is an absolutely brand new production, now placed upon the market for the first time. It has been designed and manufactured to appeal particularly to the enthusiastic experimenter who does not wish to expend a large sum of money on a quantity of tuning coils.

Five coils are issued with the L.E.S. Elot Patent Container, numbered 25, 35, 50, 100 and 150, from which it will be seen that any one can be used alone, or, if required, any combination of numbers.

LONDON ELECTRIC WIRE CO. AND SMITHS, LTD.
Stand No. 216.

This exhibit comprises "Lewcos" Screened Coils and H.F. Transformers; also "Lewcos" Plug-in Coils (litz wound), Glazite Wire, "Multiway" Battery Cords, frame aerial wire, D.C.C., silk covered, enamelled wires, 'phone cords and sundry radio wires.

LONDON & PROVINCIAL RADIO CO., LTD.
Stand No. 6.

Among others of our better-known lines, we are exhibiting two new components: (1) An indicating dial for the L. & P. Coil Holder; (2) Single coil holder for baseboard mounting, a handy little component of quality, invaluable to the constructor. Being made from the best quality of ebonite, highly polished, and having a very high surface resistance, together with its low self-capacity and positive contact to plug and socket, makes it ideal for the reception of weak and short-wave signals. Price 1/3 each.

TRIUMPH

CUSHION ANTI-MICROPHONIC VALVE-HOLDER

HEIGHT OF PERFECTION IN VALVE SEATING. PAT. APPD. FOR. Ref. No. V199

PRICE 2/6

SEE STAND NO. 238 NATIONAL RADIO EXHIBITION

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REPAIRS SETS, PHONES, TRANSFORMERS

Officially Approved by Radio Association.

ALL WORK GUARANTEED LOWEST RATES 24 HOUR SERVICE

Cash on Delivery if Desired.

JOHN W. MILLER, 68, Farringdon St., E.C.4.

Phone: Central 1950.

Do not compromise with Quality!

BUY HYDRA CONDENSERS

The Condensers which are selling at the rate of a quarter of a million a month in the U.S.A.

Capacity	Dir.	Net.	Alt.	Net.
Mfd.	Sh.	each		each
0011 to 0011	1/8	—	—	—
016 up to 10	1/9	—	—	—
10	1/9	2/-	—	—
25 and 50	2/3	2/6	—	—
1-	2/9	3/3	—	—
3-	3/9	4/3	—	—
4-	4/5	5/6	—	—
5-	6/-	7/-	—	—
6-	8/-	—	—	—
8-	9/-	9/9	—	—
10-	12/-	13/-	—	—
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Obtainable from your dealer or direct from:

LOUIS HOLZMAN, 109, Kingsway, London, W.C.2.

All tested on 500 volts.

EASY PAYMENTS

LOUD SPEAKERS, HEADPHONES, H.T. ACCUMULATORS, or any parts to your selection.

Send a list of the parts you require and we will send you a definite quotation spread over a period of six months.

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REPAIRS

By specialists skilled in every form of accurate and intricate coil winding.

Headphones, Loud Speakers & Transformers rewound, remagnetised, and reconditioned

EQUAL TO NEW

and returned the same day on C.O.D. system

The unsolicited opinion of one of our many satisfied clients "—all I can say is, they are better than when new."

VARLEY Magnet Co. Repairs Dept., Woolwich S.E.18

VARLEY Proprietors: Oliver Pell Control Ltd.

CORRESPONDENCE.

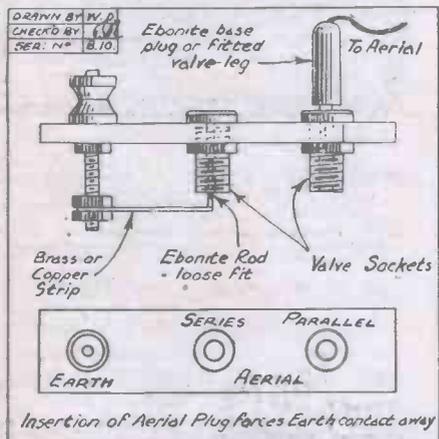
Letters from readers discussing interesting and topical wireless events, or recording unusual experiences, are always welcomed; but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—Editor.

NOVEL SERIES-PARALLEL DEVICE.

The Editor, POPULAR WIRELESS.

Dear Sir,—As there are sure to be many people constructing sets from the "P.W." blue prints I think this little gadget will be useful for those who intend to use the three-terminal series-parallel system given in these prints, but who desire the change-over to be more rapid.

