

WIRELESS

2^D

THE ONE-WORD WEEKLY

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THE WEEK'S NEWS AND NOTES

A NEW BROADCAST STATION.

HAVE you heard 5BG? I understand that this is an experimental station at Chelmsford belonging to the B.B.C. I wonder whether these experiments are the result of the many complaints from Essex and S.E. England which have been received, consequent upon the removal of 5XX to Daventry? The engineers are working with a power of 10 kw., and use a wavelength of 400 to 420 metres.

BROADCASTING FROM UNDER THE SEA.

Chatting to an old naval friend the other day he told me that under-water transmission was recently successfully tested by a diver under the North Sea, off Heligoland, who broadcast his impressions. The transmission was heard well at Hamburg, and further experiments are to be carried out *via* Hamburg and Bremen.

IN SOUTH AFRICA.

Listeners in England may, when criticising the amount of 10s. charged for the necessary licence to possess a receiving set, congratulate themselves that they do not live in South Africa! Although the South African listener has only the choice of three stations—Capetown,

Durban, and Johannesburg—he has to pay a fee of £2 5s. In view of the heavy charge, arrangements are made for a series of "easy payments." "Grouzers" may like to bear in mind the well-known phrase, "Count your blessings one by one. . . ."

THE POPE TO BROADCAST.

I understand that in the near future the Pope, at Rome, will broadcast for the first time. An address will be re-

layed from the Vatican to the Rome station.

A NEW CONTROL.

I hear that 2LO is to have a new control. An operator, sitting in a sound-proof cabinet, will be able to control simultaneously the broadcast from two stations. He will also be able to eliminate everybody's voice but his own, announce the next item while the containers on hand are entering the studio without listeners being aware of his source. Loss of convenience is eliminated, and speed-up will be noticeable. It is this attention to minor details, I think, which makes for a melodious whole.

AND THE BROADCAST OF VELOCITY.

I am rather looking forward to the Red-Air Concert which will be broadcast from 2LO on November 10. Two aeroplanes of the Imperial Airways, Ltd., will provide entertainments in their saloons as the machines are in flight. These will be picked up by a ground station, and re-broadcast. One air liner will take the Savoy Band, and the other a group of theatre artists, and for half an hour enter-



Captain P. P. Eckersley, the Chief Engineer of the B.B.C., who writes in this issue upon "Relaying America this Winter."

RELAYING AMERICA

THIS WINTER.

By Captain P. P. ECKERSLEY.

SEE PAGE 263.

OUR NEXT ISSUE. REORGANISING BRITISH BROADCASTING.

By Captain H. J. ROUND.

THE WIRELESS UNDERWORLD.

By WILLIAM LE QUEUX.

SEE PAGE 271.

tainments from one or the other 'plane will be heard by listeners while the machines are travelling at 100 miles an hour. I shall be interested to hear whether the noise of the engines or magnetos will be noticeable.

THE NEW WIRELESS EXHIBITION.

Looking in at the Wireless Exhibition on Saturday, which was opened at the Royal Horticultural Hall, I was just in time to hear Commander Kenworthy's opening speech. In the course of his remarks, he stated that the Exhibition represented 75 per cent., at least, of the British wireless industry, and that every article shown was of British manufacture. Some idea of the growth of the industry could be gained from the fact that it had a turnover of £10,000,000 a year, and was increasing. As it is a trade which calls for many skilled hands, it is pleasant to hear of work being provided for many who would, perhaps, be unemployed under present conditions.

AN INNOVATION.

I am inclined to hand a little bouquet to the staff of the Cardiff station for their enterprise. The staff and artists are "on tour" in their district to enable listeners to see how their nightly programme is produced. When the concert or entertainment is in some public hall, just as in the studio, and is relayed to the station by land line or by a wireless link, the call for this is between the B.B.C. and the local station.

LOUD-SPEAKER.

I hear that there is to be installed at the entrance to Cherbourg Harbour what it is stated will be the largest loud-speaker in the world. It has been designed for the purpose of warning shipping during heavy weather, and is intended to be a range of thirty miles. This is rather interesting, in view of Capt. Round's recent article on loud-speaker possibilities. Nevertheless, interested though I may be, I'm rather pleased I don't live near Cherbourg!

CALL SIGN.

OUR NEXT ISSUE.

Reorganising British Broadcasting

Some Vitally Important Suggestions
By Capt. H. J. ROUND, M.I.E.E.

ORDER YOUR COPY TO-DAY.

Making the Catwhisker "Stay Put"

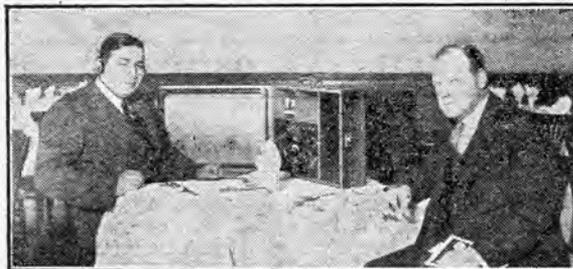
By C. P. ALLINSON.

ONE of the great drawbacks of the crystal detector, especially that employing a catwhisker, is the fact that when anyone accidentally knocks against the table the contact is lost, thereby interrupting the reception of broadcast programmes. With some crystal detectors, such as the carborundum type, which employs a steel point

on the crystal, to run round some molten sealing wax or candle wax, so as to seal the contact in position. This must be done very carefully, or else some of the wax may run between the point of the catwhisker and the crystal itself, and thereby destroy the contact entirely. Another disadvantage is that if paraffin wax or candle grease is used, it may make the surface of the crystal greasy, and thus impair its rectifying properties. Other substances that may be used are plasticine, putty or vaseline. This last, which is a mineral oil, does not appear to impair the contact at all.

Sometimes a crystal detector has a small lock-nut, by means of which the two pieces of springy brass, carrying the ball socket through which the catwhisker arm is moved, may be locked tightly together, thus preventing the joint from shifting; but this method is not likely to give sufficient protection against a strong knock, as the spring of the catwhisker itself will suffice to allow the point to move.

Detectors in which two crystals are used, such as the copper pyrites

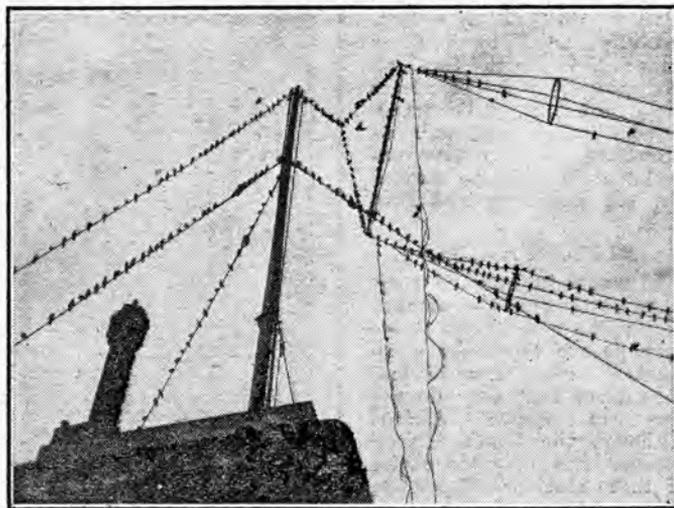


Commander Kenworthy listening-in at the Exhibition which he opened on Oct. 10th at the Horticultural Hall.

with a very heavy contact, it takes a considerable shock for this contact to be disturbed, but with the usual type employing a catwhisker, a very slight jar may be sufficient to knock the catwhisker off the sensitive spot of the crystal.

Stable Contacts.

There are various methods of obtaining a stable contact which may be tried. The object of these methods is to fix the point of the catwhisker so that even though the instrument may be jarred, and thereby perhaps altering the position of the arm carrying the whisker, the point does not move from its position on the face of the crystal. One method that may be employed is to stretch a small piece of muslin or butter cloth, or some such material with a wide mesh, just over the sensitive surface of the crystal. The catwhisker is pushed through the mesh of this material, which thus serves to keep it in position. An alternative method that has been suggested is, having found a sensitive spot



A new form of aerial! A flock of starlings visited London recently, and during their flight rested upon the aerial of the old 2LO at Marconi House.

zincite type, are less liable to suffer from vibration than the catwhisker type, as a fair amount of pressure is usually employed with these. This is usually sufficient to prevent the contact from moving, except in the case of very heavy blows or excessive vibration.

RELAYING AMERICA THIS WINTER

By
CAPTAIN P.P.ECKERSLEY



The well-known station KDKA, which we all hope to hear again this winter.

IF there is one thing which is really fascinating in wireless, it is making attempts to receive trans-Continental programmes. The result is fairly hideous and, speaking for myself, if I have a local programme good and clear, I would, after a hard day's work, prefer to close one switch and settle down to listen to it. Many disagree with me, and as it is a matter of personal opinion and not fact, I am not even in a position to argue about it.

Linking the World by Wireless.

Admittedly, at any rate, if we can begin to get some results which give us the chance of understanding speech, we shall be a step nearer that ideal of world linking, when there will be little difference between a programme S.B. from New York to Europe, and another from our local studio. We should not, and we shall not, leave a stone unturned to investigate the mysteries of night distortion, fading, and so on, and we seek to prove whether the inter-Continental wireless link should be on long wave and high power or short wave and high power. Certain it is that high power looks at present to be a *sine qua non*.

More "Midnight Oil!"

We are going to experiment on the subject this winter, and when a lot of folks are usually in bed, we shall try and persuade them to sit up to listen to us experimenting. It is usually only the "fan" who is keen enough to evolve a "hook up" which will give

him results from, say, KDKA, but we want the great mass of the listeners of Britain to hear what we are doing.

A "Visit" to Keston.

I visualise our scheme this year as something rather more elaborate than last. I see someone who knows what's going on down at Keston, where our new receiver is erected, and, 'phones on ears, will talk into a near-by microphone, superimposing his remarks on top of the American re-transmission. Thus: "That was a good atmospheric." "I wish to heaven that oscillator would go and burn himself, and his set, and all that is his!" and so on while you listen to America. I like to think that I've invited ten million people into our little hut at Keston, and that they have all got 'phones on, and that I am able, perhaps, to tell them what is happening.

Apparatus.

As to the actual apparatus to be used for KDKA, there, again, we are making fairly elaborate plans to try out all sorts of sets—super-heterodynes, the plain detector with note magnification, and even the straight high-frequency circuits, if they will stabilise nicely.

The aerial will be interesting, and, following our line of last year, we shall try the Beverage type. This aerial is a wavelength long—a rather cumbersome affair for 4,000 metres (over two miles), but more able to be visualised in terms of the short waves we shall try for—63 metres for KDKA. It is usually only a few feet high, and has to point in the direction from which signals are coming.

The great trouble, of course, is not to get a good signal—anyone can do that; the noise can be terrific. The trouble is to get quality. Night distortion is a persistent bugbear, and one that seems almost impossible to cure.

Night Distortion.

We are expecting this year that at KDKA they will give us still more power—possibly 50 kw., I hear—and they are taking great precautions to stabilise the wavelength under conditions of heavy modulation.

In some experiments we did on night distortion it was proved that wave constancy—absolute wave constancy maintained by an independent drive—was necessary to overcome night distortion. It was, however, that short waves.

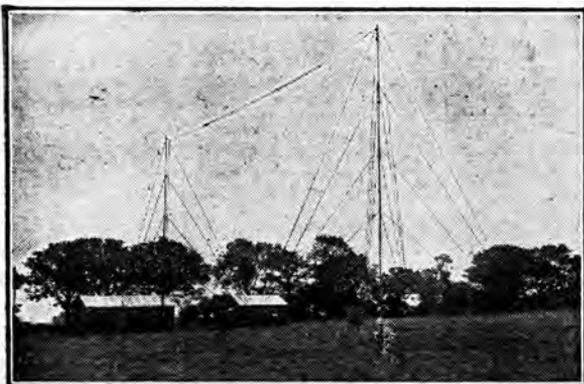
There is a... for telephony being... Rugby, and (I believe) ...ly in the States. Will... be our solution?

At any rate we have a chance this year of trying some of the new 300-500 metre stations in the... of about 50 kw. power... we, with our Beverage... sets, and so on cannot cure... distortion, we still have the... shorter and shorter waves, and, if they fail, long waves.

What Keston will do.

Keston will be arranged to have other types of aerials and receivers as well, and by this means, with supersonic and straight high frequency circuits, we hope, too, to attempt to relay European stations. When we do this, may we ask you to remember that we are experimenting, and that you are overhearing an experiment. The time is not yet when we can guarantee the wireless link as securely as we can the wired.

We shall not rest till the job is done. Meanwhile the Keston listening post gives us a useful place in which to experiment; our stations give us a useful means of allowing listeners to overhear our attempts, however feeble, to find out about it all.



It is expected that Keston will do good work in connection with linking the world by wireless during the next few months.

"WIRELESS WEEKLY"

THE PAPER FOR THE EXPERIMENTER

EVERY WEDNESDAY, SIXPENCE



David Edward Hughes, F.R.S., one of the earliest pioneers of wireless.

WHO INVENTED RADIO?

This interesting letter from Professor Henry J. Spooner, F.G.S., who knew Professor Hughes personally, explains the pioneer work done by that Scientist in the development of wireless. Hughes, using an interrupter and a small battery as the transmitter and a carbon microphone as a detector, succeeded in performing some very interesting experiments in wireless transmission and reception. He was however, discouraged.

benefactors of mankind, but he is dead, and—except by a few—forgotten."

A Personal Friend.

Forgotten! The pity of it! Happily I can claim to be one of the few, as he was my dearest and most intimate friend during the last twenty years of his life, and I think your readers would like to hear something about the lamentable incident that retarded progress in wireless some 17 years. But before attempting to deal briefly with this matter, I should explain that during many years I was a member of the charming coterie of which Hughes was president, and that the great physicist, his devoted wife, and myself, met daily, always spending our holidays together in England or abroad; indeed, we were staying at Brighton for the Christmas holidays when he caught a slight cold which, on our return to town, soon took a bad turn, and the dear fellow passed away in January, 1900, deeply mourned by the scientific world, and a large circle of friends and admirers. I may add that I had the honour of being one of the pall-bearers at his almost public funeral. I mention these facts to make it clear that I was privileged to hear, day by day, over a very long period, almost every incident of interest relating to his brilliant labours.

The Discovery of the Microphone.

As to Hughes' pioneer work in wireless, it should be explained that following on the world-adoption of his type-printing telegraph instrument, his next notable achievement was the discovery of the microphone in December, 1877, and in May, 1878, he communicated to the Royal Society particulars of his researches and experiments on this remarkable instrument, which may be said to form the foundation of telephony, and it is now generally known what an important feature of wireless the microphone is. But it was a revelation, in 1898, when Hughes showed how that even the footfalls of a common house-fly, as it walked over a board, could be heard with unmistakable distinctness at a telephone miles away.

Wireless.

It is a long story of intensive research in this fascinating field which led up to the triumph of successful aerial transmission in December, 1879, when, at the invitation of Hughes, a small party,

including W. H. Preece, F.R.S., Sir William Crookes, F.R.S., Sir W. Robert Austin, F.R.S., Prof. W. Gryll Adams, F.R.S., and Mr. W. Groves attended at his residence in Portland Street, W., to see the results.

A Distinguished Assembly.

This was followed by another demonstration on February 20, 1880, when the party included Mr. Spottiswoode, Pres.R.S., and the two Hon. Secretaries of the R.S.—Prof. Huxley and Sir George G. Stokes. They all saw the experiments upon aerial transmission, which were most successful, the results being heard upon a telephone in connection with the receiving microphone. The transmitter and receiver were in different rooms, about 60 ft. apart. At first the distinguished scientists seemed astonished at the results, but towards the close of three hours' experiments Prof. Stokes said that all the results could be explained by known electromagnetic induction effects, and therefore he could not accept Hughes' view of actual aerial electric waves, unknown up to that time, but thought he had quite enough original matter to form a Paper on the subject to be read at the Royal Society.

Discouraged.

On the departure of the distinguished visitors Hughes became so upset and discouraged at his inability to convince Stokes of the truth of these aerial electrical waves that he declared nothing would induce him to read a Paper on the subject, and he never did. In fact, he felt so much wounded and annoyed that he was on the point of throwing a large pile of manuscripts relating to these discoveries on the fire when Mrs. Hughes rushed forward, and was just in time to rescue them.

Drifting.

The profound Cambridge mathematician little knew how this one great unfortunate mistake in his brilliant life was going to retard the progress of a great discovery and invention for nearly two decades; for although Hughes continued his work he drifted into researches on magnetism and was content to sit and see others re-discover what he already knew without making a single claim to priority; but is it not sad to think of how much his golden silence cost the world?

(Continued on page 293.)

