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

October 23rd, 1926.

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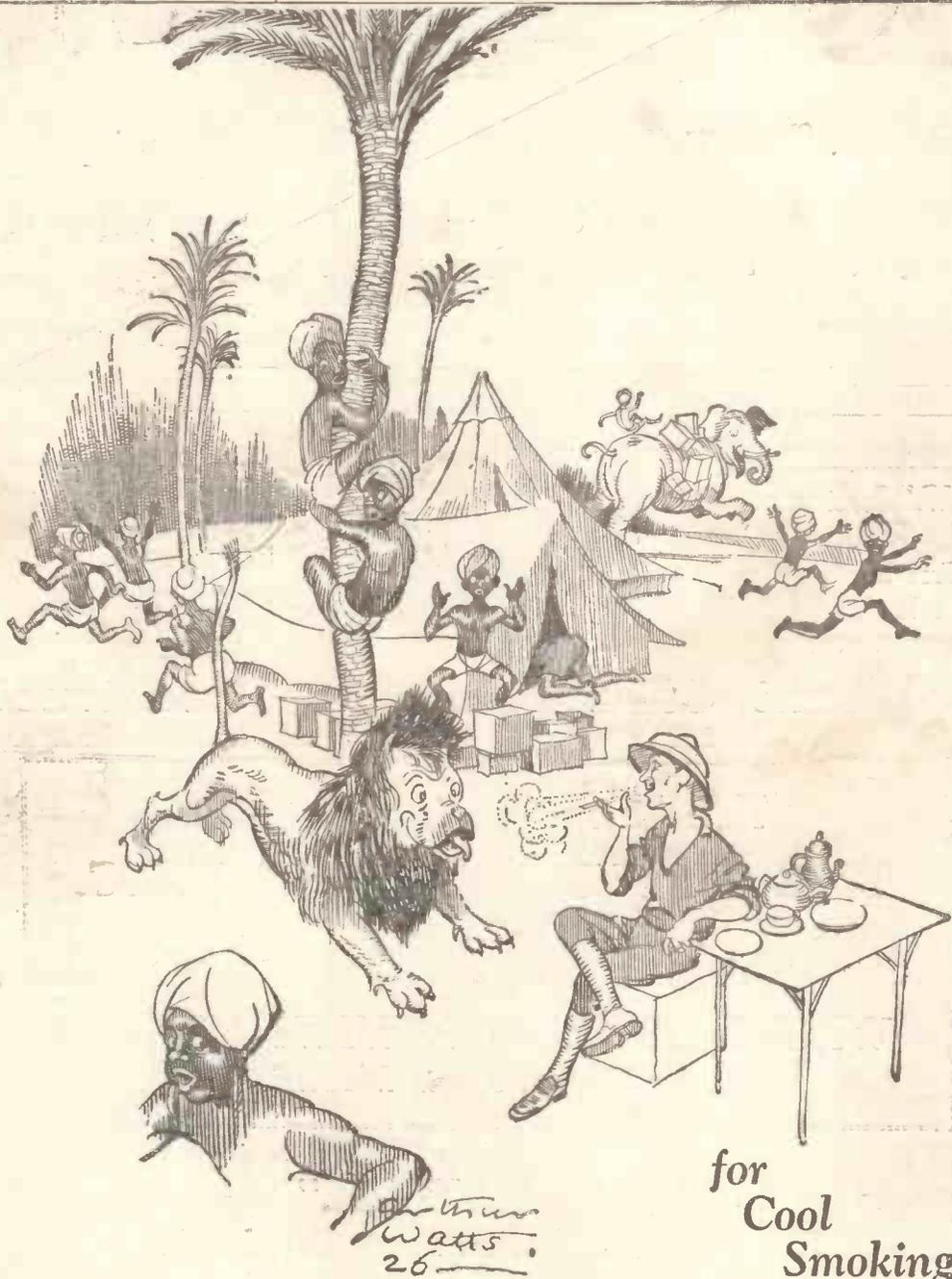
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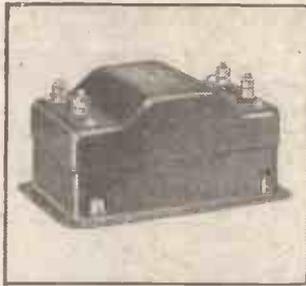
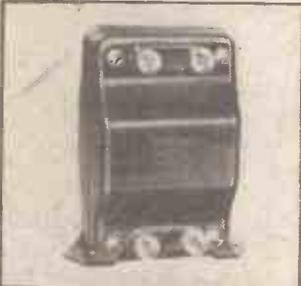
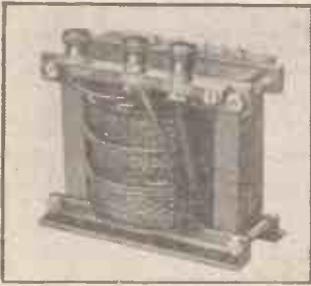
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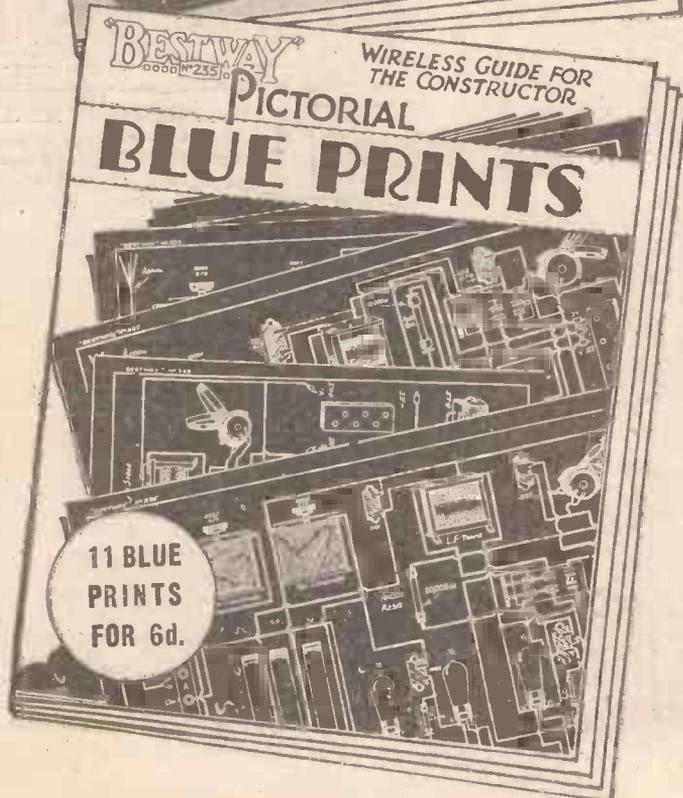
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This book consists of an up-to-date and comprehensive range of blue print diagrams drawn in a simplified pictorial style so that the amateur constructor cannot possibly go wrong when building up a set on the lines of any of the circuits with which the book deals. There are 11 circuits in all.

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And they say that the camera cannot lie!

HERE is another fallacy blown sky high. The camera can—and often does—lie. It all depends on the lens. Sometimes the lens has not been corrected for astigmatism and the edges of the pictures are awry. Buildings appear as if they are tumbling down. The young gentleman with the saxophone in the lower photograph would hardly be recognised by his own mother. It is a case of distortion made visible to the eye.

A good lens is proof against distortion because it is scientifically corrected against astigmatism. It projects all parts of the image equally. In exactly the same way a really good Transformer, such as the Eureka, is scientifically corrected against distortion. It must amplify all the notes in the harmonic scale evenly—it cannot emphasize some at the expense of others. Just as a corrected lens will reproduce a perfectly life-like image of the saxophone player, so the Eureka Transformer will recreate exactly the characteristic flute-like notes from his instrument. You will hear him as naturally as if you were in the studio.

Because a good lens costs more than a cheap one, so the Eureka naturally costs more than an inferior Transformer. It costs much more to produce. In every Concert Grand, for example, there are no less than 3 miles of copper wire. But in designing the Eureka we aimed high. We set aside the question of expense, believing that most people took a pride in the quality of their Radio Music. And our policy has been a wise one.

The Eureka to-day occupies a unique position in the Transformer field. Everywhere it is recognised as setting an extremely high standard of reproduction. We are justifiably proud of its good name. When building your next Set remember the only thing that counts to-day is *quality* of tone. The rich mellow tones of a Eureka-equipped Set make radio really worth while.



Makers also of the Eureka Orthocyclic Condenser.



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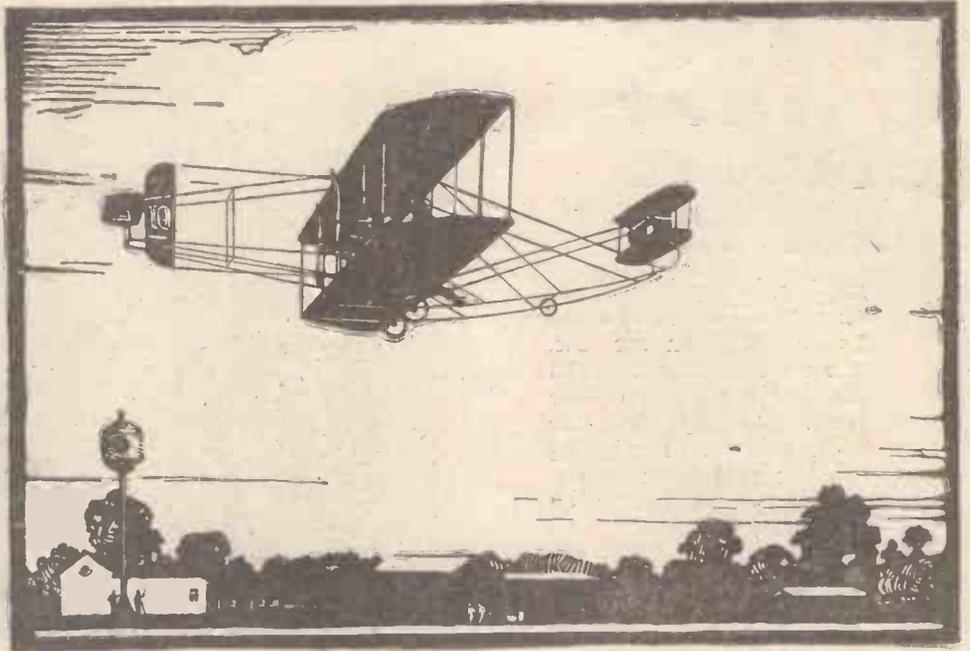
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A superb L. F. Transformer hermetically enclosed in a coppered steel case proof against atmospheric influences. Fully guaranteed
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For reflex work a special Eureka is available. Gives an exceptional volume of mellow clear tone. Fully guaranteed
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In 1910

In 1910 arose the problem of designing condensers for aircraft wireless sets.

The glass Leyden jars of those days were too bulky and too fragile, and there was no other suitable condenser made.

Thus it was that William Dubilier turned his attention to the subject and commenced his pioneer experiments. He immediately realised that to design a condenser which should be compact, unbreakable, and at the same time efficient under the high frequencies and voltages of wireless circuits would call for much specialised research.

He was successful in that same year in producing the first con-

denser to meet these requirements. Its dielectric was Mica.

Three years later, encouraged by the War Office, he commenced upon the manufacture of condensers on a large scale, and the Dubilier Condenser Company at once assumed the leadership which it holds to this day.

For sixteen years we have specialized in the manufacture of wireless condensers, and for all products bearing our name we have continuously insisted upon that high standard of efficiency which we as Radio Engineers know to be so essential.

Naturally this high standard implies a slightly increased selling price, but it undoubtedly results in the production of condensers in which you *can* have complete confidence.

And the possession of such condensers is essential to good results whether you build a crystal set or conduct laboratory research.



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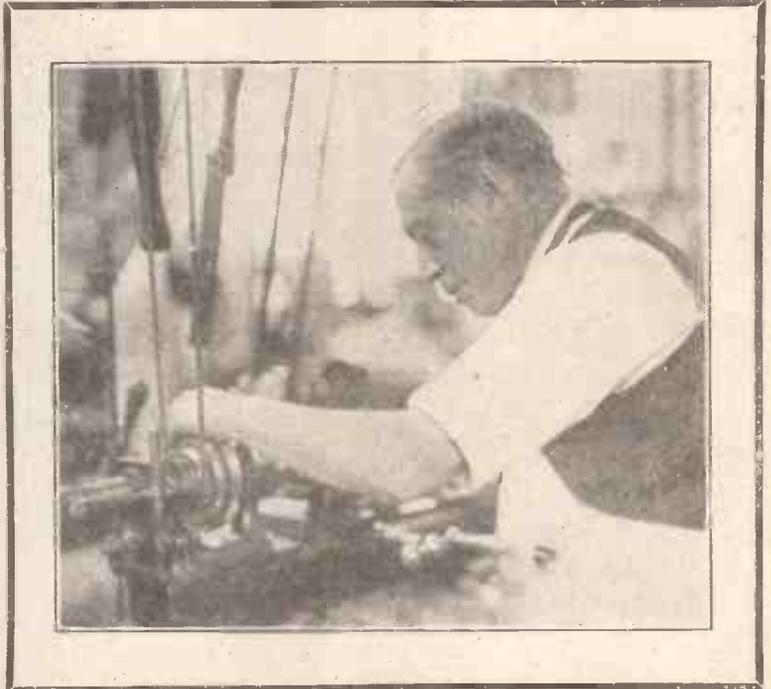


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E.F.5. 229



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The brain-made Instrument

A FAMOUS painter, when asked with what he mixed his paints replied, "with brains." Just as the finest quality paints cannot make a masterpiece unless brains and vision control the brush, so are the best materials in the world useless, in the making of Loud Speakers, without wisdom, knowledge and experience to guide the hand which designs and makes them. Telephonic experience gained in the days before Broadcasting began—and after; the brain, imagination

and enthusiasm of the pioneer; the skill of the mechanic allied to discernment in the choice of materials—such is the basis of **Brown** success. When you choose a **Brown**, you buy—not an instrument hastily assembled to conform more or less to an original "pattern," but a Loud Speaker on which has been bestowed all the individual thought, care and attention of a craftsman loving his work. A brain-made instrument!



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Q

In addition to the Cabinet, there are eight other **Brown** Loud Speakers—a type for everyone from 30/- to £15 15 0.



Treasures which crumbled at a touch

NOT so long ago the whole world was thrilled with the accounts of the exquisite treasures being exposed to the light of day at Luxor. Superb jewels worth a king's ransom—marvellous carvings typical of the splendour of the Pharaohs—georgous sepulchral furniture—and most wonderful of all, tapestries and draperies which, until they were moved, retained the beauty and freshness of the day they were woven.

But—whilst the jewels, the carvings and the furniture have now been added to the museums—the fabrics and the tapestries have gone for ever. Their delicate, gossamer-like threads could not withstand even the most careful handling. After thirty centuries, the fibres had lost their pliability—at a touch they shivered into a thousand fragments.

This tragedy of crumbling treasures affords a striking parallel for wireless enthusiasts. Once the filament of a valve is crystallised

with age it is liable to become fractured at the slightest blow. Even the ordinary wear and tear of everyday use will shorten its life. Now, however, a filament has been discovered which—because it operates almost without heat—permanently retains its pliability. Age cannot affect it. Even after several thousand hours of use its electronic emission is as prolific as ever. This Kalenised filament is one of two vital improvements introduced by Cossor this season. The other is Co-axial Mounting—a system of construction acknowledged to be one of the greatest steps forward in valve design for several years. Ask your Dealer to-day for our latest Folder describing the many exclusive features of these new valves.

Read about their amazing economy—their greater sensitivity and improved tone, but above all, their guaranteed uniformity of performance. Never before have such remarkable valves been available.

The new Cossor Point One

With Black Band. An ideal supersensitive Detector. Consumption '1 amp. at 1.8 volts **14/-**

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Cossor Valves

Popular Wireless

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RADIO NOTES AND NEWS.

A Message from Mars?—14-valve Receiver Ready—New Broadcasting Chief—Out-shouting 5 X X—Sir Oliver Lodge—The Three-in-One Tube.

New Broadcasting Chief.

LORD CLARENDON, the new broadcasting chief, is 49 years of age, and in his time has played many parts. A year or two ago he was Conservative Whip in the House of Lords, a post which he vacated to become Parliamentary Under-Secretary for Dominion Affairs. Previous to this, and before he had succeeded to the earldom in 1914, he was working in Canada as a fruit-farmer. He still owns an estate in Ontario.

Was He An Oscillator?

NO sooner was it known that the Earl of Clarendon was to be the head of the new British Broadcasting Corporation, than he was besieged by interviewers—who got very little information for their pains. He admitted, however, that he owns a two-valve set, that he does not know how to operate it properly, and that with it he has picked up one foreign station.

Piecing these facts together, it looks to me as though Lord Clarendon, Britain's first official broadcasting chief, has in the past done his share of oscillating! Quite innocently, of course, but nevertheless, I am afraid he has done it. And I think that most of us will like him as chairman all the better because of that "one foreign station," and because he, too, we fear, was once a sinner who used too much reaction!

Wireless at Westminster Abbey.

WESTMINSTER ABBEY is the latest place of interest to be connected up more or less permanently for broadcasting. Amplifiers have been installed in a room under the Abbey floor, near the grave of the Unknown Warrior, and from

here extensions have run to the pulpit, lectern and organ-loft.

The thoroughness with which the historic building has been wired for the microphones leads to the hope that national events of the future, such as Coronations, will be broadcast.

New Broadcasting Band.

A DISTINCT success has been scored by the Sylvians, the new band that now broadcasts in place of the Savoy

and oldest eye hospital in the world. Owing to the special claim of its patients it was the first London hospital to be equipped by wireless under the "Daily News" fund.

Swiss Yodelling To-morrow.

TO-MORROW night (Oct. 22nd) the variety programme is to be strengthened and enlivened by the Swiss Yodelling Quartet, who are on a visit to this country.

So be sure and listen-in between 10.15 p.m. and 11 p.m. if you are anxious not to "miss your Swiss."



The scene at Westminster, during the broadcasting of Sir Alan Cobham's welcome home from the Australian flight. The two pick-up microphones can be seen on the table.

Church at Fifty Miles an Hour.

THE manager of the "All Blacks," the New Zealand Rugby touring team, recently recounted how the team joined in a church service when moving at 50 miles an hour. Whilst crossing Canada in a wireless-equipped express, the Canadian National Railroad's operator tuned in a New York station nearly 3,000 miles away. Every word of a church service was heard, so clearly that the team just naturally joined in, as though they had been in church, though actually they were roaring through the Alberta prairies on their way west.

A Message from Mars?

IS it possible that the inhabitants of Mars will send a wireless message to the earth on October 27th? On that date the mystery planet makes its nearest approach to the earth. Can that vast space separating planet from planet be bridged by radio?

Fantastic as the idea may seem at first sight, it is possible that an attempt will be
 (Continued on next page.)

Havana Band. It is a novel combination consisting of two pianists, two saxophonists, one violinist, one banjo player, one trumpeter and one string-bass player. The effect of the light music, with the rhythm well marked, is one that comes over the other very well and crisply.

A Special Appeal.

A FRIENDLY and well-remembered voice is to speak from London on Sunday next (Oct. 24th) at 8.55 p.m., when "Uncle Caractacus" hopes to broadcast an appeal on behalf of the Moorfields Eye Hospital. "Moorfields"—as the great building is generally known—is the largest

NOTES AND NEWS.

(Continued from previous page.)

made. And to catch any faint message that may cross the millions of miles of intervening space, "P.W." has designed and built the most remarkable radio receiver ever assembled.

14-Valve Receiver Ready.

IT is a 14-valve receiver, embodying all the latest principles of amplification. Specially designed by the Technical Editor, and built in the "P.W." laboratories, it will be used to keep constant wireless watch upon the Red Planet. It is capable of receiving the faintest flickering impulses upon any wave-length between 40 and 40,000 metres, and of magnifying them enormously into a roar. Embodying as it does the most modern apparatus, it is easily the most wonderful wireless set in the world to-day.

A Possibility.

IN next week's POPULAR WIRELESS the set will be specially described, but for the moment it is enough to say that its 14 valves, efficiently applied, have potentially far more pulling power than twice that number would have possessed a year ago. Scientifically it is just possible that all long-distance records of the race may be broken by this gigantic amplifying apparatus.

Mars may not signal as she swings through space; but if she does reach out to us by radio, the receiver is ready.

Threat of Longer Talks.

IN commenting upon the above subject in "P.W." No. 227 (October 9th issue), our broadcasting correspondent referred to a speech by Mr. J. C. Stobart (B.B.C. Director of Talks).

"Mr. Stobart," he said, "can extend his talks to six hours each, if and when he is working on a genuinely alternative wave-length. But not before."

Fuller details of Mr. Stobart's speech show that a real alternative service for listeners before the talks are extended was a definite part of the plan referred to by the Director of Talks.

"Let Your Friends Listen."

BRITAIN is to have a National Radio Week, commencing November 7th and concluding on November 13th. The slogan will be "Let your friends listen," and the B.B.C. is co-operating with other radio interests to make the week a memorable one. Full details will be announced shortly.

Out-Shouting 5 X X.

LOUDER still, and louder" seems to be the motto of the German broadcasting authorities. Everybody knows how well Hamburg, Frankfurt and the others are coming over, and now there is to be a new German station far louder and stronger than any in Europe, including 5 X X. It will operate from Langenberg, on a wave-length between 250 and 600 metres.

A Radio Turn.

WANDERING round to the Holborn Empire the other day, I found they were staging an excellent turn by the Selma Four. It opened as an ordinary

drawing-room scene, with somebody suggesting some wireless music. A 5-valve wireless set was tuned in, and 2 L O came thumping through in fine style. But—as often happens—one of the company tried to improve reception, there was a sickening flash, and bang went all the filaments. So then they decided to make their own music, and very good stuff it proved to be!

TECHNICAL TERMS ILLUSTRATED

A POOR, wretched, thin, half-starved moke,

Who belonged to a greedy old bloke,

Turned and told him one day,

"If you don't buy me some hay,

I hope you will jolly well 

That Geneva Wave Plan.

WHAT has happened to the Geneva Wave Plan—that was to be in operation by mid-October? Originally the date fixed was mid-September, but the difficulty of getting all Europe's wave-meters adjusted to one correct standard has led to two or three postponements, and now the B.B.C. hopes it will come into operation next month.

The various countries are all sending

SHORT WAVES.

"Wireless and Herrings" was a recent headline in the "Westminster Gazette," but we hope there's no real connection, though the one we had for breakfast the other day was certainly a loud speaker!

"According to Mr. J. C. Stobart, we are threatened with Radio 'Varsities' in this country. But how can you send a radio underground?"—"Star."

"Polishing the ether. Difficulties of the wireless engineer."—Headlines in Morning Paper.

Emery paper is found to be best.

It has been stated that broadcast music is much more enjoyable if listened to with eyes shut. And, of course, still more enjoyable if one's neighbours listen to it with their mouths shut.

"The weather and its ways" is a topic of unending interest, and a series of six weekly broadcast talks with this title have been arranged.—Scottish Paper.

A versatile subject, "always"!

There was an announcer called White,

Who always professed to be right,

Until one summer's day

He omitted to say:

"Good-night, everybody, good-night!"

In connection with the radio physical jerks, the "Daily News" writes: "Many propose two short exercise periods—one for the early birds and another for the office workers."

The latter, we suppose, being the worms who earn!

An evening paper recently stated that a donkey in a London street held up the traffic for a considerable time, refusing to move until an errand boy standing on some steps commenced whistling. Probably more zest would be added to the sport if Radio "Canaries" for whistling were installed on all the leading race-courses.

The marriage has just been announced of an American and an Englishwoman, whom he met through hearing her voice over the wireless. Mr. Baird's "Televisor" would have come in handy.

Headline in Evening Paper: "Where does wireless stand to-day?"

If it ever travels by tube the answer is simple.

their wave-meters to Brussels for comparison with a big boss wave-meter there, and apparently the scheme cannot proceed until this autocrat of the wave-length-table gives the word "Go."

Sir Oliver Lodge.

OF all the broadcast talks I have ever heard, I thought the finest, friendliest and most notable was the one by Sir Oliver Lodge, introducing his lectures on "Atoms and Worlds." The vastness of the subject, the masterly treatment that made it seem so comprehensible, and, above all, the impression of noble personality radiated by the compelling voice, had exactly the same effect upon all to whom I mentioned the matter.

Don't you think so, too?

The Three-in-One Tube.

THE latest German invention of three valves in one is a wonderful step forward towards simpler radio. Recently I happened to be roaming round the "P.W." Test Rooms when one of these new valves (the first to come to Britain, I believe), was in operation. It was coupled up to a big Brown loud speaker, and was handing out the dance music with great gusto, the clarity being everything that could be desired.

Set Contained in the Bulb.

THE three-in-one valve was mounted upon a small base, the usual tuner, battery leads, etc., were taken to this,—and that was all.

The valve itself is rather on the hefty side, but no bigger than two ordinary valves, yet inside it were three glowing filaments, coils, resistances, and, in fact, a complete set.

It's not on the British market yet, but when it is I'm going to have one!

Organ Music from Kinema.

ORGAN music from the New Gallery Kinema, Regent Street, is a feature of the programme next Tuesday evening. This is the organ that has lately been heard on Wednesday afternoons, and it is owing to the popularity of these afternoon performances that an evening broadcast has been arranged.

Quality First.

WHY is it that Daventry's "outside" broadcasts are often perfectly clear, but when switched back to the studio the music becomes distorted? Several readers have remarked upon this in the letters I received in answer to my recent query, "Is Daventry Weakening?" and, incidentally, it may be remarked that 2 L O also suffers from this defect.

I hope that the B.B.C. is not slackening off its endeavours for perfection, nor forgetting the slogan "Quality First."

A Wireless Cake.

TO celebrate the inclusion of the Orchestra in the regular broadcast programmes, the Prince of Wales Picture Playhouse at Lewisham bought a cake. Not a tishy little miniature cake, but a whale of a fellow, weighing 2½ cwts., standing 5ft. 6 ins. high, and well over a yard wide! The top tier was surmounted by a reproduction of the wireless masts at 2 L O.

ARIEL.

REACTANCE.

A CONFUSING TERM EXPLAINED.

FROM A CORRESPONDENT.

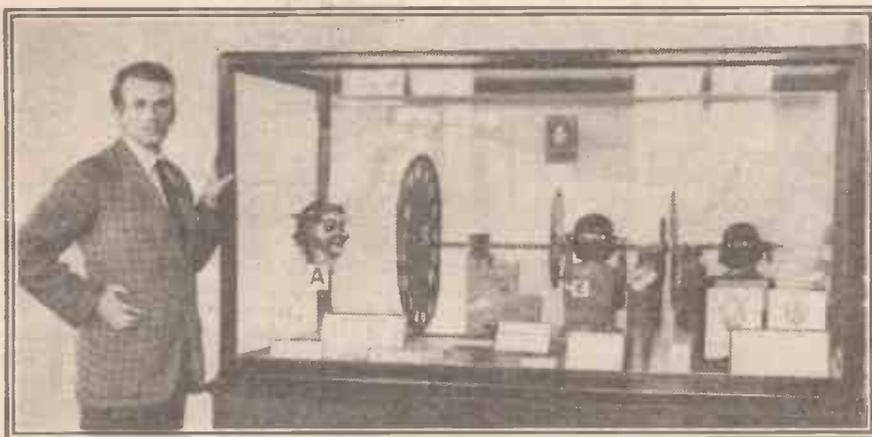
REACTANCE (not to be confused with *reaction*) is the opposition to an electric current offered by an inductance or a capacity, which are usually introduced by means of a coil or condenser respectively. (Inductance is that property of a circuit which tends to prevent any change in the value of the current flowing, and is analogous to mechanical *momentum* or *inertia*.)

If we were to wind several turns of thick copper wire on an iron core, and join the ends up to an accumulator, a very large current would flow, for the thick wire would possess hardly any resistance. The same coil, however, would very strongly oppose the flow of an *alternating* current, for, being wound in the form of a coil upon an iron core, it would possess a high inductance

opposite to those obtaining in the case of an inductance.

A condenser completely prevents a steady flow of current, but offers very little opposition to H.F. alternations, and in order to obtain a *small* reactance the capacity of a condenser must be *large*.

All electric circuits offer both resistance and reactance to the flow of an alternating current. Very often either one or the other is negligible, and direct current (as from a dry battery or accumulator) encounters no reactance. In alternating current circuits, however, the two may be of equal importance, and the name *impedance* is employed to denote the *total* opposition offered to the current by resistance and reactance (whether due to inductance or capacity).



Mr. Baird with his original television apparatus he has presented to the South Kensington Science Museum.

which would tend to prevent the current from changing. In other words, the current would encounter a high *reactance*.

Comparing the property of inductance with mechanical inertia, we may imagine the difficulty that would be encountered if we tried to push a heavy truck rapidly backwards and forwards, whereas, providing that the *resistance* (of the bearings, etc.) was low, we could easily push it steadily in one direction.

Reactance and Impedance.

The reactance of a coil depends upon its inductance and upon the frequency of the current. A high inductance offers a greater reactance than does a low one, and the opposition offered by a given inductance varies directly with the frequency of the alternations of current. Thus, doubling either the frequency of the current or the inductance of the coil will double the reactance.

The name reactance is also given to the opposition offered to a current by a condenser. In this case the conditions are exactly

A CHAT ON RECEIVERS.

(Continued from previous page.)

the present time, because given a stable H.F. unit of large magnification and good selectivity a great many other difficulties vanish.

Almost as old as the valve is the tuned plate circuit with reaction, but getting any further is a matter of great difficulty. Not only amplification has to be considered, but selectivity, because any increase of amplification tends to bring in unwanted stuff, so that the more you amplify the more you must select.

The tuned anode circuit is rather deceptive—it gives very fine sensitiveness, but all who have succeeded in adding another valve must have been deeply disappointed in the apparent small additional increases in signals.

Really a lot of the magnification of the tuned anode circuit comes from reaction,

which of course you can never apply twice, so that cascade tuned anodes really show up what the H.F. magnification is.

Selectivity.

Let us think about the selectivity of a receiver a bit.

There is at present only one method in general use for obtaining selectivity, and that is the principle of cascade tuned circuits.

One tuned circuit selects a certain amount and its selectivity is a maximum when you have the largest amount of reaction you can apply without distorting.

But two circuits in cascade will cut off unwanted waves much better than one circuit will without giving distortion, and the more the circuits the better the selectivity.

But this addition of circuits tends to make tuning very difficult to do, and a great number of attempts are now being made to simplify the apparatus for the user, but what is really wanted is a new idea for tuning differing from both the cascade H.F. circuits or its relative the superheterodyne, without the faults of the latter, which although of great interest, I have not space to consider in this article.

I am sorry to say that I see no revolutionary idea in sight, and we shall apparently have to go ahead patiently improving our methods for tuning a number of circuits accurately together with one handle motions and reducing the expense of doing it. The difficulty would be much less if we had only one range of wave-lengths to contend with in Europe, but every designer has to keep in mind 200-600 metres, and 1,000-2,000 metres, and only the designers know the heartbreaking work required to make both ranges work properly.

Valve Couplings.

The cascade tuning apparatus lends itself automatically to valve couplings in a way which tends to give the magnification which the selectivity of the set deserves.

But everyone knows the difficulties which have to be contended with to get stability.

In general we can say that to maintain stability in a cascade H.F. amplifier we should be in the limit:

1. Take care that by-pass condensers are arranged across H.F. batteries, etc., so that H.F. currents are not flowing in long leads.

2. Reduce the effect of the magnetic fields of coils by astatic winding and by shielding.

3. Reduce the electrostatic fields of coils, condensers, and any high potential leads by shielding.

4. After this is done take care that the valve capacity from grid to plate is effectively balanced out.

5. Apply effective measures to prevent any H.F. getting into the L.F. circuits.

Part way measures can be taken in all these operations—more than is necessary of course need not be done, but if you want the best receiver you will have to attend carefully to every point.

Short-Wave Parasites.

One difficulty in performing these operations has been noted in the last year or so.

It was discovered that a so-called neutralised circuit was really neutralised for the wave one was after, but in neutralising a

(Continued on page 452.)

THERE has been so much ill-informed speculation on the future constitution of broadcasting that it may be well to take this opportunity to dispose of some of the misapprehensions that are still current. Here is a stock question which is being put to us repeatedly: "Does the future of broadcasting under Civil Service control appeal to you as being likely to retain the interest and approval of the public?"

Greater Freedom.

This question implies an idea of the future of broadcasting which was never contemplated by Lord Crawford's Committee or by the Government. It is true that the Royal Charter has not yet been published, and until it is published no one can speak with certainty as to its detailed provisions. But there are quite specific and satisfactory guarantees that broadcasting



Mr. J. C. W. Reith.

under its future constitution will be at any rate no more under Civil Service control than it has been under the constitution of the past four years.