Although this may not meet with the approval of the ultra low-loss fiend (or fan), it is quite successful in my Det.-2 L. F. receiver, made from Blue Print No. 20.



The only materials required are 1 W.O. terminal, 2 valve sockets, 1 plug—either H.T. wander or proprietary type—a piece of springy brass or copper, and an inch of fine ebonite rod (look inside an old fountain pen). I think the rest is explained by the diagram, but remember the contact-point of the strip and the base of the series socket must be clean.

Yours faithfully,
E. J. ROBERTS.

Camden Town, N.W.1.

"P.W." BLUE PRINT No. 20.

The Editor, POPULAR WIRELESS.

Dear Sir,—I have constructed the 3-valve loud speaker set given in "P. W." Blue Print No. 20, with splendid results. London can be understood all over an average-sized room with one valve and Ampion speaker. The first L.F. stage brings it up to excellent loud-speaker strength, while the third valve gives terrific volume, with pure reception. My aerial is only 24 feet high, and is a single wire 55 feet long, including lead-in.

The valves used are a Radio Micro '06 for detector, and 2 B.T.H. B.4's for amplifiers. I am 15 years old. Wishing "P.W." continued success.

I remain,
Yours faithfully,
K. IRELAND.

4, Wyndham Road,
West Ealing, W.13.

RE REMOTE CONTROL OF FILAMENT SUPPLY.

The Editor, POPULAR WIRELESS.

Dear Sir,—I have installed a system which calls for no extra wires in addition to the ordinary lead-covered loud-speaker twin wire.

On pressing a switch to one side connection is made through one L.S. wire and the lead covering of the cable to an old telegraph sander, which causes a wire to be immersed in a mercury cup (thus making the filament circuit), and is held thus by a ratchet. On pressing the switch to the other side, connection is made through the other lead and the lead covering to an electric bell which pulls off the ratchet and allows the armature of the sander to rise, breaking the filament circuit.

Both poles of the L.S. must be isolated from H.T. supply either by the usual choke and condensers or by using transformer and low resistance L.S. (I use the latter.)

The system, although primitive, is very effective. Wishing "P.W." which I have taken since No. 1, every success.

Yours faithfully,
JOHN V. BOLSTER.

At Drummond Arms Hotel,
St. Fillians, Perthshire.

Important Notice to the Public.

Entirely of
British
Origin and
Workmanship.

TUNGSTONE
Pure Lead Grid
Accumulator

Patented and
Trade Mark
Registered in the
Chief Countries
of the World.

You can see a full Range of
**Tungstone Car, Wireless and
House Lighting Accumulators at the
following Exhibitions:**

**Wireless Exhibition at the Olympia,
London, from September 4th to 18th.**

**"Evening Chronicle" Wireless
Exhibition, Manchester, from
October 26th to November 6th.**

**The Model Engineers' Exhibition,
Royal Horticultural Hall, London,
from September 17th to 25th.**

**The British Industries' Fair, White
City, London, February 21st to
March 4th, 1927.**

OUR EXHIBITION

Open Daily
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The largest and most varied stock of Radio
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You can handle and carefully inspect them
before you purchase.

Our 1000 Bargain Catalogue (68 pages, in-
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Parr's Ad.

Valves Repaired

AS GOOD AS NEW!!

HALF PRICE
(Except Weco, S.P.'s, and low capacity types). Minimum D.E. Current 0.15 amps when repaired. ALL BRIGHT & DULL EMITTERS Listed at less than 10/- Minimum charge - 5/- VALCO LTD, Dept. P.W., Tabor Grove, Wimbledon, S.W.

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SMALL PARTS TO THE TRADE.
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BRITAIN'S BEST IN RADIO AT OLYMPIA

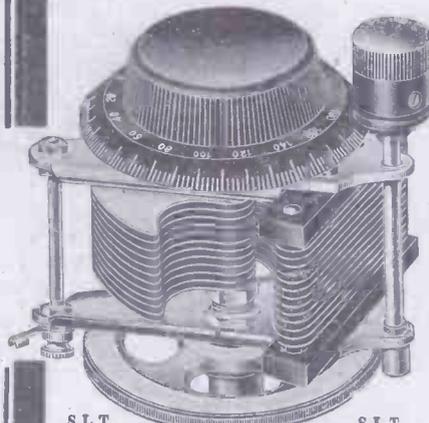
STAND NO. 253 G

THE FAMOUS
LAMPLUGH
RHEOSTAT



STRIP TYPE.