SIR.—I have read Mr. Morse's admirable article, entitled, "Did Marconi Invent Wireless?" which appeared in the 11th number of your journal, with the greatest pleasure, as it raises the question of world-wide interest, namely, is the immortal whose genius gave us the telegraph by what is known as Hertzian waves some 17 years before the illustrious Marconi came to England? The answer to this query is that he was one of those modest, silent investigators whose researches and experiments in physical science and whose fundamental discoveries and valuable inventions have so far benefited mankind, that he—DAVID EDWARD HUGHES—will doubtless be regarded by posterity as one of the great glories of our race.

Humility.

Mr. Morse truly says that "a man's work may be recognised by scientists the world over, while the man himself, especially if he has that humility which is the usual concomitant of genius, may be practically unknown in his own parish." Now, this was exactly true of Hughes, who some years after he had been rewarded and honoured by well-nigh every civilised country in the world, except his own, and had been the honoured guest of the Emperor Napoleon III at Versailles, and of the Czar of Russia at his Summer Palace, Czarskoizelo, was claimed by Huxley to be his greatest discovery.

Practical Demonstration.

Mr. Morse quite correctly explains that in 1879 Hughes gave a practical demonstration of radio, remarking that "there can be little doubt that had he not been denied the slightest encouragement or support he would to-day be remembered as one of the

WHAT IS A LOW-LOSS COIL?

By G. P. KENDALL, B.Sc.

It is at first surprising to see how popular low-loss apparatus has become, but upon considering the improved results obtained with apparatus of this type the reason is not far to seek.



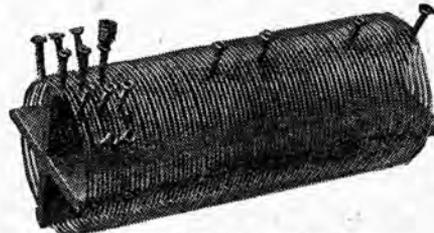
The "Three-step" coil is one for which enamelled wire is suitable.

THE "low-loss" fever seems to be gaining on us apace, and so long as we keep a sense of proportion about it all, there can be no doubt that our sets will be all the better for it. For some years now I have been preaching that one of the most crying needs of wireless development was concerned with the improvement of the commonly used types of tuning coils, and it is most encouraging to note how the widespread adoption of the phrase "low-loss" has directed attention to the really very great possibilities associated with the reduction of the admittedly high losses in tuned circuits.

Advantages.

Within the last few months quite a large number of new types of coil have been devised, many of which really justify the appellation "low-loss," since in them the more important losses have been reduced in a very considerable measure, and no doubt many of the readers of WIRELESS will have discovered for themselves by now that these coils open up interesting possibilities of improved signal strength and greater sharpness of tuning.

general idea of what to look for in a design which he is informed is a "low-loss" one. There are certain quite well understood features which should be present in a low-loss coil, and I will endeavour to give a simple account of the more important of these in the lines which follow.



A simple method of supporting an air-spaced winding.

Now, at the outset, we must become acquainted with the expression "high frequency resistance," since this is a convenient way of summing up the effect of all the losses in a coil, and saves time in referring to them. The high frequency resistance of a coil is capable of a very similar definition to that employed for the ordinary direct current resistance which we hear about in elementary electricity and magnetism, and we may say that it is a measure of the degree to which the various losses set up by a coil oppose the flow through that coil of a high frequency current. The higher the losses of various sorts, the greater is the high frequency resistance of the coil.

Low H.F. Resistance.

What we are trying to do, then, in producing a low-loss coil, is to design and make one whose high frequency resistance is as low as possible, and with this point firmly in mind, we will proceed to consider some of the sources of loss, and try to get an idea of their relative importance.

There was a time when there was a tendency to assume that if a coil was wound with thick wire, say, No. 16 gauge, the resulting inductance must be one of low resistance, but this idea is a quite erroneous one. It is quite

possible to wind a really very high loss coil with thick wire, while one of a moderately fine gauge may yet be one of quite high efficiency, although I do not wish to imply that the very highest degree of efficiency can be attained without a fairly robust gauge of wire.

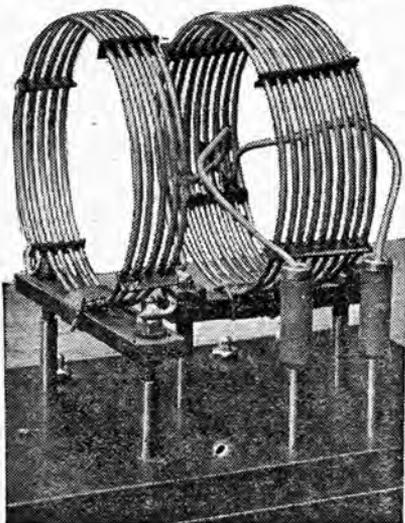
Only Surface of Wire Used.

We must realize that the high frequency resistance of a coil depends, as one of its factors, upon the crowding effect upon the surface of the wire of the high frequency currents, since we must remember that these currents do not flow through any part of the wire to any appreciable extent. They crowd entirely upon the surface, and if there are other wires in the neighbourhood bearing currents, they crowd upon that part of the surface which is as far as possible from the other wire in question. Thus we see that if we crowd a large number of turns into a small space, the currents will tend to confine themselves to quite small areas upon the surface of the wire, and the resistance of the coil is very much increased.

"Skin Effect."

Here, then, we have one of the rules which is regarded as an essential in a low-loss coil: the turns must be separated from one another to a considerable extent, in order to keep down what is called the "skin effect." To keep this trouble down to the smallest possible dimensions, it is generally considered that a single layer coil, with the turns spaced slightly apart, approaches to the ideal.

Granted that the condition just laid down is present in the coil, we may next consider the question of the gauge of wire with which it is wound. Now, recent investigations seem to show that the use of thick wire is not of such extreme importance as it was at one time thought to be, and the problem is not a simple one, yet it may be re-



A pair of low-loss coils for short-wave work.

I think, in view of the fact that innumerable new coils to which the label "low-loss" is being somewhat indiscriminately applied are appearing upon the market and being described in various places, that it is desirable that every user of such coils should have a

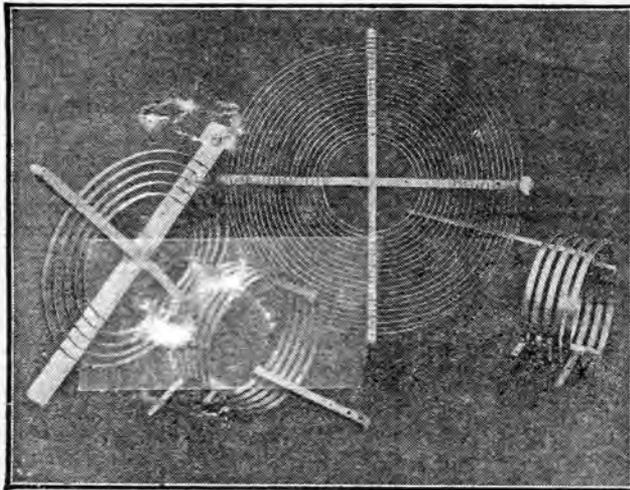
What is a Low-Loss Coil?—continued.

garded as a safe rule that our low-loss coil should have a fairly robust gauge, such as Nos. 24 or 22 or 20, No. 20 being commonly used in some of the better types.

Insulated or Bare Wire?

The covering employed upon the wire is not a matter of such great importance as it was in the more compact types of inductance, since the turns are not to touch one another at any point, and it is quite possible to use bare wire. As a matter of fact, enamelled wire seems to be coming into its own once more, for it is almost ideal for such coils as the ones we are considering. It serves the useful purpose of protecting the surface of the wire from corrosion, and that is all.

Given that we are to work with a coil of the single-layer variety, with the turns spaced slightly apart, the question of the shape of the coil arises. This factor is capable of influencing the efficiency of the coil to a quite



These coils were designed for transmission upon short waves.

serious extent, since if a given length of wire is coiled up in different ways some shapes will produce a coil of greater "inductance" than others. Naturally, we aim at producing the highest inductance for a given length of wire, so that we can tune to the desired wavelength using the minimum length of wire.

Shape of Coil.

Without troubling the reader with the reasons, it may be said that a cylindrical coil, that is to say, one with a circular cross section, achieves our end to the best advantage, and a square one is least desirable. Intermediate between the square and the true cylinder is the many-sided shape, such as the hexagonal type. These are fairly effective, since they approach the shape of the cylindrical ideal, and they are used to a considerable extent in the case of coils wound on a skeleton former.

Length and Diameter.

While we are considering the shape of the coil, it should be mentioned that the ratio of the length of the coil to its diameter is also a moderately important factor, since this again affects the amount of wire which must be coiled up to produce a certain amount of inductance. A coil which is very short in relation to its diameter can be taken as somewhat more efficient than one which is longer and of a lesser diameter. This factor only assumes really important proportions when somewhat exaggerated cases are taken. In general, the common ratios of length to diameter give coils which do not fall far short of the ideal one of the exactly correct length-to-diameter ratio.

Another factor of moderate importance is the one commonly referred to as dielectric loss. We must remember that in constructing a tuning coil it is generally necessary to use a certain

amount of insulating material, either to separate the turns from one another, or to support our single-layer winding. For example, the coil may be wound upon a tube, and this tube must be of some insulating material.

Skeleton Formers.

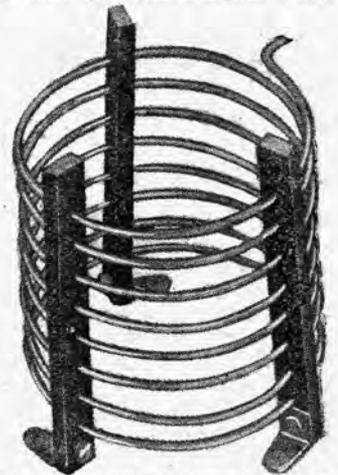
Now, all the insulating materials suitable for our purpose produce losses when they are included in what is called the electro-static field

of the coil, and the extent of this loss will vary in accordance with the quantity of material so included, the part of the field in which it is placed, and the particular characteristics of the material which we are using. These losses I have not found experimentally to be of very large proportions upon the broadcast band in comparison with others which take place in the coil, but they are yet worthy of consideration.

In a good low-loss coil, therefore, we shall expect to see that the amount of dielectric material has been considerably reduced below the amount which would obtain if the coil were simply wound upon a piece of tube or consisted of a mass of wire with insulating material between the turns.

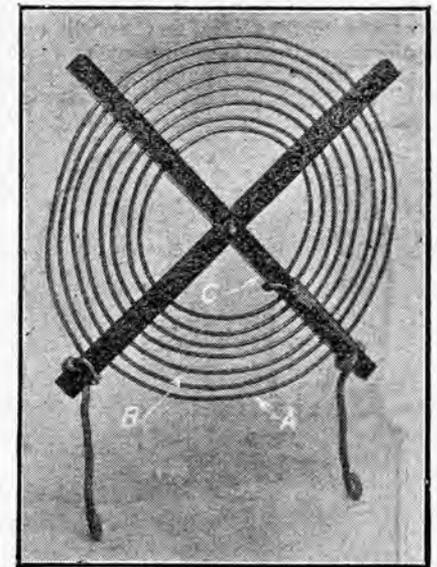
For example, there are a number of skeleton-type formers consisting of rods or strips mounted between two end rings which are very popular at the present time, and there is no doubt that they are well worth while if we

are seeking really high efficiency. Bearing this point in mind, that is to say, that the construction should be



Instead of using a complete skeleton former the turns may be supported on separate strips of ebonite.

such that there is as little insulating material as possible in use, we see that our low-loss principle must be extended to the method of mounting the coil, since if we take a really good low-loss inductance, mounted upon certain types of plug-and socket arrangement, we may quite possibly be introducing not-worthwhile losses.



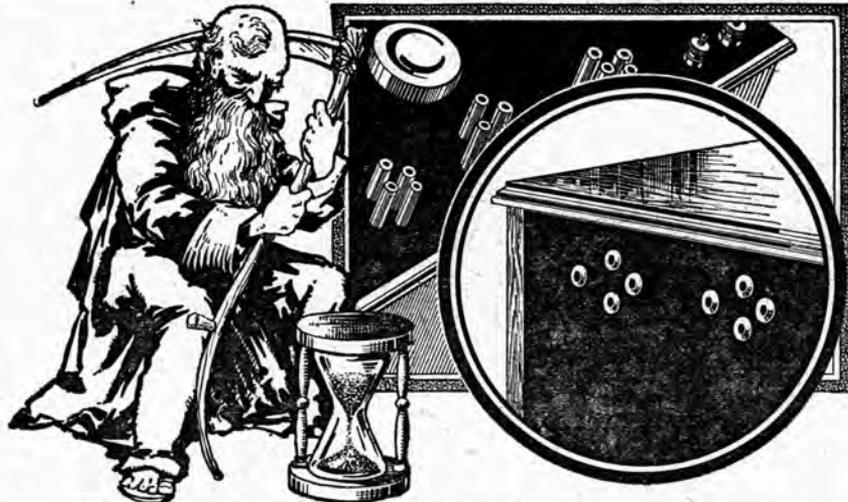
Three important features of a low-loss coil. A denotes the fairly robust wire, B the spacing between turns, and C the small amount of dielectric supporting material.

To sum up, then, we look in our low-loss coil to see these main features present:—

1. A fairly robust gauge of wire.
2. A spaced-out winding.
3. The minimum amount of insulating material in the field of the coil.
4. An approximately correct length-to-diameter ratio.



**THE
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"Times change"

What was right last year is old-fashioned this year, and next year will be obsolete. The wonderful progress made by wireless is built up of many small but important improvements in the design of component parts.

FOR EFFICIENCY'S SAKE KEEP UP-TO-DATE.

Take for example Valve Sockets. The old fashioned Valve Socket was a crude, rough barrel projecting an inch from the panel. The sockets were seldom quite parallel, making it difficult to insert a valve. Being of bare metal, accidental burning-out of the valve frequently occurred. Being so, they transmitted every mechanical shock direct to the valve filament.

The Climax Anti-Microphonic Valve Socket is made on an entirely new principle. It absolutely eliminates mechanical shock. The Valves float on metal springs.

The barrel of the Socket is provided with a circular rim which enables the socket to be mounted flush on the panel, the upper surface of this rim being insulated to prevent accidental burning out of the Valve. The Valve Stem is supported on the Climax Patent Hour-glass Spring, the waisted portion of which makes an excellent electrical contact and keeps the stem absolutely clear of all other parts of the mechanism.

The use of Climax Anti-Microphonic Valve Sockets is confidently recommended in place of the ordinary built-up valve-holder which has relatively high capacity, big dielectric losses and consequent low efficiency, particularly for high frequency work.

PRICE—One set of four Climax Anti-Microphonic Valve Sockets, fitted with patent hour-glass contact springs, complete with nuts and washers. Prov. Pat. Nos. 17,339/25 and 17,340/25. Per Box, 2/-

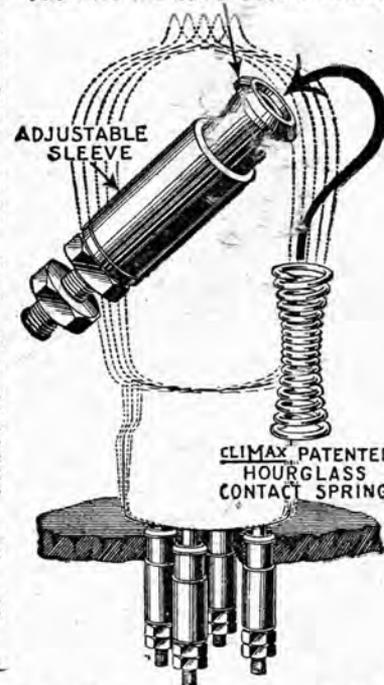
CLIMAX METAL-COOLED RHEOSTATS AND POTENTIOMETER. (Pat. No. 220,124,23.)



Climax Potentiometer, 500-ohm pattern 5/- each.

If you believe in metal—and who does not?—use exclusively Climax Rheostats and Potentiometer. They are wire wound on metal cooling cores with vitreous enamel insulation. Price—Climax Rheostats, 6-ohm pattern for one, two or three bright valves, 3/- each. Climax Rheostats, 50-ohm pattern, Universal pattern for D.E. or Bright Valves, 4/- each.

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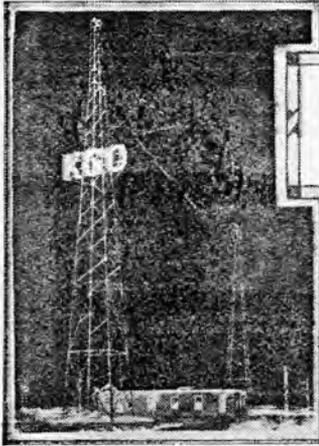
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THE AMERICAN HUNT FOR "DISTANCE"

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

KGO, the Station at Oaklands, Cal.