On the contrary, there seems no doubt that the broadcasting service will be in a position of greater authority and greater freedom. The working principle for which we have always contended—the principle of no restrictions and no privileges—is apparently agreed. The Broadcasting Corporation will rank as an independent public organisation with which there is no direct analogy and for which there is no close precedent.

THE FUTURE OF THE B.B.C.

A Special Article for "P.W."

By J. C. W. REITH, M.Sc.
(Managing Director of the B.B.C., Ltd.)

The Corporation will probably have power to widen the field of broadcasting. It will be as resilient and as responsive to movements of public opinion as we have tried to be. Its officials will not be Civil Servants—they will be appointed in the ordinary way, and their appointments will be subject to termination or extension according to commercial usage. There is no danger whatever of the broadcasting service losing the interest and approval of the public by virtue of its coming under a corporation of the kind that is envisaged by the Government.

The finance of broadcasting has always given us acute anxiety. On the one hand, the position with regard to licence revenue, so far as the public is concerned, is eminently satisfactory. Even at mid-summer, when interest in broadcasting might reasonably be expected to be at a low ebb, there was a steady increase in the number of receiving licences taken out. At the end of August there were 2,193,150 licences in force throughout the country, representing a gross revenue of £1,051,575 for the year. That is the bright side of the picture.

The Financial Position.

And now for the disposition of this money. To begin with, the Post Office is fully entitled to deduct the full cost of collection and administration, but we believe that the balance of the licence money should be reserved for the broadcasting service for its maintenance and development. So long as broadcasting remained under the control of a limited liability company there was perhaps a case for declining to hand over to it more than a limited proportion of the revenue from licence money. But now that the objection to the absence of public control is being removed through the substitution of a corporation for the company, we are hoping that adequate funds will soon be released for the further development of the service.

We are not out of sympathy with those whose purpose it is to find money for the public exchequer. On the contrary, we believe that there is much more chance of the broadcasting service becoming a permanent and regular source of revenue to the Treasury if it be allowed first of all to carry out the plans for bringing the service to the point of maximum efficiency.

The next step is to substitute a new system of distribution which it is hoped will not

only make the programmes available to everyone in the country on cheap and simple apparatus, but will also give a reasonable variety of programmes to the vast majority. That these plans should be carried out, we believe to be of the first importance. To carry them out will require a great deal of money. There will be quite enough difficulties in the ordinary way without having also to worry about finance.

Programme Constitution

Apparently misapprehensions are not confined to the larger issues of constitution and control. It is being suggested repeatedly that the advent of the Broadcasting Corporation will be marked by an undue increase in the proportion of the purely educational part of the programmes. It is



The Earl of Clarendon.

impossible to find any cause or justification for this and many similar alarms.

It is difficult to appreciate how to an average listener the transfer from the Broadcasting Company to the Broadcasting Corporation will be noticeable. The main object of the service will naturally continue to be the provision of the best available programmes of all values duly balanced. When facilities are secured for alternative programmes, the educational side of the work will expand to meet the increasing demands for it.

THE NEW B.B.C.

The Earl of Clarendon was first suggested as a likely choice for the new B.B.C. chairman in "Popular Wireless," and it has now been stated that the post has been offered to him by the Government.

Other members of the new corporation include Lord Gainsford, the present chairman of the B.B.C., and it is understood that the services of Mr. J. C. W. Reith, who, above all others, has been so successfully responsible for the development of British Broadcasting—will be retained in an important executive capacity.

The new B.B.C. chairman, the Earl of Clarendon, is at present Under Secretary for the Dominions. He is forty-nine and succeeded to the title in 1914. He was Chief Conservative Whip in the House of Lords and Captain of the Gentlemen-at-Arms from 1922-1925. He was appointed Under-Secretary for the Dominions on the reorganisation of the Colonial Office last year. He will probably commence his new duties when the B.B.C. becomes a corporation on January 1st, 1927.

The Crystadyme Circuit

By F. W. OSBORN

ANYONE who has had the opportunity of trying out a crystal and a valve rectifier in the reception of the same radio transmission by rapidly switching over from one to the other will, I think, agree that for purity and clarity, the crystal is easily best. This is particularly noticeable if the rectifier is followed by a properly designed and adjusted amplifier for working a good loud speaker. With a valve rectifier working on the "leaky grid" principle there is a distinct "woolliness" of reproduction as compared with that of the crystal.

Whether this is so with the older type of "anode bend characteristic" rectification method, using a proper rectifying valve, the writer is unable to say. However, this method is not met with very often to-day.

Mainly on account of this superiority, the writer has always been interested in the use of crystal rectifiers for the "detector" portion of a radio receiver. The main disadvantage of using crystals is that when adjusted to a state of maximum sensitivity they become unstable, often the least jar destroying the setting required, also, without the use of H.F. valves, only the local station can be received.

Many Foreign Stations Received.

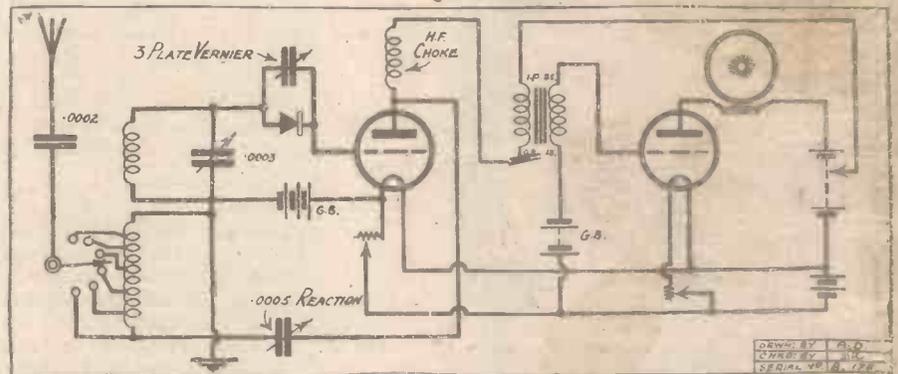
During his experiments the writer evolved the circuit given here, and it has given absolute satisfaction during the six months it has been in constant use. Providing the correct valves which can handle the power are used, with ample H.T. and proper grid bias, it gives a remarkably true and distortionless reproduction. The power of the writer's two-valve set is considerably more than that given by a straight detector and L.F. with reaction on the same aerial.

With the correct setting of the crystal many foreign and B.B.C. stations are received, some at quiet loud speaker strength and even with the reaction adjustment required to do so there is no apparent distortion unless the receiver is pushed to the oscillation point. Reaction, moreover, is every bit as finely controllable as in the "Reinartz" receiver, which it obviously so closely resembles.

The nucleus of the circuit is of a very old type, and needs no discussion. The additional features lie in the provision for the use of grid bias, and the addition of reaction, which is obtained in a novel manner. Grid bias is applied by the usual method of breaking the grid-circuit filament return lead and inserting the necessary battery, the exact value depending on the type of valve used.

The crystal detector is shunted by a small variable condenser (a three-plate vernier is about the right size) and this serves to bypass a slight amount of the H.F. component of the grid circuit. The amplified H.F. current in the anode circuit of the valve is then fed back via the usual "Reinartz" condenser control system to give the reaction effect.

Since the circuit is not so dependent on the crystal being set for maximum sen-



sitivity, there being an ample power in reserve, a stable perikon double crystal combination works perfectly, and it is only for the reception of weak distant stations that calls for any special setting. To achieve this, it is absolutely essential to obtain a setting of the two crystals which has but a small damping effect on the grid circuit, and unless this is achieved, the circuit cannot be brought to its most sensitive state, just off oscillation point.

The Crystal Adjustment.

Using an ordinary zincite bornite combination, the writer has never had any difficulty in finding such a setting for the detector, though it is true that with some settings the damping is excessive. However, either setting has no effect on the reception of a local station, which can always be got at excellent strength. Once, however, a setting is obtained which gives the necessary light damping, it will remain almost indefinitely. It is important, also, that the bornite crystal be next to the grid.

The aerial, too, is but lightly coupled, a small fixed condenser of 0.0002, as well as the small Reinartz coupling coil being used to ensure a sufficiently light load. When once the receiver is properly adjusted it is

delightfully simple to handle, the reaction control being just as steady as in an ordinary Reinartz receiver. In use the small variable condenser shunting the crystal should be kept at as low a value as possible, while allowing the receiver to be brought to oscillation point by the reaction condenser control.

It is absolutely essential that a correct L.F. valve be used in the last stage to handle the power obtained, and if the receiver is used on a good aerial the first valve will also probably have to be of the same type, as a general purpose valve will in most cases be overloaded.

Units For All Wave-lengths.

This applies, of course, to the reception of a near-by station. The tuning coil may well consist of a single layer winding 3 in. or 4 in. diameter; the grid portion of about 40 to 50 turns to tune over the broadcast belt; while the aerial-reaction portion is a similar coil, but tapped at every five turns, wound in the same direction on the same former, and just separated by a slight gap from the grid coil, the middle two ends of the windings going to the earth-filament lead. The aerial tapping lead is best adjusted by trial, bearing in mind the smaller the number of turns included, the less the damping, the greater

the selectivity, but if made too small, signal strength will be sacrificed. If the coils are fitted with plugs and sockets, interchangeable units for any wave-lengths can be made.

The rest of the circuit is straightforward, and the circuit diagram should make things clear. There is but one thing the writer regrets and that is that the selectivity is not higher, possibly tuning the aerial circuit and extreme loose coupling would improve matters, but this unfortunately adds a further control.

NEXT WEEK

'THE RADIO CONSTRUCTOR.'

A Special Supplement of eight pages devoted to the interests of the amateur constructor.

Edited by

Percy W. Harris, M.I.R.E.

Order your copy now.

The "P.W." Ranger

A receiver that can be used for ordinary broadcasting as well as for the reception of the ultra-short waves.
Designed, Built and Described by
The "P.W." Experimental Staff.



amplifying valve as usual, and in the plate circuit of this second valve are the telephones (or loud speaker).

As previously stated, the control over reaction has been specially arranged. Between the primary of the L.F. transformer and the plate of the detector valve is inserted an H.F. choke.

This prevents H.F. currents from flowing in the L.F. portion of the set. An alternative path for the amplified H.F. is arranged on a

principle that is very similar to the well-known Reinartz circuit. It consists of a plug-in coil, magnetically coupled to the aerial tuning coil, and in series with a condenser that governs reaction.

Reaction Control.

An extremely fine and even control over reaction is provided by the variation of this variable reaction condenser, and upon the normal broadcasting wave-lengths this fine control will generally enable quite a number of foreign broadcasting stations to be tuned in on the 'phones. The probability is that one or more of these will give sufficient volume for the loud speaker when conditions happen to be exceptionally favourable. In any case, at normal distances there should be excellent loud-speaker reproduction of the local and Daventry programmes when an ordinary good aerial is employed.

By removing the ordinary tuning coils and inserting in their place special "short-wave" coils the set is ready for short-wave reception. The only difficulty that would normally be experienced is the fact that whilst a .0003 condenser gives adequate control over the amount of reaction on broadcasting wave-lengths, a different capacity is needed for short-wave reception.

Well Spaced Wiring.

An extra fixed condenser has therefore been included in the set, and by means of a separate terminal strip and three terminals it can be brought into circuit as and when required. The construction of the set is in no way different from ordinary practice, except that it is essential that the wiring should be well spaced to avoid undesirable coupling effects when working at the high frequencies (short waves). Any constructor who has made two or three sets previous to this one will have not the slightest difficulty in arranging for this adequate spacing, and even those without much experience of the vagaries of short waves will be able to make a success of the wiring if every care is taken to avoid parallel paths and capacity coupling between neighbouring wires.

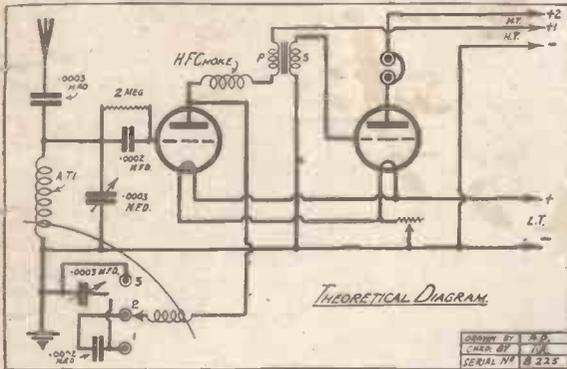
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THE "P.W." Ranger, as its name implies, is a set that is capable of very long distance reception. Only two valves are used, and yet with these two valves the set can not only receive distant stations, but is able to reproduce the programmes of the local station upon the loud speaker. This is exactly the kind of all-round set that many readers have been on the lookout for, and perhaps it would be as well to

that has been found necessary in order to make the set function efficiently upon wave-lengths below 100 metres is a modification of the condenser which controls reaction. Very little extra expense is incurred, so for this slight extra cost the constructor is able to ensure that, in addition to a broadcast receiver, he has a set that is capable of investigating the latest and most fascinating aspect of wireless—i.e. the short waves.

An inspection of the theoretical diagram shows how the circuit has been arranged to ensure these results. It will be seen that a .0003 fixed condenser is connected in series with the aerial, and that the aerial coil is tuned by a variable condenser across it in the ordinary way. A grid leak and condenser are included for rectification, and in the plate circuit of the detector valve the primary of an L.F. transformer is included.

The secondary of this transformer is joined to the



explain first how any simple two-valve set is capable of such a diversity of results.

The reason for the success of The Ranger is that the set is capable of "diving down" to the short waves, as well as receiving broadcast programmes in the ordinary way.

An examination of the photographs will show that superficially the set resembles the ordinary straight two-valver, in which the first valve acts as the detector, and the second valve is employed as an L.F. amplifier. This resemblance is, indeed, more than superficial, for, as a matter of fact, the circuit is a perfectly straight one.

Set for Short Waves Too.

Although The Ranger is capable of working as an ordinary broadcasting set, it can easily be changed over to act as a receiver for the ultra-short waves, the circuit employed for both classes of reception being almost identical. In fact, the only addition

LIST OF COMPONENTS.

	£	s.	d.
1 panel 16 in. x 8 in. x 1/4 in. (Peto-Scott) with cabinet and 8 in. baseboard	1	15	0
2 .0003 S.L.F. variable condensers (Peto-Scott)	1	1	0
1 Penton 2-way coil holder		6	0
1 Precision rheostat (30 ohms)		3	0
2 Lotus valve holders		4	6
1 Lissen L.F. transformer		8	6
1 Lissen grid condenser (.002) and leak (2 meg.)		2	0
1 Varley multi-cellular H.F. choke		9	6
1 Ormond air dielectric fixed condenser (.0003)		2	0
1 Ormond air dielectric fixed condenser (.0002)		2	0
2 Detex vermo dials (nickel)		9	0
3 Terminal strips complete (Peto-Scott)		4	0
Wire, screws, transfers, etc.		2	6

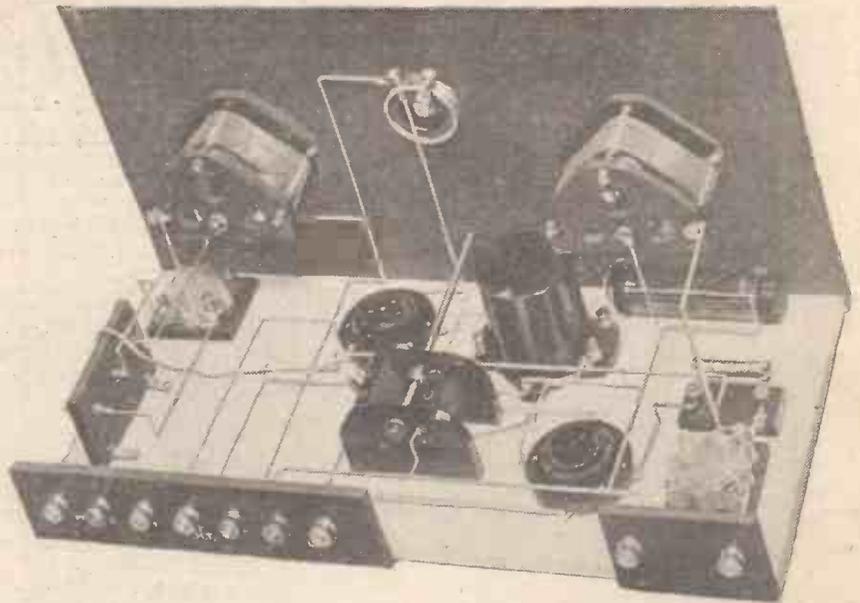
THE "P.W." RANGER.

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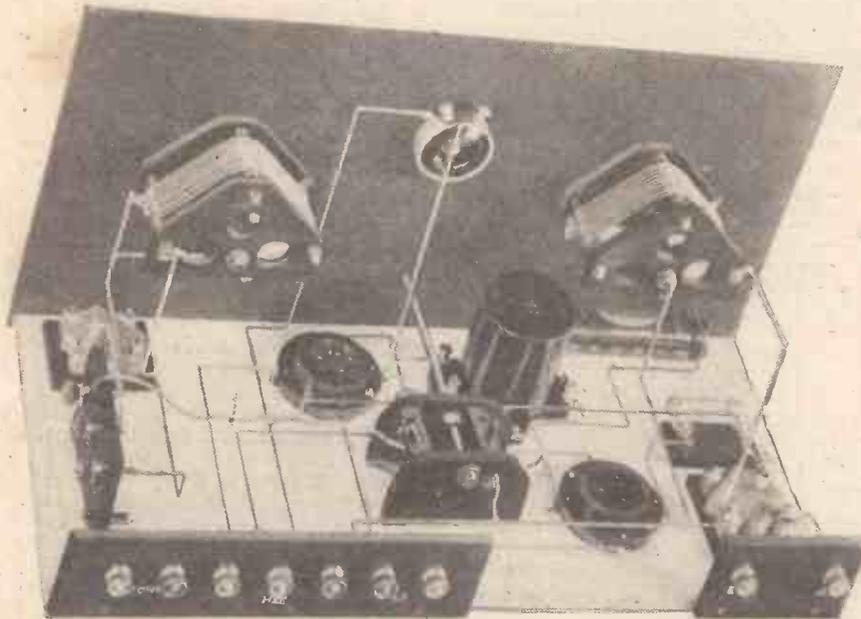
The sizes of the panel and the baseboard are stated in the list of components, and in addition there are three terminal strips required. One of these is 7 inches long and carries seven terminals for batteries, etc.; a second is 3 inches long and carries two terminals from aerial and earth. All these strips are made from $\frac{1}{4}$ inch or $\frac{1}{8}$ inch ebonite, 2 inches across, with the terminals evenly disposed along them. The third strip is 3 inches long by 2 inches in height, and it carries three terminals, which for the sake of clearness have been marked in the wiring diagram 1, 2 and 3. This latter strip is fixed to the top of the baseboard by two brackets and screws, and the other two strips are fixed by screws to the edge of the baseboard, as usual.

Panel Drilling.

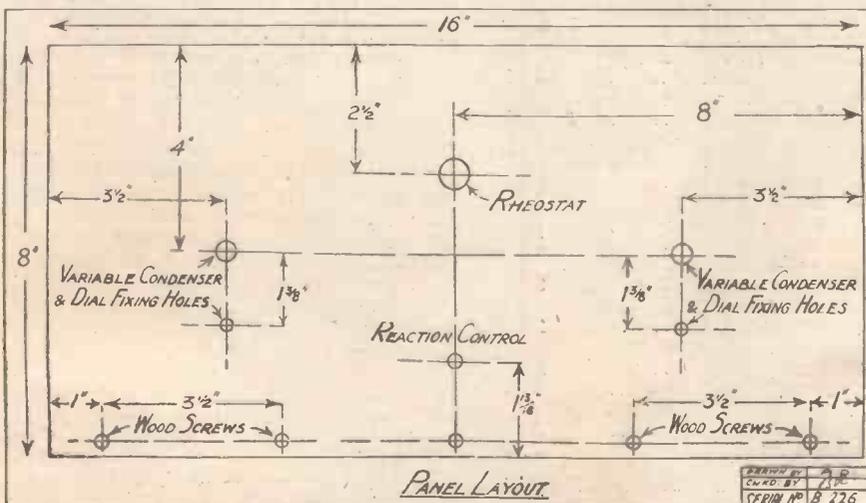
The drilling of the panel is simplicity itself, the positions for various holes being



This photograph shows the position of the H.F. Choke, and the method of fixing the reaction terminal board.



Another back of panel view, giving a good idea of the spacing of the wires that cross the baseboard.



shown upon the drilling diagram. It will be seen that five wood screws are utilised to fix the panel to the baseboard, and they should be arranged so that they enter the latter half-way through its thickness. The face of the small three-terminal strip that is mounted on the top of the baseboard is placed at a distance of 1 inch from the side, and the edge farthest from the panel is $1\frac{1}{2}$ inches from the long terminal strip.

Amongst the list of components necessary to build the receiver are two Ormond air-spaced fixed condensers; one of these is placed close to the aerial terminal and the other diagonally opposite on the baseboard. The coil holder is central, and the arrangement of the other condenser and valve holders is clearly shown by the photographs, which indicate also how the low-frequency transformer is placed. Underneath the aerial tuning condenser, in the angle between the panel and the baseboard, is laid the Varley H.F. choke. There is no need to fit this to the panel or baseboard, as its own wiring will hold it in place quite firmly.

The Wiring.

The original set was wired up with No. 18 square section tinned copper wire. The filament circuit was wired first, and these wires were kept low against the neighbouring surfaces, as they will be at earth potential. Following the filament leads, it is a good plan to wire the high-frequency part of the circuit. This comprises the aerial coil and condensers, grid leak and condenser, and the reaction terminal board. It is most important that all this wiring should be carefully spaced, and so long as this is done the rest of the wiring is relatively unimportant as regards the spacing of the leads.

The chief additional precaution that should be taken in constructing a set of this type is by scrupulous cleanliness to ensure that no leakage paths are provided by unwanted flux, and similar impurities, on the wiring itself, baseboard, panel or components. Apart from this necessity to solder carefully, the rest of the construction is not out of the ordinary.

(Continued on next page.)

THE "P.W." RANGER.

(Continued from previous page.)

When completed the connections should be checked over from the point-to-point check list that accompanies this article.

It only remains to add that care must be taken in connecting up the extra reaction condenser, as it is possible by mixing the leads to short the H.T. battery. This danger is easily obviated if the following procedure is adopted.

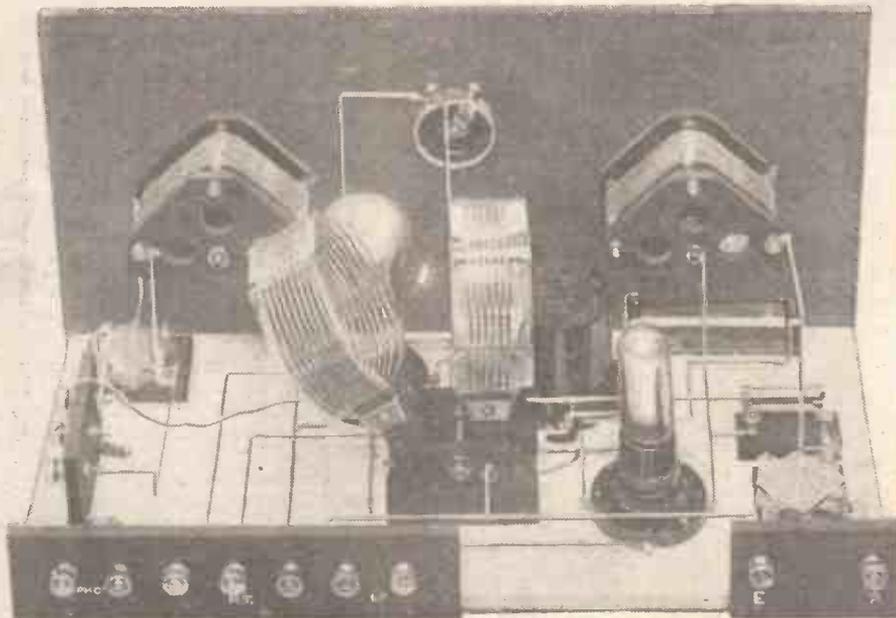
To join the two reaction condensers in parallel, the flexible lead from the moving coil should be fixed on to the terminal marked 1, and the terminals 2 and 3 should be joined together by a shorting switch.

To join the condensers in series, the flexible lead from the moving coil is taken to terminal No. 2, terminals 1 and 3 being left without external connections.

Tunney-Dempsey Fight Tuned In.

An inspection of the diagram will show that if the flexible lead from the coil is inadvertently connected to the terminal No. 3 the H.T. battery will short via the primary of the L.F. transformer, H.F. choke, and moving coil.

Owing to the wide variation in the values of the capacity reaction that can be applied, the set is not at all unduly critical as to the valves that may be used. Employing a 6-volt accumulator very good results were obtained with a B.4 valve in the 1st stage, and a D.F.A. 1 for the power valve. With a 2-volt accumulator the Cossor '1's gave excellent results, and another good 2-volt combina-



The special short-wave coils used for the very low wave-lengths are shown in position, in this photograph.

tion was the Cosmos S.P. 18 blue spot and the Mullard P.M.2.

It is interesting to know that on test, when using these latter, the broadcast account of the Tunney-Dempsey fight for the World's Championship was tuned in direct from America via K D K A

For all the tests the new "Igranite short-wave" coils were employed, using a 9-turn coil for the aerial. It was found possible to tune down to just over 30 metres

when employing a 6-turn aerial coil and 9-turn reaction. For K D K A (on 63 metres) the aerial condenser is about two-thirds "in," so that most of the condenser scale is available for the lower wave-lengths

POINT-TO-POINT CONNECTIONS.

Aerial terminal to one side of .0003 fixed condenser.

Other side of .0003 fixed condenser to one side of grid condenser and leak, to socket of fixed coil holder, and to fixed plates of A.T.C.

Other side of grid condenser and leak to grid socket of first valve holder.

Earth terminal to plug of fixed coil holder, to moving plates of A.T.C., to L.T. negative, to H.T. negative, to one side of rheostat, to moving plates of reaction condenser, to No. 3 terminal of series-parallel terminal strip, and to I.S. of L.F. transformer.

Other side of rheostat to one filament socket of each of the valve holders.

Other filament sockets to L.T. positive.

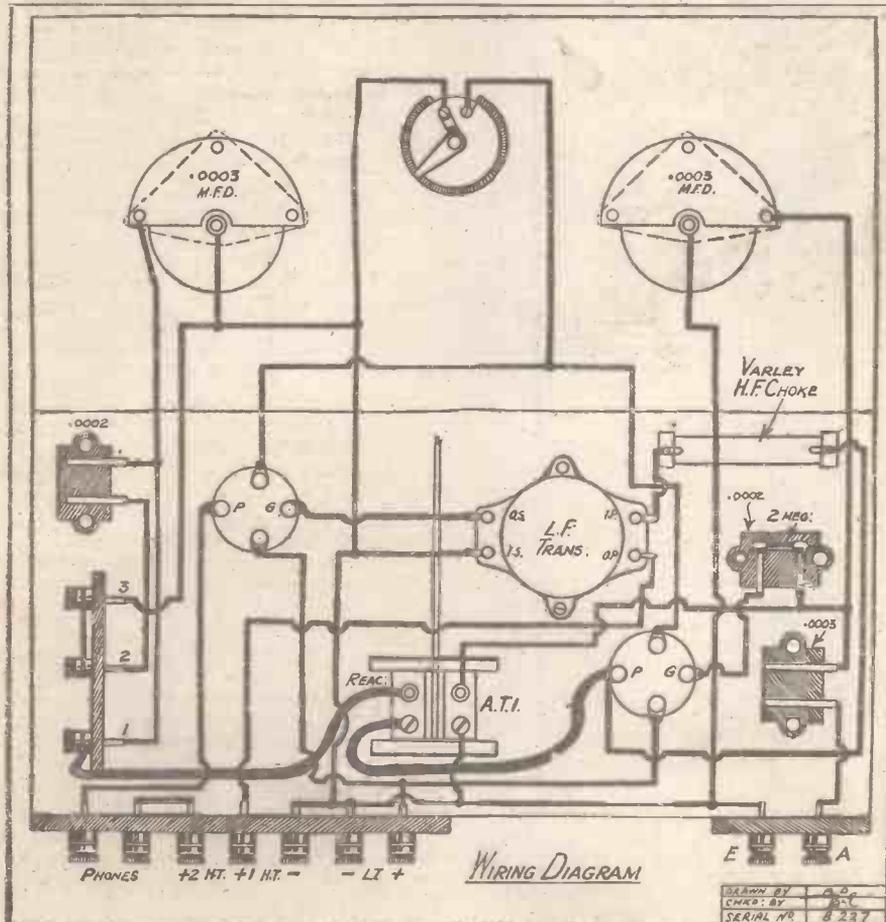
Plate socket of first valve holder to plug of moving coil holder, and to one side of H.F. choke. Socket of moving coil holder is joined by a flexible lead to one terminal on series-parallel strip as required.

No. 1 terminal on strip to one side of .0002 fixed condenser, and to fixed plates of reaction condenser. No. 2 terminal to other side of .0002 fixed condenser.

Other side of H.F. choke to I.P. terminal of L.F. transformer. O.P. terminal of transformer to H.T. positive 1.

O.S. transformer terminal to grid socket of second valve holder.

Plate socket of second valve holder to one 'phone terminal. Other 'phone terminal to H.T. positive 2.



In the set shown here no fixed condenser has been connected across the 'phones terminals, but of course this refinement may be added if desired. The best value depends upon the 'phones or loud speaker to be used, and generally it is not lower than .001 nor higher than .006 mfd.

THE question has been raised as to whether L.F. amplification will bring in stations which were previously inaudible, and whether, for a given number of valves, it is better to employ H.F. stages or L.F. stages. This question is continually cropping up in letters from readers, and has more than once been touched upon in these Notes. It has been common to assume that broadly the difference between H.F. amplification and L.F. amplification is that H.F. amplifiers give greater distance whilst L.F. amplifiers give greater volume.

This, however, is entirely on the assumption that the received signals, in the absence of any H.F. amplification, are sufficiently powerful to operate the detector efficiently. In such a case there is little or no point in using any H.F. amplification; and, indeed, if H.F. amplification be used it may be necessary so to adjust the controls that the same result is produced at the detector as could have been produced without the aid of the H.F. amplifying valves.

Providing the detector is efficiently operated, it is preferable to use any extra valves as L.F. amplifiers.

H.F. or L.F.?

On the other hand, if the incoming signals are very weak, as for example signals from distant stations, then, although it is still useful to add L.F. amplifying valves, the full benefit of these is not obtained. In such a case it is preferable to put one stage or more of H.F. amplification before the detector.

It will thus be seen that the question as to whether L.F. or H.F. amplification is required in any particular case centres around that of the efficient operation of the detector. If, for example, the station is within crystal range, even long crystal range, it will certainly be unnecessary to use any H.F. amplification, and any spare valves you may have had better be devoted to serve as L.F. amplifiers. If, however, distant or weak stations are required, try a stage or two of H.F., and note whether this produces better results.

In this connection, as I believe I have mentioned before, it is often found that a single stage of H.F. amplification does not produce any very appreciable benefit, but two stages of H.F. amplification will in the appropriate cases undoubtedly do so.

In the most general case, where a constructor wishes to employ three valves, and is not sure whether to use them as a 1-v-1 or v-2, that is to say, as H.F., detector, and one L.F., or as detector and two L.F., it is almost invariably preferable to employ them as detector and two L.F.

Do Batteries Cause Corrosion?

The question which we discussed recently as to the inclusion of the batteries within the cabinet of the set has brought me a number of letters from various readers who have had experience with accumulators, and in particular a letter from Mr. A. Wright, who gives an interesting account of his observations with a battery of large storage cells. The question at issue is as to whether the fumes or alleged fumes from the accumulators are liable to cause corrosion on metal parts within the set. My correspondent continues:

"I have been dealing with batteries of accumulators used for lighting purposes for the last thirty-five years, and I have never found anything stored in a battery

TECHNICAL NOTES.

A Weekly Feature
Conducted by

Dr. J. H. T. ROBERTS, F.Inst.P.
(Staff Consultant.)

house harmed by fumes; on the contrary, anything I wish to preserve from rust or damp I store in the battery room. I believe it is fairly common knowledge in laboratories that if electrical and other apparatus (e.g. Winshurst or other high voltage machinery) is to be kept dry enough to always be ready to excite, the only practical way is to enclose in an airtight case with open bowls of sulphuric acid. With regard to accumulators,

signals described as being of "phone strength" or "loud-speaker strength" or "good loud-speaker strength," and so on. It is evident that these descriptions must be largely a matter of opinion.

Testing by ear on very weak signals is particularly deceiving, as most listeners will not be accustomed to discriminating between signals which, although very weak, may have a very great percentage difference in intensity.