- 6 OHM 3/-
- 15 OHM 3/3
- 30 OHM 3/6



S.L.T.

S.L.T.

SLOW MOTION, STRAIGHT LINE CONDENSER

STRAIGHT LINE TUNING.
.0005 Mfd. 13/- .0003 Mfd. 12/6
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VARO-FIX FILAMENT RHEOSTAT.

INTERCHANGEABLE ELEMENTS.
AND EACH ONE ADJUSTABLE.

More Positive than Automatic Devices.
6 ohm 2/3 15 ohm 2/6 30 ohm 2/9

GRID LEAK
VARIABLE



.5 to 15
MEG-
OHMS
ONE-HOLE
FIXING

Price 4/- each

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Sole Distributors for London & Southern Counties.
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Scottish Depot:
38, Montrose Street, GLASGOW.

Send for RADIO Lists.



LOW & HIGH TENSION FROM A.C. MAINS.

(Continued from page 21.)

winding the coil. This should be done before winding on the filament windings. Put sleeving on all the leads and tape up as before. Different coloured sleeving will denote the different windings.

The coils may now be slipped on to the cores and the top leg put in when the stampings can be knocked straight with a hammer. The top clamps can now be put on. The terminals are arranged five on one side and six on the other; they are insulated with ebonite bushes. The coil leads can now be soldered to the various terminals (see Fig. 7). The core can now be painted if the constructor has an artistic eye, also the edge of the clamps, leaving the other part bright, except in the case of iron clamps, which look best painted all over.

Testing the Windings.

The primary may now be connected through the fuses to the mains; if the winding is correct the consumption should be only 4 or 5 watts. If any turns are shorted these will make themselves known by getting hot. This applies to all windings. Assuming this winding to be correct, we may now test the other windings. It is best to test the L.T. winding with a voltmeter; the reading should be between 2 and 2.25 volts. To test the H.T. winding a Neon lamp should be used; if a drawn wire lamp is used the current passed will burn out the winding. Test each half of this winding with the Neon lamp; it is not advisable to put this lamp across the outer wires as the voltage will burst the lamp if kept on any length of time. The voltage across the outer wires is 500. A very nasty shock can be received from this winding.

It is suggested that the transformer be left switched into the mains for at least an hour. If all is in order at the end of this time it may be coupled up to the set, taking great care that the proper connections are used (see Figs. 2 and 7).

Don't switch on the current till satisfied the connections are correct.

Don't play about with the control panel when the current is on.

Don't be surprised to receive a nasty shock from the control panel after the current has been shut off for some time; this is owing to the filter condensers holding their charge. These condensers can be discharged by shorting with a piece of metal.

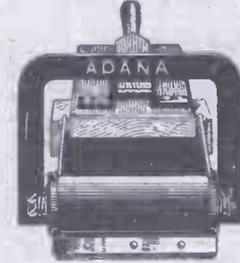
Causes of "Hum."

Some of the causes of excessive hum are as follows. Filaments too bright; not enough condensers in filter circuit; choke not large enough (if milliampere meter is not used it would be advisable to insert a choke to take the place of it, leaving the other choke in the negative lead); too much H.T. (reduce this by rheostat); run-down grid batteries, or a break in the following places: Secondary windings of transformers, or leads from secondaries to grid batteries, or grid batteries to H.T. - ; a break in the grid leak wiring of detector valve; a break in the anode coil, or leads (this will prevent tuning); broken joints on the filter condensers; chokes shorted.

No H.T. can be traced to one of the following causes: Broken leads, burnt-out winding in transformer or chokes, and emission of valves falling off.

ADANA AUTOMATIC SELF-INKING PRINTING MACHINE

45/-
Complete Plant.



THIS massively constructed Printing Machine is the most wonderful of its kind, being sold at a tenth the price of any other of the same size with similar advantages. It is capable of turning out every class of printed matter from a

CHEMIST'S LABEL TO AN ILLUSTRATED MAGAZINE including Perforating, Creasing and Box-making. The finest malleable iron and mild steel used in construction. Smooth running, speed, accuracy, simplicity are maintained to the highest efficiency. Printers' metal type (not Mono), case, complete accessories, together with excellently illustrated instructional book, included in above-quoted price. Illustrated particulars in two colours, together with samples of work, sent on receipt of stamped addressed envelope. Also sold by small weekly instalments. Ask for Terms.

The "ADANA" AGENCY (Dept. P.W.4)
34, King Street, Twickenham, Middlesex.