WHATEVER effect the new art of radio may have upon education—its influence is far larger than one can imagine—there is no question that it has had a stimulating effect upon our interest in geography. I wonder how many adults could have told you of the actual position of such towns as Hilversum, Königswusterhausen (although this is really a suburb) or many others which give daily programmes, prior to hearing them by radio?

A Universal Desire.

In America this identification of place names has gone forward to an extraordinary degree, owing to the multiplicity of broadcast stations and the almost universal desire to "get distance." In previous articles I have indicated how exceptionally well wireless programmes carry through the ether of the United States, for which reason when conditions are favourable it is comparatively easy to receive stations a thousand miles away.

A year or two ago scarcely anyone had ever heard of Fort Worth, Texas, yet to-day millions of Americans could locate it in a second on the map, for this locality possesses a broadcasting station which is heard throughout the whole of the States, and indeed, is eagerly sought by listeners in New York as a proof of the efficiency of their particular set. Oaklands, California, is another locality made famous by broadcasting, which during the winter months can frequently be heard even in New York.

Requirements for Long Distance Work.

Given the right atmospheric conditions, there are two other requirements requisite in long-distance working (assuming, of course, that the transmitting stations are doing their part). The first is sensitivity and the second sufficient selectivity to be immune from the interference of

the local station when the distant station is sought. The reason for the selectivity and sensitivity I have already indicated in previous articles.

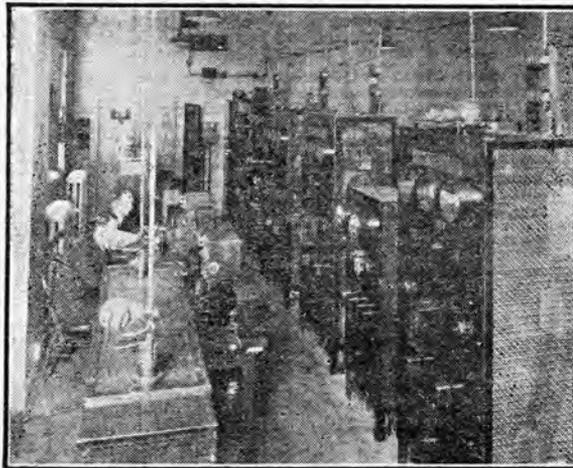
The Distance Craze.

I have often been asked whether this hunt for distance is due to dissatisfaction of the local programme or whether it is merely the joy of receiving distant stations. I am quite satisfied in my own mind that the craze for distance is due entirely to the pleasure of just hearing the distant stations, and I am quite sure that 99 per cent. of the distance hunters do not care two pins what the distant station is playing or sending

away in such a manner that you might mistake it for the local station, the more discreet manufacturer has long since given up any illusion on this matter.

Manufacturers' Views.

That the average listener really wants long distance reception and not merely to be able to choose from among the locals, is proved by the fact that almost without exception this season's receivers are made to contain two stages of really efficient high-frequency amplification. How many British sets are so equipped? Since I began writing this series of articles I have heard from several manufacturers that, as there are not the number of stations in England that there are in America, our sets do not need to be anything like so selective. I really think this is quite the wrong attitude to take. Having used two or three of the best American receivers in England during the last few months I have come to the conclusion that the higher the degree of selectivity in the receiver (so long as this is accompanied by sensitivity) the greater is the pleasure that can be derived from its operation. In my opinion, in most parts of England a really good valve set should give the listener the choice of three B.B.C. programmes (excluding Daventry) reproduced in such a manner as to make any one of them a real pleasure to listen to. This is what the public wants and will ultimately get.



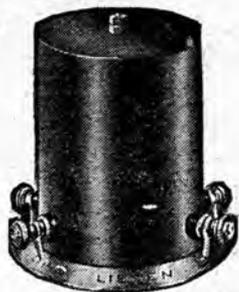
The apparatus room at WJZ, New York, one of the stations which we may hear this winter relayed from Keston.

out, provided he announces himself at reasonably frequent intervals. The reception of distant stations in America resembles the reception of distant stations in this country—atmospherics, interference from all kinds of noises, mar the reception there just as they do here. Although in America, as here, there are still some advertisers who endeavour to create the impression that their sets can receive a station hundreds of miles

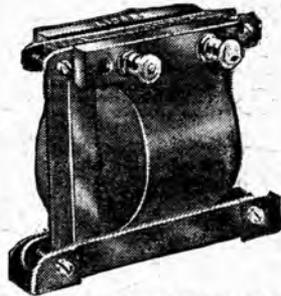
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Owing to the numerous applications from our readers for Back Numbers of our publications, we have decided to make no extra charge on any of our periodicals for issues published within 6 months. The charges for back issues prior to six months will be as in the past.

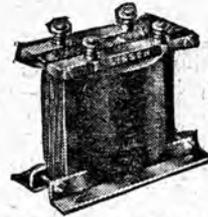
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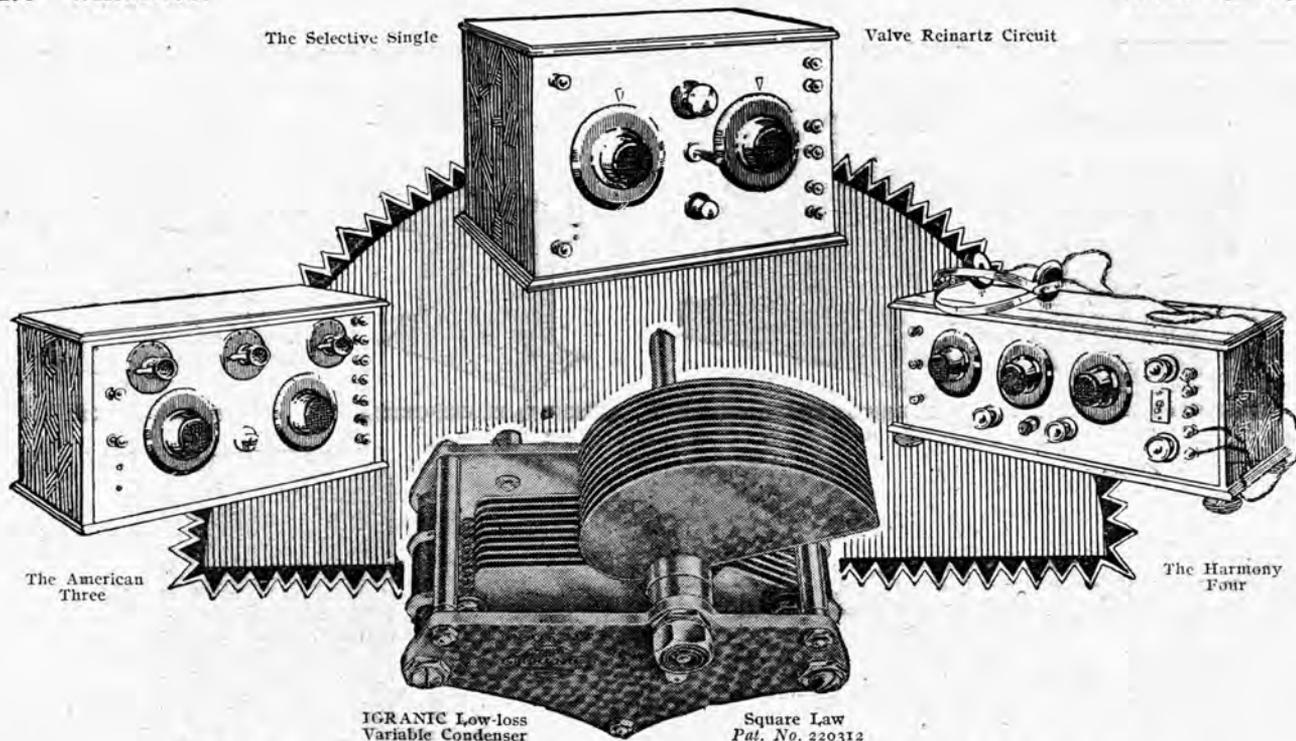
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WERE ONE DOUBTFUL as to the merits of the Igranac Low-Loss Square Law Variable Condenser one has but to note the type of circuits for which this instrument is recommended by well-known experts on receiver construction to be assured that here at last is available a laboratory instrument, and at a reasonable price.

In the September issue of *Modern Wireless* three Igranac Low-Loss Variable Condensers were specified for "The Harmony Four," an instrument for which the author claims surprising volume, purity, and very sharp tuning. In the same issue appear also particulars of "The America Three" by yet another author in which Igranac Low-Loss Variable Condensers are also given pride of place. This circuit, as its name implies, being designed for the reception of American stations.

In *Wireless Constructor* of the same month Igranac Low-Loss Variable Condensers were employed by yet another author for a Low-Loss Reinartz Circuit, a selective single-valve receiver.

These three examples serve to show the favour in which this highly efficient Igranac Radio device is held when longer range and greater selectivity are required.

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STOP PRESS!

For the "Coastal Three" described in the October issue of *Modern Wireless* Igranac Square Law Condensers were again specified.

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THE WIRELESS UNDERWORLD

by William Le Queux

Have you ever tried to save money by buying components of unknown but undoubtedly foreign origin? If you have not let this article be a warning to you.

THOUGH the public are apparently quite unsuspecting, there exists an underworld in the wireless trade, just as in the motor, cycle, gramophone, or other trades. It is from this we have the flood of unsatisfactory and often useless apparatus and component parts imported. I think that I voice the opinion of the majority of readers when I say that, unless one buys a branded and well-known make, it is often extremely difficult to purchase even a really reliable condenser.

Unsatisfactory Components.

A short time ago my curiosity led me to purchase a condenser at ten different shops in London, presumably responsible dealers. I submitted each to a laboratory test, and found that



An inferior coil was the cause of all the trouble!

in no single case was the capacity that with which it was marked. This set me thinking that the public were being greatly misled, either wilfully or by ignorance, and that the time has come when the unknown, irresponsible manufacturer should be eliminated, and that all component parts should be such as will bear a test. I bought other parts with results equally unsatisfactory, and one day last week I was invited by a friend to see and test a very expensive set he had just purchased, and of which he was justly proud.

A £70 Set and not a Soldered Connection!

From the first moment I put on the phones I saw that, though there were results, they were about 50 per cent. of what they should have been. I wanted to unscrew and open the beautifully polished cabinet in which the set was enclosed, but my friend demurred, fearing lest I might scratch the polish. At last I prevailed upon him to allow me to investigate, and

I at once realised the seat of the trouble. The wiring inside was wretchedly carried out, and there was not one single soldered contact! And



The only place for a poor H.T. battery is the dust-bin!

the cost of that set was something in the neighbourhood of £70!

This sort of thing is highly unsatisfactory and reprehensible. Many of the small "garret manufacturers" are ignorant of the most elementary laws of radio, and unable to describe the difference between inductance and capacity, or between an ohm and a farad, and employ workmen of similar ignorance. Parts are made by rule-of-thumb without any testing apparatus available, neatly finished, boxed up with imposing terminals, and boldly marked what they are supposed to be. In this way shoddy and worthless apparatus masquerades as good and reliable material.

A Warning to the Home Constructor.

A man buys one of these inefficient condensers, for example, introduces it into an expensive set he is making, and, when complete, he has the chagrin of finding that his chosen circuit gives only poor results, far below his neighbour's, which cost only



Poor telephones spoil a whole evening's enjoyment.

half or less to construct. He little dreams that the very attractive-looking condenser is the seat of all the trouble. Only if he puts the faulty condenser into another set known to give good results with the

same circuit, or if he suspects it and has it tested, will he discover the source of the trouble.

Telephones (?)

I have been shown telephone earpieces which, on being unscrewed, have been found to be wound at haphazard with what has seemed to be any piece of old wire in the workshop. As for resistance, well, such instruments may be anything from 150 to 10,000 ohms. Imagine the difficulties of an amateur with an otherwise capable set in possession of such earpieces, the right, perhaps, differing from the left. The average listener to broadcasting possesses no technical knowledge, hence he takes all for granted and accepts in good faith everything offered to him, quite un-



Generally shoddy and worthless apparatus imported from alien sources.

aware that he is getting results only half as clear and loud as he should.

It should not be thought that I am accusing the wireless trade in general of supplying the public with dud goods. Far from it. I take up the cudgels against the backstreet, irresponsible and generally alien manufacturers, who buy from men who have no technical knowledge, and who, for example, work according to a formula of, say, so many turns of wire. They make the turns irrespective of the gauge of the wire.

Something Ought to be Done.

My contention is that all condensers, either fixed or variable, verniers, transformers, couplers — in fact, everything "behind the panel" — should be tested before it is marked and sold. By this means we should not have our sets marred by one faulty part of the apparatus, as they sometimes are, and we should obtain increases in selectivity, range and volume, reduce noises, improve quality,

THE WIRELESS UNDERWORLD—Continued.

and make it easier perhaps to stop our sets from radiating to the annoyance of our neighbours.

The British radio trade is a large and increasing one, and must very shortly, if properly conducted, eclipse that of the United States. If the present state of affairs is permitted, however, and the underworld allowed to flourish, we shall quickly see a diminution in volume, and the public enthusiasm be lost.

An Old Hand.

As an experimenter in radio over nearly a quarter of a century, I have at heart the interests of the science, and that of the amateur who is entertained by it. I have been through all the experimental troubles in the early spade-work of radio-telephony, by which my bank balance was sadly de-

pleted by failure after failure and the ruining of much expensive apparatus. Practical experience over a long period has learnt me, and my fellow-workers in the field of those earlier days, that only by the best and most accurately calibrated apparatus can the best results be obtained. Therefore it irritates me, and, no doubt, it disgusts everyone with a radio set, to think that this underworld of ignorance which fattens upon and profits by the lure which radio has for the average man or woman in search of evening entertainment and instruction for which he or she is prepared to pay, should hand forth rubbish which is not only worthless, but which upsets the results otherwise obtainable on the average sets, and which at the same time competes with British-made goods.

Wireless for Ships Lifeboats

READERS will remember that there appeared in WIRELESS No. 4 a very interesting article entitled "Some Famous Wireless Rescues," which gave an account of how several thousands of lives have been saved by the prompt response of other ships to the S.O.S. calls of sinking and disabled liners.

In some cases it will be appreciated that a distress call is not always

tively but a short time since the ss. *Trevesa* gave us a too vivid example of this possibility, a fact which is probably familiar to most readers.

An interesting development in the direction of locating and picking up lifeboats of wrecked vessels has recently taken place, in that the Board of Trade has recently introduced regulations which prescribe that ships' lifeboats must under cer-

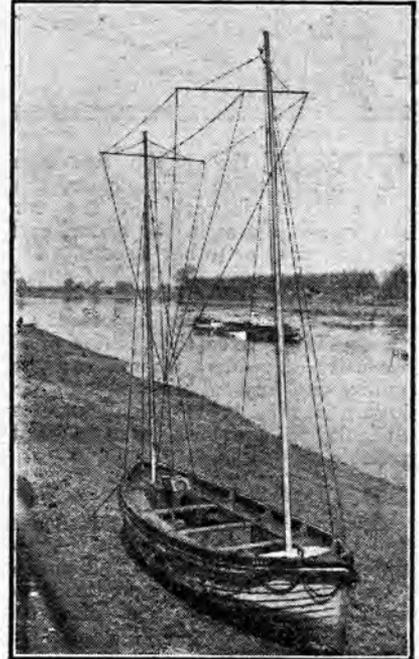
tain conditions carry wireless receiving and transmitting apparatus of fairly long range.

The photographs accompanying this article show a type of wireless installation for this purpose, manufactured by the Radio Communication Co., Ltd., and a short description of it may be of interest.

The apparatus consists of a 250-watt quench-spark transmitter working on 600 metres, and a three-valve receiver employing one detector and two stages of low-frequency amplification with variometer tuning over a 500-700 metre wave-band. A special three-position switch allows either transmitter or receiver to be used, or power to be cut off altogether. The receiver and transmitter are totally

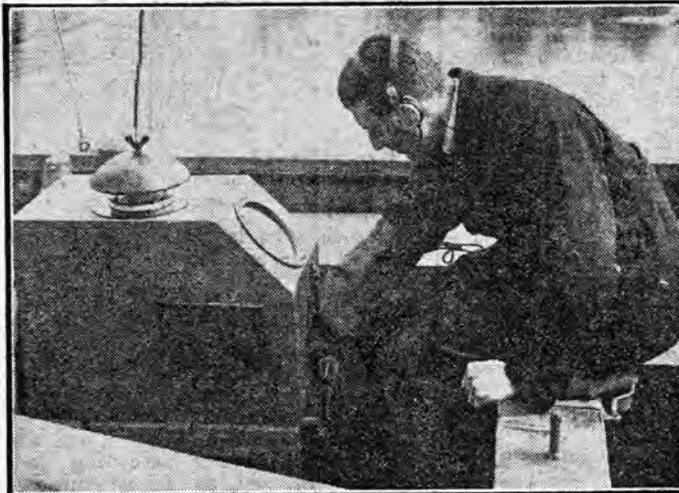
enclosed and protected against seawater, rough weather, etc. The controls can be seen through a circular window and access to them is gained by means of a waterproof sleeve.