In the case of fairly strong signals it is possible to measure the rectified current (referring here to uni-directional current as, for example, the current through a crystal detector) by means of a galvanometer inserted in series with the crystal detector and the headphones. Another arrangement is to use a galvanometer in the plate circuit of a valve, the grid having a bias applied to it sufficient to reduce the plate circuit to zero when no signals are passing. When signals are received on the grid, a current will flow in the plate circuit, the value of which will depend upon the intensity of the



All that was left of the giant Sikorsky "New York-Paris" aeroplane in which two wireless operators lost their lives.

the only emanations are evaporation of pure water and (during charging) hydrogen and oxygen, this last being too absorbed with the hydrogen to be able to oxidise anything.

When I first took up experimenting with power loud speakers, about three years ago, I substituted my H.T. dry battery with an accumulator (the set is enclosed in glass), and I have now no oxidisation of soldered joints or transformer breakdowns through fumes eating through fine windings; also the contact keeps in adjustment on galena for many months at a time. The reverse happened when I used dry batteries, for they undoubtedly produce noxious fumes."

Gauging Strength of Signals.

Amateurs are very fond of comparing notes with one another as to the strength of signals received, and, owing to the difficulty of employing any unit of loudness for comparison purposes, one commonly hears

signals. Incidentally, this experiment indicates the importance of a suitable grid bias for reducing the H.T. current consumption.

Another very simple way to compare signal strength is to arrange a change-over switch so that the headphones or loud speaker can be switched on to either of the two receivers which are to be compared, and to arrange a variable resistance, such as a potentiometer, across the headphone or loud speaker terminals on one side of the switch—the side which gives the stronger signals. By suitable adjustments of the value of this shunt resistance it will be possible to make the strength the same in both positions of the switch. In this way a rough estimate of signal strength may be obtained, and the comparison may be made more scientific by a determination of the impedance of the reproducer.

(Continued on page 453.)

Build your own loud speaker

GONE ARE the days of troublesome 'phones. The LISSENOLA brings loud speaker convenience to every home at a record in low price. For 13/6—less than the cost of headphones—you can buy this wonderful loud speaking unit, needing only the addition of a horn to make it a powerful, full-sized instrument yielding results equal to an expensive speaker. And you can build a horn yourself—with each LISSENOLA we give you full size exact patterns and clear instructions how, for a few pence, you can build a big horn of proved efficiency. In addition, the LISSENOLA will fit the tone arm of any gramophone. The secret of this efficiency rests in the remarkably effective manner in which the electro-magnetic sound-reproducing system is concentrated.

Compare the price last

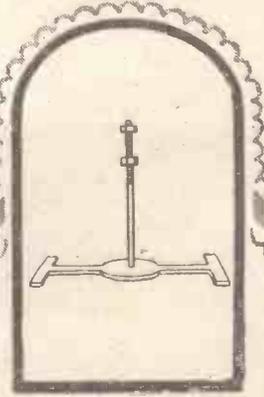
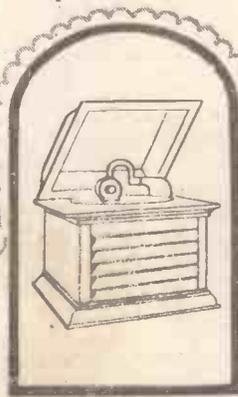
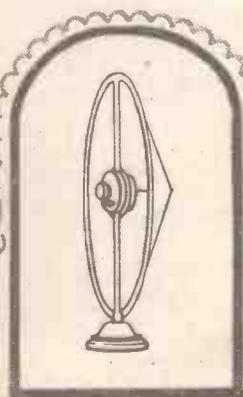
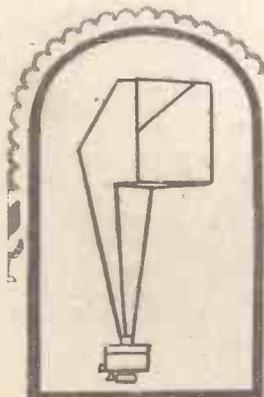
—before you buy go to your dealer and make this test: Ask him to put on the best loud speaker he has in stock—then use the same horn on the LISSENOLA, and see if you can notice any difference.

THE LISSENOLA

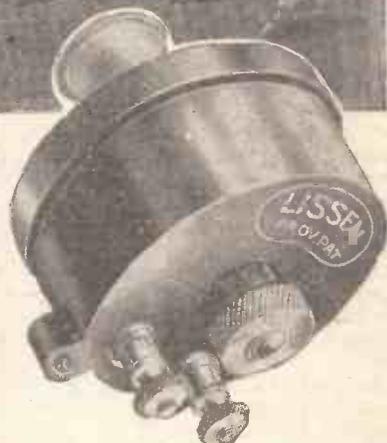
Now no home need lack a loud speaker.

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

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



L.7.



PRICE
13'6
EACH

The illustration shows the effective horn you will build yourself—it can be covered with fancy paper, or wallpaper, and painted so as to resemble a factory article. Get a LISSENOLA for your home.

By using the Lissen Reed (sold separately for 1/-) the Lissenola will carry a cone or any other diaphragm working on the reed principle.

Your dealer will gladly demonstrate and supply, or the "Lissenola" can be obtained post free by return from the makers.

LISSEN LIMITED,

8-16, Friars Lane, Richmond, Surrey.

*Phone: Richmond 2285 (4 lines).

*Grams: "Lissentium," Phone, London."

Managing Director: T. N. COLE.

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

The "Lissen" Reed Attachment (pat. pending) for use with cone diaphragm loud speaker. Price 1/-.

"SIDEWAYS WOUND" COILS

By H. G. AYERS.

ALTHOUGH many types of plug-in tuning coils are in use, there is still room for improvement, and the writer claims that the coils described have several distinct advantages.

It is recognised that a "sideways"-wound coil is the most effective, inasmuch that the potentials are well separated and are definitely on either side of the coil, enabling maximum magnetic coupling to be obtained. Other advantages claimed for this winding are that all coils are of the same diameter, giving maximum coupling and uniformity. All wire is at right angles to the axis, giving low H.F. resistance, ample

that they are all parallel and true in both directions; it is worth while giving special care in preparing the former, as the "good looks" of the coil will depend on the pegs being true. A third former having 23 pegs is very useful for medium-sized coils.

Two discs are now made from sheet metal, that will comfortably slide down inside the pegs, and a hole drilled at the centre to take a bolt about 1½ in. long, the head of which will pass through the hole in the centre of the former.

A piece of board about 4 ft. long and 3 in. wide is selected to carry the former and reel of wire, a wooden peg is inserted about 6 in. from one end on which the former can revolve, and a hole drilled about 18 in. away to take a long French nail to carry the reel of wire.

Method of Winding.

The former is placed on the wooden peg, and one disc dropped in within the pegs, the wire is led from the reel and a turn given round one peg to secure the end, leaving about 6 in. to spare; then, by turning the former round with the left hand and feeding the wire on with the right, the coil is wound by starting over 2 pegs, under 4, over 1, and under 2, etc., with the 17-peg former, and over 2, under 8, and over 1, and under 4 on the 29-peg former, and over 2, under 6, over 1, and under 3 on the 23.

The wire should not be strained unduly tight or the combined strain of many turns will bend the pegs inwards. Occasionally during winding the spare disc is used to press the turns down and keep the coil compact; if the bolt is put in the spare disc it is useful to handle it by.

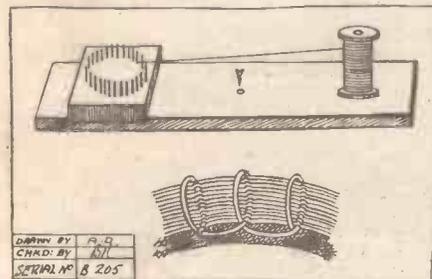
When sufficient

turns have been put on the wire is given a turn round one pin, the spare disc dropped in, wire cut, and the former removed from the board; the bolt is now inserted upwards through the hole in the former and the nut screwed on and tightened sufficiently. The coil is now removed from the pegs by pulling the bolt; should it be tight, the coil can be eased up from the bottom by inserting something suitable between the pegs at several places under the bottom disc and gently levering upwards.

Useful Data.

The number of turns in each layer is the number of pegs plus one halved—viz. 9, 15 and 12—and can be arrived at by counting the number of parallel wires on the edge of the coil one peg behind the point of starting.

While the coil is clamped in the discs, it is sewn securely with single thread; the method is shown in the sketch—the thread being shown very thick for clearness, and, of course, is pulled up reasonably tight. The discs are now removed, and the coil can be mounted as desired. It is not necessary to treat the coil with wax.



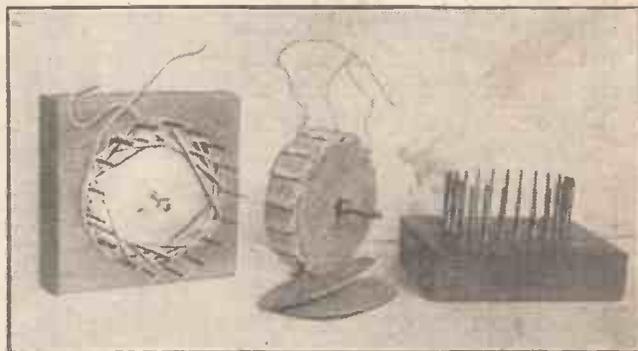
air spacing, turns are not closely paralleled, the coils are extremely rigid and self-supporting, and the centre field is free from any supporting material, damping effects from that source being entirely eliminated.

The difficulty with a sideways-wound coil is to keep the width within reasonable limits, but it will be observed from the photograph that this is overcome; a 250-turn coil can be wound with 28 S.W.G. D.C.C. and is only one inch wide.

The Formers.

Two hard wood—oak, ash, beech or birch—bases are first prepared, 4 in. square by 1 in. deep; a circle 2½ in. in diameter is described on one face of each, one divided into 17 equal divisions and the other 29, and with a ⅜ drill holes ¼ in. deep are drilled at these divisions, care being taken that these holes are perfectly upright. A ⅜ in. hole is also drilled through the centre.

Two-inch oval brads are used for the pegs; these must have the heads removed and any rough places on the length removed with a fine file, and finally polished with emery cloth so that the coil when finished will slide off without obstruction. The brads are now driven in flat sides at the side, and should any of them not be upright they should be straightened, so

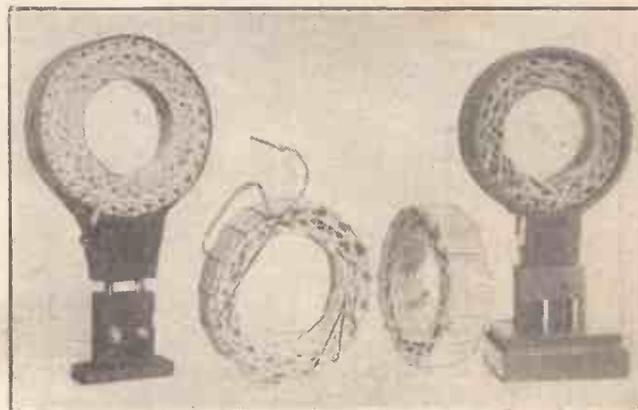


Coils in the making. This photograph gives a clear idea of the method employed.

The writer has had exceedingly good results, and will be pleased to hear the opinion of other experimenters.

The following details of winding may also be useful:

- Pegs 17 up to 60 turns 22 S.W.G. D.C.C.
- Over 2, under 4, over 1, under 2 pegs.
- Pegs 17, 65—120 turns 24 S.W.G. D.C.C.
- Pegs 17, 125—150 turns 26 S.W.G. D.C.C.
- Pegs 29, 155—200 turns 26 S.W.G. D.C.C.
- Over 2, under 8, over 1, under 4.
- Pegs 29, 210—250 turns 28 S.W.G. D.C.C.
- Pegs 23, 50—100 turns 24 S.W.G. D.C.C.
- Over 2, under 6, over 1, under 3.



Four examples of sideways-wound coils made by the method described.

TESTED RADIO
BOWYER-LOWE
APPARATUS

- FOR PERFECT RECEPTION



POPULAR CONDENSERS.

The "Popular" condenser, owing to its design, provides a precision corrected square law condenser at a low price. The rotor is electrically connected to the girder and plates, while the fixed plates are held at four points by ebonite insulators. Supplied with 3-inch dlals.

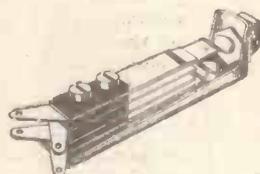
.0003 M.F. 10/-
.0005 M.F. 10/6



COIL SCREENS

These coil-screening boxes provide a very efficient method of utilising screened coils. The sockets are standard. The box is of polished aluminium and screws into the base screen, thus providing a perfect electrostatic screen.

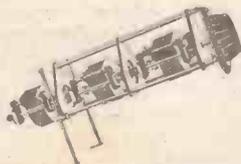
Screen and Base 15/-



JACKS

The introduction of Bowyer-Lowe Jacks provides the wireless constructor with components which are far superior in design and manufacture to anything hitherto available.

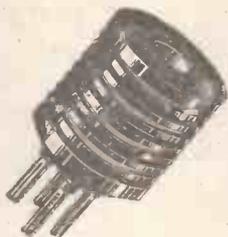
Single Circuit (open)	-	2/2
Single Circuit (closed)		2/7
Double Circuit (closed)		3/-
Filament single control		2/9
" double "		3/3



GANG CONTROL CONDENSERS

This condenser has been designed for use in single-control receivers and is provided with three independent condensers of .0005 M.F. capacity insulated from one another but controlled from one dial. A simple means is provided for varying the relative positions of the rotors so that the different coils and transformers can be balanced.

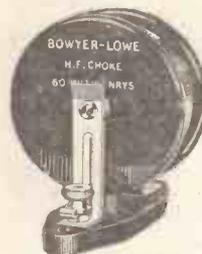
With 4-in. dial £3 13 0
Without dial - £3 10 0



H.F. TRANSFORMERS

These transformers are section wound with the Primary and Secondary loosely coupled and are highly efficient. The primary is tuned by means of a .0003 M.F. variable condenser to the stated range. Every transformer is matched to a standard, and no particular selection is needed for multi-stage H.F. working.

Each 9/-



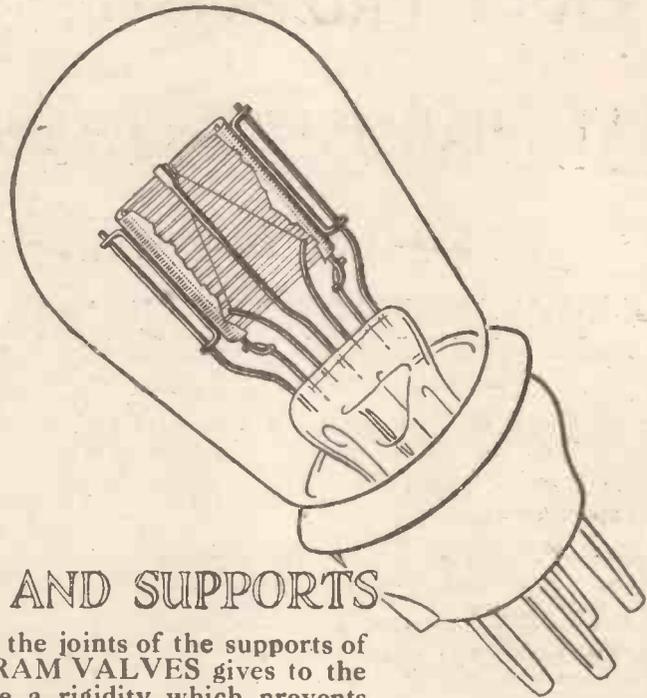
H.F. CHOKE

The graduated sizes of the air core high-frequency chokes available in this series enables the best size to be selected for any circuit, as changes can be very quickly made. The chokes are machine-wound of low self-capacity, while the sizes will cover most needs of the amateur.

2 Millihenries	} 7/-	20 Millihenries
5 "		40 "
10 "		60 "
		Base for Chokes 2/-

ANNOUNCEMENT BY THE BOWYER-LOWE CO., LTD., LETCHWORTH, HERTS

Solid, Firm and Rigid



JOINTS AND SUPPORTS

Spot welding at the joints of the supports of all types of OSRAM VALVES gives to the whole structure a rigidity which prevents microphonic noises and ensures reliable, satisfying service.

Osram Valves

for Broadcasting

The G.E.C. - your guarantee

None know better than users of OSRAM VALVES how reliable and consistent is the performance of every single type, due to the soundest methods of construction and to the unrivalled excellence of the OSRAM Dull-Emitter filament.

Use

GECOPHONE

Britain's Best Broadcasting Sets,
Components and Accessories.

£200

IN CASH PRIZES FOR "P.W." READERS

A

GREAT CHANCE FOR AMATEUR CONSTRUCTORS

WHAT YOU HAVE TO DO—

The Editor of POPULAR WIRELESS is offering 5 prizes of £25 each and 5 of £15 each to readers of POPULAR WIRELESS who enter the "P.W." Constructors' Competition by filling up the coupon on this page. There is no entrance fee.

The prizes will be awarded under the following categories:

- A. A prize of £25 for the best home-made L.F. amplifier unit. Second Prize £15.
- B. A prize of £25 for the best home-made Variable Condenser, approx. capacity .001 mfd. Second Prize £15.
- C. A prize of £25 for the best original wireless receiving set component. Second Prize £15.
- D. A prize of £25 for the best home-made Variometer for B.B.C. wave-lengths. Second Prize £15.
- E. Special prize for readers under 16 years of age. A One Valve B.B.C. wave-length (not 5XX) receiver, size limit for panel 10 in. by 7 in. First Prize £25. Second Prize £15.

READ THESE RULES CAREFULLY.

The First Prize of £25 in each class will be awarded by the Editor of POPULAR WIRELESS for what he considers the best constructive effort within the terms laid down for the respective classes. In all cases workmanship and design and the amount of actual "home made" apparatus will be primarily considered in the judging. The second prizes will follow according to merit.

The Editor may divide any of the prizes, at his discretion. The Editor's decision will be absolutely final and binding in all respects.

Any number of entries may be sent but each entry must be separate and distinct in itself and must be accompanied by a separate signed coupon (as given here). Thus, if you want to enter two of the classes, just buy another copy of "P.W." which will give you the necessary coupon.

All apparatus must be addressed to:

"Amateurs' Radio" Competition,
The POPULAR WIRELESS
7/9, Pilgrim Street, Ludgate Hill,
London, E.C.4 (Comp.)

and it must reach that address not later than TUESDAY, November 16th. Nothing arriving thereafter will be admitted for adjudication. When packing your apparatus, pack carefully and make sure that you enclose stamps to cover the cost of its being sent back to you, otherwise its return cannot be guaranteed. And when sending up your apparatus please use on the parcel a label (according to the class you are entering), see page 396. This will greatly facilitate the work of handling entries. Every care will be taken of entries, but no responsibility can be undertaken in this respect. This contest is only open to bona fide wireless amateurs.

Any apparatus of professional make (other than the smaller component parts and accessories) will be disqualified.

No one connected in any way with POPULAR WIRELESS is eligible to compete.

Apparatus will be returned as soon as possible after the adjudication.

ENTRANCE FORM.

I (Signature).....
of (Address).....

.....
an amateur in wireless construction, wish to enter the "P.W." Constructors' Competition Class. . . . (write "A," "B," "C," "D" or "E," as the case may be) and hereby agree to abide by the Editor's decision. I declare that the entry herewith submitted, is of my own construction. (If under 16 years, please state age.)
To the Editor ("Amateurs' Radio" Competition Dept.), POPULAR WIRELESS, 7/9, Pilgrim St., Ludgate Hill, London, E.C.4 (Comp.)

New B.B.C. Board.

IN view of the fact that Lord Clarendon was included in the short list of Corporation Stake favourites published first of all on this page, the announcement of his appointment as chairman of the British Broadcasting Corporation would not come as a surprise to readers of POPULAR WIRELESS. It was, however, a distinct surprise to some people. The appointment may become a political issue. The Labour Party have already decided to raise the matter in Parliament on the ground that the chairmanship of the new B.B.C. should not be regarded as ordinary party patronage. If the objection is not upheld—and it certainly will not be—then the Labour Party intend to indicate that as soon as they get into power they will change the Broadcasting Board. The name of Mr. George Lansbury is already mentioned as the Labour successor to Lord Clarendon as chairman. Outside of those circles in which party political advantage is guarded with keen jealousy there is general agreement on the wisdom of the appointment of Lord Clarendon. He has wide interests and a sound general understanding of human problems.

Pouishnoff Again.

Pouishnoff is to be the pianist for the Star Ballad Concert at London on November 7th.

Bach's "Passion."

The B.B.C. are considering a broadcast of unusual interest for next year. This is Bach's "Passion" according to St. Matthew, which is to be performed by London soloists in Peterborough Cathedral on March 24th. The London Symphony Orchestra and a special choir of 1,500 voices will participate.

The S.B. Controversy.

The recent week in which the Albert Hall classical concert and the Grotrian Hall international symphony concert were both compulsory simultaneous broadcasts from all B.B.C. stations has brought to an acute stage the controversy about the S.B. policy of the B.B.C. A considerable body of opinion is challenging the criterion of quality for the determination of S.B. People who object in this way point out that there should normally be some alternative somewhere in the British system, however good the main programme may be. A modification of policy may be confidently expected.

B.B.C. and the Post Office.

There is a renewed tendency in certain quarters to criticise the B.B.C. for inaction as against the Post Office. A monstrous suggestion is also being made that B.B.C. officials are feathering their own nests by playing up to the Post Office. The fact is that the B.B.C. has already gone considerably beyond a liberal interpretation of its licence in developing an independent policy. The financial requirements of the broadcasting service have been put before the public and Parliament in a reasonable and convincing manner. No amount of ill-considered polemics, or theatrical attacks, could accomplish anything like what the B.B.C. has done in getting its case across. Those who are now traducing the officials at Savoy Hill would be better employed in trying to help the cause of broadcasting.

BROADCAST NOTES.

The New Board—The S.B. Controversy—B.B.C. and the Post Office—"Charley's Aunt"—Wave-length Problems—Staff Changes at Savoy Hill.
(FROM OUR BROADCASTING CORRESPONDENTS.)

"Charley's Aunt."

Arrangements are in hand for a special broadcast of "Charley's Aunt" as a feature of the Christmas programmes from London.

"HALLO EARTH, MARS CALLING!"

Scientists all over the world are following with interest the "P.W." attempt to pick up radio signals from our planetary neighbour Mars. See next week's issue of "P.W." for full details of the wonderful fourteen-valve receiver specially designed for this inter-world wireless test.

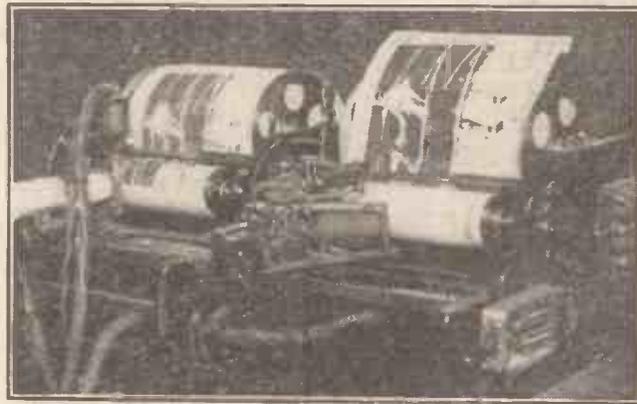
ORDER YOUR COPY NOW!

An Eton Broadcast.

The end-of-Christmas-term concert at Eton is to be broadcast this year.

Radio Pantomime.

A complete radio version of "Cinderella" is in preparation, and will be broadcast



The first wireless pictures of the Dempsey-Tunney fight coming through from America at Radio House.

during the Boxing Night programme on Monday, December 27th.

"Flotsam" and "Jetsam."

These two popular artistes will be heard by listeners every night during the week beginning November 22nd. The plan of "period engagements" for artistes of such wide popularity as these is to be followed more regularly in future.

The Wave-length Problem.

There are still further difficulties with regard to wave-lengths, and it is now unlikely that there will be even a dress rehearsal until about the middle of November. Thus the new distribution of wave-lengths throughout Europe will not be

generally operative until well on in December, if then. No one is to blame for these delays, except perhaps the eager spokesmen of the International Union of Broadcasters, who have been much too optimistic in their announcements.

Wave-lengths for Britain.

With only nine wave-lengths for England, Scotland, Wales, and Northern Ireland, there is naturally a good deal of difficulty in determining a reasonable allocation. It is unlikely that final decisions will be taken until the Corporation is definitely functioning; that is, some time in February. The scheme which appears to be finding most favour at the moment is the one which provides four new high-power regional stations. In addition there would be two stations at Daventry, and perhaps one transmitting relay station. But the whole scheme is still nebulous. The position is completely transformed by the international difficulties which prevent Britain from having as many exclusive wave-lengths as was formerly anticipated.

B.B.C. Staff Changes.

The appointment of Captain Eric Dunstan to be head of the new broadcasting service in India has attracted considerable Press comment. Captain Dunstan joined the B.B.C. in a characteristically casual way. He was calling on some friends at the Savoy Hotel. While waiting, he looked through the window across Savoy Hill, and caught sight of Admiral Carpendale at work in the B.B.C. headquarters. Having known Admiral Carpendale well, it occurred to him to drop in and renew the acquaintance. As a result, he became an announcer a few days later, and now only six months afterwards is off to India to start a new service.

Captain Dunstan was, in fact, the junior announcer at Savoy Hill.

Miss Hilda Matheson, formerly political secretary to Viscountess Astor, has joined the B.B.C. staff, and will assist on the talks side of the work. This is an interesting and happy appointment from several points of view.

The Gilbert and Sullivan Broadcasts.

More than two hundred letters from listeners were received by the B.B.C. in connection with the last Gilbert and Sullivan broadcast. There was an almost unanimous approval upon two points, one being that this class of light opera is just the thing for broadcasting. And the other a suggestion that the whole of the performance should have been broadcast, instead of only an hour.

Unfortunately the latter course is impossible under the present agreement with the theatre managers, and it was only as a special occasion that a full hours' programme could be arranged.

The next Gilbert and Sullivan relay has been arranged for Monday next, October 25th, when Act I. from "The Gondoliers" will be broadcast.

Build perfection into your L.F. Amplifier by using

GECOPHONE

(REGISTERED TRADE MARK)

NEW SEASON'S COMPONENTS

Reduced Price
GECOPHONE
Transformers.



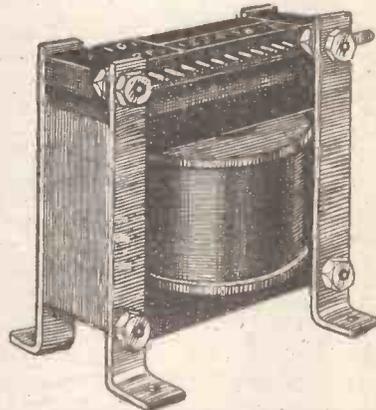
Increased manufacturing facilities and a continuous demand for GECOPHONE L.F. TRANSFORMERS make it possible substantially to reduce prices. Their excellence is unrivalled.

REDUCED PRICES:

Ratio 2-1 17/6

Ratio 4-1 22/6

Sold by all
Wireless Dealers
and Stores.



GECOPHONE TAPPED TRANSFORMER provides the only really satisfactory method of volume control. Volume can be modulated from full strength to a whisper. High impedance primary gives full amplification over the whole audio-frequency range.

Price £1 7 6

A New
GECOPHONE
L.F. Choke.



GECOPHONE L.F. CHOKE is a neat and compact component for use in choke-coupled L.F. stages. High value of inductance gives maximum amplification of the lower frequencies and ensures natural reproduction. The new circuit uses a butt joint to render the inductance more constant.

Price
15/-



8-POINT SWITCH

for use with GECOPHONE Tapped Transformer. The knob only shows above the panel.

Price 4/6



GECOPHONE CHOKE AMPLIFYING UNIT

The ideal Unit to build into your set for perfect reproduction with heavy power. The Unit requires to be preceded by a transformer for connecting to detector valve. All terminals are clearly marked — the metal container is grey enamel finished.

Price (without valves) £4 0 0

WRITE FOR FULL PARTICULARS.

The G.E.C. - your guarantee

Use
Osrham
Valves
For Broadcasting
Your Guarantee
of Better Wireless.

DEMPSEY v. TUNNEY fight

THE GREAT FIGHT.—A ringside description of the great fight at Philadelphia was clearly heard in Norwich in the early hours of yesterday morning by Mr. C. L. Ashhurst, of George Borrow Road, Norwich, and two friends, on a specially constructed short wave set, the distance from the transmitter being about 3,000 miles. "It was thrilling," said Mr. Ashhurst, "to hear the speaker describe every detail of the fight, round by round, and we were able to follow the conflict almost as easily as one seated by the ringside. Now and again the cries of the crowd came surging through. At the conclusion of the fight we were switched back from Philadelphia to New York, from where we were given a brief review of the contest and comments on the result. Tunney won eight rounds out of the ten."

—*Eastern Daily Press, Sept. 25th, 1926.*

The Ediswan new $\frac{1}{4}$ -watt valves are fully described in the booklet "The Ediswan Range." Ask your dealer for a copy, or write direct NOW.

Remarkable reception on 2-valve set!

(Read report on left.)

Mr. Ashhurst, who used the Ediswan new $\frac{1}{4}$ -WATT D.R.2 as detector, writes:—"This remarkable reception was due in no small measure to your valve."

NOW YOU KNOW THE VALVE TO USE

FIT

EDISWAN VALVES

AND NURSE YOUR SET

THE EDISON SWAN ELECTRIC CO., LTD., 123-5, QUEEN VICTORIA STREET, LONDON, E.C.4





As we amiably struggle from booth to booth at the Radio world at, held at the new Madison Square Garden, on Eighth Avenue, between 49th and 50th Streets, New York City, the question, "How many people are here?" constantly rings through our mind. A million, at least, we painfully estimate.

What can be described legitimately as the predominating tendency in design, is hard to say. There are several predominating tendencies. Shielding, for example. A multiplicity of receivers on view for the first time were practically nothing but metal; and cones—nearly every stand where were loud speakers for the public's inspection had prominently displayed a cone of some description. Incidentally, the writer wishes to point out that his recent statements, which some may have construed as slightly derogatory to the cone, are whole-heartedly taken back.

Our Correspondent deals with the novelties of New York's Radio Exhibition for the benefit of amateurs in this country who are interested in "What's going on" in Radio in America.

By LAWRENCE W. CORBETT.
("P.W.s." New York Correspondent.)

to your horn, and expect a cone to be the obvious panacea. Too many people did that in America! First make sure that your L.F. amplifier is in good trim. Spare no cash when buying the transformers.

Amplion people have gone into production with a cone! It retails for about six pounds and, in outward appearance, somewhat resembles the Radiolux. If I am not very much mistaken, this Amplion cone has not yet been seen in England. Heretofore, I believe, Alfred Graham & Co., of England, have always set the pace to the American Amplion people, but this time it looks as though the American people have gone ahead on their own account. Your New York correspondent endeavoured to elicit from the New York Amplion Corporation such information as would enable him to tell you whether or not the Amplion cone would appear shortly in England or not. No such information was available.

An "Oval Cone" Loud Speaker.

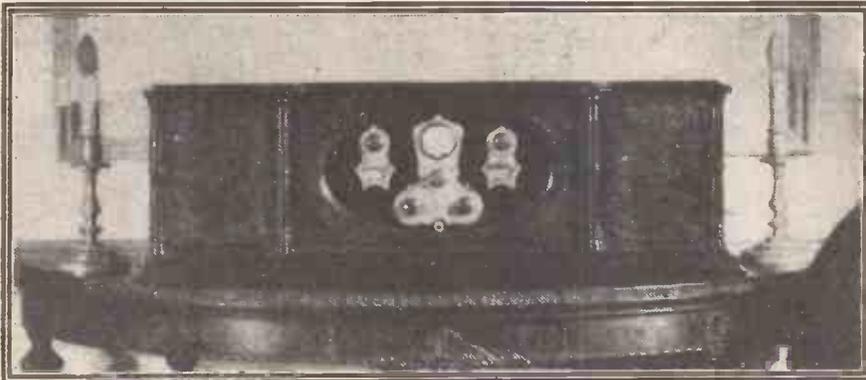
Amplion has another model out, too. It is called the Patrician, and is a new development employing a 48-inch air column with standard Amplion unit. The whole is contained in a highly-curved mahogany cabinet 18 in. by 12 in. by 9 in. It is non-directional and retails for about nine pounds.

Another cone development which may affect British buyers is that of the Patent Radio Corporation. It is a 36-in. cone, and the writer has heard good reports concerning it. Whether or not it will be handled by Igranic is not clear. The writer has been informed that a lot of the Patent Instruments marketed in England by Igranic are imported from America, and not just manufactured in England under Igranic patents. Maybe, then, the Patent cone, too, will be seen in England soon. Five or six pounds appears to be the average retail price for a good cone in America, though there are quite a few retailing at a third of this price.