Printers should write for particulars of new system of supplying First-Class Founders' Type.

'PHONE REPAIR SERVICE

'Phones re-wound and remagnetised, 4/6 per pair. Remagnetised only, 2/-. Loud Speakers and Transformers re-wound. Glass Jars for making up wet H.T. units, waxed, 1/3 doz.; plain, 1/- Post extra. The H.R.P. Co., 1, Cottrill Road, nr. Hackney Downs Station, E.8.

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Why use cheap, rubbery substitutes? All sizes cut, post free. 1/2" thick, 1d. per sq. inch; 3/16" thick, 3d. in the 1/- cheaper, if 1/2" polished, 1d. sq. inch. 2d. stamp for sample. All Wireless Parts and Sets equally cheap. Solid Oak Cabinets. Lists direct. JACOBSON FACTORY, SOMERTON, SOM.

EASY PAYMENTS

Finest 2-valve amplifier set, including loud speaker, 120 H.T., D.E. valves, £7 10s.; or 18/9 down and 11 instalments of 15/-.

CASE BARGAINS.

Good Crystal Sets, 8/3 and 9/3. Amplifiers, 17/6 and 21/-. Phones, Telephones, tympans, Fr. T. Houston 11/-; U.S. Bellwings, 17/9. Valves, Radio Micro, 5/9; or power, 9/-. Good H.T., 60-v., 5/9; or 4½-v. (laboratory test), 3/9 doz. Accumulators, with 12 months' guarantee, 2-v. 40 ignition, 8/3; 4-v. 40, 15/-; 6-v. 60, 28/-. Polished Cabinets, Ebonite, Variometers, Condensers, Coil Holders, and everything in Wireless, reliable and cheap. Satisfaction or cash refunded.

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29, High Street, Clapham, London, S.W.4.

ACTIVE AGENTS WANTED (either sex) to sell Private Christmas Cards. Up-to-date designs. Latest Novelties. Best Paying Spare Time Agency Ever Offered. Free Book. Highest com. Valuable prizes. Apply Firth Graham Co. (Dept. F112) Accrington.

ZINCS FOR WET H.T. BATTERIES.

The perfect H.T. supply. Build your own battery. Use our zincs with special connectors. NO SOLDERING. 1/- doz. Post extra. Trade supplied. COLE & VINCENT, 147, Barclay Rd., Walthamstow, E.17.

HEADPHONES REPAIRED

Re-wound & remagnetised 5/- per pair. Loud Speakers repaired 5/-; Transformers re-wound 5/- each. All work guaranteed and tested before delivery. Write for Trade Prices. Phone: Clerk, 1795. MASON & CO., 44, East Road, City Road, N.1.

STERLING RECEIVERS. SENSATIONAL OFFER.

Having purchased a large number of Sterling 2-Valve Loud Speaker Sets we are offering them to the public on Unprecedented Terms. A Genuine Sterling 2-Valve Loud Speaker Set complete ready for immediate use with D.E. 06 Valves, H.T. and L.T. Accumulator, Aerial Equipment, and one of our World Famed De Luxe Excellent Loud Speakers. Price £15.15.0. Royalties paid. Terms 15/- Deposit and 15 Monthly Payments of 20/-. Send for one of these superb Sets at once as the number for sale is limited and when sold cannot be repeated under double the price. Free Catalogue on application. THE WIRELESS DISTRIBUTING CO., LTD., (Dept. D.W.), WIRELESS HOUSE, STOKE NEWINGTON N.16.





The L. & P. Indicating Dial

The whole wireless world knows that the "L. & P." Universal Coil Holder gives the finest control of coupling ever achieved.

Thanks to the new L. & P. Indicating Dial, you can now keep a record of the exact degree of coupling between the two coils, from 0 to 90°.

The Dial is easily fitted to any L. & P. Coil Holder—without even the need of drilling a hole. It is an accurate scientific instrument, beautifully made, and working without a trace of backlash. The one thing needed by the experimenter who believes in keeping a log for all stations received.

The L. & P. Indicating Dial, 5/6 each.

The L. & P. Universal Two-coil Holder is a marvel of value at 8/6.

FROM GOOD DEALERS EVERYWHERE.

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COLOURED CONNECTING WIRE

[RED YELLOW BLUE BLACK WHITE and GREEN]

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10/6 1-3 and 1-5 for 1st and 2nd stages

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(See page 46 for Formo S.L.F. Condenser.)



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