A large storage battery provides the H.T. and L.T. for the receiver, and in addition drives the motor alternator for the transmitter. It is interesting to note that a crystal detector is provided as an alternative in the receiver in case of emergencies.



The installation is self-contained, the masts being about 22 feet high.

The aerial masts shown have a height of about 22 ft. above water level. Recent tests have shown that the installation can send telegraphy signals capable of being heard on a 1-valve receiver without reaction over a distance of 300 miles under favourable conditions. The minimum range required by the Board of Trade is 80 miles.



The apparatus is protected from the weather, access to the instruments being given through a special sleeve, while a port-hole permits the operator to see what he is doing.

sufficient to protect passengers and crew from terrible privations. What happens, for instance, if the doomed vessel sinks before the rescuing ships arrive? In such circumstances her human freight take to the lifeboats and drift perilously until picked up—possibly a matter of several days if the wreck occurred off the beaten track! In this connection it is rela-

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The original lustre of new terminals may be retained by dipping them in pure shellac varnish. The head need only be dipped and not the screwed shank. The contact faces should be tightly gripped together before dipping to prevent the varnish reaching them. Do not unscrew until the shellacked surface is quite dry. A similar process may be employed with the use of enamel. If shellac is used, the terminals will assume a yellowish but bright appearance which will remain for a considerable time.

F. O. R.

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- how to concentrate his attention and arrange his ideas;
- how to think and how to reason;
- above all, how to remember,

he might have been a useful member of society from the beginning.

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brain into him than the Lord gave him. But—

"it will enable him to make full use of the brain he has been given.

"Most of us at present are wasting it."

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which interfere with the effective working power of the brain. And it develops in their place such valuable qualities as:—

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IGRANIC PARTS.—L.F., 1st. Stage, 21/-; 2nd Stage, 19/6; Coils, Ultrinic, 9/-; Ultronic, Major, 9/-; Minor, 7/6; Honeycomb, 25, 35, 4/3; 50, 4/6; 75, 4/10; 100, 6/3; 150, 7/-; 200, 8/-; 250, 8/6; 300, 9/-; 400, 10/-; 500, 10/3; 600, 11/-; 750, 12/6; 1,200, 15/6; 1,500, 17/6. Rheostats, 3/6, 5/6. Variometers, 10/-, 12/6. Potentiometer, 5/6, H.R. Variometer 8/6. Variable Grid Leak 8/6. New Square Law Variable Condensers, .001, 27/6; .0005, 24/-; .0003, 21/-.

LOTUS (GEARED)—2-way, 7/-; 3-way, 10/6.
R. I. RADIO INSTRUMENTS.—L.F. in sealed box, 25/-; Anode Choke, 10/-; Permanent Detectors, 6/-, 7/6; New Var. Air Condensers and V., .0003, 22/6; .0005, 24/-
REFLEX RADIO COILS (Made under Burndept License)—35, 8d.; 50, 9d.; 75, 1/-; 100, 1/2; 150, 1/8; 200, 2/9; 250, 3/3; Post 2d. each. Mounts, 1/- each extra.
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SUCCESS (HEARD & FITCH)—L.F., all black Super, 21/-; Choke, 10/6 Var Condensers, No Loss, List Prices.
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TRANSFORMERS (L.F.)—Ferranti, 17/8; Pye, 22/6; Silvertown, 21/-; Ormond 14/-; Royal, 20/-; Lissen 71, 30/-; T.2, 25/-; T.3, 15/6. Powquip, 14/6; Formo shrouded, 10/6; Ormond Lates Shrouded Model, 18/6; Croix, 9/6; Wates Supra, 12/6. Bruet Shrouded 5-1 or 3-1 13/6 each.
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Customers purchasing £5 worth of our OWN goods at full prices presented with a first class pair of HEADPHONES, 4,000 ohms. Or, alternatively, if you buy 25/- worth of our OWN goods you can purchase a good pair of PHONES for 4/- extra.

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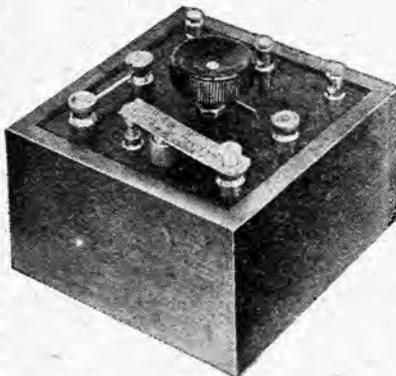
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HOW TO MAKE A CARBORUNDUM DETECTOR UNIT

By H. BRAMFORD.

A useful detector which may be used as a stand-by.



The battery for the detector is housed within the box.

THIS article describes how to make a complete carborundum detector unit, which may be used in conjunction with any existing crystal receiver, it being necessary in this case to short the crystal on the receiver itself. The unit is also useful as a stand-by detector, as owing to its stability it may always be relied upon once it has been properly set or adjusted.

Material.

- The material required will be as follows:—
 Potentiometer 600 ohms—Slipton.
 3 Telephone terminals . . .—Nickel.
 4 W.O. terminals
 2 Small pillar terminals . . .
 1 Crystal cup—plain
 2 Cells $1\frac{1}{2}$ volts each.

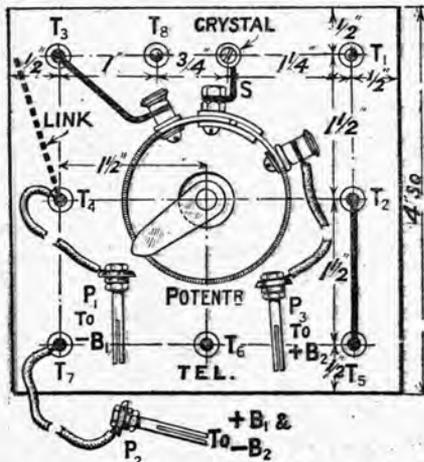


Fig. 1.—The panel should be marked out and drilled in conformity with the above drawing.

Construction.

The panel is drilled as shown in Fig. 1, all the holes being 4B.A. clear, with the exception of the potentiometer mounting hole.

Details of the detector are fully

given in Fig. 2. The carborundum crystal is fixed into the cup with Woods metal and the spring is made from tempered steel.

Assembly.

The wiring and assembly are given in the first figure, and for purposes of simplicity the work should be commenced by first mounting upon the panel the four W.O. terminals, T₁, T₂, T₃ and T₄; next, the telephone terminals T₅, T₆ and T₇. Terminal T₈ is a small pillar terminal. The crystal cup is mounted in the position indicated, and the assembly is completed with the fixing of the potentiometer.

The connections to be made from the underside of the panel are as

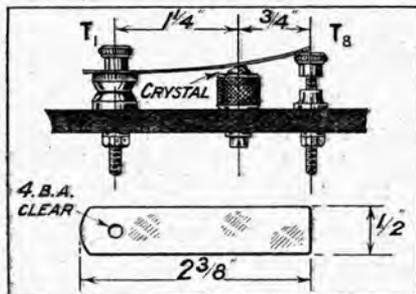


Fig. 2.—The tension of the spring is adjusted by moving the head of T₈.

follows:—Terminal T₁ is connected externally to the crystal set. Terminal T₂ is connected to T₅. Terminal T₈ is used only for connecting either a link or extra phones. Terminal T₃ is equipped with a flexible lead, the end of which is equipped with a valve pin, upon which a white Clix panel bush is attached between the two securing nuts. Terminal T₄ is equipped with a flex lead in a similar way, the panel bush in this case being black. A wire link connects T₃ and T₅ on the upper side of the panel. Connection is made from T₃ to one of the potentiometer terminals (Fig. 1). The other potentiometer terminal is equipped with a flex lead and valve pin with a red Clix panel bush. Final connection is made from the potentiometer switch arm to the crystal cup.

Batteries.

The two batteries are connected in series. A 4B.A. clearance hole is first punched in each of the battery tags. The positive tag (short) of one battery is then secured by means of a valve socket to the negative of the other

cell. The remaining positive and negative tags of each battery are then equipped with valve sockets. Plug P₁ is inserted into battery B₁—negative.

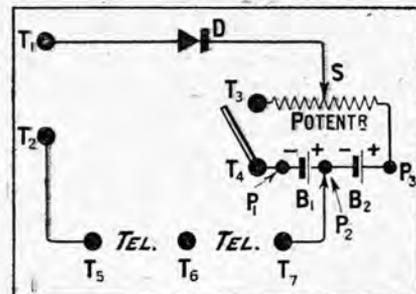


Fig. 3.—The theoretical connections of the unit.

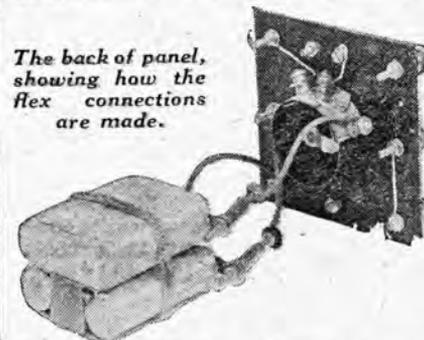
P₂ into B₁ and B₂ centre or common socket, and P₃ into B₂ positive (Fig. 3).

Circuit.

The theoretical circuit is shown in Fig. 3. Here the terminal and plug and socket numbers correspond with the numbers given in the other diagrams, for purposes of reference.

Operation.

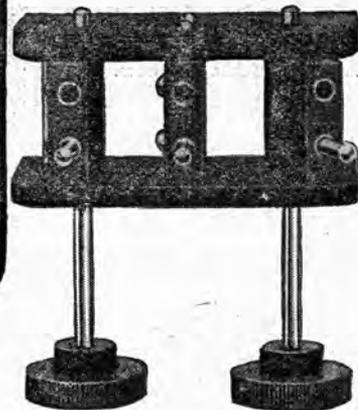
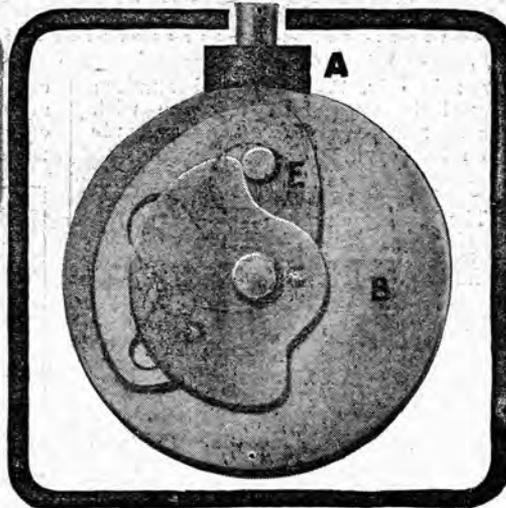
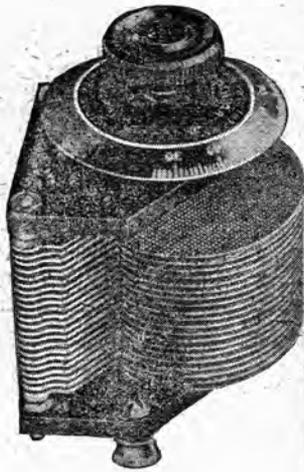
To operate the detector connect terminals T₁ and T₂ to the telephone terminals of the set and short the original detector with a piece of wire. The three telephone terminals enable two pair of phones to be used if desired. If one pair of phones is used, connect them across T₅ and T₇.



The back of panel, showing how the flex connections are made.

The tension of the steel contact upon the carborundum crystal is regulated by means of the head of terminal T₈ (Fig. 2), upon which the spring rests. When the unit is not in use the link between terminals T₃ and T₄ should be removed, otherwise the cells will be given unnecessary use and eventually become used up.

Cam-Vernier— the master-patent, for efficient fine control.



Since the commencement of the Broadcasting era, no more useful or more popular device has been introduced than the Polar Cam-Vernier principle—which has added infinitely to the simplicity of fine tuning, and appeals to any listener who appreciates soundness of design.

The Polar Cam-Vernier Device (Patent No. 17838/25) is illustrated diagrammatically above. This diagram shows: (A) the "driven" member—coil-holder or condenser, etc.; (B) the friction disc; (C) the centre spindle and rotating plate carrying pin (D) engaging in slot in intermediate plate; (E) the cam, integral with the intermediate plate, carrying an eccentric pin which engages in slot in driven member A.

This device, which occupies less than $\frac{3}{16}$ inch in thickness, gives 10 degrees of "vernier" movement (about 1 to 8) at any portion of the sweep—at the end of which the positive movement operates.

The 'Polar' Cam-Vernier Variable Condenser embodies the principle described above—both rough and vernier adjustments being registered on scale. The vanes are designed to give true square-law readings when working with parallel capacities (e.g., self-capacity of inductance coil) and scale readings are continuously proportional to wavelengths. Single-hole fixing, low-loss ebonite end-plates .001 mfd., 12/6; .0005, 11/6; .0003, 10/6.

The 'Polar' Cam-Vernier Coil-Holder is made in three types: Type "J," the most popular, made of best grade ebonite, nickel-plated fittings; can be locked in positive drive by pulling knob outwards; two-way 6/-. 3-way 9/6. Type "N" has in addition a rotary movement as well as swing, giving extremely fine variations from close-coupled to right-angled loose position; 2-way 11/-. 3-way 17/-. Basket-coil Type—lighter in construction—2-way 4/6; 3-way 7/-.



Sold by Radio Dealers everywhere. In case of difficulty write to:—

Radio Communication Co. Ltd.

34-35, Norfolk Street, Strand, London, W.C.2.



BORROWING



THE world has always contained a large number of confirmed borrowers, the kind of fellows who are just as ready to touch you for half-a-crown at sight as to call round in the evening and beg the loan of your lawn mower or your step-ladder. Some people, in fact, seem to have brought to a fine art the process of living without possessing anything worth talking about. But never in the history of the world has borrowing been quite so extensively practised as it has been since the coming of wireless!

Wireless and Morals.

Everyone is agreed that wireless has devastating effects upon the moral character of any man, and nowhere is the truth of this better seen than in the perfect orgy of borrowing which has been observed of late in all classes of society.

Well-known Excuses.

The best people, of course, always return what they have borrowed after a more or less lengthy lapse of time.



" . . . Beg the loan of your lawn mower . . . "

When they do so they explain so charmingly that the filament of the borrowed valve was broken before you lent it, or that it was a good thing that the transformer let them and not you down by burning out, that you really cannot be angry with them.

"Quid Pro Quo."

If wise you treasure up their honeyed words in your memory and make use of them next time you return something in what we may call a slightly second-hand condition. In wireless there are not, as in other matters, two sharply defined classes, the borrowers and the lenders. Since everyone is a borrower, it follows naturally that everyone must also be a lender, though some people are more so than others. One of the most generous lenders that I know has, to the best of my belief, never spent a penny upon wireless apparatus in his life. If you go round to his den you will find it simply stacked with every kind of component that you can

imagine. He has several receiving sets of various sizes in full working order, and every kind of valve from the peanut to the most expensive power valve. He will lend you almost without your asking for it, practically anything that you want. Should you desire a coil of particular size he will offer you a selection; this one belong-



" . . . Return something in a slightly second-hand condition . . . "

ing to X, that one to Y, and that one to Z. He will ask you to return them to their owners when you have finished with them.

A Friendly Tip.

It occurred to me some time ago to try to discover the reason for my friend's enormous success as an acquirer of wireless material. He is not a particularly charming man; in fact, I should have said off-hand that he was not the sort of person to whom anyone would ever lend anything. But there it is; his den looks like a wireless shop. After long and strenuous investigation, I have at last hit upon the secret, and I now divulge it for your benefit, reader, in case you should combine a passion for wireless with an overdrawn bank account. His procedure in the first instance was simplicity itself. He borrowed from various friends a volt-



" . . . He is not a particularly charming man . . . "

meter, an ammeter and a milliammeter. Thus provided, he found the rest perfectly straightforward. If, for example, he coveted the very expensive transformer with which Joskins had provided himself, he would look at it critically and say, "Yes, its appearance is all right, but I rather wonder whether it contains enough wire. Do you know the d.c. resistance of the

primary and secondary windings?" Joskins, of course, did not, but after a short talk with my friend he became convinced that he wished to know this more than anything else in the world. The borrower therefore took the transformer home, and had the use of it for quite a long time, explaining when Joskins met him and asked him when he was going to have the information that he sought that these jobs took a good deal of time and had to be most carefully done.

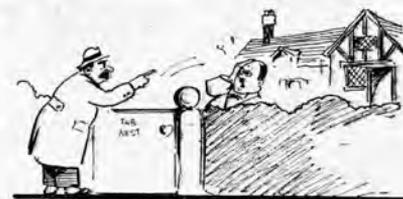
Obliging with Valve Curves.