Another cone development is due to Radio Foundations, Inc. It is a balanced, oval cone loud speaker, and claims are made for it to the effect that it amplifies both the high and low notes equally well. Radio Foundations say that the usual loud speaker of cone type, if it has a large diameter cone, tends to over-emphasise the low notes, while the small cone will give undue prominence to the high notes. With the oval cone it is said that the long sides stress the low notes, while the short sides are better for the high notes; thus absolute balance is obtained.

Yet another interesting cone on the market in America is one of many in a line produced by the American Bosch Magneto Company. It has wicker work facings, highly enamelled, which harmonise with the wicker-work fittings in a summer room. So much for the cone.

(Continued on next page.)

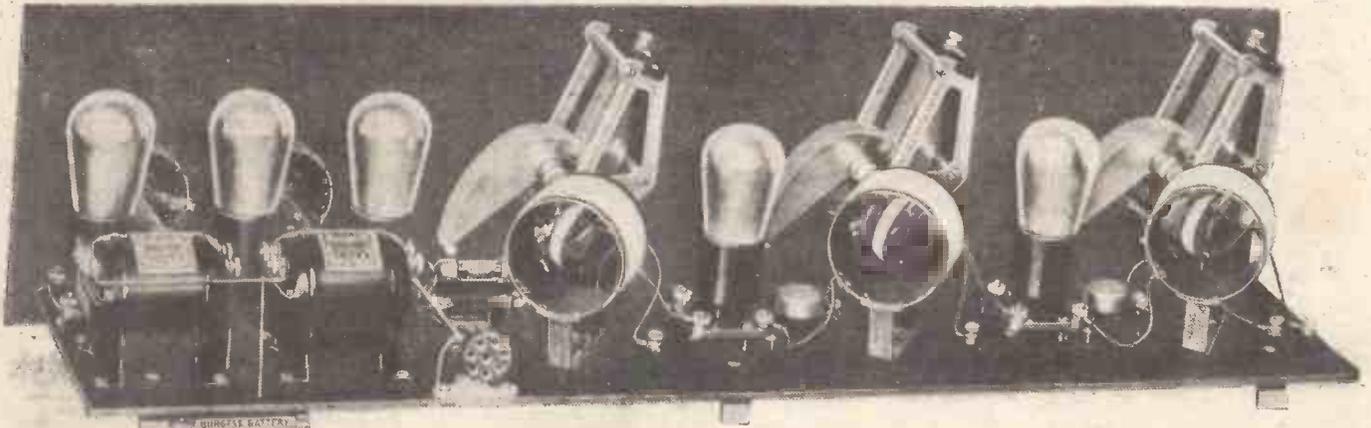


A magnificent example of American radio design—a product of the Argus Radio Corporation

There are cones and cones, and there is little doubt that, providing a good one is chosen, it will give a rounder, more mellow reproduction of the original than most horn type loud speakers. Ware, though! Don't think that the distorted reception you are at present experiencing is due entirely

The best cone in the world will produce beautifully distorted output if not hooked-up to a perfect L.F. amplifier.

Yes, as I walked from stand to stand at the New York show, I was surprised at the numerous cones now available. And here's news: the American

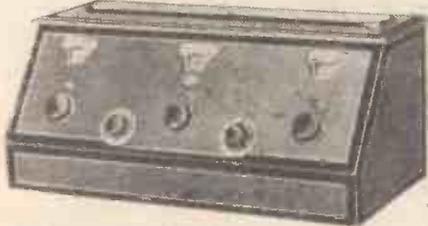


In this "Equamatic" receiver, produced by the Karas concern, the coupling between the primary and secondary of the H.F. transformer is automatically varied, as the condenser dial is rotated to vary the capacity.

NEW YORK'S RADIO SHOW.

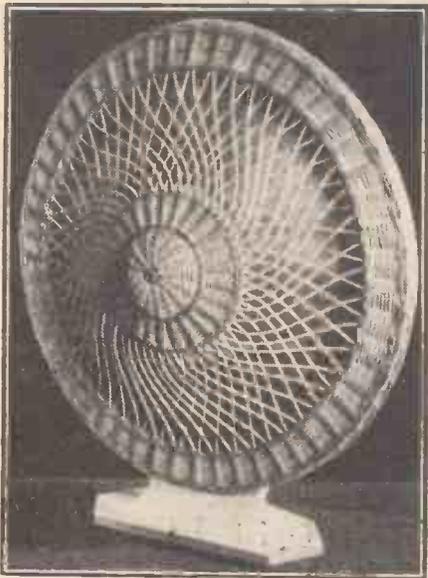
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As mentioned above, shielded receivers were much in evidence at the Madison Square Garden. Yes, indeed! One radio editor went so far as to say in his paper that practically every new receiver utilised shielding in some way or other. Without doubt, many receivers have taken on the appearance of automobile chassis. Take, for example, the new Priess nine-valve receiver (there are quite a few nine-valve receivers on the market in America). The front panel of this set is of brass, grained to take



The improved Crosley 5 38 five-valve receiving set.

the appearance of wood. The set chassis, itself is about 2 ft. long, and is made entirely of heavy brass and bakelite sections, joined by brackets, cross-members, and stiffening strips in such rigid fashion that the outfit can be dropped bodily on a concrete floor without hurt! This set utilizes a frame aerial,



The new Bosch cone loud-speaker mentioned on the previous page.

and the manufacturers claim it gives an overall amplification of 2,500, as compared to an average of about 1,500 for the super-heterodyne.

Another all-metal levitator is being marketed by Perlesz. Also a nine-valve receiver, it employs

The Bosch "Amorada" seven-valve single control receiver. Five variable condensers are linked up to one roller dial.

four stages of tuned H.F. amplification, a tuned detector, and four stages of L.F. amplification!!! You might raise your hands in horror above your heads, but Perlesz seems to be able to satisfactorily get results from this receiver. The L.F. stages, I believe, are coupled by specially designed chokes which have a tap to obtain a step-up. To cap all this, dear sirs, be informed that this is a single-control receiver. The five variable condensers are all operated by one single knob! And a rugged-looking job it is, too. The Perlesz nine-valver, in a console, sells for about one hundred and twenty-five pounds, exclusive of batteries and valves. If you live west of the Rockies, however, it will cost you six pounds more.

Four Built-in Loud Speakers.

A new neodyne, Model 800, of Freed-Eismann also employs shielding. It has eight valves, including four stages of H.F., and single control, too. Each H.F. stage is totally shielded, as also is the detector stage. Shielding for the L.F. stages has also been resorted to. The manufacturers claim that shielding of the L.F. stages minimises distortion such as may be caused by pick-up from outside electrical disturbances.

The Bosch Amorada receiver is another example of total shielding. Each of the tubes in this receiver, with the exception of the two L.F. stages, has a special metal cap which may be easily removed. This is a 7-valve receiver retailing for about sixty pounds.

There is not much to mention in the horn loud-speaker line. One manufacturer has produced a loud speaker that resembles an opened book. We can see the time, when the gentleman chosen to read the first lesson will demand that a loud speaker of this type be placed on the lectern, so that he may not have to return to his pew between the lessons, but may rest and be entertained for his diligent efforts. Amplion evidently expect to go over big with their new cone, for they are, it appears, making a determined effort to sell-out their A.R. 102, A.R. 111, and A.R. 114-units. A certain retailer is advertising them in the following words: "Amplion safe continued. These units are offered at such a low figure that the manufacturers will not permit us to make it public."

The Zenith people evidently do not seem to care much for the cone. Most of their super de-luxe sets employ two distinct horns, built in, which operate in cooperation. One of the two is designed especially for the low notes, while the second is better for the higher notes. The Spanish model put out by Zenith has four built-in horns!

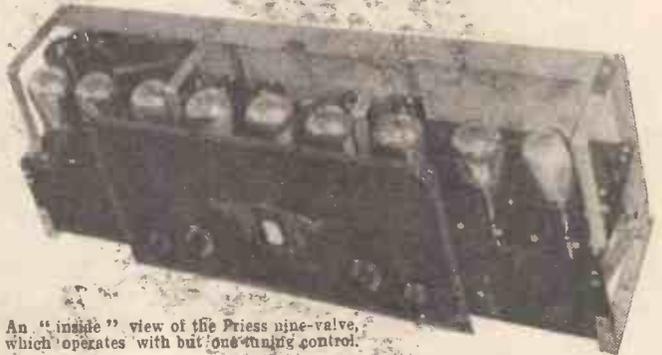
As regards valves (I nearly said "tubes" that time!) there is not a great deal to report. No doubt the news trickled over to Europe a few months ago that quality and not distance is now the aim of the American fan, and so the old general purpose valve immediately went down one peg. Few people are content now unless they have a power tube in the last L.F. stage, with often 225 volts of grid bias. Special detector tubes, too, have appeared, as also have specially designed H.F. ones.

Battery Eliminator.

The L.F. power valves often require as much as 45 volts on the grids alone. With the advent of the power valve, it was at once realised that the ordinary H.T. battery would receive rather a serious knock. Who cared to buy 200 volts of H.T. battery every few months? The answer came quickly. Most houses in the United States have A.C. current, and so H.T. battery eliminators were designed, which would step-up the voltage up to, in many instances, 200 volts.

Many such eliminators were shown at Madison Square Garden. Paerent had an interesting exhibit along this line. It was a combined power amplifier and B battery eliminator. It is designed for connection to the first L.F. or detector output. Within the instrument are the power

tube rectifying tube, filtering system, transformer, etc. H.T. taps are included on the panel, so that the plates of the valves in the main receiver may also be supplied from this unit by the simple expedient of connecting it to an electric light socket.



An "inside" view of the Priess nine-valve, which operates with but one tuning control.

Many other manufacturers had similar exhibits. Timmons, for example: their instrument has a valve base with a length of flexible cable connected to it. This valve plugs into the holder of the last L.F. valve in the main set. Another flexible lead connects from the unit to the electric light mains. The loud speaker is connected to the power unit, existing H.T. batteries are done away with, and the H.T. terminals of the set are connected to terminals on the unit, so that all H.T. potential is obtained from the mains.

This unit is housed in an attractive maroon metal cabinet, and measures 12 x 5 x 6 in. approximately. It operates direct from the 105 to 120-volt A.C. mains of 50 to 60 cycles. Tremendous power with excellent



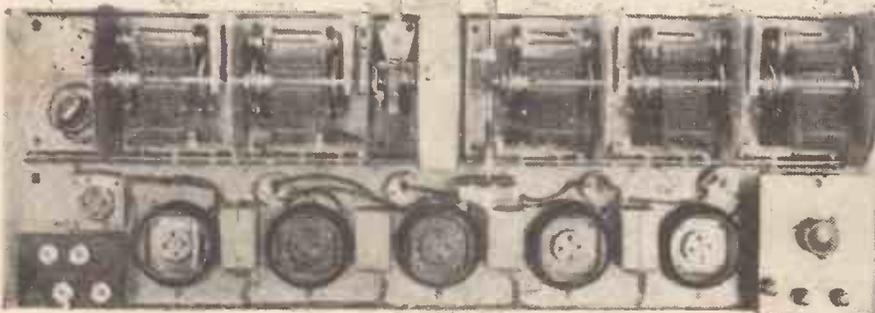
The "Berkeley" model Magnavox single dial, five-valve set, which costs approximately £52 without accessories.

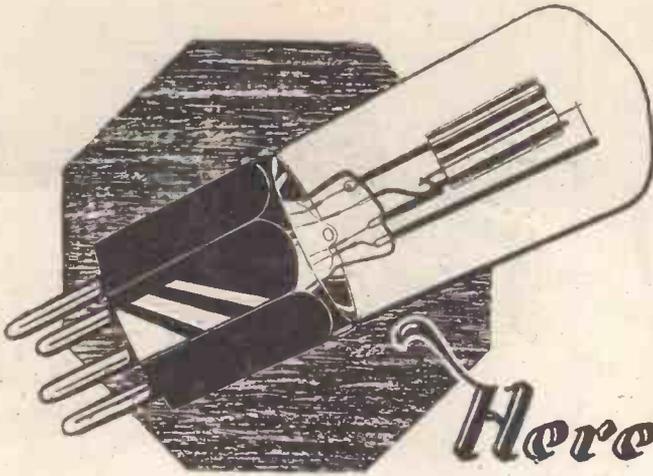
quality is obtainable from this unit. The plate of the power valve receives three hundred and fifty volts potential. The unit also takes care of the high grid bias required. The day is rapidly approaching when everybody will be using super-power amplifiers as their output stages!

While H.T. battery eliminators capable of supplying 200 volts were common at the New York show, one manufacturer is making a bid for popularity in the H.T. battery line. He has produced a dry H.T. battery capable of being charged to its original strength six to eight times at a cost of about 12 cents a time. It is said that this battery will last for as long as two years.



The new American Amplion "Patrician" loud speaker, which sells for about £9.





Here are details of the new valve

Here are the promised details of the New Octron Radio Valve. While it is impossible to mention all its points, the following is a brief summary of its outstanding features.

Low internal capacity and suitability for short wave length. Non-microphonic. Octagonal Bakelite Cap prevents valve rolling when laid on table. It has a hole between pins to reduce electrostatic capacity. Patent hollow nickel-plated valve pins giving maximum clean contact. Wire connections to filament and anode made through these pins not outside them. Pipless bulb reducing possibility of breakage. Designed by expert Radio Engineers and produced in a works specially equipped for the exclusive manufacture of Radio Valves.

Four types are made, suitable for 2 and 4 volt batteries:

- Blue Line** Extra high amplification factor and impedance for resistance capacity L.F. **Price 12/6**
- Red Line** Standard type of H.F. valve for straight circuits. Also makes good detector valve with excellent results when followed by low ratio transformer. **Price 12/6**
- Green Line** Standard type of L.F. valve for first or second L.F. stages. Excellent results as detector when followed by high ratio transformer. **Price 12/6**
- White Line** Power Valve for Loud Speaker work. To handle large volume with low impedance. **Price 15/-**

The 'Octron' Valve will improve your reception. Ask your dealer—you'll know it by its octagonal base—or send for full specifications to Sole-Makers

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Standard Model

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OCTRON

The Valve with the Octagonal Base



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Q See
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**Battery
Eliminator
employs
T. C. C.
Condensers**

MOST Battery Eliminator contain Condensers which have to stand up to the full voltage of the mains. The mains supply is often as high as 250 Volts A.C., and ordinary condensers tested to 300 volts cannot be guaranteed to stand up to this pressure for a long period.

Therefore, for safety's sake, use—or see that your Battery Eliminator utilizes—the special

T.C.C. High-voltage Condensers. Built and tested to withstand 600 volts, the T.C.C., having been used on domestic lighting supply for a number of years, is perfectly safe and absolutely reliable. For behind it are twenty brimming years of experience in Condenser-making—years during which millions of Condensers, from large 4-ton Power models (consistently used by the G.P.O., Admiralty, War Office and Cable Companies), to the famous little green 1½-ounce Wireless Condensers have been used. In the name of safety, could there be a better choice for a Battery Eliminator than T.C.C.?

Q T.C.C. 600 volt D.C. Test Mansbridge Condensers for Battery Eliminators come in capacities of .5, 1, 2, 4, 5, 8 and 10 mfd.

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The Grid Leak is not discernible, being totally enclosed in Bakelite Valve Holder Base.

**Something new and good
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The latest LOTUS triumph is a Combination Grid Leak and Valve Holder which eliminates unnecessary wiring and soldering and makes for economy in cost and space.

Guaranteed efficient in construction and design.

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Combination Grid Leak and Terminal Valve Holder	3/9
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All Anti-Microphonic Type.

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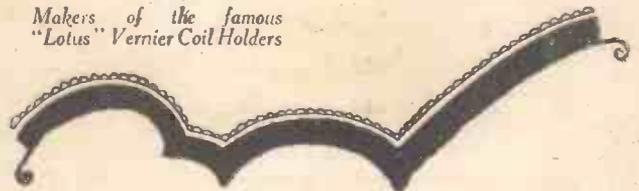
Combination

GRID LEAK AND VALVE HOLDER
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A Special Article by a very well-known and popular radio engineer.

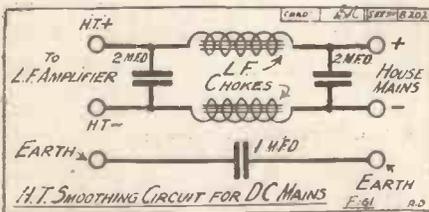
By B. HONRI
(B.B.C. Engineering Staff.)

"THIS, sir, is an ideal receiver," is a well-worn and overworked expression. Wireless salesmen love it, for it always applies to their most expensive sets. "Tenderfoot" listeners like to hear it, for it somehow seems to fit in with the advertisement pictures of whole families (in evening dress) sitting around the loud speaker with delighted smiles on their faces. Both parties are satisfied, so let us leave them in their bliss.

what is one man's meat is another man's poison.

To meet popular demand, wireless manufacturers have tried to make their sets do too many things. A large number of manufactured receivers are good for distant reception, give quite good reproduction of the local station, and are simple to operate. There are very few sets which excel in all three requirements, and very many which don't satisfy any.

Unfortunately all house mains are not the same, and it is difficult for manufacturers to design a standard smoothing unit for eliminating the hum of the dynamos at the

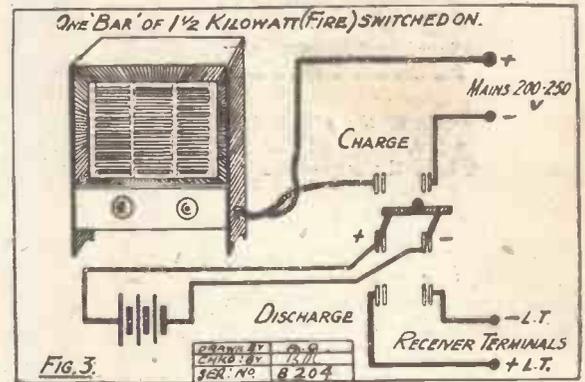


Using the Mains.

There must be hundreds of would-be listeners in search of a really perfect loud-speaking receiver for "local" use only, which looks like a piece of furniture and works off the house mains. And yet how many receivers are there which are "ideal" for this purpose? Very few, I think. A seventy-five-guinea perfect quality receiver would give far more pleasure than that long-suffering instrument, the suburban drawing-room piano.

The maintenance of a wireless set is a more expensive matter than most people think, if it is not carried out in the right way. All listeners, for instance, who have electric light in their houses should make use of it in some way or other to bring down the "cost of upkeep" of their sets. The man who has 250 volts direct-current mains should most certainly use the electric supply for his H.T.

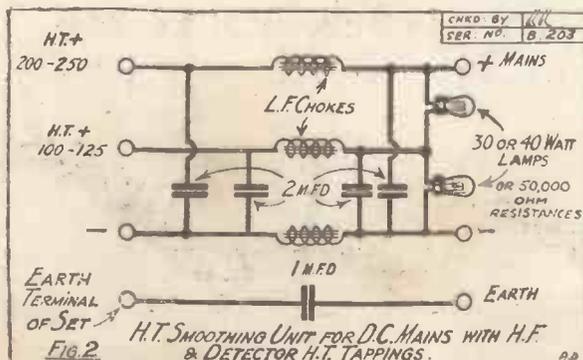
If worked every night, the L.F. side of the average wireless set would use up about 2s. worth of electricity in a year. Compare this with the unsatisfactory H.T. battery, which costs about £2 a year to maintain and only gives its full voltage for a very short period. Crackles, howls and bad language have all been caused by half-run-down H.T. batteries. The expending of about 30s. on chokes and condensers will ensure you of a practically free H.T. supply for life.



In this case, however, though ignorance is as blissful as ever, wisdom would have brought more money into the till of the salesman and greater satisfaction to the buyer of the wireless set. Let me make one thing perfectly clear: there is no ideal receiving set for everybody, nor is there any likelihood of there ever being one.

Asking For Too Much.

There is an ideal set for you, who have electric light in your house; a different ideal set for me, with my distant station mania; and a still different ideal set for Terence Bluggie, who wants to be a jazz drummer and can't hear the jazz tom-tom on his horn loud speaker. As the B.B.C. Programmes Department have discovered,



electric light stations. In Fig. 1 is a circuit for working a set off the mains. This particular circuit I use for my own L.F. amplifier, working off 200 v. D.C. mains, though I must admit that I put an eighty volt bank of accumulators in series with the mains to give me a still higher voltage! Providing you adjust your grid bias correctly, it is a very good idea to use the full mains voltage on your amplifier, for you will be able to obtain far greater volume from the last valve than with the conventional 120 volts H.T.

Economical L.T. Charging.

If I was fortunate enough to have a 400 v. supply on tap, I would most certainly use it on my L.F. amplifier. The last valve of an L.F. amplifier, whether it be resistance or transformer coupled, should have as many volts raked up on its plate as possible. The greater the voltage, the greater the "grid swing" and the less chance there is of distortion due to grid current or rectification at this stage.

It is more difficult and rather wasteful to run the filaments off the D.C. mains without the use of special circuits, but it is very easy to charge your L.T. accumulator at home. Fig. 3 shows how to charge an accumulator in series with an electric fire. In the winter time, when you normally use the electric fire, you are able to charge your L.T. for nothing but the loss of (Continued on next page.)

FOR LONG-DISTANCE CRYSTAL WORKERS.

By J. F. C.

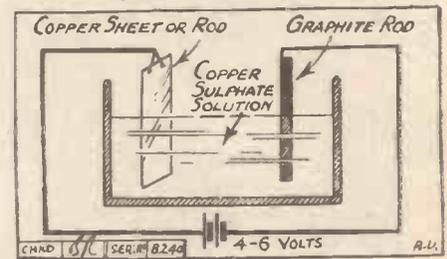
DX CRYSTAL experimenters are well aware of the fact that one of the most sensitive crystal contacts is that between a galena crystal and a pointed pencil of graphite. The one trouble about such a crystal combination, however, is that it is difficult by ordinary methods to make an electrical connection of the highest efficiency on to the graphite rod.

The following method, however, will in every case remove this difficulty, and provide a perfectly efficient connection to a rod of graphite or similar material.

Prepare a solution of copper sulphate of medium strength, and immerse in it a copper sheet or piece of thick wire and the end of the graphite pencil or rod to which it is desired to make an electrical connection in the detector of the set. To the copper sheet and graphite rod connect a battery or accumulator having an E.M.F. of four volts or thereabouts. The positive pole of the battery or accumulator must be connected to the copper sheet, the negative pole being connected to the graphite rod.

By this method, a good solid layer of

pure metallic copper will be electrolytically deposited on the end of the graphite rod immersed in the solution. This copper deposit may be obtained of any desired thickness, and after the rod has been removed from the solution, rinsed, and dried, an electrical connection may be made to the graphite by means of ordinary solder.



There is just one precaution to be observed in this process. Do not have the copper sulphate solution too strong, otherwise the deposited copper will crumble away after the graphite rod has dried. It is far better to have the solution on the weak side, and to wait for a longer time before the required thickness of metal has been deposited, for when the copper is deposited slowly it possesses a more consolidated nature, and is therefore more adaptable to the subsequent process of soldering.

WHAT IS AN "IDEAL" SET?

(Continued from previous page.)

about 18 watts of the 600 watts used on the electric fire. To find the polarity of the mains, hold the leads (well apart) in a tumbler of slightly acidulated water; you will find that bubbles rise from the negative lead.

If you have alternating current in your house, then you may light the filaments of your valves and obtain your H.T. from the mains. There are many rectifying and smoothing devices on the market, and the amateur would be well advised to use one of these rather than himself experiment on the A.C. mains. Small Leclanché batteries have lately been developed for use as H.T. batteries with great success. These will give a steady output of up to 20 milliamps, and merely require a new solution of sal ammoniac every four or five months. They are specially useful to the listener who has no electric light and does not want to carry H.T. accumulators to the charging station.

DX Reception.

All these maintenance points should be thought out by the wireless salesman who wants to give his customers real service. If you have made your own set, whatever type it may be, it is not "ideal" until you have a constant and never-failing H.T. and L.T. supply. Arrange switching so that your charging of accumulators can be done without moving them from beside your set. Follow the directions on the sides of your accumulators or Leclanché batteries. If you do this, your batteries will probably have a much longer life than they would if you entrusted them to the tender mercies of your local garage.

If you are keen on receiving distant stations and you are close to your "local," then the super-heterodyne is the set de luxe for you. But don't expect the super-het. necessarily to give you good quality on your local station. It is far better and more economical to receive the local station

on the detector and L.F. amplifier section of your set. If you are buying a complete super-het. or neutrodyne, make sure that the L.F. amplifier is a good one. Faults to look for are: no provision for grid bias; no power valve for working loud speaker; high ratio transformer in first L.F. stage; small L.F. transformers. Remember that a good L.F. transformer is usually "as big as your fist."

For the Local Station.

For local reception the ideal receiver for loud speaker reception is a crystal followed by two or three resistance coupled L.F. valves. If a crystal gives you loud telephone strength, then two L.F. valves only (using high magnification valve in the first stage) will be necessary. This kind of set is easy to maintain, necessitating one H.T. voltage only, which may be taken from your electric light mains. If you have this type of set, be careful in your choice of loud speaker.

I read recently of a wireless society comparing resistance capacity with transformer L.F. coupling using a certain make of horn loud speaker which has a terrific resonance on about 250 cycles. Naturally the resistance amplifier emphasised this fault, giving a "wuffy" and muffled tone. This particular loud speaker had been designed for working with L.F. transformers and balanced to some extent the distortion they introduce, giving a fairly straight characteristic over the middle frequencies. The new hornless and cone loud speakers are heard at their best on resistance-coupled L.F. amplifiers.

Don't be misled by advertisements into painting your aerial with special "electric" solutions which are guaranteed to improve the quality of reproduction of your set, "especially on pianoforte music." The efficiency of your aerial affects the sensitivity and to some extent the loudness of your set, but has nothing whatever to do with its tone. If your friend tells you that his gold cat's-whisker improves the reproduction of the bassoon, don't believe him; he is "of imagination all compact"! Money spent on such trifles would be better diverted to a fund for the buying up—and destruction—of all dud L.F. transformers! But what a fund it would have to be!

RESISTANCES.

THE resistance of any part of an electric circuit, such as a length of wire, a transformer winding, a soldered joint, a valve filament, and so on, is the opposition offered by that part of the circuit to the flow of an electric current.

Thus, if an accumulator is connected to the two ends of a length of wire, the resistance of the wire limits the amount of the current which will be driven through it. If it is necessary to change the value of the current, then either the resistance of the wire, or the voltage of the battery, or both, must be altered.

If we double the resistance of the wire, the current will be halved, whereas doubling the battery voltage will double the current.

Resistance is measured in *ohms*, the number of ohms equalling the number of volts required to drive a current of one ampere through the resistance. For example, if 6 volts send a current of 2 amperes through a rheostat, the number of *volts required per ampere* is $\frac{6}{2} = 3$. Hence the resistance of

the rheostat is 3 ohms. Thus, we can say that the resistance of an electric circuit is obtained by dividing the voltage by the current.

The same rule applies if the voltage and current are *alternating*, as, for instance, in a house-lighting system supplied from A.C. mains. The resistance of the circuit is obtained by dividing the alternating voltage by the alternating current.

It must not be thought, however, that resistance depends in any way upon whether the current is direct or alternating. It is a definite property of the circuit or apparatus, just as is weight, length, or colour.

Why I Linked up with "P.W."

By PERCY W. HARRIS, M.I.R.E.

In this article—the first he has ever written for "P.W."—Mr. Harris tells readers for why he has accepted my invitation to edit a special Constructors' Supplement. His reasons are obviously for the ultimate benefit of "P.W." readers—The EDITOR.

THE wireless experimenter of to-day does not often realise the immense strides that have been made in the last few years in the direction of simplification for his benefit. My own experimental work dates back to 1908, when a little group of friends decided that the remarkable phenomena of which we were reading so much should be investigated in an amateur way.

What little information was available was very closely guarded by the commercial interests engaged in developing radio, and we had to go upon the few scientific papers read before learned societies, and an occasional article in more popular form. Still, in spite of such difficulties, we managed to make good progress, and all kinds of coherers were tried, invented, re-invented, and modified, until we were able to get results which, for amateurs, were very creditable. A little later, when we began to experiment with crystal detectors, the great improvement in range astounded us, and, as a matter of fact, the crystal receiver I used in 1909 was little less efficient than those we use to-day.

But what a difference there was from the home constructor's point of view! There were no ready-made crystal detectors—or, rather, what few were available were impossibly expensive—the plug-in interchangeable coil was yet to come, unless you were very rich you had to make your own variable condensers, inductances, and everything else. In fact, as amateurs we were pioneering a new country. Dr. Fleming was still experimenting with the early form of the Fleming valve, of which, of course, we knew nothing. It must be remembered that the modern valve is really a post-war product, and did not become available to the amateur until comparatively recently.

A New Method.

In 1909 two years had yet to pass before the first wireless journal would appear—and even then, in its early days, it was a small house-organ for a commercial wireless company. Subsequently, and after it had blossomed out into a wireless magazine of more general interest, I wrote a good deal in it, and later edited it.

In those days, however, experimental work was very restricted. Few people troubled to build receivers which went below 600 metres; there was no telephony, not to speak of broadcasting, to hear, and our great mainstay was the Eiffel Tower,

which could be heard very easily on any good crystal receiver tuning up to two thousand six hundred metres, while we all made our sets cover four thousand metres in order to include Nauen, the big station outside Berlin.

"Sneered at by 'Superior' Amateurs."

After the war, when experimental wireless was again allowed, and amateurs were getting busy once more, I endeavoured to help my fellow amateurs over sundry stiles by writing articles and acting in an editorial capacity with a well-known wireless journal. Later, finding that the old method of giving the reader a theoretical diagram, and assuming that he knew enough about the subject to need nothing more, was proving fallacious, I began to write articles giving amateurs not only the theoretical circuits, but also providing scale drawings and indicating the precise positions of the actual wires used, with photographic reproductions of the various stages of construction.

This method is now adopted almost universally, and readers of POPULAR WIRELESS may be surprised to hear that my preliminary efforts in this direction were at first sneered at by "superior" amateurs of the day, being referred to as "padding," "superfluous detail," "wasting the reader's time," and in other uncomplimentary terms. To counterbalance this I received hundreds of letters from all parts of the country thanking me for providing much needed information in a form which did not require many months of previous study to comprehend.

Even at that time it was very difficult for the average experimenter to keep pace with the developments of wireless research, and to-day it is far more difficult. Reading alone is insufficient to keep the serious student abreast of modern developments, and, unless such study is accompanied by practical experiments, one is bound to get rapidly out of touch. For several years now I have been engaged in much editorial and management duties, as well as experimental and literary work connected with wireless.

To keep pace with affairs, my literary and experimental work has often had to proceed far into the night, while the business



occupations of the daytime have often prevented me carrying out certain daylight researches on both long and short waves which I have considered of importance. In fact, to put matters briefly, I have increasingly felt the need to devote more time to my laboratory and to give my readers still more information of modern developments and modern conditions.

I am very pleased to say that the proprietors of POPULAR WIRELESS have very generously made arrangements by which I can devote just as much time as I desire to my laboratory and literary work, unencumbered by business cares during the day. The immediate effect will be that many fresh researches and developments of new ideas that I have had in mind for a long time will now become practicable, and, of course, the readers of POPULAR WIRELESS will immediately have at their disposal the information so gained.

Many New Developments.

I wish I had the space here to tell you of the many new developments in receivers and receiver design on which I am now working, but before long you will see many of them in these columns. Furthermore, being closely in touch with leading experimenters in both America and Europe, I hope to make available to POPULAR WIRELESS readers the practical application of a number of most important new inventions on both sides of the Atlantic. These will be carefully tried out in my laboratory, and described in a practical and tested form for the benefit of the British experimenter.

Finally, I want to say how pleased I am to associate myself with "P.W." with my old friend Mr. Norman Edwards and with Mr. Dowling and other members of the "P.W." staff. Their enthusiasm and desire to further the progress of this journal makes me feel sure that in linking up with "P.W." I have associated myself with what is best in radio journalism.

WITH the increasing use of various neutralising methods for balancing or stabilising H.F. amplifiers, certain minor but objectionable features have been brought into prominence. One such defect is the tendency to develop parasitic oscillations which, although of much smaller wave-length than that to which the main receiving circuit is tuned, give rise to objectionable "noises" in the set.

If one might paraphrase a well-known

PARASITIC OSCILLATIONS.

A New Problem in H.F. Amplification.

By J. C. JEVONS.

ance of the coil L and the mutual inductance between its two halves. This phantom inductance is linked with the inductance L1 in the plate or output circuit by the parallel capacities of N and C. Now it is well

known that when a valve includes inductive reactances in both the input and output circuits, and also capacity coupling between them, it will tend to generate oscillations at any frequencies with which these reactances co-operate to constitute a resonant circuit.

in which parasitic oscillations may be generated. For instance, when either of the ordinary neutralising arrangements shown in Figs. 1 and 1A are used, the parallel paths provided by the inter-electrode capacity C (shown in dotted lines) and the balancing of neutralising condenser N form a link between the inductance L in the input circuit and the inductance L1 in the output circuit of the valve, and parasitic oscillations are liable to be generated as a result of the difference between these two inductances.

The remedy put forward for preventing these undesirable oscillations is to insert a suitable damping resistance in their common path to the filament in one or other of the ways illustrated in Figs. 2, 3 and 4.

Further Methods.

Accordingly a damping resistance R is inserted, as shown, so that it is included in

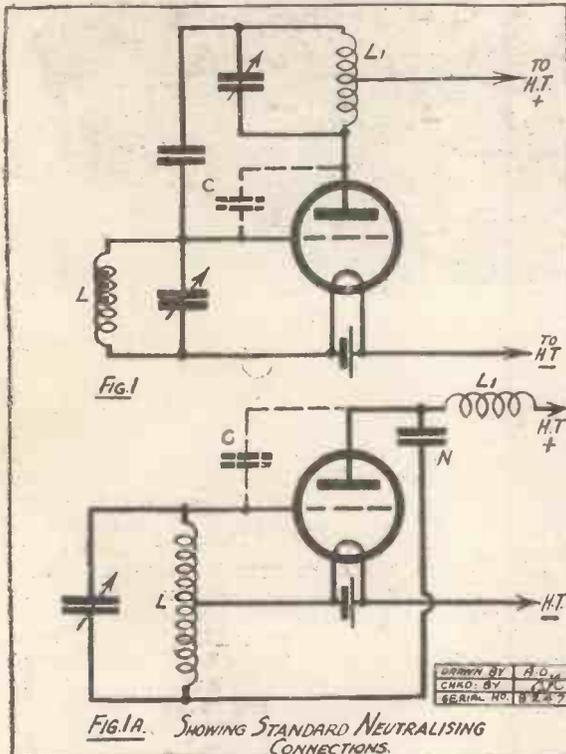


FIG. 1A. SHOWING STANDARD NEUTRALISING CONNECTIONS.

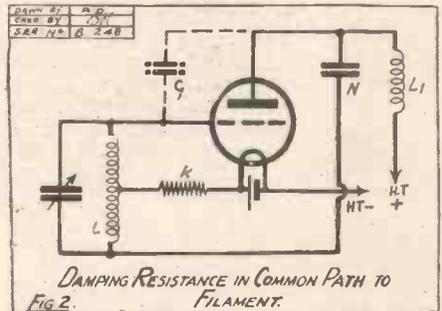
Damping Resistances.

The arrangement indicated in Fig. 2 shows a valve with its input circuit L connected at one end to the grid and by a mid-point tapping to the filament, a small balancing condenser N being inserted across the plate and the other end of the input inductance.

It is well known that in such a system the inter-electrode capacity C, by providing a feedback path from the anode to the grid, permits the transfer of energy from the output circuit to the input circuit, which is liable to cause self-oscillation at the frequency to which those circuits are tuned. It is in order to neutralise this effect that the balancing condenser N is inserted as shown between the anode and filament.

It will be observed that the path including the balancing condenser N is in parallel with that including the inter-electrode capacity C. Varying currents accordingly flow in these two parallel paths through the corresponding halves of the input coil L in such a manner as to induce electro-motive forces, which theoretically are equal and opposite, so that no resultant potential variations are imposed upon the grid.

In practice, however, it is found that the two parallel capacities N and C form the seat of intruding parasitic disturbances. Their existence may be explained as being due to the fact that the input circuit contains a "phantom" inductance represented by the difference between the actual self-induct-



DAMPING RESISTANCE IN COMMON PATH TO FILAMENT. FIG. 2.

the common path traversed by any additional stray H.F. currents such as would tend to generate parasitic oscillations. By offering a high impedance to their passage, the resistance R prevents them from reaching such an amplitude as to set the system oscillating.

Incidentally, it is pointed out that the resistance R, by minimising the flow of such currents across the inter-electrode capacity, serves the additional purpose of increasing the effective signal voltage impressed by the received waves upon the grid of the tube. In other words, by eliminating undesirable capacity leakage it increases the efficiency of the amplifier in operation.

Fig. 3 shows an alternative arrangement of damping resistances. Here, two resistances R are connected respectively between the filament of the tube and the two outer terminals of the coil L. It will be seen that these resistances are included in the parallel paths established by the balancing

(Continued on page 431.)

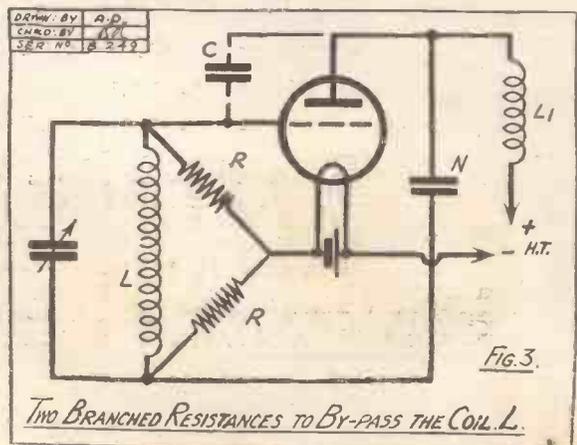
couplet, the state of affairs could be described thus:

Big waves and little waves—we try to neutralise 'em,
But little waves make lesser waves, and so ad infinitum.

Publicity has recently been given to a method of getting rid of the effect of these small inherent oscillations by the use of a resistance inserted between the input inductance and the centre point of two "twin" condensers in shunt. It is interesting, however, to note that this particular problem has been investigated in great detail by the engineers of the Western Electric Company (now Standard Telephones and Cables, Ltd.).

Preventing Oscillations.

In that company's Patent No. 254472, first applied for on May 28th, 1925, and accepted and published in July of the present year, it is pointed out that when a number of H.F. amplifier tubes are connected together and neutralised in the ordinary way, one result of the introduction of the balancing condenser is to provide a new path



TWO BRANCHED RESISTANCES TO BY-PASS THE COIL L. FIG. 3.



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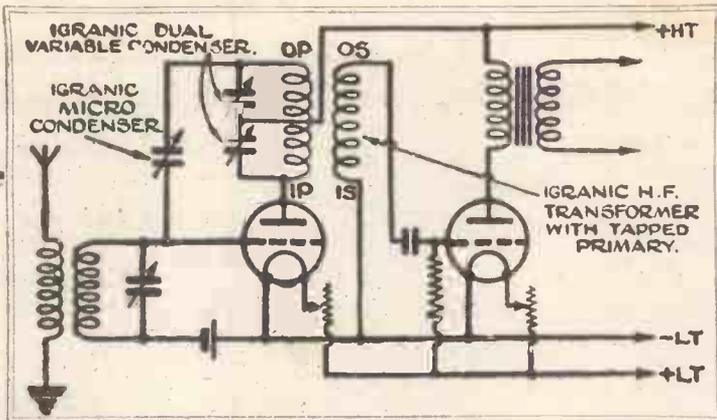
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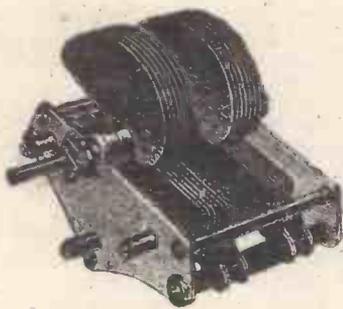


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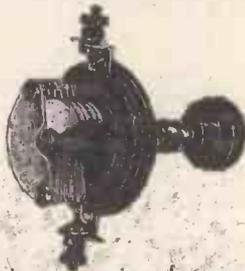
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NEUTRALISING A NEUTRODYNE.

FROM A CORRESPONDENT.

To an ordinary amateur, the act of neutralising a set built specially for this purpose may or may not be successful. If the set has been built according to a specification, which has included clear instructions on how to neutrodyne and operate, it is probable that results, after a struggle, may be fairly good.

However, to every set built to "cut and dried" instructions there must be at least ten others constructed from personal experience.

Although the amateur who has constructed such a set may have a good technical knowledge of the set, and may have employed special matched neutroformers, matched variable condensers, yet the results may still be disappointing.

He may have been scrupulously careful to place the neutroformers at the correct angle and distance from each other, and have wired the set exactly as required, but still the results from the point of a neutrodyne may be nil.

Unsuitable Valves.

Now, assuming that (1) the circuit is O.K. and reliable, (2) the wiring is correct, (3) the batteries, leads, aerial and earth satisfactory and (4) the lay-out good, the trouble may be due to one of the following three things, namely, incorrect neutralising, large capacity between the grid and plate leads inside the set, or unsuitable valves.

From personal experience of these three factors I should name the last one as the most probable.

It has been observed that with valves of the 3-volt 06 class, neutroding is often a practical impossibility.

During tests with these valves, using "Copey" screened coils (as made and patented by Messrs. Peto Scott), it was found that tuned to 2 L O at 6 miles from that station, no points could be found on the neutrodyne condensers that would indicate neutralisation.

In fact, it was later discovered that the internal electrode capacity of the valves was such that the capacity of the grid plate and other leads (and the capacities of the valve holders) was more than sufficient to surpass the former, without needing the use of neutrodyne condensers.

Valves of the 6-volt DE 5 type were then introduced, and without altering the wiring of the set in any way, definite points could be found on the neutrodyne condensers where signals practically died away, thus indicating that the capacity of these was sufficient to neutralise the set, leaving a reasonable margin for safety.

How to Proceed.

The actual process of neutralisation can be carried out in the stages numbered below:

First connect up all batteries, aerial, cath, etc., to the receiver.

(1) Tune in the local station or, failing that, adjust a buzzer wavemeter to approximately 250 metres and set at some two or three feet from the set.

The readings of the two variable condensers tuning the neutroformers (assuming that two stages of H.F. amplification are employed) should be exactly equal, the readings on the aerial condensers being some degrees either higher or lower than those of the former.

(2) Completely remove the first H.F. valve from its socket. This valve is the one connected to the aerial circuit.

(3) Readjust all three tuning dials carefully until signals come in loudest (they will still be heard).

(4) Now turn off the filament rheostat to the first H.F. valve and replace valve in its socket. If one rheostat is used to control both H.F. valves, it will be necessary to leave the rheostat on and place a piece of paper over one filament leg of the valve removed, so that when the valve is again plugged into its socket it does not light.

(5) Signals still heard in phones. Do not touch any of the tuning dials.

(6) Adjust first neutrodyne condenser until signal is reduced to a minimum or is

entirely cut out. This will require careful movement of its handle, but when the best point has been found the condenser can be left set.

(7) Neutralising of the first H.F. valve is now complete, and the filament of the valve can be lit (either by turning on the rheostat or by removing the piece of paper from its filament leg).

Final Adjustments.

By removing the first H.F. valve from its socket it will now be noticed that the signal increases to great strength, and by again returning it to its holder (with the filament off), the signal will be very faint or absent. This indicates complete neutralisation.

(8) Now remove the second H.F. valve from its socket and repeat exactly the process as already outlined from (2) to (7). The process is, in short—remove the second H.F. valve, tune all dials to maximum strength on signal, replace valve with its filament off, then adjust second neutrodyne condenser until minimum signals are heard (or are absent), and replace valve and light its filament.

If desired, the whole process can be repeated so as to get an absolutely accurate neutralising effect.

It should be pointed out that if it becomes necessary to insulate one of the filament legs of the H.F. valves during the process of neutralising, it should be the positive one that is covered, and not the negative.

PARASITIC OSCILLATIONS.

(Continued from page 428.)

and inter-electrode capacities, N, C respectively.

The resistances are sufficiently high to offer a large impedance to the flow of parasitic oscillatory waves and therefore tend to damp them out.

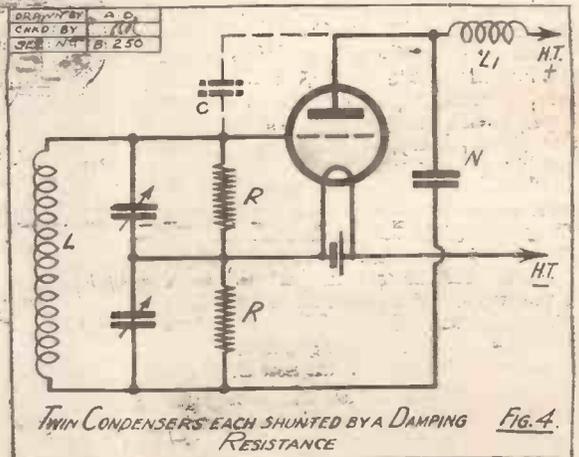
At the same time they exclude the inductance of the input coil L from the parallel paths opened up to the passage of extra H.F. currents by the inter-electrode and balancing capacities. Owing to the very high frequency of such currents they will obviously take the path through the resistances R in preference to the path through the inductance L. Therefore, so far as concerns any such energy fed back from the plate to the grid, it is now restricted to paths which contain no inductive reactance but are purely aperiodic, and cannot therefore generate oscillations of any wave-length.

Still another arrangement is shown in Fig. 4, in which the input coil is shunted by two "twin" condensers, and the filament connection is taken from a point midway between each. The damping resistances R are in this instance branched across the filament and grid on the one hand, and the filament and the lead containing the balancing condenser N on the other.

The result is that the inductance of the input coil is again excluded in favour of the parallel paths containing the non-inductive resistances. As its inductive reactance is included in the input side of the tube the generation of parasitic oscillations is effectively prevented.

Valuable Invention.

Although the addition to an ordinary neutralised circuit of special damping resistances, in the manner described, may not



at first sight appear to have any great importance, yet the invention is essentially of a practical nature.

The fact that the origin of these mysterious disturbances has now been definitely identified in itself reflects great credit on the skill of the inventors quite apart from the ingenious methods adopted for their prevention.

IT has been reported (as we noted in our last issue) that the Earl of Clarendon has accepted the position of Chief of the new B.B.C. The Earl of Clarendon has just arrived back from Canada, where he has been on a three months' tour in connection with the Overseas Settlements Board, of which is he Chairman. When asked whether it was true that he had been given the B.B.C. post, Lord Clarendon is reported to have said: "I can make no statement at all in connection with that at present"—but probably by the time this issue is on sale the report concerning Lord Clarendon will have either been confirmed or contradicted.

It seems the consensus of opinion, however, that Lord Clarendon has been chosen as the new B.B.C. Chairman; therefore, it is not inappropriate if we devote some attention to the possible new Chairman of the B.B.C.

Lord Clarendon says he possesses a two-valve set which, to quote his own words, he cannot work very well, but which he finds "very great fun"! Lord Clarendon has evidently made a very deep study of broadcasting, for he has discovered with considerable ingenuity the fact that "wireless is a tremendously important thing" and that its prospects "are remarkable." Lord Clarendon has further noted that wireless has educational possibilities, although he imagines that "people who have sets nowadays would be reluctant to do without dance music or light entertainment of the kind to which they are accustomed."

And even further still, Lord Clarendon has convinced himself that wireless can be used to the greatest possible advantage.

The Future of the B.B.C.

Now, these opinions may be very remarkable, but we cannot help wondering whether they are sufficiently remarkable to warrant Lord Clarendon's appointment as the new B.B.C. Chairman. We would ask Lord Clarendon, with all respect, what are his qualifications for the post? What does he know about broadcasting? If he was about to serve an apprenticeship at the B.B.C. and "learn the ropes," so to speak, under the guiding hand of its present, fully-qualified Chairman, Mr. J. C. W. Reith, we could understand to some extent the reasons for the appointment, but from the pronouncements which Lord Clarendon has made in connection with broadcasting it does not seem that a great genius has been appointed at the head of the new B.B.C.

The Chairmanship of the B.B.C. requires more than enthusiasm and ingenuousness. It requires a very deep knowledge of the public psychology, to say the least of it. And we sincerely hope that Lord Clarendon, if he does accept the B.B.C. appointment, will make it his business to devote a considerable amount of his time to the study of broadcasting problems. We cannot help literally "trembling in our shoes" at what the future holds in store for British broadcasting.

The one bright star in the future is the

CURRENT TOPICS.

BY THE EDITOR.

The New B.B.C. Chairman—What the Future Holds in Store—More Programme Arguments—"Educating" Listeners—The Wave-Length Charges.

fact that Mr. J. C. W. Reith will, in all probability, retain office as chief of the Executive Staff.

"Highbrow" Items.

The recent controversy in the newspapers about the length of "highbrow" items in the programmes has again added fresh fuel to the fire which ever plays around the B.B.C.'s selections for popular programmes. Protests at the inclusion of long items dealing with classical music, etc. have again been making their appearance in the correspondence columns of the newspapers and more than ever does it seem that

listeners in the bulk are objecting to the excess of "educational" matter which is appearing in the B.B.C.'s programmes. The prospects of these programmes being lightened do not seem to be very hopeful, for we notice that the B.B.C. have announced that Sir Henry Hadow has agreed to act as Chairman of a Joint Committee being set up by the B.B.C. and the British Institute of Adult Education, to enquire into the possibility of further development of education by wireless.

The "Uneducated."

Sir Henry Hadow is undoubtedly a very distinguished man; he is Vice-Chancellor of Sheffield University and Chairman of the Consultative Committee of the Board of Education. These qualifications are admirable in their proper place, but we cannot help wondering at the necessity for the B.B.C. acquiring the services of such a distinguished educationalist; surely broadcasting, being primarily a means of giving entertainment to millions of people, does not require the super-intelligent services which Sir Henry Hadow can offer?

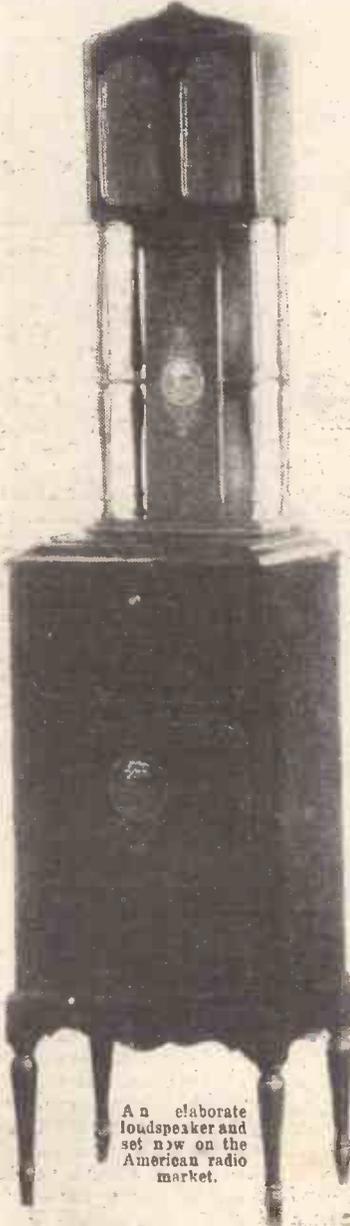
Mr. J. C. Stobart, the B.B.C. Director of Education, has already threatened us with Radio Varsities, and it would seem that the B.B.C. are contemplating even fresh assaults upon the "uneducated" minds of their listeners. The assumption that so many listeners are uneducated or lacking in "culture" is, in itself, a presumption; but that, willy-nilly, educational matter should be thrust into their ears by a company which is receiving money primarily to enable them to supply listeners with entertainment, can only be regarded as an impertinence, and we sincerely hope that listeners, through such organisations as exist in this country for giving vent to the opinions of listeners, will strongly combat this excessive tendency of 2, Savoy Hill to permeate the broadcasting programmes with "educational" matter.

Wave-Length Changes.

The change in wave-lengths has again been delayed; this time, we understand, owing to further technical difficulties. It now seems very improbable that the new wave-length scheme will be brought into operation by October 15th, but we are given to understand by the B.B.C. that the scheme will definitely be put into operation before the end of next month.

There seems to have been some difficulty with the other European countries over the adoption of a standard wave-meter, for it had been agreed at first that the parent wave-meter should be Brussels and the calibration of the B.B.C.'s wave-meters by the Brussels' standard was taking longer than expected. It is a great pity that these delays have been occasioned for many listeners have been refraining from altering their sets or making further improvements, and, consequently, buying new apparatus, until the B.B.C. have definitely announced the adoption of the wave-length scheme.

We hope that there will be no further delays and that the scheme will be brought officially into operation as now promised.



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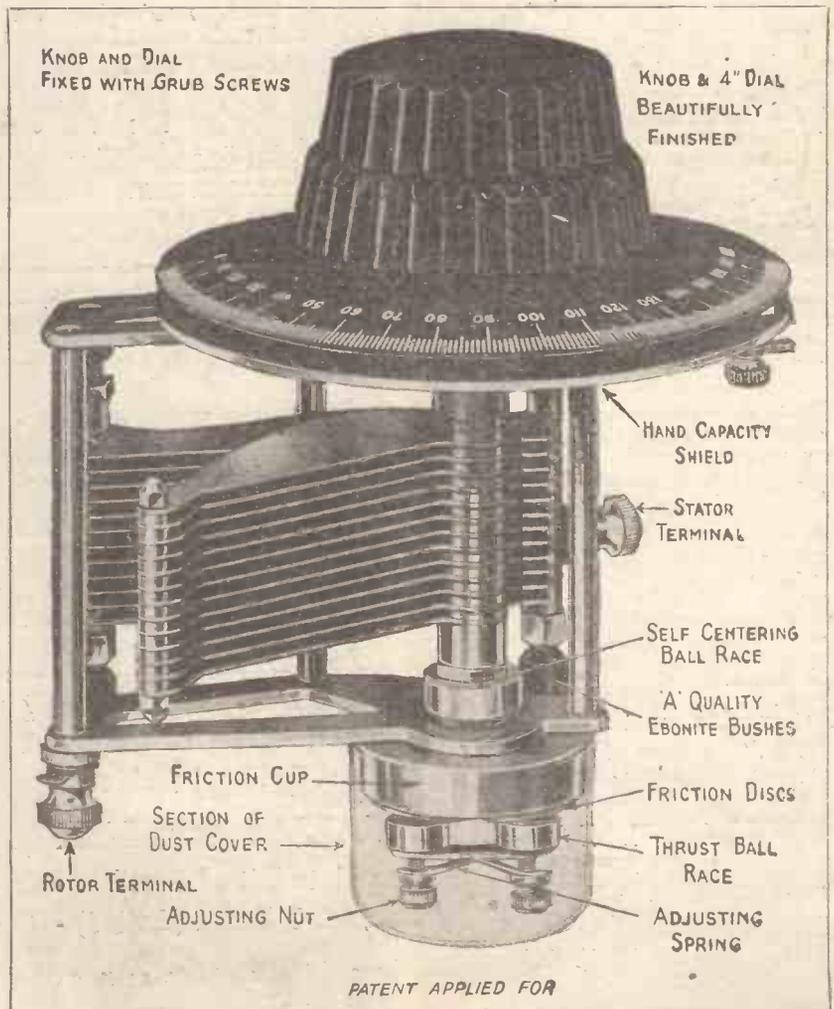
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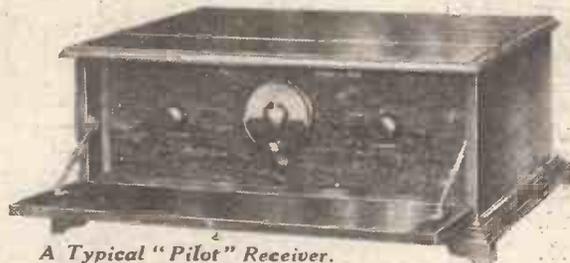
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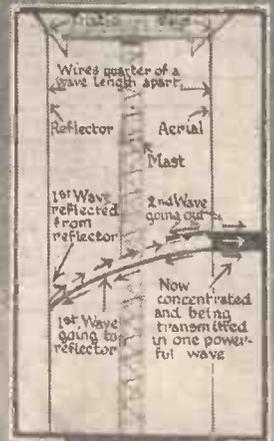
THE LONG - DISTANCE " BEAM " SYSTEM.



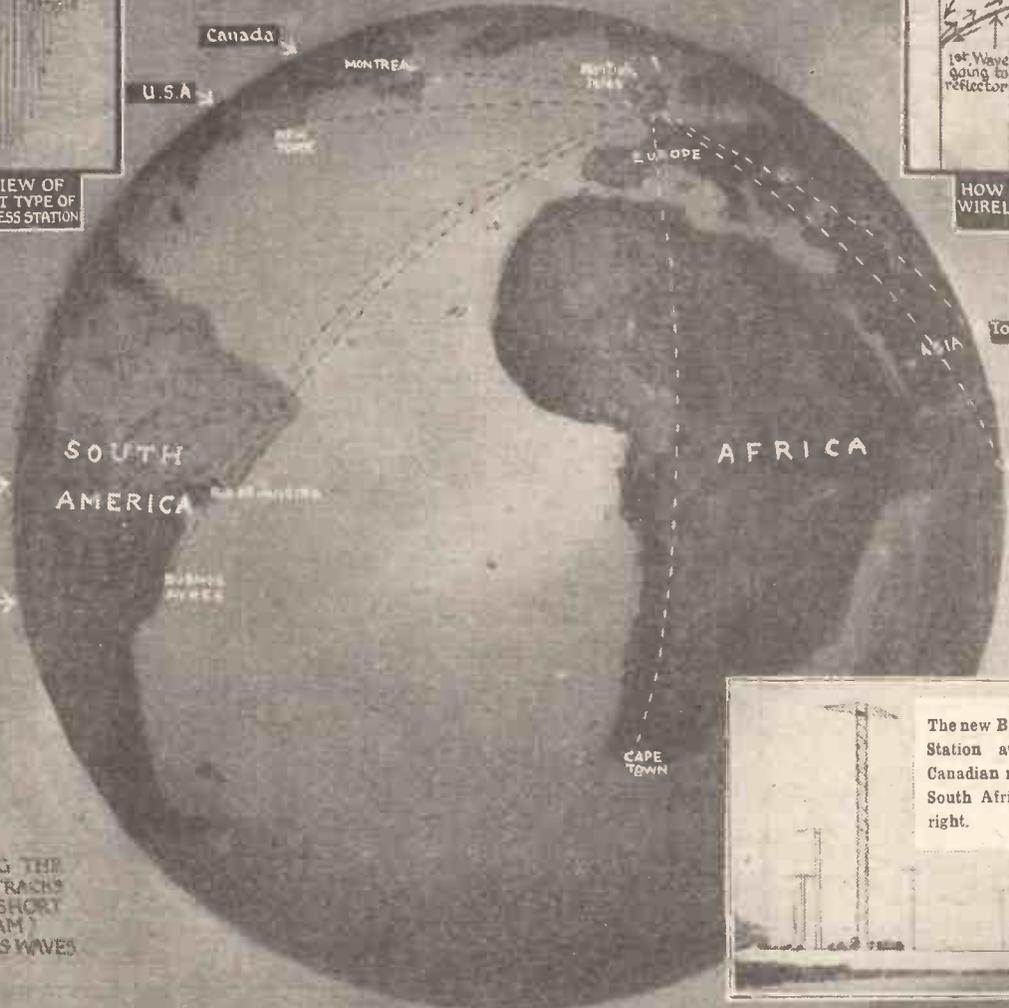
INCOMING AND OUTGOING MESSAGES ARE CONTROLLED FROM ONE CENTRE AT THE GENERAL POST OFFICE, LONDON, WITH WHICH THE BEAM STATIONS ARE CONNECTED BY LAND LINES.



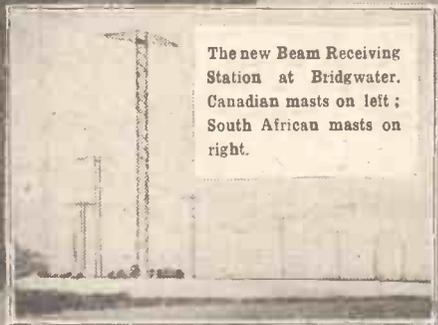
GENERAL VIEW OF THE LATEST TYPE OF BEAM WIRELESS STATION



HOW THE BEAM WIRELESS WORKS



SHOWING THE CIRCLE TRACKS OF THE SHORT (OR BEAM) WIRELESS WAVES



The new Beam Receiving Station at Bridgewater. Canadian masts on left; South African masts on right.

HOW SHORT WAVE WIRELESS SAVES POWER

Great circle of ordinary wireless waves, causing waste of a large amount of transmitting power.

Transmitting Station

Short or beam wave showing little waste.

Receiving Station

A SIMPLE DIAGRAM SHOWING HOW THE REFLECTORS ARE PLACED

Montreal (Canada)

Bridgewater (England) Receiving station

Bodmin England Transmitting station

Cape Town (South Africa)

The aerials and reflectors are so placed that one station can communicate with other stations in widely separated parts of the globe.

AN EXPLANATION OF BEAM WIRELESS BY MEANS OF LIGHT

Light blanketed

Reflector

Strong concentrated rays

Light

Diagrammatic details by courtesy of the Marconi Co.

EXPERTS IN RADIO

JUST TO REMIND YOU

When you're wanting "pukka" telephones for long range work, don't forget that Brandes "Matched Tone" are still far and away the best. And if you are building, the 1st and 2nd stage Brandes Transformers are admirably efficient. Look at the prices!



AUDIO TRANSFORMERS

The Brandes 1st stage Transformer has a high voltage amplification ratio of 1.5. This, together with a straight line amplification curve, means that the amplification is constant over a wide band of frequencies, thus eliminating resonance. The 1-3 Transformer amplifies over speech, pianoforte and harmonic ranges equally well. Mechanically protected and shielded against interaction. Terminals and outside soldering tags.

17/6

Ratio 1.5 (black case). Ratio 1.3 (brown case)



MATCHED TONE HEADPHONES

The whole secret of Matched Tone is that one receiver refuses to have any quarrel with its twip. Aply schooled in these generous sentiments by our specially erected Matched Tone apparatus, their synchronised effort discovers greater sensitivity and volume and truer tone. There is no possibility of the sound from one earpiece being half a tone lower than its mate.

20/-

Brandes

From any Reputable Dealer

BRANDES LIMITED, 296 REGENT ST., W.1

ACOUSTICS SINCE 1908

CORRESPONDENCE.

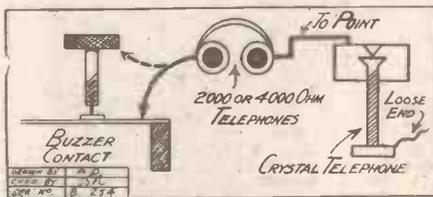
Letters from readers discussing interesting and topical wireless events, or recording unusual experiences, are always welcomed, but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—Editor.

EXPERIMENTS WITH THE CRYSTAL TELEPHONE.

The Editor, POPULAR WIRELESS.

Dear Sir,—Although the three articles by Mr. J. F. Corrigan, M.Sc., that have appeared in your journal cover the ground very well indeed, there is one easy experiment which I should like to mention. It should be carried out by everyone seriously interested in the matter, as it seems to me to show that a crystal telephone, under conditions that suit it, is equal in sensitiveness to the electro-magnetic type.

The trial is made by means of an ordinary buzzer wave-meter, with the make-and-break working at various speeds. Touch the side of the break which



gives the loudest sound with one end of the cords of a pair of wireless headphones of 2,000 or 4,000 ohms, leaving the other one loose. Either cord will answer for the contact. As the note of the buzzer is made to rise from a low note to a shrill one, the sound in the telephone falls off, till it almost or quite vanishes. Then make the same experiment with the crystal telephone, using as the contact that forms the point a piece of hard synthetic galena sharpened to a point with a file. This time take care to make the cord that is attached to the point the one used for touching the buzzer. The other will not act nearly so well, if at all. The crystal telephone will also be found to reproduce the note of the buzzer. Now join the two types in series, as shown in the diagram, so that the current that reaches the crystals must pass through the headphones. In my experience the crystal telephone is superior on the high notes, equal on the middle, and only a little inferior on the low.

Yours faithfully,

LESLIE MILLER.

23, Rural Way, Streatham, London, S.W.16.

RE B.B.C. PROGRAMMES.

The Editor, POPULAR WIRELESS.

Dear Sir,—Having held a wireless licence for four years, I feel entitled to say what I, along with many others, think of present programmes. This is my own experience.

Arrive home 6.30 p.m.; switch on 6.45, item usually being broadcast, Talk; 7, News; 7.10, Talk; 7.28, musical interlude, usually five minutes; 7.40, Talk; 8 to 9.30, music, mostly highbrow; 9.30 to 9.45, Talk; and more talk at 10.

That, I think, is a typical example of what we are given as entertainment. Of course, some will say we are never satisfied, and if we want lighter music we can hear plenty between 10.30 and 12. But when one has to get up at 6 a.m., one cannot stay listening till 12 o'clock every night.