When it was known that my friend might, if you asked him nicely enough, be induced to take valve curves, he was simply snowed under with valves of all kinds and with requests to provide their characteristics.

Since he first started on his career he has made considerable advances in the scope of his operations. Having borrowed a wavemeter, he now undertakes to calibrate inductances, high frequency transformers or complete receiving sets. He has always several wavemeters in stock since he verifies the calibration of these for his friends, who are vastly obliged to him for his kindness. Now that he has added a borrowed "megger" to his equipment the ebonite question no longer troubles him at all, since he has always ample supplies at hand.

His Only Worry.

The only worry my friend has at the present time is that his house is really too small to accommodate the



" . . . He'll succeed in borrowing the president's house . . . "

enormous stock of materials, components and complete apparatus that he has accumulated. He has let it be known that he is so cribbed, cabined and confined that he cannot carry out his work properly, and the other members of the community, realising the splendid work that he is doing for them by testing and calibrating, feel that it is a thousand pities that his style should be cramped in any way. The president of the wireless club is a bachelor, who lives in a house that is really many sizes too large for him. There is at the moment a movement on foot to induce the said president to lend his house to my friend and to move himself into the latter's smaller quarters. So far the president has not adopted quite the unselfish attitude that one would like to see in such cases, but I have little doubt that before long my friend will have succeeded in borrowing his house.

"COMING SOON!"

Some of the Stars
in Next Week's
Programmes.

A Popular Conductor.

IT is a considerable time since Sir Landon Ronald has conducted a concert for the B.B.C., and Sunday's programme, therefore, will have addi-



Mr. Dale Smith.

tional interest. It will form the greater part of the afternoon programme, Sir Landon conducting the Wireless Symphony Orchestra. The programme offers abundant variety, including Wagner's "Rienzi" Overture, Elgar's Andante for Strings, a Mozart Symphony and Svendsen's "Carnival in Paris."

At 4.30 Mr. E. Le Breton Martin, whose talks on birds and country lore have become known, will read "The Song of Honour," a poem by Ralph Hodgson, set to music by L. Stanton Jefferies.

The second half of the programme is essentially English in character. It includes the late Mr. George Butterworth's Rhapsody, "A Shropshire Lad." The composer, it will be remembered, lost his life in the Great War, and it is worth noting that Vaughan Williams' "London Sym-



Miss Doris Vane.

phony" included in last Sunday's programme is dedicated to the young man's memory.

Unique Features.

On the religious side, the peal of bells from Croyland Abbey will be broadcast, and a Roman Catholic address by Rev. Father Bampton. The

secular programme will be shared by the J. H. Squire "Celeste" Octet, now led by Mr. Bernard Reillie, the singer being Mr. Denis Noble, the B.N.O.C. star, and Miss Edith Pen-ville the lady flautiste, as soloist.

Storm and Calm.

As a rule, it is said, that the calm comes before a storm, but Monday's programme intends to reverse this aspect, and depict the emotional contrast of Storm and Calm. "The Flying Dutchman" Overture makes an excellent beginning, and a very beautiful programme follows, ranging through the best specimens of Beethoven, Rossini, Elgar, Debussy and Grieg. The artists are Miss Mary Foster and Mr. Harold Williams. The latter, in addition to being one of the best known singers on concert and radio platforms, has just come fresh



Miss Vivien Lambelet.

from his operatic triumphs with the B.N.O.C. at Leeds and Glasgow.

Labour's Wireless Concert.

Under the ægis of the *Daily Herald* a special programme is to be broadcast on Tuesday, in which items will be supplied by the Workers' Chorus and Bands of various Labour centres. It should prove interesting.

The Cart Before the Horse.

So many people, apparently, prefer cross-word puzzles and guessing competitions to listening to the music for itself alone, that it is not surprising that another query programme has been arranged for 2LO on Wednesday. On this occasion listeners are invited to think of the name while the work is being performed, and before the announcer gives it at its conclusion.

Continental and Chamber Music.

For those who like Continental programmes, fresh opportunity will be given on Thursday for an hour, from 8 to 9 o'clock. Later, the Chamber Music Concert will be devoted to works by the young British composer, Miss Rebecca Clarke. Although well-

known on the classical concert platform for her performances as viola soloist, Miss Clarke has written some very interesting music, including a sonata for her own instrument, the



Miss Nellie Norway.

viola, and piano, and movements from which she will play to-night, with Mr. Bryan at the piano. An Instrumental Trio will also be played, with Miss Marjorie Hayward as violinist, Mr. Bryan piano, and the well-known 'cellist, Miss May Mukle, who has just returned from America.

Those Good Old Times.

I am not sure that we should really appreciate the prosy old Victorian days, but at any rate on Friday next we shall have an opportunity of hearing some of its music. Firstly, a selection of Victorian ballads has been arranged by Robert Chignell, himself a well-known composer as well as a singer. Then a little scena laid in a mid-Victorian drawing-room will be heard, especially written by Tyrone Power, and after which I expect we shall enjoy the contrast, but secretly thankful that those "good old days" are dead and gone.



Mr. Harold Williams.

Later, as an additional contrast, will come that charming singer, Miss Vivien Lambelet, and Miss Toni Farrell, with some of her syncopated "pianologues," followed at 9.30 by a performance of Sea Shanties, sung by members of the Seven Seas Club, and relayed from Anderton's Hotel.

THE GIFT OF TONGUES.

By ANTHONY SOMERS.

I HAVE discovered a remarkable method of learning Foreign Languages, a method for which I have been looking all my life. I only wish I had known of it before; what toil, what drudgery, what disappointment I should have been saved!

It has sometimes been said that the British people do not possess the "gift of tongues." Certainly I never possessed that gift. At school I was hopeless. When the subject was French or German, Latin or Greek, I was always somewhere near the bottom of my form. And yet in other subjects—English or History or Mathematics—I held my own quite well. I have now come to the conclusion—my recent experience has convinced me of this—that the reason I failed to learn languages was that the method of teaching was wrong.

Now, although I never could "get on" with Foreign Languages, I have always wanted to know them—especially French. I have wanted to read the great French authors in the original. I have wanted to read Racine and Victor Hugo and Balzac, and that great critic whom Matthew Arnold so much admired, Sainte-Beuve, in French, and not merely through the medium of a characterless translation. Besides, I have wanted to spend holidays abroad without being tied to a phrase book. And so I have often tried to find a method which would really teach me a Foreign Language. And at last I have found it.

How to Learn Languages.

Some-time ago I saw an announcement entitled "A New Method of Learning French, Spanish, Italian and German." Of course, I read it, and when I saw that this method was being taught by the well-known Pelman Institute, I wrote for one of their books on the subject, and this so interested me that I enrolled for the Course in FRENCH. And, frankly, it has amazed me. Here is the method I have wanted all my life. It is quite unlike anything I have seen or heard of before, and its simplicity and effectiveness are almost startling.

Consider, for example, this question with which the book (which, by the way, can be obtained free of charge) opens.

"Do you think you could pick up a book of 400 pages, written in a language of which you do not know a syllable—say, Spanish, German, Italian or French—and not containing a single English word, and read it through correctly without referring to a dictionary?"

Most people will say that such a thing is impossible. Yet this is just what the Pelman method of language instruction enables one to do, and so remarkable is this method that I shall be greatly surprised if it doesn't revolutionise the normal method of teaching languages in this and other countries.

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Everyone who wishes to learn FRENCH, SPANISH, ITALIAN or GERMAN without difficulty or drudgery should post this coupon to-day to the Pelman Institute (Languages Dept.), 88, Pelman House, Bloomsbury Street, London, W.C.1. A copy of the particular book desired will be forwarded by return, gratis and post free.

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Please send me a free copy of "HOW TO LEARN FRENCH"—
"HOW TO LEARN GERMAN"—"HOW TO LEARN SPANISH"—
"HOW TO LEARN ITALIAN" (cross out three of these), together with
full particulars of the New Pelman Method of learning languages.

NAME

ADDRESS

Brown

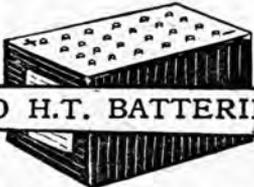


Brown Crystal Set, £3



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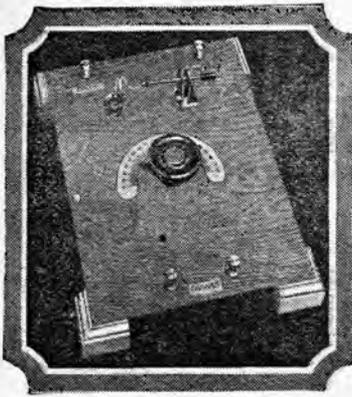
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During Broadcasting hours our Mortimer Street Showrooms are now demonstrating the Crystavox. If you cannot call and would prefer a demonstration at your own home write to the Sales Department at our North Acton Works. No charge is made for any private demonstration within five miles from Marble Arch and you will be placed under no obligation to purchase.

The *A Loud Speaker working from a Crystal Set.*
CRYSTAVOX



A CRYSTAL SET FOR 2/6

By
C. C. PRIOR.

THE set to be described was built at a cost of about 2s. 6d. The circuit is the common variometer circuit (Fig. 4). The panel is of three-ply wood, well dried, 8 in. by 6 in., and is drilled as shown (Fig. 1). The only part which requires a detailed description is the variometer, which is constructed on the D-coil principle. This principle may present some difficulty to the beginner, but is easily explained.

The Coils.

Consider the well-known type of variometer in which a ball rotor is made to turn inside a tube stator in such a way that the windings can be made to run in the same direction as those of the stator or in the opposite direction, thus increasing or decreasing the inductance of the variometer and thereby raising or lowering the wavelength. Such a rotor is shown in Fig. 3 (a). Now suppose that the ball is cut in half along the dotted line and the two halves laid side by side on the table. We shall now have two coils, one in each half of the rotor,

as in Fig. 3 (c). These are the so-called D-coils, and we can wind them flat, one on each semi-circle of a circular disc. If we wind another two coils

and repeat the process with the second former. One of them will form the rotor and the other the stator. We will deal with the rotor first. We first join up the inner ends of the two winding A₁ and B₁ (Fig. 2). Now take a length of 2B.A. screwed rod about 1½ inches long and pass it through the centre of the disc,

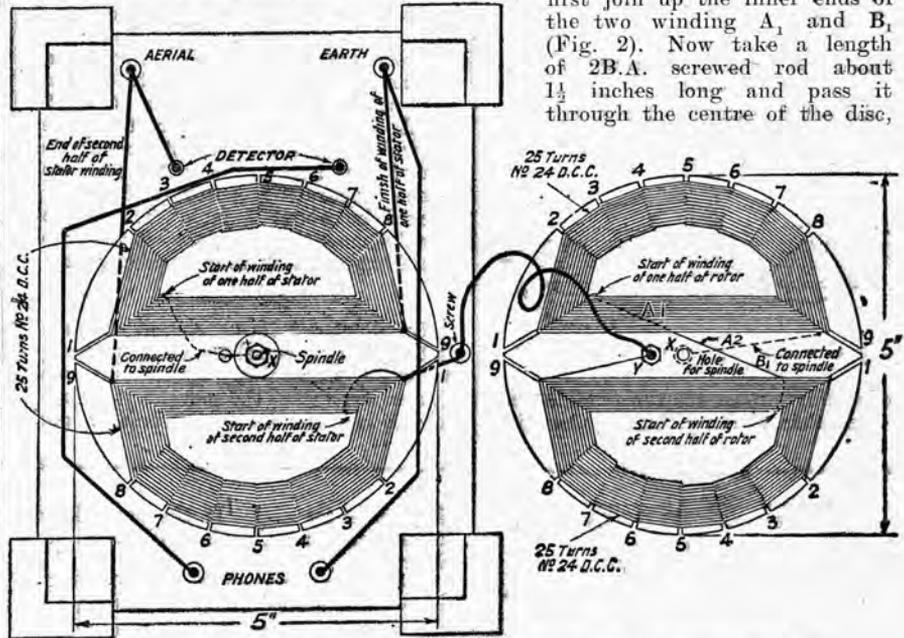


Fig. 2.—Wiring details together with instructions for connecting the coil windings.

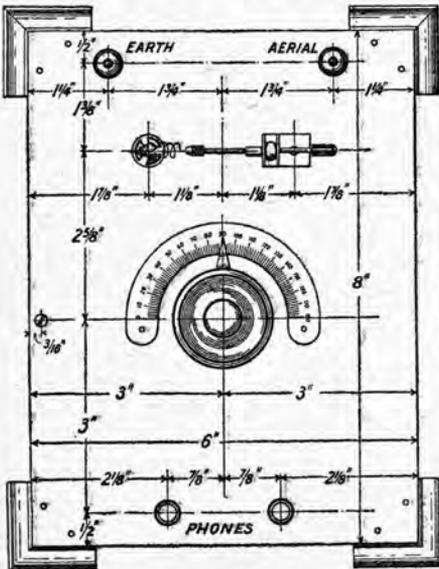


Fig. 1.—The panel is made of three-ply wood and drilled in compliance with this drawing.

the windings of which will be seen as in Fig. 3 (b). Now if we flatten one side of each coil we shall get two coils

on two semi-circles of another disc to represent the stator, we can bring the discs very close together, and by making one disc rotate immediately above the other, we can obtain the full variometer effect. This we will now proceed to do. We shall have to wind two coils for the stator and two for the rotor. We cut out from a sheet of fairly stiff cardboard two circular discs, each 5 inches in diameter, and we cut 9 slots in each half circle as in Fig. 2. Seven slots are cut radially, each approximately one inch in length, and two other slots as shown. We now wind 25 turns of 24 s.w.g. double cotton-covered wire basket coil fashion, starting at slot 1, leaving about 4 inches of wire loose. Having reached slot 9, we do not carry on to the other side, but go straight across to slot 1 again, and so on till 25 turns have been wound. We bring the finishing end of the wire out through a small hole made in the cardboard former and cut, leaving about 8 inches of wire free for connecting purposes. We wind the other half of the former in the same way

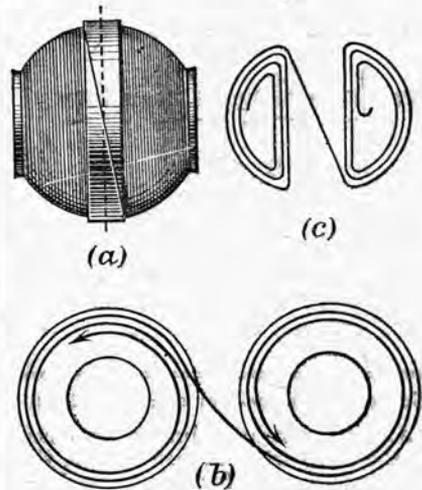


Fig. 3.—Showing how the construction of the flat D type of coil is based on the method of winding the rotor of an ordinary variometer.

securing the disc between two nuts, one above and one below. (at X on

A CRYSTAL SET FOR 2s. 6d.—cont.

the rotor in Fig. 2). Under the top nut secure the outside end of one of the windings (A₂ in Fig. 2). Pass a

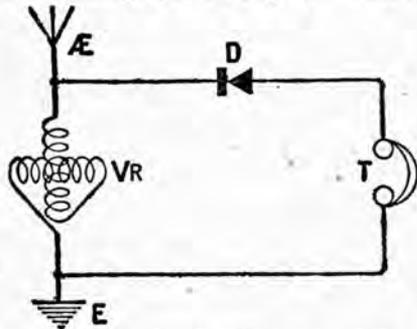


Fig. 4.—A simplified circuit of the receiver.

4B.A. screw through the disc from below at Y and secure with a nut.

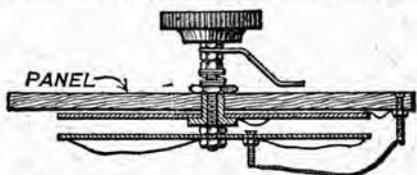


Fig. 5.—Showing how the adjusting handle is mounted.

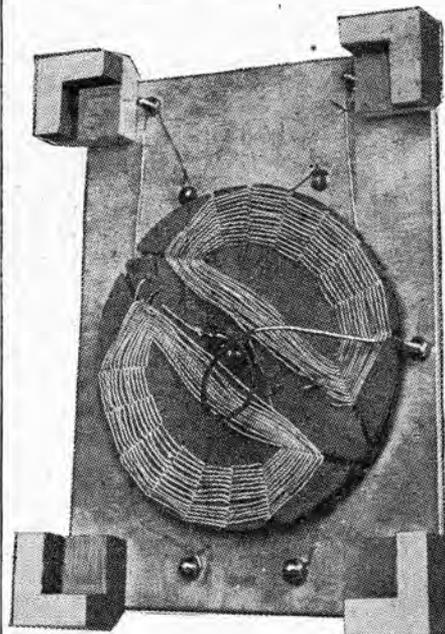
Under this nut secure the outside end of the other winding, baring the wire

in each case, of course. The rotor is now complete. The disc forming the stator is secured to the panel by a 2B.A. flanged bush passing through a hole in the centre. Under the flange secure the inside end of one winding. The inside end of the other winding is secured under the nut on the screw at the edge of the panel (see wiring diagram, Fig. 2). The outside end of one of the stator coils goes to the aerial and the outside end of the other to earth. The rotor is now mounted over the stator by passing the 2B.A. rod through the bush and securing it on the front of the panel by a spring washer and nut, locking it with a second nut. The knob and pointer are then added. A piece of rubber-covered flex is used to connect the screw Y on the rotor (Fig. 2) to the bolt near the edge of the panel to which the inner end of one of the stator windings is secured. The distance separating rotor and stator should be about $\frac{1}{8}$ inch. The photographs show the complete set with the panel mounted on four wooden feet.

Results.

Excellent results have been obtained with this set, equal to those given by a more expensive commercial set. The writer tested the wavelength range of this receiver with a wavemeter, and

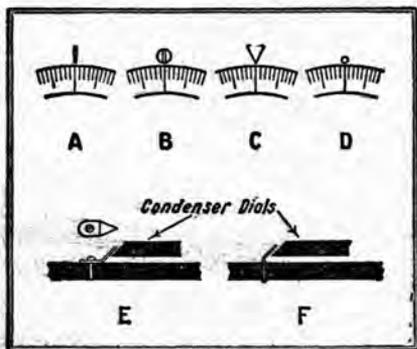
found that it tuned from about 285 metres to 520 metres, thus covering the whole of the B.B.C. band of wavelengths. The signal strength at four miles from 2LO is excellent. The receiver, however, is not designed to receive 5XX.



The wiring of the receiver is extremely simple.

DIAL-READING INDICATORS

A few methods of providing a panel dial with reading indicators are given in the diagram. A short description of each suggestion is as follows:—



Some suggestions for dial indicators.

A. Here a straight line is scratched on the panel with a sharp scribe, the indentation thus formed being filled with white enamel.

B. Here an ordinary countersunk screw is secured to the panel, the slot in the head of the screw acting as an indicating line. The surface of the screw head may be made to come dead flush with the lower external rim of

the condenser dial. If the screw head is painted black the slot will stand out clearly.

C. Here a piece of white celluloid is cut to a shape similar to that shown and glued to the surface of the panel.

D. Here the process is similar to that mentioned in suggestion A, only a small indentation is made with a fine drill instead of a scratch line.

E. Here a piece of thin brass is cut and bent to shape as shown. It is secured to the panel by means of a 6 B.A. screw.

F. Here an ordinary pin is forced through a fine hole in the panel from the underside, the pointed end being bent over as shown. F. O. R.

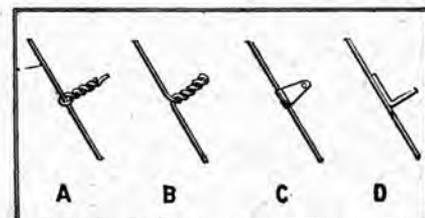
TAPPING COILS

A few methods of taking tappings from low-loss coils are described in this article. Each method is illustrated in the diagram.

A. Here we have a simple method of tapping a coil wound with enamelled wire. First scrape the enamel off the portion of the coil which is to be tapped. Twist a piece of bare wire around the scraped part of the coil as shown, and then solder. This method has the advantage of not injuring the coil.

B. Here the tapping is made by means of the wire, which is used in the inductance itself. This suggestion is very adaptable for bare wire coils. Each tapping is made by means of a twist as shown, which is formed during the process of winding, at the desired intervals. The projection thus made is suitable for clip connections.

C. In this case small brass tags are soldered on to the winding as shown. The winding may be covered, enamelled, or bare, insulation being removed where the tag is soldered.

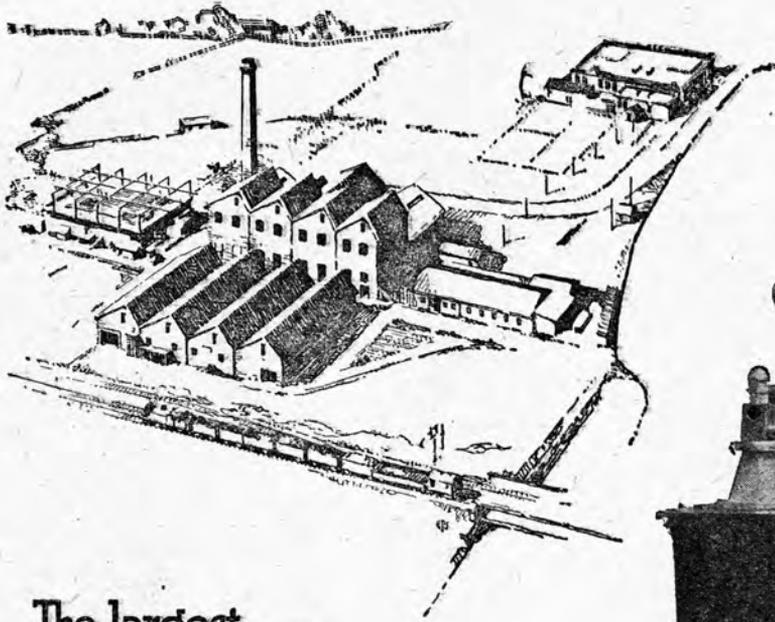


Some easily made coil tappings.

D. Here a piece of square wire is shown bent at right angles and soldered on to the winding. The latter two suggestions are for use in conjunction with clip connectors.

B. R. A.

No. 7 OF "WIRELESS"
OUT NEXT TUESDAY



The largest
in the world



THE Dobilier Condenser Co. (1925) Ltd. manufactures the largest condensers in the world, using the best dielectric in the world (*i.e.*, Mica) in the largest Condenser factory in the World.

Our factory at Acton is illustrated above, together with the largest Condenser in the world, which was manufactured entirely by us at our works.

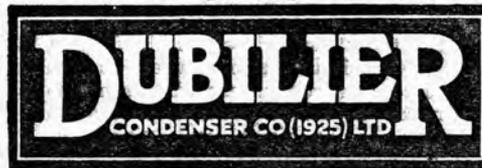
The fact that we produced the first practicable mica condenser is evidence of our ability as experimenters and

pioneers, while the further fact that we are to-day, after twelve years of development, the largest manufacturers of wireless condensers in the world is evidence of the outstanding quality of our products.

The Dobilier Condenser Co. (1925) Ltd., manufactures:—Fixed Mica Condensers, Variable Air Condensers, Anode Resistances, Grid Leaks, the Dubrescon Valve Protector, the Ducom Aerial Adaptor, the Minicap Switch, and the Mansbridge Variometer. The Company are also sole concessionaires for the Mansbridge Condenser.

Whenever any of these products are required it is always wisest to—

Specify Dobilier.





Getting the Best from a Crystal Set

By



Stanley G. Rattee, M.I.R.E.,



MANY people regard a crystal set as being an appliance to which it is necessary to only connect an aerial and earth and telephones before the best results are obtained.

Broadly speaking, this understanding of things is correct, but nevertheless the execution of things must be done with care if the best results are wanted. Obviously, the crystal set itself must primarily be of good design and construction, and for the purposes of this present article it is assumed that the reader already possesses such a set and wishes to get the best possible results from it.

Crystals.

In the first place, the crystal used in the receiver must be of a good type with plenty of sensitive spots. In this connection it is as well to have by one a number of pieces of crystal of the many well-known varieties now on the market, which may be tried, retaining that piece which gives the loudest results.

As to the handling of the crystal, this has been dealt with so many times before that, beyond saying that the crystal should be kept free from grease and dust, I will leave the subject alone, referring the reader to the article, "How Crystals are Ruined," which appeared in No. 2 of this journal, for any further information on the subject which may be desired.

Catwhiskers.

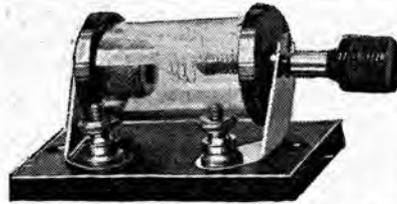
The next point to receive consideration for the best results is the matter of the catwhisker, and though almost any thin wire may be made to give results, it is nevertheless necessary to conform with certain requirements before the best are obtained. In the majority of adjustable crystal detectors the loudest signals are obtained when the catwhisker is resting but lightly on the surface of the crystal, and to attain this end the catwhisker should be light and springy—that is, slender, not too stiff, and not too short. The material from which the catwhisker is made may be almost any metal, such as gold, silver, or one of the alloys, and the point which makes contact with the actual crystal should be as clean as the proverbial new pin!

The Aerial.

So much for the set itself, and we will now turn our attention to the aerial and earth system.

Dealing with the aerial, this should be the best it is possible to erect in the circumstances available, and though many readers will no doubt obtain good results with, say, indoor arrangements, it is nevertheless a fact that if it were possible to substitute the indoor aerial with a good outdoor aerial, the good results at present obtained would be considerably out-classed.

In crystal reception the main requirement is good loud signals from



When modern crystals are used, the catwhisker should generally rest lightly upon the crystal.

the local station, and in order to get these results the aerial should be high, clear of trees, walls, roofs, and other such things which reduce the effective height of an aerial. It is not in any way necessary to exceed the permitted length of one hundred feet, but the very best use should be made of that length. The lead-in should be kept well away from the side of the house, and where the wire enters the house through the window frame a leading-in tube should be used of sufficient length to still give clearance from the side of the house and window-sill.

The Lead-in.

On the "inside" of the leading-in tube, that is in the room where the set is used, the connecting wire from the tube to the aerial terminal of the set should be as short and direct as possible, at the same time keeping it free from the walls, floor, and so on.

It has, as a matter of fact, been my experience to meet crystal-set users who have actually nailed this lead-in round the wall, from the leading-in

tube to the set, "because it looks neater!" In such a case as this why insulate the aerial outside the house when it is to be fixed to the walls of the house on the inside?

The Earth.

Another point which should receive careful attention is the earth connection, and this should not, as in many cases it does, run parallel and close to the internal portion of the aerial lead-in. In some cases I have known the two wires to be twisted together for reasons of tidiness!

The actual connection to earth should be a good one, and if a water-pipe is used it should be ascertained that water does actually flow in the pipe all the time. Just because the pipe goes in the ground is not always indicative of a good earth, and care should be taken to see that water is always present; a gutter-pipe, for instance, is of little use.

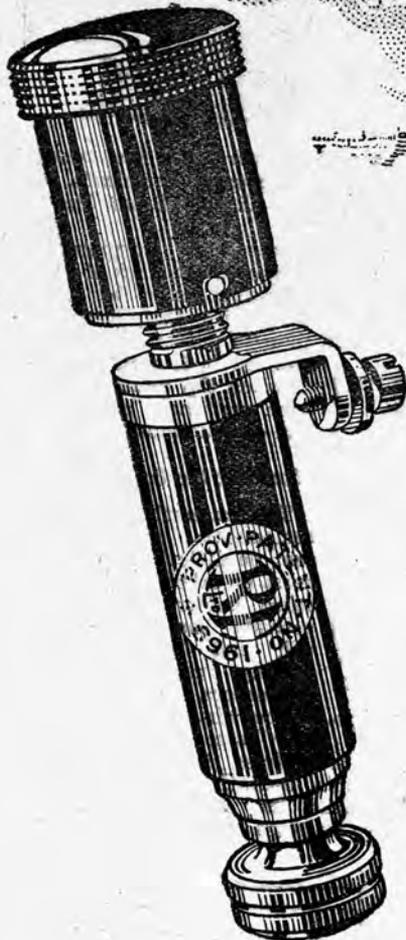
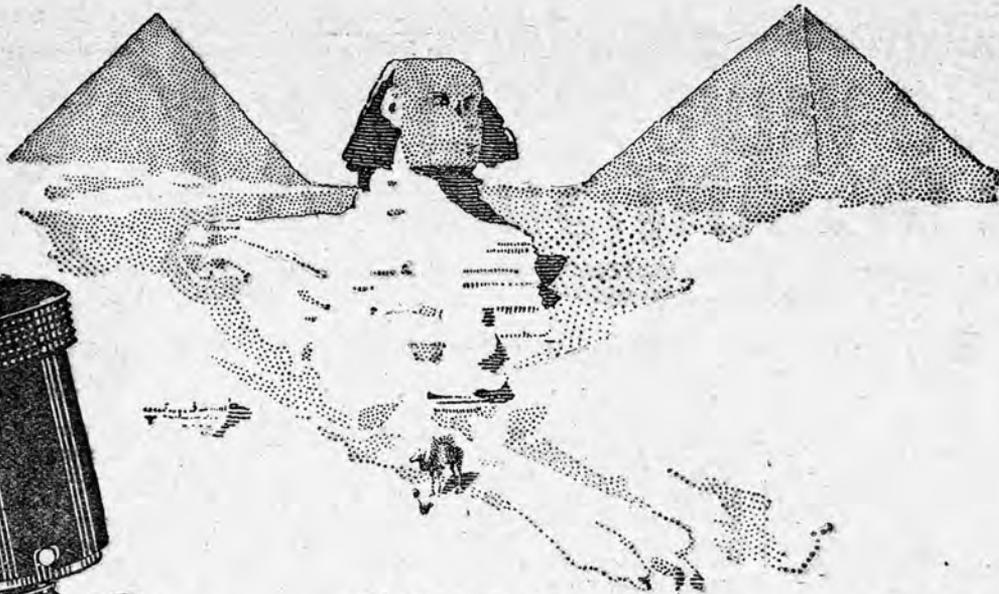
Conclusion.

In closing, it is recommended that the telephones used in conjunction with a crystal set shall be of the most sensitive type which personal financial ability will permit. In valve reception one may perhaps be permitted to lose a little signal strength on account of the loudness of the signals, but in the case of a crystal set it is as well not to "waste" any volume whatsoever, and for this reason a really sensitive pair of telephones should always be used.

RUBBER FEET FOR YOUR WIRELESS CABINET.

It is a good plan to fix rubber feet to the bases of wireless set cabinets, and the small, round rubber blocks sold as door stops are very suitable for the purpose. They may be fastened to the wood by screws and washers, and protect table tops from damage as well as minimising the effects of vibration of the shelf or table on which the set is standing.

P. H. W.



STABILITY

The greatest asset of a crystal detector is stability. The lack of stability in the ordinary type of cat-whisker was one of the reasons why so many enthusiastic crystal users decided to adopt valves; the disadvantage of the very limited range of crystal reception has been practically overcome owing to the large increase in the number of broadcasting stations throughout the country, with the result that if stability could be assured, the unequalled purity of crystal reception could be enjoyed by all.

Now the R.I. Permanent Mineral Detector is the solution of all crystal difficulties. In this famous detector, a small selected piece of mineral having special properties is mounted in a metal cup embedded in Wood's metal. No catwhisker of any kind is employed; contact for rectifying purposes being made with another crystal mounted on a spring plunger which maintains a good pressure against the special mineral. This combination ensures absolute stability and perfect rectifying contact.

The use of a spring plunger fitted to one of the elements enables the point of contact between the crystals to be moved if desired, although searching for sensitive spots is unnecessary since the contact surfaces of both crystals are uniformly sensitive.

You are not purchasing something which has not been tried; to-day there are well over 100,000 in use, and this component has received the universal approval of the whole of the Technical Press. In addition it is marketed by a firm whose name R.I. stands for the best in Radio.

The R.I. Permanent Mineral Detector is manufactured in two different forms. The ordinary type is provided with a pair of supporting clips for mounting the component either above or below a panel; PRICE 6/- complete with metal brackets and screws for mounting.

The other form is designed for one-hole fixing, and is provided with a detachable ebonite cover which protects the adjusting knob when in position. PRICE 7/6 complete.



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Write for the new R.I. Blue and Gold Catalogue free on application.

Advt. R.I. Ltd., 12, Hyde St., New Oxford St., London, W.C. 1.

P.C. 7.

A TWO-VALVE RECEIVER FOR DISTANT STATIONS

By J. R. O'Connell



WITH the coming of winter many constructors who up to now have been content with the reception of their local station will be asking what type of receiver they ought to make in order to be able to receive some of the more distant broadcasting stations.

Of course, the number of stations that can be received by any set largely depends upon circumstances, and a set that will, when used in a certain part of the country, bring in all of the main B.B.C. Stations may, on being taken to another locality, only bring in a few of the same stations. However, given a normally good spot for reception and an averagely efficient aerial and earth system, the receiver to be described will give good results.

General Design.

The receiver is a compact two-valve set employing one high-frequency valve coupled to a detector by the well-known tuned anode method, reaction being direct on to the aerial.