Now there must be thousands in the same position as myself, and I should like to hear a few of their opinions. What we want is entertainment, not education.

"ORDINARY LISTENER."
376, Green Lane.
Small Heath, Birmingham.

INTERESTING POINTS.

The Editor, POPULAR WIRELESS.

Dear Sir,—I beg to draw your attention to a matter with which you are doubtless familiar, but which I do not remember having seen mentioned in any wireless journal, viz. the inadequate and awkwardly placed terminals with which many excellent components are fitted. The following examples will illustrate what I mean:

1. Breewood grid leak: locking nut for knob. Much too small. No ordinary wireless spanner will fit it. It is so flimsy that in tightening it with pliers there is danger of crushing it. In fact, I recently purchased one with a crushed nut.
2. Lotus coil holder.

Baseboard model supplied with 1/4 in. fixing screws. This means countersinking almost through a baseboard in order to securely fix the holder.

3. Ignatic Paent rheostat. Terminals at bottom. Unless this is fitted a good distance up the panel from the baseboard it is extremely difficult to connect wires to it.

4. Lissen grid leak and vernier knobs of condensers. Generally made of a soft material which soon loses its thread. These should be brass lined.

You can doubtless call to mind many other examples. May I suggest that you express your opinion on these matters in your paper and perhaps get improvements made. By so doing you will doubtless earn the thanks of many constructors.

Yours faithfully,

W. W. WOODMAN.

61, Hanover Road, Willesden, N.W.10.

AERIALS AND SCREENING.

The Editor, POPULAR WIRELESS.

Dear Sir,—As you are quite aware, a good deal has been published from time to time on the erection of aerials, choice of position, etc., etc. Now, as you are always anxious to put before your readers anything of general interest, you may be pleased to learn of something which, according to wireless law, is against all possibility of reception except on a very powerful set. I refer to screening. A person whose acquaintance I have recently made, lives in a cottage completely surrounded by trees, many of them 70 to 80 feet high. Some of them overhang the house. This person has always been keen on installing a set, but, owing to the apparently unsuitable conditions and the advice of friends, has looked upon it as hopeless. Now, I erected an aerial under all these trees, and tried a crystal set. The result was, music from Daventry fairly good, but speech poor. On trying a one-valve, however, the result was more than satisfactory. Daventry splendid, Radio Paris quite strong, also Hilversum, German high power, rather faint. Now there may be some of your readers who have friends similarly situated, so that this little experiment (which ought to have proved a failure) may prove of material assistance. Wishing your paper every success. Yours sincerely,

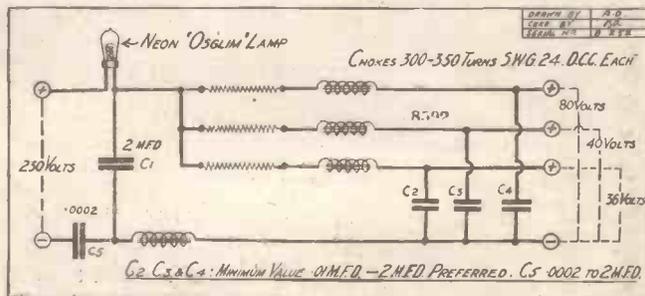
E. HOPPER,

2, Glebe Lands,
River Dover.

H.T. FROM MAINS.

The Editor, POPULAR WIRELESS.

Dear Sir,—In my professional dealings with clients, some of whom take a considerable interest in wireless apparatus, many are home constructors, yet it does not appear to be generally known how useful and advantageous it is for all wireless constructors to have a Neon "Osglin" Lamp on hand for testing insulation of sets, also for use in obtaining H.T. current from the public supply mains cheaply and efficiently, so if you would be kind enough to allow me space in your valuable journal, I think the following information, together with the enclosed diagram, might prove to be of much interest and help to large numbers of your readers. I have no hesitation in recommending the apparatus. I am using one myself with the three tapplings, but it can be used as one tapping as desired, but the advantage will be obvious of the three tapplings. All that is necessary by way of alteration to the set is to add a potentiometer, as shown in the diagrams. The choke can be made as follows: Make a bobbin with centre hole 1/2 inch diameter, not less than 1 1/2 inch between flanges, core of soft iron wires such as spark coils are made of, wind 300 to 350 turns of 28 W.G. 24 D.C.C. wire insulated between each layer. Finished bobbin then enclosed by turning ends of iron wire core over to form hedgehog type, care being taken to see that connecting wires are well insulated. The condensers can be of any good and reliable make of capacities as shown but No. 1 must not be less than 2 mfd.; The resistances are easily made by winding



resistance wire on hard fibre to the desired resistance of each tapping. An easy way to arrive at the desired ohmic resistance is to get a voltmeter and wind sufficient wire till desired voltage is obtained. This will obviate the use of the formula for the purpose, and the non-technical constructor. But it must be remembered that it is especially necessary to have all live parts mounted on good ebonite, if trouble is not wanted, also to remember that these lamps are not

(Continued on page 454.)



Are you using
Cosmos
SHORTPATH
Valves ?

IF not you are probably not getting the best results out of your receiving set or doing full justice to the B.B.C. and Foreign entertainers.

Maybe you have little interest in constructing or experimenting, and desire only to listen to the broadcast programmes. That being so you are chiefly concerned with your valves, which you require to give *good volume* and *purity of tone* with *little consumption* of either accumulator or H.T. Battery currents.

If you are a constructor or an experimenter you require in addition to the above qualities *distance* and *selectivity*.

All these features are combined in a remarkable degree in "Cosmos" Shortpath Valves S.P.18 and S.P.55. For the sake of getting the best out of your set, and as a consequence the best out of the programmes, investigate the claims of these valves as set out in the "Cosmos" Valves Booklet.

Ask your Dealer for a copy.

METRO-VICK SUPPLIES, LTD.,

(Proprietors: Metropolitan-Vickers Electrical Co., Ltd.)

Metro-Vick House, 155, Charing Cross Road, LONDON, W.C.2

Fit "Cosmos" S.P. Valves and do justice to the Entertainers.

Improve your Loud Speaker with a better battery.

Your new H.T. Battery should be a Lissen new process.

Notice the difference it makes to your loud speaker reproduction—there comes a new power smoothness, noticeably clearer reproduction, more powerful, more enjoyable than you have ever known it.

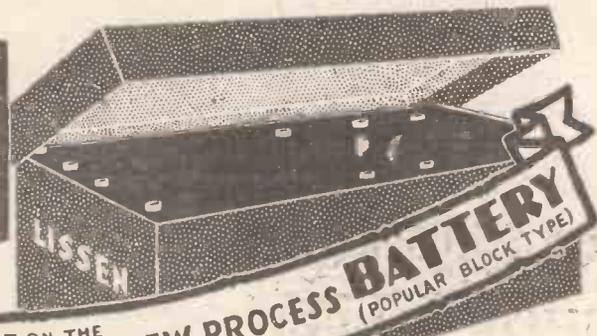
The success of this Lissen new process is now a definitely established fact and naturally the secret is closely guarded.

The quality of the energy supplied by a battery is as important as the quantity. Insist upon your being given the Lissen new process H.T. Take no substitute, for there is none for good loud speaker work. If any difficulty send remittance to Lissen direct. No postage charged. Or will be sent by return C.O.D. Please mention dealer's name and address.

10/6

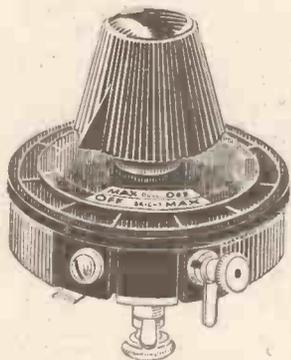
rated 60 volts.

Price would have been 13/- but for our new direct-to-dealer policy of distribution which cuts out all wholesale profits.



ALWAYS INSIST ON THE **LISSEN** NEW PROCESS BATTERY (POPULAR BLOCK TYPE)

FINE RHEOSTAT AND A FINE POTENTIOMETER—



that is what they say who see the Lissen. You will say it too after you use a Lissen. And you will still say it after long use.

You don't want a former in your rheostat or potentiometer which will warp and buckle after a few months' use, or wires which will move about and short circuit, or a contact brush which will wear uncertain. That's why you will insist on a Lissen after comparing it with all others; for a Lissen Rheostat will never let you down like that.

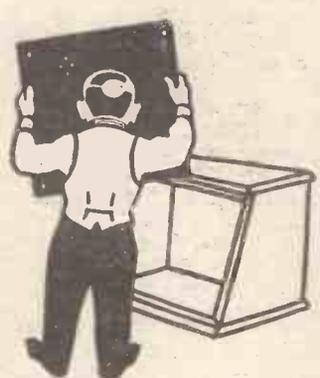
Previously high priced and largely reduced because of our new direct-to-dealer distribution policy (which cuts out all wholesale profits) aided by our huge production programme.

	Previously.	Now:
LISSEN 7 ohms, patented	4/-	2/6
" 35 " "	4/-	2/6
" Dual " "	6/-	4/6
" Potentiometer, 400 ohms, pat.	4/6	2/6

Lissen one-hole fixing, of course—every one. Base board mounting type same prices as above.

IMPORTANT TO THE TRADE—Orders for all LISSEN parts must now be sent direct to factory and not to usual wholesale dealers. Apply for particulars of new trading policy if not already advised. Every dealer in his own interest should be registered with us.

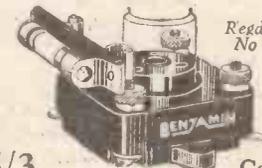
LISSEN LIMITED 8-16 Friars Lane, Richmond, Surrey.
Managing Director: T. N. COLE.



Saving Space

TWO NEW ideas for saving back panel space—simplifying wiring and mounting, and doing away with all the troubles arising through faulty connections and spacing

Remember, also, that the BENJAMIN Anti-Microphonic Valve Holder is not only infinitely superior to all its imitators in design and finish, but in actual performance too.



Regd. Design
No 722528

5/3 Complete

VALVE HOLDER & GRID-LEAK
A Dubilier Dumetohm 2 meg. Grid-Leak is fixed on to a rigid insulating bar by means of nickel-plated copper clips.



Regd. Design
No. 722529

7/- Complete

VALVE HOLDER, GRID-LEAK & CONDENSER
Nickel-plated copper clips carry a Dubilier 5x2 Condenser (.0003) in addition to the Grid-Leak. Series or parallel.

BENJAMIN VALVE HOLDER
without Leak or Condenser. Price 2/9

From all good Dealers

BENJAMIN

BRITISH MADE

Clearer-Tone, Anti-Microphonic
VALVE HOLDER

THE BENJAMIN ELECTRIC LIMITED
Tottenham, London, N.17.



"**B**ROADCASTING as a means of progress for art or the theatre is quite negligible," was one of the many provocative things Mr. Noel Coward, the young playwright, told me one evening when I met him in his comfortable dressing-room at the New Theatre.

Mr. Noel Coward was just making-up prior to going on the stage to play one of the finest rôles he has ever undertaken, and it can be quite safely said that much of the success of a really fine play (as is "The Constant Nymph") is due to his excellent performance.

"Of course, I have little or no time for wireless as a hobby," he said, "and I am generally so tired when I get home that I have no heart to prefer anything but sleep. Consequently you will find no wireless set in my home; but I have often listened-in, and I have always found the programmes sent out from Savoy Hill full of interest."

I asked Mr. Coward for his candid opinion on the average broadcasting programme of to-day, and I also added that I felt sure that the B.B.C. would not mind his being *very frank*, as they are always willing to learn! He laughed, and then he told me what he thought.

"Quite the most interesting feature in any radio programme to-day, to my mind," he said, "is dance music. The public will never tire of syncopation, and when dance music is said to be overdone in British broadcasting programmes this is quite incorrect.

Monotonous Dance Tunes.

"The great mistake in the dance music that is broadcast is that in nearly all cases it is in the same style, with exactly the same rhythm. This is not the case in America, where I consider broadcasting a better entertainment than in England (chiefly because it has better bands at its service), for across the Atlantic there is much more variety in the broadcast musical programmes. There are no two tunes following each other which are in the same rhythm or style, and this makes a very agreeable change."

Mr. Noel Coward's chief objection to the weakness in the British broadcasting programme is what he terms "the continual pandering to the old British ballad." From what he gathered he surmised that anybody

* * * * *

The opinions of one of our youngest and most popular playwrights given to "Ariel" in an interview.

* * * * *

had to make a request for an old popular ballad and it was instantly granted, with the result that ballads formed a large percentage of the programme.

"The day of the ballad is over, and the sooner it is realised the better. Personally, I think that the B.B.C.'s choice of items is not always a very accurate one, and I am sure that a great deal of the stuff that is



Mr. Noel Coward.

broadcast must be very boring indeed. On the other hand, the B.B.C. is coping with all the enormous difficulties that arise in the choice of a perfect programme that is popular with one and all, and is, on the whole, doing its job remarkably well."

Mr. Noel Coward often listens-in when any of his friends are broadcasting. He told

me he is always very surprised, as he can never recognise their voices over the ether, and it always affords him a great deal of amusement. In most cases it is a great disappointment.

"The trouble with broadcasting," continued Mr. Coward, lighting another cigarette, "is that it possesses absolutely no atmosphere. The gramophone is a great improvement on broadcasting, but to my mind the radio is dead and the loud speaker yet another means of distorting what is already not perfect.

"I prefer the headphones to the loud speaker, because, after all, if you are in a room with some people you can at least remove your headphones without offending your friends."

Broadcast Plays.

I asked Mr. Coward what he thought of broadcasting as an allied art to the theatre,

"As a means of publicity, in some cases I think it is invaluable. I do not think, however, that the broadcasting of an excerpt of a musical play matters; it certainly does not help the box-office. It might arouse the curiosity of a few to go and see the whole show, and there it ends.

"As for a straight play, it should never be broadcast. A play, like any running in a West End theatre, depending on its acting and its situations, is absolutely useless as a radio entertainment.

"What I do like, however, are the little things specially written for the wireless; these achieve their object. Most of them would be hopeless on the stage, but over the microphone they are ideal. Every line is studied to get its best effect with the unseen listener, and every situation strikes home. That is most necessary."

Mr. Coward does not like the Children's Hour. Thinking that the majority of listeners are grown-up, he feels that too much time and importance is devoted to this feature.

"They afford me huge amusement, however, for they are so very impossible."

In the opinion of Mr. Noel Coward, broadcasting as an advancement on the artistic tendencies of the theatre or entertainment does not exist even as a thought. Its educational value is indisputable, but where it scores is that it puts many things well

(Continued on page 452.)



Apparatus Tested

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.

THE "NIFE" HIGH-TENSION ACCUMULATOR.

WE presume that this battery is so called because it does, in fact, operate on the Edison Nickel and Iron principle, Ni being the chemical symbol for nickel, and Fe the chemical symbol for iron. Anyway, the method has many points in its favour, and we were glad of the opportunity of testing one of these accumulators, which was sent us for this purpose by the makers, Messrs. Batteries, Ltd., Redditch, England.

It does not make use of sulphuric or any other acid, but employs an alkaline solution, which not only does not attack the plates, but even tends to preserve them. This electrolyte serves only as a conductor, and does not enter into combination with the active materials or cause corrosion of the terminals or other metal parts. The "Nife" plates cannot be damaged by accidental short circuits or charging in the

wrong direction and sulphation is, of course, quite impossible.

The "Nife" unit, a thirty-volter, consists of twenty-four glass tubes, each tube forming one cell and containing two plates. They, the tubes, are mounted in holes in a moulded Dagenite base, and are so arranged that very long leakage paths are provided in order to reduce the possibility of inter-cell current leakage to a minimum. And here we should suggest that an improvement could be effected by the use of tubes of thicker glass, owing to the strain imposed upon their bases by quite normal mishaps. The leverage is considerable, and one or two of the tubes were cracked in the model sent us. The tubes are easily replaced, however, and Batteries, Ltd., supply spares at the low price of 2d. each.

The electrolyte, which is made up from a powder supplied in tins at 1s. 6d. for a quantity sufficient for one 30-volt unit, is

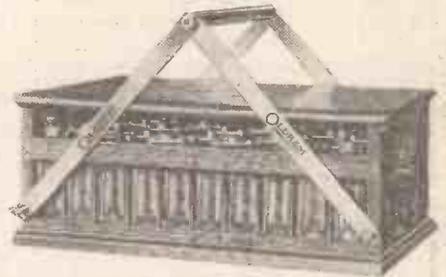
rather unpleasant to handle from an odorous point of view, but is not the vicious stuff that acid is, and is perfectly "discreet" once distributed among the cells.

On test the 30-volt "Nife" gave a steady current for a considerable period, and while it must be mentioned that the voltage tended to drop slightly throughout practically the whole of the discharge, there were no fluctuations to give rise to noises or reception instability. And Messrs. Batteries, Ltd., are not exaggerating when they claim something like twice the "life" per charge for their "Nife" as against a lead acid battery of a similar nominal capacity (1 amp. hour actual).

The price of a "Nife" 30-volt unit, including electrolyte, cover and straps, is 30s.

"LOTUS" PLUGS AND JACKS.

Messrs. Garnett, Whiteley & Co., Ltd., of "Lotus" coil and valve holder fame, recently sent us samples of their new
(Continued on page 442.)

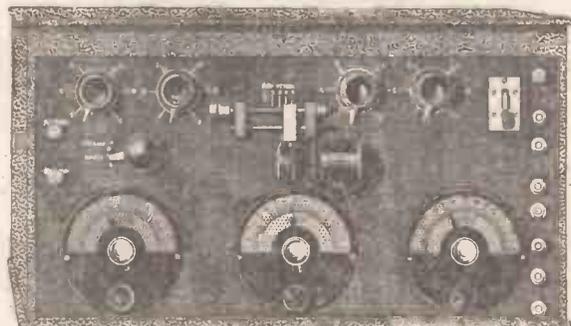


The Oldham Unit H.T. Accumulator which retails at the rate of 10d. per volt.

"ALMOST INCREDIBLE!!"

"Almost incredible" that was the spontaneous exclamation of a listener at the demonstration last Monday in our Showrooms, less than a mile from 2 L O. Station after Station had been tuned in. All round Europe we went. First Paris . . . then Rome . . . Madrid . . . Berlin, and so on. All at loud-speaker strength. But not on etrace of 2 L O, not even when operating within 40 metres of the London Station. The famous Ormsby Long Range Extra Selective Receiver, using exactly the same circuit as on our Home Construction Model, achieves these wonderful results. You can build this remarkable set yourself. There's no difficulty. No fear of failure. Success is certain if you use our patent Home Construction Model. It's simple . . . easy . . . and cheap. We have letters from enthusiastic customers all over the country, and at Olympia literally hundreds called to express their appreciation in person. Send for this simple model. Make the receiver yourself. And choose your programmes from the best in Europe.

Demonstrations every night from 8 to 10 p.m. at our London Showrooms.
Catalogue on request.
Trade enquiries invited



Home Construction Cardboard Model, showing wire connections with coloured strings, complete with instructions and list of components. 3/-
Postage 5d.



THE multiplicity of Radio Valves now upon the market is almost bewildering. This makes it the more incumbent upon careful users to pick and choose. The only American-designed Valve "Made in Britain's Newest Factory" is

14/- CLEARTRON 18/6

which embodies the latest research work in the art of Wireless on both Continents. The Highest Vacuum in the Known to Science } HI-VAC Valve The Sturdiest Construction } meaning and Strongest Filaments } LONG LIFE and that well-known

Majestic Volume and Operatic Purity

Above all

THE IRONCLAD GUARANTEE

(your safeguard)

The only Valve on the market which offers INSTANT REPLACEMENT WITHOUT COST OR QUESTION if the user is not wholly satisfied!

Would CLEARTRON dare to make this unique offer if CLEARTRON Valves did not perform 100%?

Send for our 1926/27 New Catalogue.

CLEARTRON RADIO, LIMITED,

ONE CHARING CROSS, LONDON, S.W.1. Works: BIRMINGHAM.

Telephone: Regent 2231-2. Telegrams: Cleartron, Westrand, London.

2-VALVE SETS



sets complete with following accessories
Long distance 2-valve L.F. and Detector Receiver in handsome polished cabinet. Includes set as shown: power, 1-.06 D.E. valves, tuning coils, H.T. 60-v. L.T., Aerial Equipment, H.T. & L.T. Leads, 2 pairs of 4,000 Ohms phones, or LOUD SPEAKER (Marconi Tax Paid.) £4:19:6 The Lo' Carr and Pack. 5/-

HEADPHONES, all 4,000 ohms N & K Standard Pattern, 7/11 pair. N & K. Genuine, new light-weights, 11/8 13/6. Dr. Nesper, 10/6 and 12/11. Telefunken, adjustable, genuine (20/- model), 14/11. Brunet, 11/9, 12/11, 14/9. 3 models.

BRITISH HEADPHONES: Brown's Featherweight, 20/- Brown's A Type (Reed) 30/- B.T.H., 15/- Sterling, 20/- Western Electric, 20/. All makes stocked.

THORPE K4 VALVES (5-pin) 9/6. Limited number.

FINE BRITISH VALVES! Smash High Prices!! **PURATONE (ROBON)** 2-volt-.06 ... 6/11 3-3.5-.06 ... 6/11 Post 6d. each.

RECOGNISED WHOLESALE AND DISTRIBUTOR of the manufacturers of Edison Bell, Jackson's (J&J) Polar, Igranite, Peerless, Eureka, Barratt Amplion Magnam, Burdett, Lotus, Dussler, Marconi, Dorwood, Sterling, Success, B.T.H., McMichael, Lissen Utility, R.I., Bowyer-Lowe, Formo, Brunet, Ormond, Newey, P. and M., etc., etc.

CHOKES—Cosmos, H.F. 6/6; used H.F. G.L.F. 10/- each. Success L.F. or H.F., 10/- each. A.J.S., 15/- with unit 20/-

WARNING! SEE K. RAYMOND'S NAME ON PREMISES. THIS WILL ASSURE YOU GETTING THE GOODS I ADVERTISE. PLEASE ASK "IS THIS RAYMOND'S?"

H.T. BATTERIES—Eveready, 66-v. 12/6; 108-v. 21/- L.T. for D.E. Valves, 7/6 and 9/- Siemens, 60-v., 80-v., 12/6. Helleson, 60-v., 14/6. Various 1.5 D.E. Batteries, 1/6 to 2/6.

EBONITE—"Grade A," cut while you wait, 3/16 at 1/4 per sq. inch: 1 in. at 1/4.

"J.B."—All lines stocked. S.L.F.—.0005, .0005, 11/6; .00035, 10/6. Post 6d. set. 4" Dial included.

DON'T FORGET TO REAP THIS: 29, Barrington Road, Brixton, S.W.9. 30th September, 1926. "May I be allowed to congratulate you on the wonderful 2-valve set which you are selling for £4/19/6 complete."

"I was fortunate enough to purchase one of these sets this week and after very thorough tests it has proved to be perfect in every detail, giving very fine clear results, and I shall be only too pleased to recommend this set to all my friends."
"JOHN F. DREW"

ORDERS BY POST MUST BE ACCOMPANIED BY SUFFICIENT TO PAY POSTAL CHARGES.

VALVES—Cosmos S.P.18, Red or Green, 14/- New Blue Spot, 14/- All Mullard, Ediswan, Gram, Marconi, Coscor, Bright, D.E. and Power, 8/-, 14/-, 18/6, 22/6, 24/6, 30/-, £2. Mullard P.M. 1, 2, 3, 4, 5, 6 stocked.

LISSEN

LISSENOLA, 13/6. L.F. TRANSFORMER, 8/6 35 OHM RESIST. 2/6. H.T. OR L.F. CHOKES, 10/- FIELDLESS COILS, 10/- GRID LEAKS, F., 1/- DITTO VARIABLE, 2/6. ALL PARTS AVAILABLE. POST EXTRA.

KAYRAY

S.L.F. CONDENSERS



With knob and dial 7/11
-0005 or 0003 Aluminium Vanes Bakerlite Ends Please note test Report P. 1 7/26 "Amateur Wireless" Brass Vanes Metal Ends 10/6 (This has 4 in. Dial) POST 6d. per set.

OUR NOTED I-VALVE and CRYSTAL SET, in solid polished cabinet, complete with valves, phones, H.T. and L.T. Units, Aerial Equipment, Daventry Coil, Extraordinary value 45/11. Carriage, 2/- **ASTOUNDING 2 Valve AMPLIFIER** in L.F. pillar, 25/11. Amplifiers in or COMPLETE handsome with valves, polished box, H.T. and L.T. 1 valve, 16/11. Units, 14/6 Carriage 1/5. Carriage, 2/-

Ormond Products. SQUARE LAW LOW-LOSS .0005, 9/6; .0003, 8/6 (1/3 each less no varior Friction Geared-.0005, 15/-; .0003, 14/6; .00025, 13/6. Straight Line Frequency Geared-.0005, 20/- .00035, 19/6. S.I.P. .0005, 12/-; .00025, 11/- **SO. LAW LOW LOSS DUAL**-.0005, for Electric Six, 19/11 each Ormond Friction Dial, 10/- Filament Rheostats Dual, 2/6; 6 ohms or 30 ohms, 2/- Potentiometer Geared, 2/6. Shrouded, latest model, 15/-

IGRANITE TRIPLE HONEY-COMB INDUCTANCE COILS. 30, 2/9; 40, 2/9; 50, 2/9; 60, 3/-; 75, 3/3; 100, 3/6; 150, 3/9; 200, 4/-; 250, 4/6; 300, 4/9; 400, 5/6; 500, 7/-; 750, 9/6; 1,250, 14/-; 1,500, 14/- ALL PARTS STOCKED.

BARGAIN DEPT Huge quantities of window-rolled and goods which have been taken in exchange for sale at ridiculous prices. Bargains not sent by post.

LOW LOSS SQUARE LAW This variable Condenser is simply marvellous value. It cannot be soualled in price or quality. .0005 of 4/11 Post 6d. set. .0003 4/11 VERNIER 1/- each extra.

BURNE-JONES (Magnam) Screened Coils, as delivered. Baseboard, N Condensers, 5/-, Twin Sq. Law Variable, 22/6. "Magnam" West End Depot.

ACCUMULATORS. 2-v. 40, 7/11; 2-v. 60, 9/6; 2-v. 80, 12/6; 2-v. 100, 14/6; 4-v. 40, 13/11; 4-v. 60, 17/11; 4-v. 80, 26/6; 6-v. 80, 26/6; 6-v. 80, 35/6. ALSO another good make, 1/8 extra on each of above. Post 1/-.

AMPLION LARGE STOCKS OF LOUD SPEAKERS. 38/-, 45/-, 68/- ALL CABINET MODELS and attachments stocked. Grand Value in NON-MICROPHONE VALVE HOLDERS. Board Mounting, 1/6

GRAM-FARISH

WEST END DEPOT. Sold on Money Back Guarantee Fixed Condensers, 1/1, 1/6; .0003 and Grid Leak, 2/- for Series and parallel; Grid Leaks, 1/3 each.

PHILLIP'S "TETRODE" Electrode Valve, Double Grid, 8/11. Post 6d. each.

Detex Calibro Dials, 5/9; Detex Vermo Dials, 4/6; Eko H.T. Units, 55/-; Igranite Tone Control, 6/3; Star-T. Units for Remartz, B.E.C., 2/6; 5X3, 3/6; Ormond Neutralizing, 4/- (for Base or Panel)

RADIO MICRO VALVES. .06, 3-v., 6/11; .25, 2-v., 6/11; Power-.3, 8/6; Power-1, 9/11. (Power are 3-volts.) Phillips 4.4 Electrode Valve for Underlyne, 8/11. Post 6d. each **EVERYTHING in Demand** - stocked for Wireless.

SCREENED COILS with base, by Burne-Jones, Magnam and Lewcos. All Orders in Rotation.

CALLER'S COLUMN

NOT SENT BY POST. Permalins with N. and W. 1d.; Nickel, 1 1/4d. Spade Tags, 6 a 1d. Soldering, 3d. doz. E6 Bushes, 1d. Screw Winder Flugs, 2d. 3d., 4d. pair. Plug and Socket, R. or B., 3d. Staples 4 a 1d. Valve Pins, 2 a 1d. 4 or 2B.1. Rod, 3d. 1/4. Battery Boxes, Copper, 2/3. Climax, 5/7. Pine 7/22. Aerial, 100 ft., 1/11; Special Heavy weight, 2/3. Phosphor Bronze, 49 strands, 10/6. 1/2 (limited). Twin Flex, R. & B., 12 yds., 1/4. 1/6. 2/- Miniature Silk Twin Flex, 6 yds. 6d. Maroon Lighting Flex, 6 yds. 9d. Insulators, 3 for 1d. Tinned Copper, 1/16th sq. 1d. 2 ft. D.C.O. Wire, 1 lb. reel, 20g. 9d.; 22g. 10d.; 24g. 11d.; 26g. 1/2; 28g. 1/4. Battery Boxes, with clips, covered leatherette, 2/11; Metal, 3/9. Ebonite, Grade "A," cut while you wait, 3/16th in 1/4 sq. inch; 1/2 in. 1/4 sq. in. Stock sizes cheaper: 7 x 5, 1/9; 8 x 6, 1/3; 8 x 6, 1/3; 9 x 6, 1/11; 10 x 6, 1/9; 12 x 9, 4/6. Also cheaper quality for crystal sets. Special offer in Crystal Sets, 6/11, 7/6, 8/11, 9/6, 12/6. Also enclosed cabinet, wonderful value, 18/11. AMERICAN TYPE Oak Cabinets, with baseboard, take 12 x 8 ebonite, 10/6; 2 x 9, 11/9; 16 x 9, 16/11; 18/11. Any stock in 3 days. Handsome panel switches, DPDT, 1/6; SPDT, 1/7. (Highest quality). Nighting Arrestors, 1/6. Wave Length Permanent Det., 6d. Red Diamond Perm. Detector, 2/- Liberty, 3/6; Browning, 3/-; H.I., 6/-; Crystals, Shaw's Genuine Hertzite, sealed, 8d.; Neutron Wryar, 1/6; Dayzite, 2/6. Splendid enclosed Crystal Detectors, on base, 1/1, 1/1, 1/6. Micrometer, 1/9. Service do., 2/9 (with crystal), P. & P. Switches, 1/7. Non-microphone V.H., 13/3. Solid Red Eb., 2/6. Baseboard, 8d. 2-way Geared Coil Holders, 2/11. 3/11. Penton, Lotus, Polar, Newey stocked. Back of panel, W.L.L. 4/11; Kay Ray, 3/11. 20-v. H.T. Accumulator Unit—the top and all plates are removable, can be replaced or cleaned. The world's greatest bargain, per 20 volts, 8/6. 2 drills for 1-h. fixing, 1/3. Phone Cord, 1 1/2, 1/3. L.S. do., 1/6, 1/9. H.T. & L.T. Leads, 4-way, 1/11. Our old friends, Crown Polo H.I. Batteries, 60-volt (not one in a 1,000 has to be returned). I will change any faulty. Price 6/11. Adico, Eveready, 60-v., all 1.5 Batteries here. (Columbia always stocked). Roll up in your thousands!

CALLERS: MAKE OUT YOUR LIST FOR A SPECIAL QUOTA-TION.

K. RAYMOND 27 & 28a, LISLE STREET, LEICESTER SQUARE W.C.2
Hours: 9.15 to 7.45 SATURDAY 9 to 8.45 SUNDAY 11 to 1
Back of Daly's Theatre Nearest Tube, Leicester Square. Phone: Gerrard 4637.

APPARATUS TESTED.

(Continued from page 440.)

"Lotus" Radio Jacks and Plugs and Switches. A special feature of the jacks and switches is that they have been designed to occupy a minimum of space behind the panel and project but 1 1/4 in., as against 3 or 4 in. in the case of most others on the market. This, in our opinion, is an important step forward in design, for the line of demarcation between a "land-line" telephone jack and a radio jack has hitherto been all too faint. Radio apparatus demands much more electrical efficiency than does that used for the comparatively rough and robust telephone system of army and even P.O. practice, and visual evidence that this is recognised by manufacturers can but be reassuring to wireless amateurs. That a considerable variation in dimensions has been effected would indicate that the component has received careful consideration in design.

Another important feature is that the contact elements of the "Lotus" Jack are mounted in such a way that they cannot be moved out of their relative positions. Fan-tail shape soldering tags are fitted which can be brought to any desired position to suit the wiring. Solidly made, with hard springs and pure silver contacts, five types are available at very reasonable prices. The No. 4 (filament single control), for instance, is 2s. 6d.

The "Lotus" Jack Plug is specially de-

signed for use with "Lotus" Jacks, but an ingenious spring sleeve fitment (which is supplied with each one) enables it to be adapted for use with any other type of jack. The "Lotus" Jack will take either ordinary flex wire or telephone tag terminals. It is of a clean, neat design, is nicely finished, and is really cheap at 2s.

The "Lotus" Jack Switch operates on the push-pull principle, and our comments in respect of the "Lotus" Jack are in the main applicable to this excellent device. At the reasonable figure of 3s. 6d., the No. 8, which is a double-pole single-throw, should find its way to the panels of a vast number of amateurs' sets this season.

Messrs. Garnett, Whiteley's radio products are all good, and these latest additions to their increasing range will doubtless receive a very general welcome.

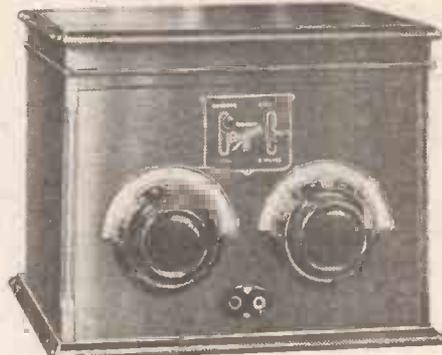
THE R.I. MULTI-RATIO L.F. TRANSFORMER.

The price of this popular component was recently reduced from 27s. 6d. to 25s. Readers are advised to alter their "Lists of Parts" for "P.W." sets whenever necessary in order to record this welcome news.

"GREEN DRAGON" DIAPHRAGM PAPER.

This material, specially manufactured for pleated loud speaker diaphragms, is supplied by F. J. Eastoe, of 29, Prince's Parade, Church End, Finchley, N.3. It requires no treatment, and is sold in 40-inch lengths, measuring 6 in. in width. It is a tough, green-coloured paper, is easy to handle, and in all respects perfectly suitable, in our

opinion, for the work for which it is intended. Further, it appears to resist variations in atmospheric conditions, and does not lose its "crispness" in considerable changes of temperature, and these advantages will be appreciated by amateurs who have constructed loud speaker diaphragms with unsuitable materials.



A popular Burndept receiver, the Ethophone Three.

"Aermonic" Anti-Microphonic Valve Holder.

We recently received a sample of this component from Messrs. A. F. Bulgin & Co., 9, 10, and 11, Cursitor Street, London, E.C.4. It is a neat little device, and is as well made and as nicely finished as all the other "Aermonic" components we have examined.

Designed for baseboard mounting, provision is made for two fixing screws and four soft but tough soldering tags are fitted. It is quite efficient in operation, and is very reasonably priced at 1s. 9d.

CARBORUNDUM STABILISING DETECTOR UNIT

ENSURES GREATER SENSITIVITY—INCREASED SELECTIVITY—CRYSTAL CLEAR TONES

There is no denying the pure true quality of crystal reception, and it is now possible to get such reception on any set without the fuss and trouble of a nervous cat's whisker jumping off the sensitive spot.

The Carborundum Stabilising Detector Unit has revolutionised crystal reception. It is built around the fixed permanent Carborundum Detector—no cat's whisker—no adjustments—and retains its sensitivity and simply cannot burn out.

The Stabiliser gives you a resistance controlling feature through which the Detector can be made to match the impedance of any circuit—think what this means on reflex sets.

For the reception of tones of natural quality equip your set with the Carborundum Stabilising Detector Unit, which is the only really permanent Detector and the only perfect Detector for crystal and reflex receivers

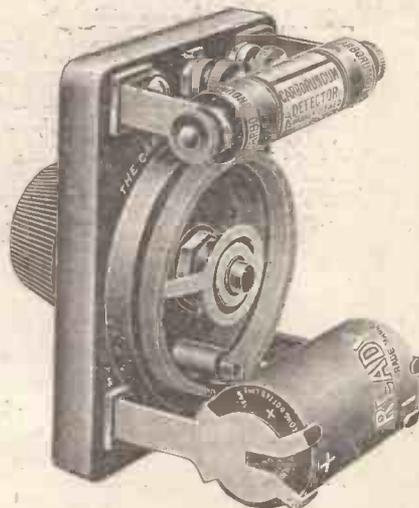
BRITISH MADE.

PRICES INCLUDING POSTAGE.

- No. 32—Carborundum Stabilising Detector Unit complete with No. 30 Carborundum Detector but without Dry Cell - - - - - 12/6
- Ever-Ready Dry Cell U.W. 5. (price extra) - - - - - 5d.
- No. 30—Carborundum Detector - - - - - 5/-

Send for Descriptive Folder W.3 to

THE CARBORUNDUM COMPANY, LTD.,
TRAFFORD PARK : : MANCHESTER.



SEE OUR EXHIBIT—STAND No. 12
 MANCHESTER EVENING CHRONICLE
 WIRELESS EXHIBITION.



*If coils were this size
the "Lotus" would hold
them securely*

Patent
No. 244,251

The Moving Block Cannot Fall

The vernier movement comprises three sets of enclosed precision machine-cut gears, and reduces the speed of the moving block by eight times. Side plates, coil blocks, and knobs in artistic bakelite mouldings. All metal parts heavily nickel plated. Made for left as well as right hand.

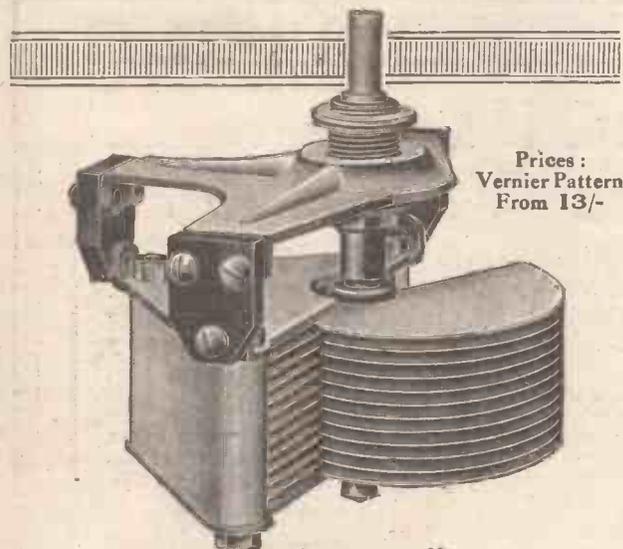
PRICES:
Two Types:

For outside panel mounting:	
Two-way	7/-
Three-way	10/6
For inside baseboard mounting, with 6-in. handle:	
Two-way	8/-
Three-way	12/6

LOTUS VERNIER COIL HOLDERS

Made by the makers of the famous Lotus Buoyancy Valve Holder.

**GARNETT, WHITELEY & CO., LTD.,
Lotus Works, Broadgreen Rd., LIVERPOOL**



Prices:
Vernier Pattern
From 13/-

Fit "Utility" Guaranteed Components

HERE is the "Utility" Low Loss Condenser. The centre spindle rotates on ball bearings, all brass parts are nickel plated, pigtail connection from moving plates. One end plate only is used and all sources of loss have been reduced to a minimum. There is no better Condenser than "Utility"—and all good Dealers stock them.

Insist upon—"Utility" No-Capacity Change Over Switch, Micro Dial, Jack and Plug, Push-Pull Switch.

WILKINS & WRIGHT LTD
KENYON ST. *Utility* BIRMINGHAM

Manufacturers of Car
Electrical Equipment



By Appointment to
H.M. the King



*End your H.T. troubles
and Save Money—*



**MODEL
H.T. 3.
60-VOLTS**
Tapped every
2-VOLTS

Have you compared the advantages of a C.A.V. H.T. Accumulator as against dry batteries, for your H.T. supply.

Do you know that your radio reception can be vastly improved by using the C.A.V. Improved 1927 Model H.T. Accumulator, and that your H.T. supply will then actually cost less?

Get your local dealer to demonstrate what a difference they make to reception, and you will wonder why you did not use one long ago.

READY FOR IMMEDIATE USE

60 NO CHARGING NO FILLING WITH ACID

DISTILLED WATER SYPHON SUPPLIED FREE

MODEL H.T.4 -30-VOLTS 30/-
--- H.T.5 -90-VOLTS 90/-

100 GUINEAS FOR A NAME
A distinctive name is required for this accumulator, for which 100 guineas in cash prizes is being offered. For full details see next week's issue of this journal.

WRITE FOR OUR ILLUSTRATED
1927 RADIO CATALOGUE.

Telephone:
CHISWICK 3801
(Private Branch Exchange).

Telegrams:
**VANTERIA, ACT,
LONDON**

C.A. Vandervell & Co. Ltd.
WARPLE WAY, ACTON, LONDON, W.3.

RADIO TORIAL

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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 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 6s. per Blue Print.

Only a limited number of circuits are covered in 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

WIRELESS AND THE LANDLORD.

"AERIAL LAW" (London).—I have received a communication from a solicitor representing my landlord demanding the immediate removal of my aerial. Can you advise me as to the position I am in? These are the facts: The aerial has been attached to the roof for the last three years, with the verbal permission of the landlord, and the other day I happened to go on the roof to renew the string supporting the aerial, and the

(Continued on page 446.)

A WORD ABOUT RESISTORS & VALVES

MODERN Valves, generally speaking, work best at the filament voltage specified by the makers. It is therefore possible to fix resistors to control the voltage applied to the filament, thus economising in initial expense and also space occupied in the receiver. Burndept Resistors are made in 18 values, all being of standard size to fit easily into the Burndept Screw Resistor Holder.

TO FIND THE CORRECT RESISTOR

to suit a particular valve, divide the required drop in voltage by the amperes taken by the valve—i.e. accumulator minus valve (volts) divided by valve amperage equals resistance required (in ohms). Thus to work an L.L. 525 valve (which works at 5 volts, taking 0.25 amps.) off a 6 volt accumulator.

$$6 - 5 \text{ (volts)} \div 0.25 \text{ (amps.)} = 4 \text{ ohms.}$$

To control two valves in parallel by the same resistor divide the result of the calculation by 2. Burndept Valves when used in connection with Burndept Fixed Resistors give excellent results.

Supplied in 18 different values from 0.5 ohms to 50 ohms, each 1/8

Screw holders in cartons containing 2, a carton 2/-

BURNDEPT

WIRELESS LIMITED

AGENTS AND BRANCHES EVERYWHERE

Head Office & Factory:
Blackheath, London, S.E.3.
Telephone: Lee Green
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London Office & Show-
rooms: 15, Bedford Street,
Strand, W.C.2. Telephone:
Gerrard 9072. Telegrams:
Burndept, Westrand,
London.



Send for the Burndept Valve Folder. Free on request.

Why all the best circuits demand Ripaults

Patent Applied for

LATERAL ACTION CONDENSER

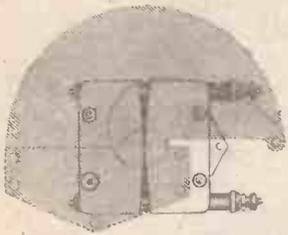


Diagram shows the comparative area taken up by the "sweep" of the old type Straight Line Frequency Condenser and that occupied by the uniquely constructed Ripault Straight Line Frequency Condenser.

A Revolution in Condenser Design that met with instant success

WHEN we placed upon the market the Ripaults Lateral Action Condenser, we knew that embodied in it were several features which would necessarily make it the foremost choice for up-to-date circuits of the "Star" class.

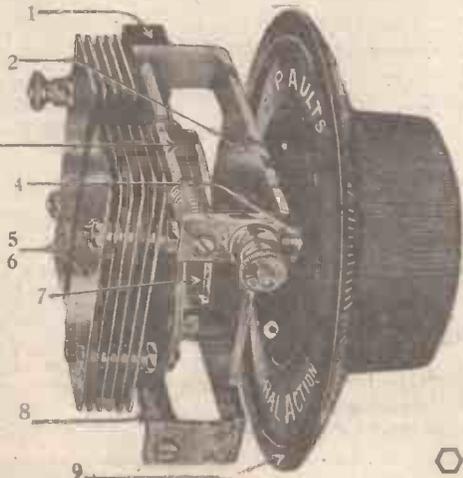
Why? Because it was revolutionary in construction, not for the sake of novelty, but for the sake of efficiency. Because experiment has proved to us that the minute variations of capacity made possible only by the Lateral Action were an infinite improvement—especially as regards easier and more selective tuning—on the old-type "swinging" movement.

The prominent details of Ripaults Lateral Action Condenser are listed below, and constructors will do well to study them. Our sales are themselves proof that these features—lacking in so many Condensers—are considered vitally important by those who build sets for themselves.

Available in either Straight-Line-Frequency or Square Law types. '0005-18/6. '0003-17/6.

9 Points of Design

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 trilateral 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.



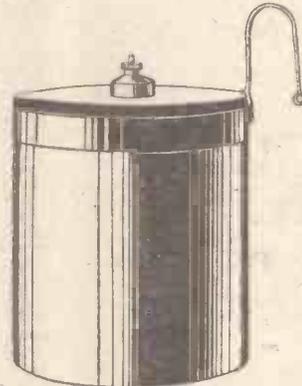
Manufactured & Guaranteed by Ripaults Ltd., King's Rd., London, N.W.1

SIEMENS

FLUID LEGLANCHÉ CELLS

for

L.T. PURPOSES



Complete Cell with Wood Cover.
Dimensions 8½ ins. high x 6 ins. diameter.
Weight 8½ lbs.

This type of fluid cell, which consists of a large earthenware Jar, Sack element (+ pole), cylindrical Zinc (- pole), and a Wood Cover to check evaporation of the solution, has been designed to meet the requirements of those who prefer a cell which may easily and conveniently be recharged at home. The longest service will be obtained when connected to valves of the 0.06 ampere class, and a battery of these L.T. Sack cells should give 15 to 18 months' service with a 2-valve set before the Sack element and Zinc would require to be renewed. With a 4-valve set (0.06 ampere valves) the service would be about 6 to 7 months. In both cases an average use of three hours per day is assumed.

Each cell has an initial E.M.F. of 1½ volts and a suitable number of cells should be connected in series according to requirements.

For use with Valves rated at	1.8 to 2 volts	2.5 to 3 volts	3.5 to 4 volts	5.5 to 6 volts
Number of L.T. Sack Cells recommended	two cells	three cells	four cells	six cells

Maximum rate of discharge 0.5 ampere
Economical " " " " " " 0.25 "

PRICES s. d.

L.T. Sack Cell, complete with one charge of "Siebrosal" 10 0 each
Spare Earthenware Jar 3 0 "
" Sack Element 3 6 "
" Circular Zinc 1 6 "
" Siebrosal " 1 6 per lb.

Send for a copy of our Cat. 650, giving full particulars.

SIEMENS BROTHERS & CO., LTD., WOOLWICH, S.E.18.

RADIOTORIAL QUESTIONS & ANSWERS.

(Continued from page 444.)

landlord has apparently objected to this, hence the solicitor's letter. The solicitor describes it as the unwarrantable trespass committed by me in going upon the roof and fixing a wire. I do not doubt that the landlord will now deny giving permission for the aerial to be fixed in the first place, but the fact remains. Finally, the letter adds that proceedings will be commenced to compel removal, etc.

If you are the sole occupier of the premises we should feel disposed to disregard the threat of proceedings. To speak of trespass on the part of a tenant who goes on the roof of the premises he occupies is absurd. Strictly speaking, the landlord may object to the fixing of an aerial without his consent, but if the tenant offers to pay any increase in insurance premiums which may be demanded in consequence of the affixing of the aerial it is difficult to see what reasonable objection the landlord could raise.

SIMULTANEOUS BROADCASTING.

A. B. C. (Torquay).—When the B.B.C. stations are simultaneously broadcasting, does one receive the sum of the transmissions, or only the one station, as in a usual separate programme transmission?

Each of the stations, although all are transmitting the same programme, is using its own particular wave-length, as is the case when it is broadcasting its own individual programme, so that one only actually hears the station to which one's receiver is tuned.

TESTING TELEPHONES.

F. R. H. (Shepperton-on-Thames).—What is the best method of testing a pair of telephones?

The best way to tell if a pair of 'phones is in good condition is to put the 'phones on and place the end of one of the leads between the teeth. Rub a key or nail upon the other lead, and the weak galvanic currents set up in the body will cause a scraping

sound in the earpieces, which will correspond with the rubbing of the key. Such a current is very weak, and is a better test for continuity than the usual dry-cell test.

LAYING OUT A SET.

"SET BUILDER" (Clacton-on-Sea).—What are the chief points to bear in mind in designing the lay-out of a 4-valve wireless set (H.F., Det. and 2 I.F.)? As the set will be a conspicuous article of furniture, I should like it to look as nice as possible, consistent with efficiency as regards the spacing, etc. But the space at my disposal is small, and as some of the components will be cramped I should like to know which of these will suffer less from crowding.

The most important consideration in deciding the lay-out of a set of this kind is that the H.F. amplification section of the receiver is adequately spaced. Each particular set has to be arranged in accordance with the exact width of panel and depth of base-board available, but a good instance of the method to economise space is shown by the accompanying photograph.

This depicts a receiver of the type named, and it will be seen that in order to maintain a pleasing symmetry the aerial tuning condenser and the H.F. tuning condenser are placed at opposite ends of the set to balance the panel.

Theoretically, the H.F. condenser should be as near as possible to the H.F. valve, but the leads can be fairly long providing that the spacing is adequate.

It will be seen that the far end of the panel (where the H.F. wiring is mostly situated) has been left, com-

paratively clear, whilst at the L.F. end of the panel every part of the space is utilised.

As two unscreened L.F. transformers are used, one has been placed in a plane at right angles to the other, so as to minimise the danger of L.F. howling. Although it is possible to group L.F. components

together fairly closely, care must be taken with all the wiring that leads are air-spaced well apart, parallel wiring being avoided as far as possible.

'CLIMAX POTENTIAL DIVIDER.

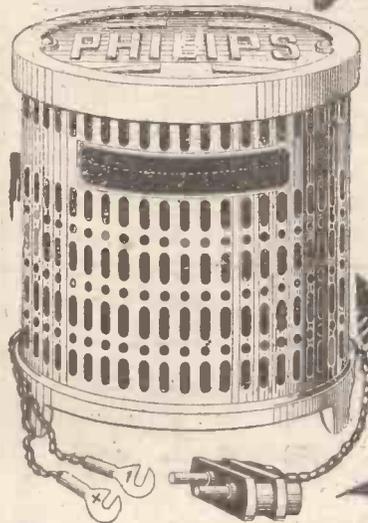
"H.T. FROM D.C. MAINS" (London).—I intend making your D.C. H.T.

(Continued on page 449.)



A lay-out of a four-valve set that gives a pleasing appearance with efficiency of operation.

A word from Professor Low



PHILIPS' RECTIFIER CHARGES RADIO BATTERIES SILENTLY AND CLEANLY, AUTOMATICALLY REGULATING THE CURRENT SUPPLY. IT NEEDS NO ATTENTION, JUST A PLUG TO BE INSERTED IN AN ELECTRIC LAMP SOCKET, THE WIRES TO BE CONNECTED TO THE BATTERY, AND THE WHOLE FIT CAN BE FORGOTTEN.

Price complete **£4.15.0**

"There seems no end to their utility, and I have seldom come across apparatus so capable of hard use without requiring any attention whatever. They are excellent in every way."

(Signed) **A. M. LOW.**



PHILIPS' H.T. SUPPLY UNIT GIVES AN UNLIMITED AND STEADY FLOW OF CURRENT THAT WILL OPERATE A SET OF ANY SIZE AT A COST THAT IS ALMOST NEGLIGIBLE. WHILE IN ACTION IT IS PERFECTLY CLEAN AND SILENT.

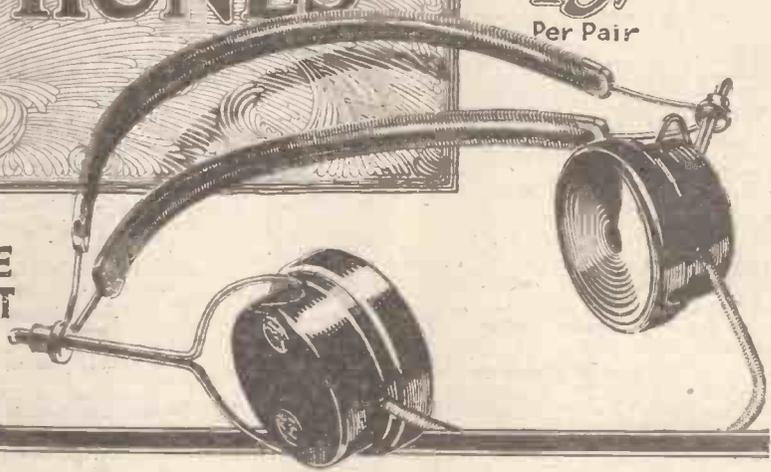
Price complete **£7.10.0**
Both units are suitable for alternating current only.

Advt.: Philips Lamps, Ltd., Philips House, 145, Charing Cross Rd., London, W.C.2



Price
15/-
Per Pair

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The British Thomson Houston Co., Ltd.

Sold by all good Radio Dealers

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SCRAP DRY BATTERIES!

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Model	Voltage Tappings	D.C. Price	A.C.	
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2A	Two	£2 15 0	£8 10 0	
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V2A	1 Variable, 1 Fixed	£4 5 0	£7 15 0	
V3	2 Variable, 1 Fixed	£5 10 0	£9 0 0	
V3A	3 Variable	£8 2 6	—	
3A	Special "Marconi Straight 8" Model	£8 6 0	£9 10 0	

"BROADCASTER," April, 1926.
"On test, the results were very satisfactory indeed. We can recommend the 'EKCO' H.T. Unit with every confidence."

"BRITISH TRADE JOURNAL," July, 1926.
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"We are pleased to inform you that your Unit answers perfectly without the slightest hum or ripple. Please send us all publicity matter, as we intend to push this."

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"The 'EKCO' is the most satisfactory H.T. Unit we have yet had brought to our notice, and can be fully recommended to the attention of all readers."

"BIRMINGHAM MAIL," 2 6 '26.
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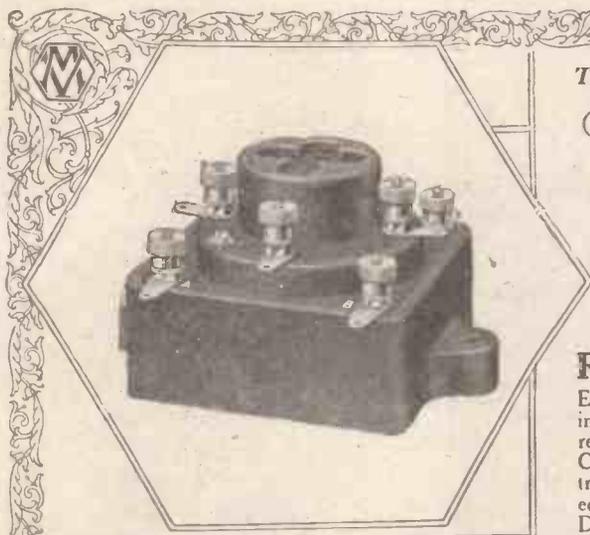


Illustration shows Type "V" unit incorporating the "Cosmos" Spring Value Holder.
Price 10/6

Suitable Valves are:
for 2-volt "Cosmos" S.P.18/B at 14/-
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The

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Resistance Coupling Unit

Real purity of reproduction

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 is as effective as an ordinary transformer-coupled stage. It 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. Cosmos S.P. Blue Spot Valves consume 0.09 amps
3. Economy in H.T. battery consumption. Less than 1/20th of normal.
4. Immunity from breakdown caused by complete or partial failure of the windings of transformers or chokes.
5. Small space and light weight.

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

METRO-VICK SUPPLIES LTD.

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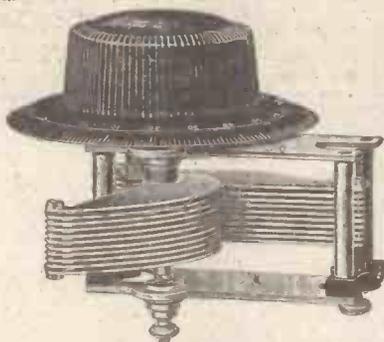
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S.L.F.

The New J.B., S.L.F. Condenser is made on lines similar to our Low Loss Type (Pat. No. 241,805). In addition, its many excellent new features include Special Bearings Top and Bottom which eliminate springs. Side and end play in the centre spindle is impossible. The Top Bearing is of large diameter and friction-lined, which ensures an absolutely smooth movement. The brass vanes are supported at tips to ensure accurate spacing. End plates are highly polished and all fittings are heavily nickel-plated.



Fitted with 1/4" shaft, sold complete with 4" Dial and is more compact than most S.L.F. Condensers.

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LOSS FORMER—the
Former of the Future.

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Has large air space between
wings. Easy windings. British
made from the famous
"BECOL" genuine ebonite.
Size 3" diameter to outside of
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(postage 6d.).



THE BRITISH EBONITE CO., Ltd., Hanwell, London, W.7

RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 446.)

eliminator described in "P.W." No. 223, but cannot discover the address of the makers of the "Climax potential divider" and chokes.

The components for the unit in question are obtained from The Climax Radio Electric Ltd. Quill Works, Putney, S.W.5.

SWITCHING OFF H.F. VALVE.

"BEGINNER" (Leeds).—I possess a 2-valve H.F. and Det. set which, tuned to the local station, gives me an excellent volume in the 'phones. I find, however, that turning off the rheostat to the H.F. valves makes for little diminution in the volume. Is this correct?

Yes. Usually the H.F. valve makes very little difference to the strength of signals from a nearby station. It is only on the weak signals of a distant station that the H.F. amplification is really effective.

The reason that the valve can be turned off without affecting results is that it has a certain inter-electrode capacity, and this is by-passing the signals in the same way as an ordinary condenser would.

MOUNTING COILS CLOSE TOGETHER.

"UN-COUPLED COILS" (Salisbury).—What is the best method of mounting two tuning coils on a baseboard close together so that the coupling between the two is minimised as far as possible?



In order that there shall be as little inter-linking as possible between the two circuits, the coils should be aligned as shown in the accompanying photograph.

It will be seen that the plane of the axis of the rear coil is at right angles to that of the neighbouring coil.

FAULTY 'PHONES.

D. S. (Dulwich Village).—I am using a 2-valve receiver (Det. and L.F.) to work four pair of telephones, one of which is in a room upstairs. Two or three days ago one of the three pairs of telephones used downstairs refused to work. It has been found that this particular pair will not give results wherever they are connected, whilst all the other pairs are working normally either in their own position or when replacing the pair that have given out. What is likely to be the cause of the trouble?

The trouble appears to be due to the permanent magnets in the telephones becoming demagnetised. This is generally due to the 'phones being connected in circuit the wrong way round. When this has been done, the magnetism caused by the current flowing through the 'phones opposes the permanent magnetism which is necessary for the operation of the telephones. In time this destroys the permanent magnetism, and it becomes necessary to restore this before the telephones can be used.

There are many firms who will undertake to re-magnetise or re-wind telephones when a fault of this kind has developed, such as the Varley Magnet Co. (Oliver Pell Control), Blomfield Road, London, S.E.18.

TUNING-IN DISTANT STATIONS.

"NOVICE" (Bedfordshire).—I have purchased a 2-valve set, which, I am told, consists of an H.F. and a detector valve.

Having no friends interested in wireless in the immediate neighbourhood I cannot obtain

(Continued on next page.)

EXPERTS IN RADIO ACOUSTICS SINCE 1908

IS THIS WHAT YOU'RE LOOKING FOR?

TESTING the new 2-valve receiver at our Works at Slough, on a standard P.M.G. aerial, we tuned in the two Paris stations, London, Daventry, Bournemouth, Birmingham and Newcastle on the loudspeaker. This despite bad screening set up by a large power station not more than 50 yards from the vicinity of the laboratory. We were testing on 66 volts only. You can expect even better from the 3-valve Brandeset.



THE BRANDESET II.

The new Brandes 2-valve set features simplicity of control and ingenious compactness. Condenser dial, filament rheostat, reaction dial and "throw-over" switch for long or short wave tuning complete the panel controls. Straight line frequency condenser tuning and grid-bias

is employed. The standard coil is suitable for Daventry and no "plug-in" coils need be purchased. The L.T., H.T., and grid-bias leads are plaited into one cable from rear of set.

£6 10

(Exclusive of Marconi Royalty and Accessories.)



THE BRANDESET III.

The new Brandes 3-valve receiver employs the same ingenious characteristics as the Brandeset II, except that an extra stage of Audio Frequency is employed. It has straight line frequency condenser tuning, grid-bias, and is adapted to long and

short wave tuning. Both receivers give most excellent loudspeaker reproduction on a number of stations, and are specially designed for this purpose.

£8 10

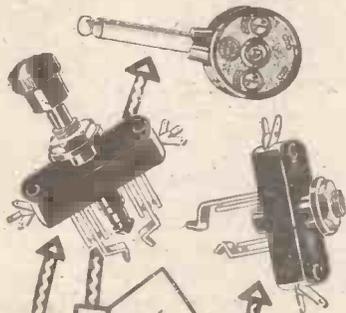
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 This push-pull switch is designed to occupy the minimum space, being only 1 1/2 in. deep. Of the finest Bakelite, it has nickel silver springs and contacts of pure silver. Soldering contacts can be made to suit any wiring.
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 Others from 2/6

LOTUS JACKS
 Designed to take up the least space in the back of your radio. Made from best Bakelite mouldings with nickel silver springs and pure silver contacts. One-hole type, and so the contacts can be brought into any position.
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Garnett, Whiteley & Co., Ltd.
 Lotus Works,
 Broadgreen Road, Liverpool.

RADIOTORIAL QUESTIONS & ANSWERS.

(Continued from page 449.)

any information as regards tuning the set, which appears to be working O.K., but on which I cannot receive distant stations, although I receive whistles (which I take to be their carrier waves).

Can you inform me how I can receive distant stations?

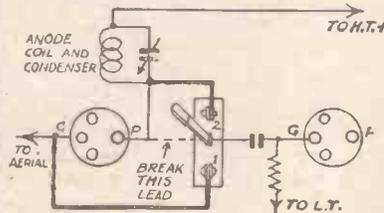
I know my aerial and earth are all right as I have had a crystal set working from 5 X X on them.

Assuming you know the correct coils to plug-in and that everything is connected up correctly, you proceed as follows: First turn on the filament rheostats. If the valves take 4 volts and a 4-volt accumulator is used they should be turned right on, so that all resistance is out of circuit. Should you, however, be using a 6-volt accumulator, the rheostats must only be turned on about two-thirds of the way round, otherwise the filaments of the valves will be over-run.

Having adjusted the filaments the reaction coil should then be moved towards the coil to which it is coupled.

For the Constructor

No. 5.—Cutting Out an H.F. Valve.



How to insert a single-pole double-throw switch for cutting out an H.F. valve (tuned anode) is shown above.

The existing lead from plate to grid condenser is broken, and the grid end is joined to the centre of the switch. Two new leads are then necessary, as shown by the heavy black lines.

One connects the lower switch contact to the grid of the preceding valve, and the other joins the top contact to the plate of that valve.

Usually the reaction coil is coupled to the aerial, but on some sets it is coupled to the anode coil.

The important thing to remember, however, is that whatever coils are coupled together, they should never be so close together that the set howls as this causes interference to nearby sets.

A good method of adjusting the reaction coil is to bring it gradually nearer the anode or aerial coil and while doing so keep on tapping the aerial terminal with a wetted finger.

While a series of clicks will be heard even when the reaction coil is at 90 degrees with the anode or aerial coil, these will be suddenly intensified on bringing the reaction coil closer.

In practice, it will be found satisfactory if the set starts oscillating silently when the reaction coil is brought up to within approximately 45 degrees of the coil it is coupled to, although if it oscillates (heard by the intensified click) when the reaction coil is farther away, a smaller reaction coil should be used, and the same process repeated.

Having got the set almost oscillating, the reaction coil is left in this position. The two variable condenser dials are then rotated *simultaneously*, both starting at about the same number of degrees.

It is always a good plan to start at 90 degrees on each dial, as then you can tune down so many metres, and also (by rotating the condenser toward 180 degrees) tune up an equivalent number.

If the set gets away from the oscillation-point when the condensers are set at 140 degrees or more, then the reaction coil can be brought slightly closer to the other coil.

When the carrier wave of the transmitting station is heard the condensers are rotated until it is at its maximum volume, and the reaction coupling is loosened as far as possible.

Should, however, speech or music be distorted, the reaction should be "loosened" further by moving it away from the other coil. Signal strength will then decrease slightly, but it will be found that the distortion has disappeared.



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'PHONE REPAIR SERVICE
 Headphones Re-wound or Re-magnetised, 4/6. Loud Speaker Re-wound, 4/6. Transformers Re-wound, 5/-. Re-magnetising only 2/-. All work guaranteed. Postage extra. Write for trade terms.—H. E. P. Co. 1, Cottrill Rd., Spurstowe Terr., Hackney, E.8.