The photographs show that only five terminals are provided, the reason being that the battery connections are made by means of flex leads which are brought out at the back of the cabinet. The three terminals on the left-hand

when the shorting strap is open and the aerial is connected to A2, the condenser will be in series. The coil holder at the top of the cabinet carries the aerial and reaction coils, while the holder on the right-hand side is for the anode coil.

The components required to construct the set are listed below, and

and connecting wire, a few wood screws, and three spade terminals.

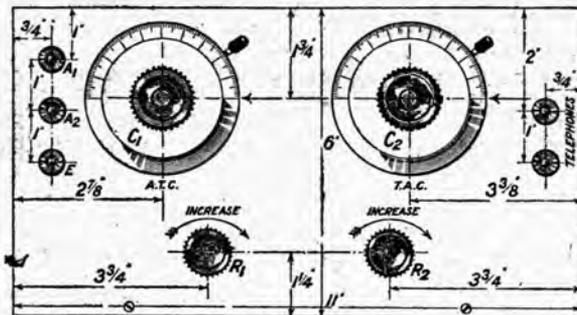
One packet of Radio Press Panel Transfers.

Having collected the components and drilled the panel, the work of putting the set together may be commenced. Before doing this, however, it is a good plan to put on the transfers, as it is easier to do so when the panel is free from terminals and such like obstructions.

Mounting the Components.

The mounting of the components should present no difficulty, but care must be taken to place the valve holders in such a position that the valves will not obstruct the moving vanes of the condensers.

The wiring, which may now be commenced, is, as will be seen from the diagram, a very simple operation. It will be noticed that the grid condenser is held by its tags between the plate



All dimensional details should be strictly adhered to.

for the convenience of those readers who wish to duplicate the original receiver the names of the various makers are given. Of course, components of other makes may be used, provided they are of reputable manufacture.

One ebonite panel 11 x 6 x 1/2 (Grafton Electric, Ltd.).

One suitable cabinet and baseboard ("Camco").

One "Lotus" two-coil holder (Garnett and Whiteley & Co., Ltd.).

One single coil holder (Goswell Eng. Co.).

Two Utility variable square law condensers .0005 μF and .0003 μF capacity (Wilkins & Wright).

Two Microstats (Wates Bros.).

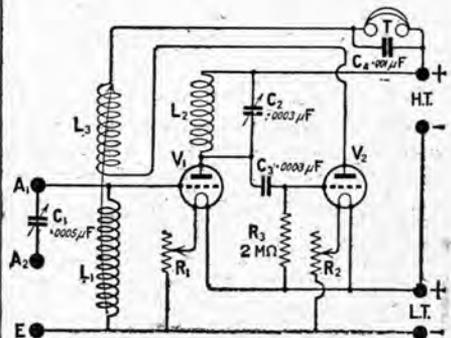
Five terminals.

Two valve holders (Peto-Scott, Ltd.).

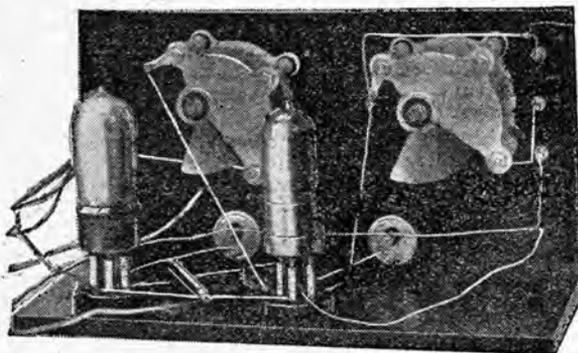
Two fixed condensers .0003 μF and .001 μF capacity (Edison Bell).

One 2-megohm grid leak (Edison Bell).

Small quantity of red and black flex,



By connecting the aerial to A2 the condenser C1 is in series, whereas by joining A2 and E together and connecting the aerial to A1, the condenser is in parallel. The earth is connected to E in both cases.



The wiring of the receiver is extremely simple. Note the well-spaced wiring.

side provide an easy method, due to Mr. Harris, of placing the aerial tuning condenser either in series or parallel with the aerial. When the aerial is connected to A1, and A2 and E are joined, the condenser will be in parallel with the tuning inductance;

pin of the high-frequency valve holder and the grid pin of the detector valve holder. Short pieces of flex are used to make the connections to the coil holders, and while the leads going to the reaction coil may be twisted together, this should not be done

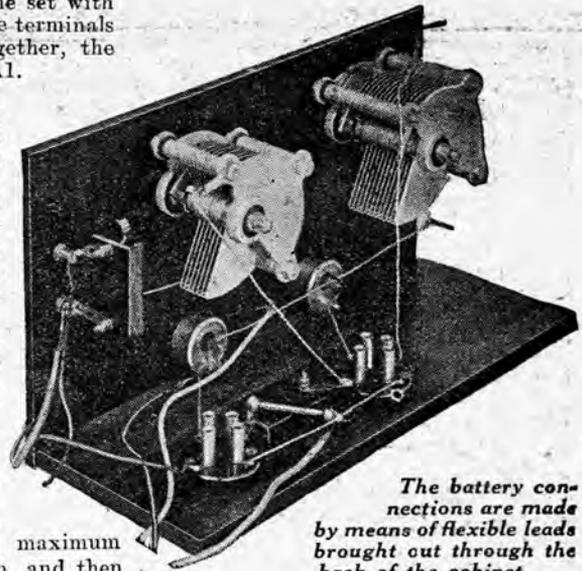
when making the connections to the aerial-coil.

Testing the Set.

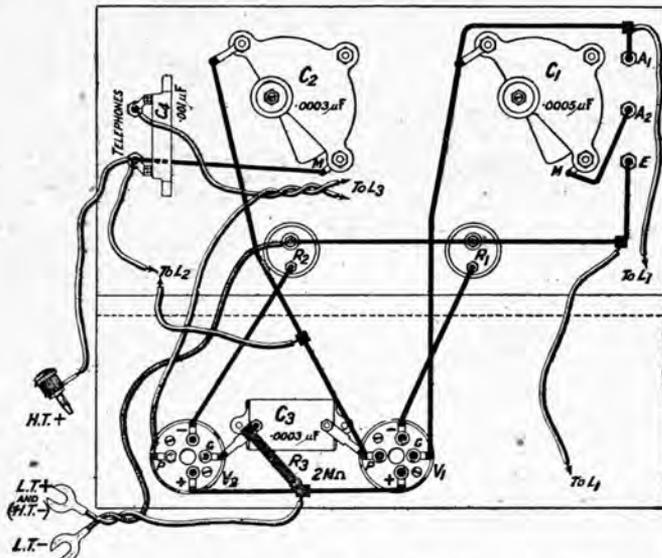
Having finished the wiring, the set is now ready for use, and may be tested out. With the valves in their holders (either bright or dull emitter valves may be used) and the rheostats in the off position, the L.T. leads may be connected to the L.T. battery. This done, the rheostats may be turned (one at a time) to the on position. If the valves light and are properly controlled by the resistances used all is well, and having again turned the rheostats to the off position, the aerial, earth, telephones and H.T. battery may be connected up. It will be seen that only one lead has been provided for this battery, the reason being that a connection is made from the L.T. battery plus terminal to the socket marked minus on the H.T. battery;

It is as well to try out the set with the condenser in parallel, the terminals A2 and E being joined together, the aerial being connected to A1.

To receive a station on a wavelength between 300 and 500 metres a No. 35 or 50 coil may be placed in the aerial socket, a No. 75 in the anode socket, and a 50 or 75 in the moving socket. The rheostats may now be turned on, and with the aerial and reaction coils at right angles the two condensers should be simultaneously rotated, the anode tuning condenser being turned at a slightly lower speed than the A.T.C., until signals are received. Adjust the anode tuning condenser, then the aerial condenser, until the signals



The battery connections are made by means of flexible leads brought out through the back of the cabinet.



When wiring up note the manner of connecting to grid leak.

this flex lead, which should be fitted with a wander plug, is used to vary the high tension voltage in the usual manner.

are at maximum strength, and then the coupling between the aerial and reaction coils may be slowly tightened, at the same time retuning with the aerial condenser. Signals should become louder as the coupling is tightened, and if this effect is not produced the leads to the reaction coil should be reversed and the procedure repeated. When the leads are connected to the coil in the proper manner a steady build up of signal strength will be noticed as the coils are brought together, until a certain point is reached, whereupon a "pop" will be heard in the telephones, indicating that the set is oscillating. When this condition is reached

the coils should at once be separated. It should be possible to so adjust the receiver so that the slightest forward movement of the reaction coil will make the set break into oscillation, but the coil must never be moved that little bit forward. When using C1 in series usually a size larger coil will be required in the aerial, also the receiver will generally oscillate more easily with this arrangement.

The coils for 5XX are aerial No. 150, anode No. 250, reaction No. 100.

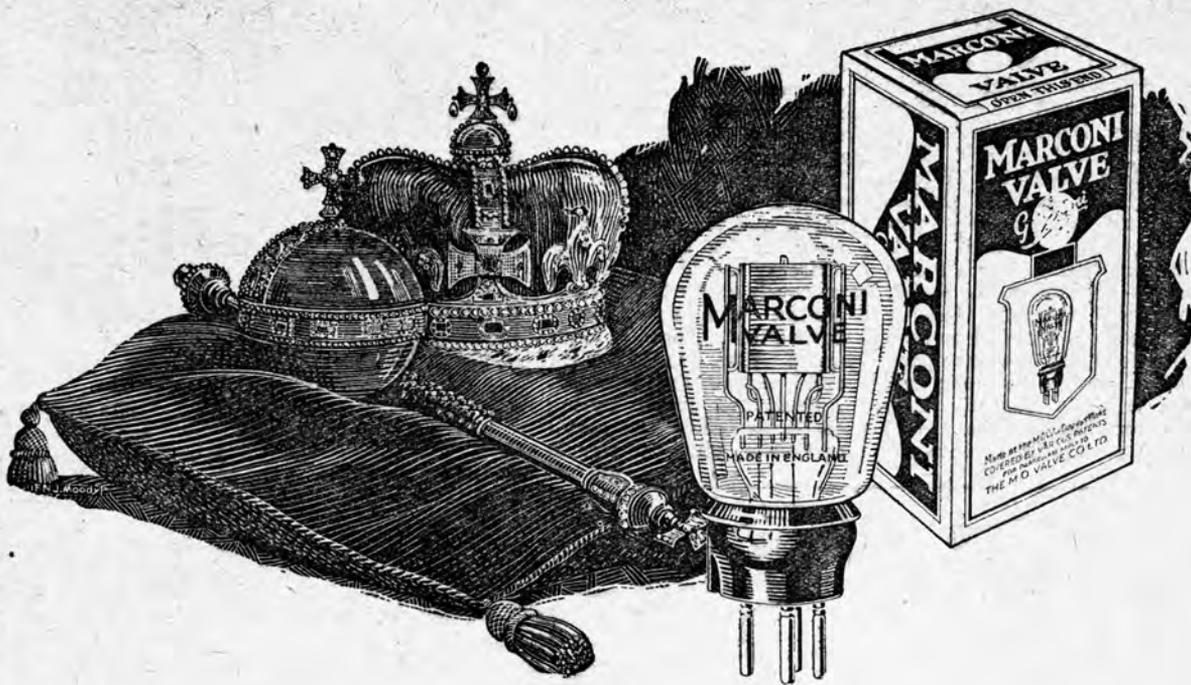
Results Obtained.

Tested on an average twin wire aerial about 50 ft. long and between 40 and 50 ft. high, situated in N.W. London, 2LO was too loud for comfort in the telephones, and no difficulty was experienced in picking up a number of other transmissions, Brussels, Toulouse, Malmo, and an unidentified German station being particularly good. On another test conducted during the recent International wavelength tests over twenty stations were received at good strength in about an hour and a half.

No. 7.

Hector is Disconcerted.





The Ruler of Radio

Your set may be a good one but it is only as good as the valves permit.

The valve is the ruler of radio with absolutely autocratic powers. Every note of music, every inflection of voice, all the charm of radio is made or marred by the valves you use.

How important then it is to choose Marconi Valves—the valves that are persistently perfect in performance, scientifically—not freakishly—designed and sturdily manufactured for long and lasting service.

Your friend who uses them and your dealer who sells them will confirm the merits of Marconi Valves.

In the range of Marconi Valves there is the right valve for the right purpose—and a valve for every purpose.

Choose.
MARCONI
VALVES

*At your
radio dealers*

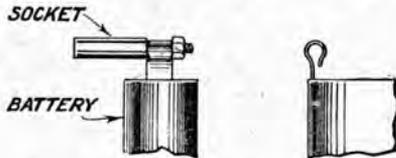
In the purple box

Announcement of THE MARCONIPHONE COMPANY, LIMITED
 Registered Office: Marconi House, Strand, London, W.C.2

Some Constructional Hints and Tips

Simple Battery Connections.

Where flash-lamp batteries are used for H.T. voltages, a quick and simple method of making connection is very useful. The diagram shows an easy way of doing this. Bend the battery tags over the screwed portion of a valve socket and grip the whole



A useful connection for flash-lamp cells.

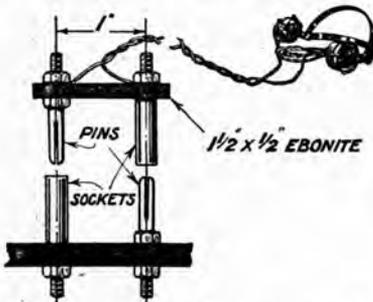
into shape with a pair of pliers. Secure the socket to the tag by means of a nut as shown. Connection will be found to be quite firm. For the plug connection from the next battery a valve pin is secured to the end of a flex lead.

F. O. R.

* * *

Quick Telephone Connector.

A quick telephone connector may be made as shown in the diagram. Mount upon the panel an ordinary valve socket and pin 1 in. apart in place of the usual terminals. Next cut a piece of ebonite $\frac{1}{2}$ in. by $1\frac{1}{2}$ in., and drill two 4B.A. clearing holes on the centre



Valve pins and sockets are used for this quick connector.

line, the holes being 1 in. apart. Mount a pin and socket as shown, and connect the telephone leads by means of the securing nuts. To connect the 'phones in circuit, plug adapter in plug and socket on panel.

F. R.

* * *

A Connector for Low-Loss Coils.

Below is described how to make a connector for use in conjunction with low-loss coils, such as the "Three Step." All that is needed is a split pin. The construction is described in the diagram. First cut a piece of ebonite as shown. This answers the

purpose of a handle when changing the tapping point. A 4B.A. clearing hole is drilled in the ebonite and the split pin is secured in position by



Details of the connecting rod.

means of a 4B.A. screw, nut and washers. A flexible lead is secured between the washer and the ebonite, as indicated. The other end of the lead is taken to the desired point of connection upon the set. It will be found that the split pin will push easily on to any desired portion of the inductance coil in use, and thus maintain a firm hold, giving good contact.

B. R. A.

* * *

Double Terminals.

Double terminals are often very useful, especially when used as a means of linking up telephones in parallel. The terminals are built up as shown in the diagram, which is self-explanatory, all that is necessary being to mount an ordinary terminal upon the panel upside down, as shown, the head of the terminal and a spare head being added on the long screwed portion of the terminal.



A terminal fitted upside down gives a multi-connecting post.

M. A. Y.

* * *

Large Panel Holes.

Large panel holes up to, say, $\frac{1}{2}$ -in. diameter, may easily be drilled with a tapered square file. First drill a small hole in the panel with the usual type of drill. The hole thus drilled provides a lead for the file. The file is inserted in the brace or breast drill and used in the ordinary manner. If the file "jams," give one or two turns backwards and proceed. It will be found that the file cuts through the panel with almost as much ease as a drill, and being square in shape a drill clearance is automatically provided. Both sides of the panel should be drilled.

R. A.

ORDER No. 7 OF "WIRELESS"
TO-DAY
ON SALE TUESDAY.



MUSIC LOVERS who are so disappointed with the tone quality of loud speakers so far available, have given up the idea of receiving broadcast by this means.

You will now be delighted to learn that after years of patient research, the makers of the Puremax have evolved an instrument which gives not only full volume but that perfect truth of reproduction which makes Puremax reception a joy to the most critical ear.

Puremax purity is accomplished by combining:

1. The super selected mica diaphragm.
2. The floating armature.
3. The scientifically balanced electro magnets.

So great a confidence have we in the Puremax loud speaker, that in addition to an unconditional guarantee of 12 months, we invite you to try it out, in your own home, on your own set, at our expense for one month.

Send the appended coupon with your remittance, we will immediately send an instrument carriage paid to your door, together with our guarantee to return your money in full at any time within one month.

Price - £4 : 19 : 6

Lee & Churchill, Ltd.
76, Fore Street, E.C.2.

COUPON.