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 Send card for Radio press reports and booklet. This valve can be used in any set with a variation and will give 50% to 150% increase in power.
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Louden Valves



“... no less than five American Stations . . with one LOUDEN.”

Here is a letter from Mr. France, of Rotherham, who tells us he began experimenting long before broadcasting started. Your enthusiasm for DX work may not lead you to search the ether until 2 a.m., but if you are keen upon the reception of strong, clear signals you will find, as Mr. France has done, that the Louden is the valve to use every time.

Dear Sirs,
 “Some time ago Messrs. Woodhead Bros., Electricians and Wireless Dealers, brought me one of your blue top valves, and asked me if I would try it, and give them a report; I gave them a good report and backed it up by buying four more.
 “At 2 a.m. the following morning I received music and speech from no less than five American Stations, and I have a very nice letter from WGY confirming my report, and this with one of your blue-topped valves used as a Detector with reaction as usual, standard, straight Detector.
 “The next day I received the following stations, all British Main Stations: Sheffield, Nottingham, Leeds Relay Stations, and Frankfort. Zurich I had on for 55 minutes; it was especially good, and music could be heard distinctly and perfectly 30 ft. from the Loud-Speaker.”
 — ALFRED FRANCE (Rotherham).”

Louden valves are made by British labour in a British factory with British capital, and can be depended upon for the finest volume, range and silver clearness. They can only be offered at such low prices because of our well-known policy of selling direct to the public and cutting out the middleman's profit.

Order your Louden Valves by post to-day.

4/6 Bright Emitters. L.F. Amplifier, F.1. H.F. Amplifier, F.2. Detector, F.3. 5.5 volts 0.4 amps.	8/- Dull Emitters. L.F. Amplifier, L.E.R.1. H.F. Amplifier, L.E.R.2. Detector, L.E.R.3. 2 volts 0.2 amps.	8/- Dull Emitters. L.F. Amplifier, F.E.R.1. H.F. Amplifier, F.E.R.2. Detector, F.E.R.3. 4 volts 0.1 amps.
9/- Dull Emitters. L.F. Amplifier, F.E.R.1. H.F. Amplifier, F.E.R.2. Detector, F.E.R.3. 6 volts 0.1 amps.	11/- D.E. Power Valves. Trans. Amplifiers P.E.R.1. Resist. Amplifiers P.E.R.2. 4 volts 0.2 amps.	12/- D.E. Power Valves. Trans. Amplifiers P.E.R.1. Resist. Amplifiers P.E.R.2. 6 volts 0.2 amps.

Postage and packing: 1 Valve, 4d. 2 or 3 Valves, 6d. 4, 5 or 6 Valves, 9d.

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H.T. BATTERY ELIMINATOR**

**ELIMINATE RADIO H.T. BATTERIES!
USE THE A.C. MAINS**



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**TANGENT
House,
Blackett St.**

GENT & CO., LTD., Faraday Works, LEICESTER.

A CHAT ON RECEIVERS.
(Continued from page 406.)

new trouble had been introduced which has to be overcome. The act of neutralising definitely gives the whole receiver a bad tendency to oscillate at very short wavelengths.

The "Straight Eight."

I remember in building up my "straight eight," which is founded on the Rice neutralised circuits, the whole receiver persisted in oscillating at 30 metres, and it was some time before I recognised what was happening and found a cure for the trouble.

We have now, I think, effectually cured this defect in all cases.

Bit by bit these H.F. operations will become easier to do, and with easier H.F. the L.F. distortion troubles will vanish, my ideal being the method previously mentioned—direct working of the power valve from the rectifier through a resistance coupling, for in this case the only possible distortion will be that caused by too sharp resonance in the tuning circuits or overloading of the power valve.

Better Valves.

I will not dare to do much prophesying as to what direction improvements will take in, because there is always a possibility of a new method being evoked, but with our present knowledge cheap accurate coupled condensers are one obvious necessity.

Perhaps valves better designed for H.F. work will be a line taken up. There is, however, a limit to the magnification required, because if the magnification per valve is too much then less tuning circuits will be wanted and the result will be lack of selectivity.

**NOEL COWARD—
ON THE B.B.C.**
(Continued from page 439.)

within the reach of all who are poor in finance.

Broadcasting Improving.

In conclusion, Mr. Coward said: "I think that the news items should be more carefully chosen and compiled. In the uneducated districts where the working man might pick up the earphones for just a few seconds, grave trouble might be caused were he to hear just a portion of a paragraph that might have a thoroughly different meaning than when heard complete. Therefore I think that every sentence complete should have a definite meaning. It takes a great writer to make a paragraph retain the same meaning even when mutilated, but it can be done.

"I do not see anything else very wrong; but I would like to say that I think that broadcasting, although I know very little about the whole thing, seems to me to be improving month by month. Certainly it has greatly improved in the last year, and there is no reason why it should not go on doing so."

: Instruments :
ONE-METERS
are the finest Multi Range Sets. No. B 52 T has 7 ranges: 120 v., 6 v. and 300 m.v.; 6 amps, 120 m/a, 12 m/a and 3 m/a. 55/-
THE ULTRA ONE-METER
is an entirely new production of wonderful precision and delicacy from microamps to 20 amps, millivolts to 2,000 volts. Measures 50 ohms to 50 megohms.
Instrument only ... **50/-** Multipliers each ... **6/6**
ELECTRADIX RADIOS
Instrument Dept. P,
218, Upper Thames Street, London, E.C.4

REPAIRS SETS, PHONES, TRANSFORMERS.
Officially Approved by Radio Association.
ALL WORK GUARANTEED. LOWEST RATES. A. U. SERVICE
Cash on Delivery if Desired.
JOHN W. MILLER, 68, Farringdon St., E.C.4
Phone Central 1951

WIRELESS.—Capable, trustworthy men with spare time who wish to substantially increase income required where we are not fully represented. Applicants must have practical knowledge of installation of Set and Aerial, be a householder or live with parents, and be able to give references; state age and experience. Address: Dept. 32, General Radio Company, Limited, Radio House Regent Street, London, W.1.

AERMONIC 1/9
DON'T PAY MORE
Anti-phonetic. Lowest capacity. Lowest price—best value. The new design enables us to sell at less than other makes and puts Aermonic "miles in front."
Aermonic Holder - 1/9
Other makes are not so fine. If "can't obtain" drop us a line.
List of Aermonic Specialities Free.
JAMES CHRISTIE & SONS, LTD.
246, West Street, SHEFFIELD.
London Agents: A. F. Bulain & Co., 10, Cursitor Street, London, E.C.4.

£2? WOULD you like a Multi-Valve Receiver for 40/- down? In our Catalogue "P" are details whereby many well-known Sets are obtainable on easy terms. Accessories too! Our technical advice is yours without charge. Write to-day to:
New Times SALES CO.
77, CITY ROAD, E.C.1

TRIUMPH
2-COIL STAND
Ref. No. C.169
Price 5/9

**THE LATEST SUCCESS
VELVET VERNIER ACTION
FULLY GUARANTEED. 1880**
TRIUMPH VALVE-HOLDER
(Anti-Microphonic) &
TRIUMPH RHEOSTAT.
ASK YOUR DEALER FOR ILLUSTRATED LISTS,
or send p.c., mentioning "Popular Wireless," in
A.H. CLACKSON LTD. WHITE HART WORKS, LONDON, N.22



Prov. Patent No. 240917

Clarke's "ATLAS" FILAMENT CONTROL

Do you know which is the finest Rheostat? Simple though the question is, you CAN'T give a fair reply unless you know the true "inwardness" of Clarke's "ATLAS" Filament Control.

You can see at once that it's "different." Its fine quality porcelain body attracts attention from a host of others. In point of fact it is unique. Working on a principle of special resistance discs it gives a constant and complete control over the flow of electrons through the valve, and its almost uncanny precision is a delight. No wires to scratch, scrape or wear out. No powder to pack or give flickering control. Its 50 ohms resistance makes it ideal for either bright or dull emitters. Silently efficient throughout its long life, it is a deciding factor in resolving that elusive carrier wave into clear and distinct signals.

For 6/6 you have the finest rheostat value in the trade.



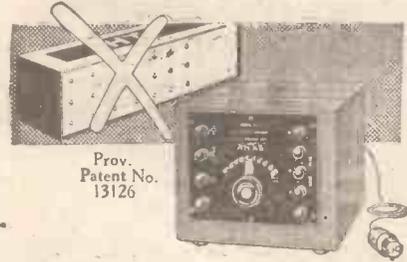
Clarke's "ATLAS" FIXED CONDENSERS

Bakelite casings and inserts. Copper foil and best ruby mica. Nickel-plated metal fittings. Strong soldering connection. Absolutely constant values.

Every Condenser is tested under 1,000 Volts pressure.

PRICES:	
0001-0005 mfd.	1/6 each
001 - 002 "	1/9 "
0025 - 004 "	2/- "
005 - 007 "	2/6 "
01 mfd.	3/6 "

"CLARKE'S" "ATLAS" Radio Specialities



Prov. Patent No. 13126

Another worry ended! Clarke's "ATLAS" High Tension BATTERY ELIMINATOR

makes the old H.T. Battery an unnecessary evil for all who have electric light in the home.

It solves the problem once and for all. With a supply of 100 to 250 volts, any voltage from 20 to 150 can be obtained by simply plugging-in to the nearest electric light socket. Four stages of Grid Bias are provided for: 4, 8, 12 and 16 volts. Current consumption negligible.

For DIRECT and ALTERNATING Current.

PRICES:	
Direct Current for 200/250 volt mains	£4 : 10
Alternating Current for 100/125 volt mains and 200/250 volt mains, including 2 valves	£8 : 5
Royalty on A.C. Model only, 12/6 per instrument.	

FULL WAVE RECTIFICATION. Each instrument carries the "Atlas" guarantee.

H. CLARKE & CO. (Mcr.), LTD., ATLAS WORKS, OLD TRAFFORD, MANCHESTER

MÉTAL RADIO VALVES

Why pay more for valves when you can obtain "Métal" Radio Valves at the prices quoted. It isn't as if higher priced valves are better than "Métal." They are not, for with "Métal" Valves—one of the oldest makes—you can get results unobtainable with most valves. That is why they are used by the French Government and in countless Continental and U.S.A. sets.

PRICES:			
Type.	Fil.	Volts.	Amps.
C.L.62	2	0'06"	10/6
C.L.202	2	0'2	8/-
6/100	4	0'06	3/6
Power.			
C.L.502	2	0'5	12/-
C.L.104	4	0'10	15/-

Your dealer stocks them. Write for list showing all types

Sole Distributors:
JOHN RAE, LTD., 60, BLACKFRIARS RD., LONDON, S.E. 1

ELIMINATE HUSKINESS FROM THIS SEASON'S RADIO BY FITTING

FERRANTI

BRITISH MADE, AUDIO FREQUENCY TRANSFORMERS

TYPE AF3	TYPE AF4
25/-	17/6

VISIT STAND No. 52, MANCHESTER EXHIBITION

CORRESPONDENCE.

(Continued from page 436.)

LOOK FOR THE HALL-MARK

"It is curious," said Sparks, "how inconsistent some people really are." "Meaning?" I asked, filling my pipe. "Take Reynolds, for example, our book-keeper," he replied. "The other evening he asked me to go along to his place to see whether I could give him some advice and help him to get his new Wireless set working properly." When I arrived, he fetched out his set and we sat down together to see whether we could find out why the confounded thing wouldn't work properly. Four miles from 2LO we were, and barely a whisper. We checked up the wiring several times—that seemed all right. We examined the valves; they seemed to be quite above suspicion. We tested the transformer—nothing wrong there. In fact, we turned the spot light on every component in the set, all to no purpose. Then suddenly I began to suspect the panel. "Tell me," I said, "where did you get this panel?" "Where I bought the other parts," he answered, "down the road at Jenkinson's. Why, what's the matter with it?" "Well," I replied, "it doesn't look like real Ebonite." "But it must be," he insisted, "I watched Jenkinson cut it off the sheet myself." "Ah, my friend," I said, with a smile, "all is not gold that glitters. You wouldn't think of buying a ring for your wife, without looking for the hall mark. This panel is black, it looks like Ebonite, but there may not be a trace of rubber in it at all. Here is where your trouble lies." And then I read him a lecture on the fallacy of buying good components and trying to save a few shillings on a leaky so-called Ebonite panel. He admitted that he could have bought a *Radion panel for only a shilling or two more. A panel guaranteed, stamped on the corner with a trade mark which is just as valuable in its way as the hall mark on a gold ring.

"So I suppose he has got to re-build his set now?" I asked. "Yes," replied Sparks, "and I'll wager he'll have something to say to Jenkinson about his 'dud' ebonite!"

*Radion is the trade name for a super quality of Ebonite, made by the oldest and largest firm of Ebonite manufacturers in the world. It is a material specially evolved for wireless use, possessing the highest possible insulation value. Resiston is the name given to a high grade Ebonite panel sold at a slightly lower price than Radion.

Panel Size.	Radion.	Resiston.
7 ins. x 10 ins. ...	5/9 ...	4/8
7 " x 12 " ...	7/- ...	6/6
7 " x 14 " ...	8/- ...	6/3
8 " x 12 " ...	8/- ...	6/-
9 " x 15 " ...	11/3 ...	8/6
10 " x 12 " ...	10/- ...	7/6
12 " x 12 " ...	12/- ...	8/-

and in 12 other sizes.



Manufactured by American Hard Rubber Co. (Britain) Ltd., 13a, Fore Street, London, E.C.2

G.A. 6x24.

made in any other voltages ranging between 200 and 250. It can also be borne in mind that the use of "Osglins" is quite the safest means of taking current from mains, because these lamps will not pass enough current to damage even the telephones or loud speaker, even if put direct through the lamp without the intervening valves, etc.

Many thanks for your courtesy in publishing this for me, which I hope will be of use to your numerous readers.

Yours faithfully,
W. H. SMITH
(Electrical Engineer.)

Kinsale, Frinton-on-Sea.

PREVENTING 'LECLANCHE CELLS' 'CREEPING.'

The Editor, POPULAR WIRELESS.

Dear Sir,—In view of the number of people now going in for wet H.T.'s of the Leclanché type, I think the tip following may be of use in the prevention of "creeping": To each pint of the sal ammoniac solution add one heaped teaspoonful of granulated sugar.

I read of this many years ago in connection with cells of the above-mentioned type for ordinary bell ringing, and see no reason why it should not be as effective in the small cells as in the others. In any case it does no harm.

Wishing "P.W." the success I feel it deserves as the best paper of its kind.

Yours sincerely,
L. PRIDDIS.

10, King Alfred Terrace,
Winchester.

SOME "P.W." SET RESULTS.

The Editor, POPULAR WIRELESS.

Dear Sir,—On September 7th I was touring the Continent with the help of my old friend, the 2-valve Unidyne, on the look-out for musical items.

On making a list, at the close of those station- received at good strength, I found I had a total of twenty. I then thought I would try the "P.W." Ultra Crystal Set, as it was a very good evening. I found Frankfort, at times, came in almost as loud as Daventry, and closed down at 11.30. Hamburg could be heard up to midnight, when his closing words could be heard very clearly indeed.

Finding still another station tuning at 12.10, and not hearing his call, I went back to the Unidyne and found he was U. Radio, Madrid.

Last evening, October 4th, when trying another detector on the Ultra, Frankfort could be heard fairly, Hamburg was faint, as was Radiola, but I was very surprised to hear our old friend Toulouse calling very clearly. My aerial consists of single 18 and 18 bare copper twisted together, 80 ft. long. 26 ft. high badly screened at free end to west, but open to south and east, and not another within half a mile.

One Thorpe K.4 valve in Unidyne has done over 1,600 hours and the other just over 1,000.

Faithfully yours,
E. O. SAXBY.

P.S.—At moment of writing—7.30—Hamburg and Frankfort are quite good on crystal, 2 LO faint. Belmont Lodge, Throlyway Faversham, Kent.

ALTERNATIVE PROGRAMMES.

The Editor, POPULAR WIRELESS.

Dear Sir,—The listener has still no organ or organisation with a voice that can make itself heard to the B.B.C., and will be in still worse plight with its successor as regards programme selection.

The democracy find the money which the State assert a right to apportion, the monopoly given to the B.B.C. and to be perpetuated, is in effect as undemocratic as the Government of Russia and the large trade unions, and the listener has even less of a vote that counts.

That not only alternative but differentiated programmes would have been long ago provided had licensees any power in calling the tune is certain.

It is hopeless to please all tastes, but educationalists and entertainment seekers, and high and middle and low brow, can be separately catered for and independently controlled.

National concerts, chamber music, etc. appeal to some, and the B.B.C. regard them as "important." For others the only importance is to get them over and done with and get on with broadcasts from hotels cinemas, etc.

Sir Hamilton Harty may hate jazz, but what he and his school regard as "the finest music in the world" does not provide others with the exhilaration or tunes that haunt us as does Mr. Jaek Hyton and his colleagues, and we want a lot more of the class of Mr. Ansell and Mr. Ketyby.

The Sunday programmes, excellent of their biased class, are entirely composed from the point of view what is a minority class, and there is no escape except to a few multi-valve owners.

The popularity of wireless and its revenue will surely decline as time goes on unless the divergent and totally irreconcilable views of the population are more seriously reckoned with than hitherto.

I am, yours faithfully,
"A VULGARIAN."

"Wilbury," 71 Sydenham Road North,
Croydon.

Britain's Best in Radio

LAMPLUGH GRID LEAK

Variable, .5 to 15 MEG.-OHMS. One-hole fixing. An efficient and well-made component, the resistance element is guaranteed constant and is impervious to moisture.



Price 4/- each.

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Sole distributors for London and the Southern Counties:—
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86, Montrose Street, GLASGOW.

Send for  Lists.



This mark is  our Guarantee.

Obtainable from all the leading Wireless Dealers.

AUTOMATIC CONTROL ! !

With our Alarm Clock Attachment you can stop and start your set automatically at any time you wish. Send NOW for free particulars. Attachment 2/9, post free. Fully guaranteed. — A. R. ELLIS (Dept. P.W.), 5, Arthur St., Luton, Beds.

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/-.

CASH BARGAINS.

Good Crystal Sets, 8/3 and 9/3. Amplifiers, 17/6 and 21/-. Phones, Telefunken type, 7/3; Fr. T. Houston, 11/-; U.S. Baldwins, 17/9. Valves, Radio Micro, 5/6; or power, 8/9. Good H.T., 60-v., 5/9; or 4-v., (laboratory test), 3/9 doz. Accumulators, with 12 months' guarantee, 2-v. 40 ignition, 8/3; 4-v. 40, 15/-; 6-v. 60, 29/-. Polished Cabinets, Ebonite, Variometers, Condensers, Coil Holders, and everything in Wireless, reliable and cheap. Satisfaction or cash refunded.

MUSIC ROLL EXCHANGE,
29, High Street, Clapham, London, S.W.4.

BUILD YOUR OWN LOUD-SPEAKER RECEIVING SET FOR £1.

Instruction book, written for novices, with photos; diagrams, templates. 2/-, post free. PUBLISHER, Liss Printing Works, LISS, HANTS.

"2 for a Bob" (Post Free)

and you will be satisfied. The "CLEAR STONE" mineral combination Refills for all makes of Permanent Detectors. Sufficient for two Detectors. Full instructions. Positively the Loudest Results on Earth. S. LYONS, 119, Clerkenwell Road, E.C.1.

PRIVATE GREETING CARDS. AGENTS (either sex; any age) wanted. Largest Manufacturers in Great Britain offer Magnificent FREE SAMPLE BOOK, containing WONDERFUL NOVELTIES - VELVET FIGURES with life-like GLASS EYES; NOTE PAPERS; Dainty CALENDARS FOR PURSE or HANDBAG; BLOTTER; GREETING CARDS for every taste; and DELIGHTFUL COLLECTION OF CALENDARS. PROFITS AND PRIZES WILL AMAZE you. Write: ALL-BRITISH CHRISTMAS CARD CO Dept. 442, BLACKBURN.

ACCUMULATORS ON EASY PAYMENTS

High-Tension Accumulators built up from 20-volt sections (15/- each). Example: 60-Volt H.T. 45/- CASH or 12/6 DOWN and 6 monthly payments of 6/-. Carriage Paid. Satisfaction or money back. Write for Lists to DEPT. 11, GOVEBURY DIRECT SUPPLIES LIMITED, 23, Warwick Row Coventry. Any Wireless Goods supplied on easy payments.



RADIAX COILS
 exceed in efficiency all ordinary types. The standard Low Loss Coil is the most efficient form of all the plug-in coils, nothing but wire and air.
 No. 25, 1/3 No. 100, 2/6
 ,, 35, 1/6 ,, 150, 3/-
 ,, 50, 1/9 ,, 200, 3/6
 ,, 75, 2/- ,, 250, 4/-



THE DX COIL
 For a distance work, gives an auto coupled circuit without altering your set. Permits a variety of aerial tuning circuits, enables neutralising on anode circuits, makes the poor set good, and the good set a "super." Everyone needs these coils, which positively add selectivity and range.
 No. 35, 3/- No. 150, 5/6
 ,, 50, 3/6 ,, 200, 5/-
 ,, 75, 4/- Set of 5, 21/-
 Free chart of circuits with each purchase.

THE NEW SERIES OF SUPER LOW LOSS COILS
 A type is made for all best circuits. Get the special list. These are perfectly made and finished, and accurately calibrated and matched. A guaranteed Radiax proposition.

SPLIT SINGLE COILS
 for anode tuning and a variety of purposes.
 150/400 6/9 600/1200 8/-
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 Three-leg base, 2/3.



TRANSFORMER with split primary or secondary.
 150/400 ... 10/6
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S.L.F. CONDENSER.
 Real Low Loss, smooth movement, perfect finish. A thoroughly reliable component, with dial as shown.
 Single .0003 ... 10/6
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 Double, for Elstrée Six, etc., .0005, 17/-
GEARED COIL HOLDER
 Another new Radiax line. A wonderful valve. Beautifully made and finished, smooth working, and free from backlash.
 Cat. No. 865, 4/-

SUPER-HETERODYNE KIT
 The Super-Het. is probably the best Super Set. Its selectivity and range are undoubted, and it avoids the difficulties of straight H.F. stages. Our new Low Loss Components, Oscillators, etc., enable a Super-Het. Set to be assembled as easily as the simplest straight circuit.
6-VALVE KIT, comprising filter transformer with condensers, 3 I.F. transformers with condensers, oscillator transformer and coupler. £3-10-6

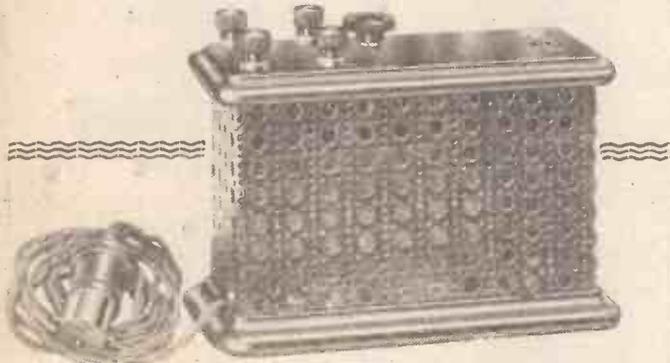
H.F. CHOKE
 Low self-capacity type. The successful control of reaction depends upon the choke coil used. To build a first-class choke is by no means the simple task one might imagine, and much costly and experimental work has preceded the production of the "Radiax" choke, which is perfect for modern neutrodyne circuits.
 Up to 150 metres ... 7/6
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GET OUR LIST of newest Low Loss Components



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How many Valves in your Set ?

LIGHT your Valves from your Lighting Mains—via an Accumulator and the new Rectalloy L.T. Charger.
 Connect in series—then with the movement of a switch the Charger will recharge the accumulator when the set is not in use.
 Simplicity itself! All your L.T. difficulties solved for £2 15s.
 Model C, 100-110 volts A.C. **55/-**
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Write for Folder P.S., describing this and other efficient Rectalloy Chargers which bring to a reality the day when it is possible to forget your Accumulators!



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<p>JACKS 4-POINT 1-Hole Fixing 1/9</p>	<p>S.O.S. BATTERY TESTER 3-Bead Type tells immediately if full or empty Only 3/6</p>	<p>RELIABILITY CONDENSERS Mansbridge Mids. Type 25, 1/6 1 mfd., 2/6 5, 1/9-2 mfd., 3/6</p>	<p>WIRELESS CABINETS For Panels 7 in. high Width 8in. Hinged Lid Oak 12 in. 17/-, 14 in., 17/6, 13 in. 18/6. Mahogany 1/- extra.</p>	<p>DEWAR SWITCH 12-Contact 2/6</p>
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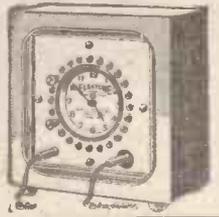
READ THIS LIST AND SAVE MONEY ON COMPONENTS
RECENT REDUCTIONS.—Sterling .0005 Square Law Condensers with Vernier, 9/6; Geared 12/-; Miniloss, 15/-; .00025 8/6; Geared, 10/6; Miniloss, 14/-; Marconi Automatic Detector, 2/6; Series Parallel Variometer, 10/6; Eddystone Absorbos Feet, set of 4, 2/3; Benjamin S.P. Switch, 1/3; N.P. Oil Plug & Insulator, 2/4; Adaptor, 14d.; Socks, 2d.
LATEST COMPONENTS.—6-Way Coil Stand, 2/9; Colvern Low Loss Inductance Former, 5/-; Formo Straight Line .0005 Condenser, 10/6; Success, 18/6; Eureka, 15/6; Cydon, 15/6; Lissen 60 v. H.T. New Process Battery, 10/6; Valve Vibrating Springs, 6d. set of 4.
CONDENSERS.—Low Loss, Square Law, with knob and dial, .0003, 5/-; .0003, 4/6; with Vernier Blade, 1/4 extra; Twin .0005, for Elstrée Six, unequalled value, 9/6; Cydon Twin for ditto, 27/6; Ormond, 1/3; Utility, Sterling, Polar, Formo, Igranite, G.E.C. Var. and all capacities. Neutrodyne type, Ormond, 2/-; Colvern, 3/6; Gambriel, 5/6.
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L.F. TRANSFORMERS.—R.I. Multi-Ratio, 27/6; Marconi Ideal, 25/-; Junior, 15/6; Ferranti A.F.3. 25/-; A.F.4, 17/6; Formo, 10/6; H.T.C. Empire, 7/6; Croix 5 to 1, 4/-; Lissen new type, 8/6; Igranite, 16/-; Eureka Concert Grand, 25/-; N.O. 21, 1/-; Baby Grand, 15/-; Ormond, 15/-; Royal, 20/-; Success, All Black, 21/-; Silvertown, 21/-; G.R.C., 15/-; Brandes, 17/6; Burndept, 16/6; Special Value, 7/6; Modulation, 7/6.
BOONIE.—Any size cut; Clayton brand, 4 in., id. sq. in.; 9 in., by 5, 2/2; 12 in., by 9, 4/6; 15 in., by 9, 5/6; 3/16 in. 25 per cent. less. Faragon and Radion, id. per sq. in.
TERMINALS & ACCESSORIES.—Single W. Office N.P. or Pol. Brass with nut and washer, 1d.; Phone and Castle type, id.; Double Mark, 3, 2d.; 4-way Phone Connector, 6d.; Pole-riding paper, 3d.; Fluxite, 3d.; Black Tape, 6d. coil; 4 in. Empire Tape, 6d.; dozen yards; Insulating tube, 3d. yard; Glazite, 1/2, 10 ft. coil; Shellac Varnish, 6d.; Mica 2 in. x 1 1/2 in., 4d. dozen; Wax Block, 6d.; Chatterton's Compound, 9d.; Drills, 1/-.
VALVE HOLDERS.—Anti-Phobic Benjamin, 2/9; Lotus, 2/3; with terminals, 2/6; Burndept, 2/9; Harlie, 1/6; Reliability, unequalled, 2/-; all baseboard types, ord. ditto 6d.; N.P. Valve Sockets, flush fitting, id.; Superior Panel Typs, 6d.; All Ebonite, 10d.
HEADPHONES.—B.T.H. extra; Brown's "F" Type, 20/-; Reliability, 7/6; Adjustable, 8/-; Dr. Nesper, 12/11; T.M.C., 17/6; Western Electric, 20/-; all 4,000 ohms; Sullivan, 120 ohm Double Ex. Work, Rev. 4/-; 150 ohm Single Phone, 2/6; Long Phone Cord, 1/-.
ACCUMULATORS.—Exide, D.T.G., 4/6; D.F.G., 8/6; W.J., 20 v., H.T. type, 15/-; Oldham H.T. complete, 10d. per volt; Durac 20 v., 12/-; 10 v., 6/-; Repairing Outfit, 2/6.
AERIALS.—100 ft., 4 in. copper tape, 1/6; 7/22s Bright, 2/3; Enamelled, 3/3; Electron, 1/8; Superior, 2/6; Mars, 3/6; Ashton Spreaders, 12/- per pair; O.V., complete, 2/6.
INSULATORS.—Large Shell, 3d.; Reel or Egg, 1d.; Climax, 6d.; Ditto, with shock absorbers, 3/-; pr. Gal. Pullers, 3d.; 120 Gal. Straining Wire, 1/6; Straining Bolt, 1/6.

Send to: **J.H. TAYLOR & CO.** 4, RADIO HOUSE, MACAULAY ST., HUDDERSFIELD.
 Free on Request. Made of Reliability. Tel. 341. Grams: THOROUGH HUDDERSFIELD. Mark of Reliability.
 Orders 5/6 Value Carriage Paid. Under 5/6 2d. per 1/- for Packing etc.

Just select your programme ELECTONE does the rest.

Choose the items which appeal to you, note the times at which they commence, and arrange your plugs on the face of the Electone at the corresponding times—that's all. No unwanted items, no annoying switching off and on. Electone does it all—automatically. Without Electone your set is incomplete. Incidentally it saves nearly 50 per cent. on accumulator and H.T. battery current, thus really doubling the life of the valves. Ask your dealer to demonstrate. In case of difficulty, write direct to:—

Price 27/6
 Electone is a handsome reliable timepiece.



ELECTONE AUTOMATIC PROGRAMME SELECTOR
FREDK. J. GORDON & CO., LTD., 92, Charlotte Street, LONDON, W.1.

Three Wonderful Crystal Detectors

2/6 each.
 Silver Plated
The "KLIP-ON" (Pat.)
 converts your Catswhisker into a Loud, Lasting-Vibration Proof Detector in two seconds. Many testimonials from delighted users.

3/6 each complete with Clips and Screws (Pro-Pat.) **THE BEST PERMANENT DETECTOR.** The only Detector on the market which has safety device preventing the possibility of injury to crystals, and which also allows the whole of the crystal to be searched. The only Detector on the market which has adjustment from lightest contact to required pressure ensuring the finest results. This is obtained by means of a special Friction Clutch. Fits clips on existing sets. From Wireless Dealers or post free from **PARTRIDGES Ltd.,** 140, Northwood Street, Birmingham.

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TECHNICAL NOTES.

(Continued from page 412.)

It is sometimes desirable to use an ammeter or milliammeter as a volt meter, and vice versa: for example, you may have a milliammeter available and may wish to use this for reading the voltage of an H.T. battery. This is quite an easy thing to do provided you have available a suitable resistance which may be introduced in series with the instrument. An average value for the internal resistance of a milliammeter might be perhaps 500 ohms, and if the internal resistance of the instrument be known it is quite easy to determine the value of the external series resistance, which will make it suitable for use in the way mentioned. Supposing the internal resistance of the instrument is 500 ohms, and we wish to measure the voltage of a battery which has a maximum value of 100 volts, the instrument being assumed to have a maximum reading of 25 milliamps.

Evidently, in order that the application of a 100-volt battery shall produce a current of 25 milliamps, it is necessary that the total resistance in circuit (neglecting the resistance of the battery) must be 4,000 ohms. Therefore, the extra internal resistance of the instrument must be 3,500 ohms. A 100-volt battery will thus produce a reading of 25 degrees on the instrument when the resistance mentioned is in series and consequently if the actual degrees on the instrument be multiplied by four they may be taken to indicate the voltage of the battery. It should be noted that this only applies when the current drawn from the battery is so small as not to pull down the voltage. The current of 25 milliamps. from an ordinary H.T. battery will probably pull down the voltage fairly quickly, but in any case this will be evident by a gradual falling of the reading on the instrument.

.....
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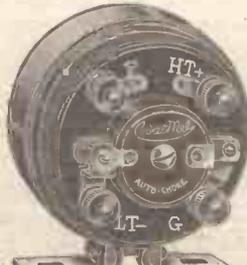
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 The extent of a filament's electrical life is governed by the operating temperature. You are assured of long useful life from your valves when the filament temperature is so low that no sign of glow can be discerned.

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