Name

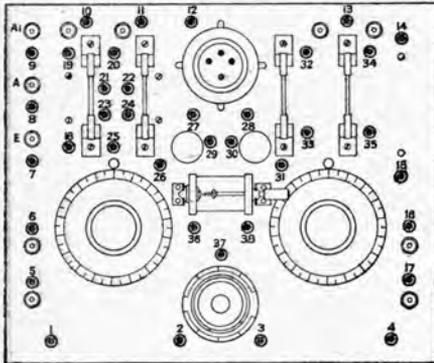
Address

Dealer's Name

I enclose remittance for £4 : 19s. : 6d. on the understanding that it will be immediately refunded should I not be satisfied with Puremax reception.

THE CENTODYNE *By PERCY W. HARRIS, M.I.R.E., Editor.*

Two Further Circuits to Try.



Each component has its own Clix and numbers.

I GIVE this week the connections for two further circuits on the Centodyne, the first being an H.F. valve, followed by a crystal detector, transformer coupling being employed, and the second is a single-valve Reinartz circuit.

H.F. Valve and Crystal.

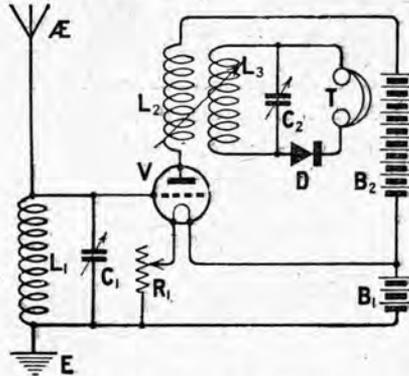
Aerial and earth batteries and telephones to usual terminals.

Top of left fixed socket to 8, bottom to 7.

8 to 2, 7 to 1, 8 to 12, 7 to 10, 28 to top of back fixed socket, bottom of same to 13.

Top of back moving socket to 3, bottom to 4, 4 to 17, 16 to 38, 36 to 3.

Use 35 or 50 coil in left fixed socket, 35 in back fixed socket, and 50 or 75



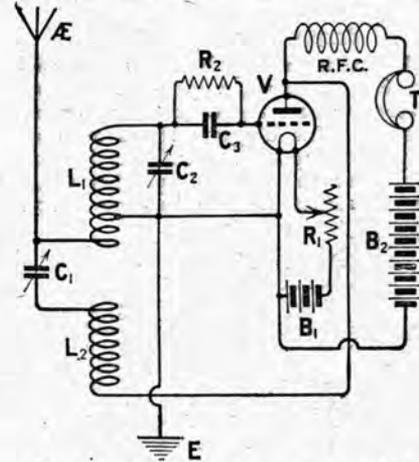
The first circuit is a transformer-coupled H.F. valve followed by a crystal detector.

in back moving socket. Find best coupling of back coils by experiment.

Try experiments with different sizes of coil in back fixed socket.

Reinartz.

Use 75X coil in left fixed socket, 50 in moving, and take aerial to



The second circuit is a straight-forward Reinartz using an X coil for L1.

usual Centodyne terminal. Batteries and telephones as usual. Tapping from X coil (6 or 10) to 7. Top of fixed coil to 9, bottom to 8, 7 to 1, 9 to 2, 2 to 25, 20 to 12, 26 to 25, 29 to 20 (.0003 μ F condenser in clips), 1 to 11, 28 to 14, 15 to 16, 17 to 13, 28 to bottom of left moving socket. Top of same to 4, 3 to 8.



WHY BOTHER WITH MULTIPHONE BOARDS and CONNECTORS!

CABLE HEADPHONES RENDER THIS UNNECESSARY.

PRICE 15/- pair.
ENTIRELY BRITISH MADE.

Any number of "CABLE" Phones can be placed in series or parallel instantly. The phones, with leads, weigh only 9 ozs.

O.V. THE PORTABLE INDOOR or OUTSIDE AERIAL

SIZES STANDARD 11 ft. x 1 1/4 in.
SUPER 12 ft. x 3 1/2 in.

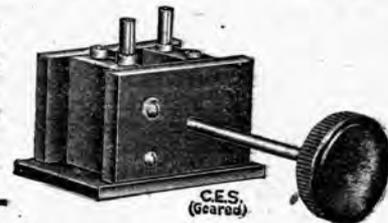
THE STANDARD AERIAL IS ROUND — THE SUPER IS FLAT.

PRICES STANDARD 2/6
SUPER 5/6

CABLE GEARED COIL HOLDERS

BEST QUALITY EBONITE.
2-WAY 5/6 3-WAY 9/6

CABLES AND ELECTRICAL SUPPLIES,
CABLE HOUSE,
234, PENTONVILLE ROAD, LONDON, N.1.
TELEPHONES: NORTH 3109-4072.



(O.V. Super)
INSIST ON THE O.V. WHEN BUYING YOUR AERIAL.



Doing one thing - - - and doing it well

A BASIC essential of fine craftsmanship is the whole-hearted concentration upon one special task. Those fine old craftsmen of the Middle Ages devoted their whole lives to the betterment of their craft. They possessed the right spirit.

The same understanding can be observed among the ivory carvers of Japan, the metal workers of India, and the watch-makers of Switzerland. They all carry on the traditions of their fathers for generation after generation. Truly they realise that doing one thing and doing it well inevitably spells success. Among wireless enthusiasts throughout the country the name Cossor has also been associated with the basic idea of doing one job and doing it well.

Cossor Valves are the *only* contribution to the wireless industry by A. C. Cossor, Ltd. And here again specialisation has brought success. For many years Cossor has been making valves—always experimenting, always aiming to effect

improvements. Each year has seen the standard of performance slowly—but surely—raised. Each year finds Cossor more determined to remain true to its self-imposed task.

Three years ago the research work on the Cossor hood-shaped Anode and Grid and the arched filament was completed. Its inventors were fully convinced that for increased sensitiveness, durability and tonal purity these principles possessed immense possibilities. And they resolved to concentrate upon their development.

What has happened has been wireless history. From a new valve with a sale of a few hundreds a week, the wireless industry has watched Cossor sales leap upward until today it enjoys the distinction of being by far the most popular British Valve.

Once again it has been proved that the public is always ready to recognise an honestly made article—and, once having recognised it, loyally continues its support.



The Wuncell Dull Emitter
Voltage 1.8 volts. Consumption .3 amp.
W1 for Detector and L.F. 14/-
W2 for H.F. amplification. 14/-

The Cossor Loud Speaker Valve W3
Voltage 1.8 volts. Consumption .5 amp.
Price 22/6

Cossor



The Amplion Pedigree

The reason why the AMPLION is undeniably the finest Radio Loud Speaker and recognised as the World's Standard.

It will be seen that the AMPLION is not merely produced to meet a sudden demand, but is the result of years of experience in Loud Speaker design and construction.

Thirty-eight years ago . . .

- In 1887 Mr. Alfred Graham demonstrated the first practical Loud Speaker.
 - In 1893 GRAHAM Loud Speakers placed upon the market.
 - In 1894 First used in the British Navy. Transmitters applied to Phonographs for Loud Speaker reproduction.
 - In 1896 Naval Telephones developed and adopted by the Admiralty after severe and extended test.
 - In 1898 Watertight Loud Speakers Patented. Fitted on board many warships and mercantile vessels. Telephonic Submarine Signalling System devised.
 - In 1902 Complete Loud Speaker installations on central battery plan erected on warships as sole means of communication.
 - In 1906 The most extensive naval installation to date, including an exchange system fitted in H.M.S. Dreadnought.
 - Onwards Graham Loud Speakers applied to all sorts and conditions of service at home and abroad, ashore and afloat.
 - To 1919 No less than 12,000 ship installations carried out.
 - In 1920 AMPLION Loud Speakers produced for Wireless, and "AMPLION" Trade Mark registered.
 - In 1922 AMPLION standardised by leading manufacturer^s of radio apparatus.
 - In 1924 *At Home* AMPLION sales exceed those of all other makes put together.
- Abroad* AMPLION companies formed and Agents appointed in all countries where Broadcasting is in operation, ensuring world-wide distribution of an essentially British product.



The Loud Speaker Supreme

Obtainable from AMPLION STOCKISTS and Wireless Dealers everywhere.

Patentees and Manufacturers:

ALFRED GRAHAM & COMPANY (E. A. GRAHAM)
ST. ANDREW'S WORKS, CROFTON PARK, LONDON, S.E.4

Standard
"Dragon"
type A.R. 19.

Demonstrations gladly given during business hours at the AMPLION Showrooms: 25-26, SAVILE ROW, REGENT STREET, W.1. 79-82, HIGH STREET, CLAPHAM, S.W.4.; and at the recently opened Scottish Depot, 101, ST. VINCENT STREET, GLASGOW

WHO INVENTED RADIO?

(Concluded from page 264.)

It should be further explained that Hughes' usual method of experimenting with his aerial apparatus was, after trying successfully all distances allowed in his residence, to put the transmitter in operation and walk up and down Great Portland Street with the receiver in his hand and with the telephone to his ear. He found that the sounds seemed to slightly increase for a distance of 60 yards, then gradually diminish, until at 500 yards he could no longer with certainty hear the transmitted signals. What struck him as remarkable was that opposite certain houses he could hear better, whilst at others the signals could hardly be detected; but Hertz's discovery of *nodal points* in reflected waves (in 1887-9) explained to him what he then considered to be a mystery.

The Hughes Medal of the Royal Society.

Hughes was blessed in a high degree with that imagination which, bounded and conditioned by co-operant reason, Tyndall rightly regarded as the mightiest instrument for investigation and research.

Mr. Morse, in referring to the *Basis of the Poulson Arc*, very properly mentions the illustrious Prof. Elihue Thomson's method of generating radio-frequency oscillations. Strangely enough, this great scientist is a proud holder of a Hughes' Medal of the Royal Society, and he was good enough to spare me two or three hours in my home when he was over here last year for the World Power Conference, and to receive the Kelvin medal from the hands of Lord Balfour, also to deliver the James Forrest lecture; and I was able to show him a few valued souvenirs of my dear friend Hughes, and to hear first-hand as much about his triumphs as his extreme modesty would permit.

Concluding Remarks.

In conclusion, I may explain that as Mrs. Hughes went to America to live near some of her relatives about a year after her husband's death—surviving him by some twenty years—I do not know for certain what has become of a great mass of manuscript relating to his unpublished work, but I may remind you, Sir, that there is a good deal of matter of a historical character relating to his wireless and other work available, which, if made generally known, might give life to a movement to give effect to the suggestion made by *The Electrician* (I think) at the time of his death—that a suitable memorial should be erected to the memory of the great scientist and philanthropist, who so much adorned the nineteenth century.

HENRY J. SPOONER.

Royal Societies Club.



OLIVER CROMWELL

Character

WHEN you choose the Eureka, you buy something more than a mere Wireless Component. You buy character—an ideal. Back in 1922, when Broadcasting was just commencing to awake the imagination of the public to its immense possibilities, two scientists commenced to design what, in their opinion, should be the finest Transformer that money could buy. They realised that it would be costly—because all worth-while things are costly. They knew that their task would be long and arduous—because the very nature of their quest necessitated research along virgin paths. Their strength of character enabled them to overcome all obstacles. The Eureka Concert Grand was the result. This fine instrument has now been followed by the introduction of the Eureka Baby Grands and the Eureka Reflex. The same high ideals—the same splendid craftsmanship—the same superiority of design—but at a price within the reach of all.

Eureka Concert Grand . . . 25/-	No. 2 . . . 21/-
Baby Grand, Nos. 1 and 2 . . . 15/-	Reflex . . . 15/-

EUREKA

Advertisement of Portable Utilities Co. Ltd., Fisher St., W.C. 1

Wireless and Education.

SIR,—In a recent issue of WIRELESS I saw a reference to experiments which are going to be tried in London on the use of wireless as an educational medium.

It may be interesting to your readers to know that an experiment on a considerable scale is being tried in Pembrokeshire during "Education Week," from October 25th to the 31st.

Through the co-operation of the B.B.C. about 50 schools in the County are being fitted up free with wireless sets, loaned for that week, so that the children in all the schools will have an opportunity of hearing the afternoon educational addresses from Daventry.

The B.B.C. is good enough to offer valuable prizes to children in elementary schools and to children in secondary schools for essays on the talks, and also to teachers for essays on the utility of wireless from the educational point of view.

To commence the week the Director of Education is broadcasting a talk on "Pembrokeshire's Education Week" from 5 WA Cardiff, and Dr. D. G. Taylor is to broadcast, from the same station, a talk on "Education and Christianity," on Sunday night, October 25.

This experiment will be watched with great interest, as it is the first experiment of its kind, on a wide scale, in a rural area.—Yours faithfully,

EVAN T. DAVIS,
Director of Education and Clerk
to the Cardiff Education Committee.

Correspondence

20 Miles from 2LO.

SIR,—I have just made the "half-hour crystal set" as described by Mr. Harris in No. 1 of WIRELESS, and I am pleased to say that it works well. I am over twenty miles from London, and I get far better results with this set than I do with a bought one. Thanking you very much.—Yours faithfully,

W. HOMANS.

King's Langley, Herts.

Results in Bournemouth.

SIR,—I have constructed the crystal set described by Mr. Harris in No. 1 of WIRELESS, and I have received satisfactory results from our local station.

I am now going to try it with terminals in place of the staples.—Yours faithfully,

A. H. WITHERS (aged 10).

Bournemouth.

Better than a Bought Set.

SIR,—I have had excellent results on the "crystal set in half an hour," described by Mr. Harris in No. 1 of WIRELESS. It is better than a set which I bought some while back.

Congratulations, both on the set and your new paper.

SIDNEY H. GEDYE.

Palmers Green.

Made by a Child!

SIR,—In the issue of WIRELESS, dated September 19, Mr. Harris described "How to make a Crystal Set in Half an Hour," and you asked for readers' experiences with it.

You may be interested to hear how my son Kenneth, aged 7 years and 10 months, made the set. He read the article and said, "Oh! Daddy, I could make that." He first planed and stained a piece of board and then made the coil. The only wire we had was some No. 16 d.c.c. He followed Mr. Harris's instructions most carefully, and the only help given him was in cutting the tin for the crystal holder. No soldering was done, and the crystal used was one of well-known make.

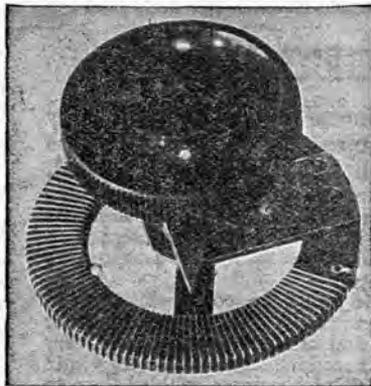
As you can imagine, there was great excitement in the family when the testing time came. This was on the afternoon of Sunday, September 20, when a Ballad Concert was broadcast from 2LO. We were astonished at the wonderfully clear reception. The astonishment was even greater when, the catwhisker having come out of place, we found that reception was equally clear when the corner of the tin touched the crystal.

Is this a record for this set? We are roughly 27 miles from 2LO as the crow flies, but have the advantage of being on the Chilterns at about 600 feet above sea level, and we have a very good aerial.—Yours faithfully,

ALBERT T. GRAVER.

Great Missenden, Bucks.

This, the third of a series of such advertisements, deals with the "ELLA-VARIC" RHEOSTAT.



As will be seen from the illustration, the element is designed on a new principle which enables it to lie practically flush with the panel.

Only the highest grade of English resistance wire is used in its manufacture and the action is particularly smooth and silent.

One-hole fixing is incorporated, and the rheostat can be had in either

5, 15 or 30 ohms. Complete with knob and pointer.

2/6 each

Other Specialities:—

"ELLA-VARIC" Coil Holders, "ELLA-VARIC" Variometers, "ELLA" Battery Chargers.

If your dealer is unable to supply write direct to:—

LIONEL ROBINSON & Co.,
3F, STAPLE INN, HOLBORN, W.C.1.

Telephone:—HOLBORN 6323.



A down payment of only £3.8.6 buys an

A.J.S.

The finest 2-Valve Loud Speaker Set in the World

The balance payable in convenient monthly instalments.

The Receiver is as illustrated and completely equipped, regardless of cost. The cabinet is of beautiful mahogany. This new Speaker Set is designed to give loud speaker results on nearby stations and the results are truly amazing. Complete with A.J.S. Junior Loud Speaker, 2 Mullard Dull Emitter Valves, 100 volt H.T. Battery, 3 v. 100 amp. accumulator, full aerial equipment and coil (300—550). £13 18s. 6d., including royalty. Other models up to £75.

For purity of tone coupled with volume A.J.S. Receivers are a revelation and must be seen and heard to be fully appreciated.

Demonstrations daily and particulars from the London Distributors.

H. TAYLOR & Co., Ltd., 49/53, Susssex Place, South Kensington, S.W.7
Phones: Kensington 8558/9 & 5540.

Russell's

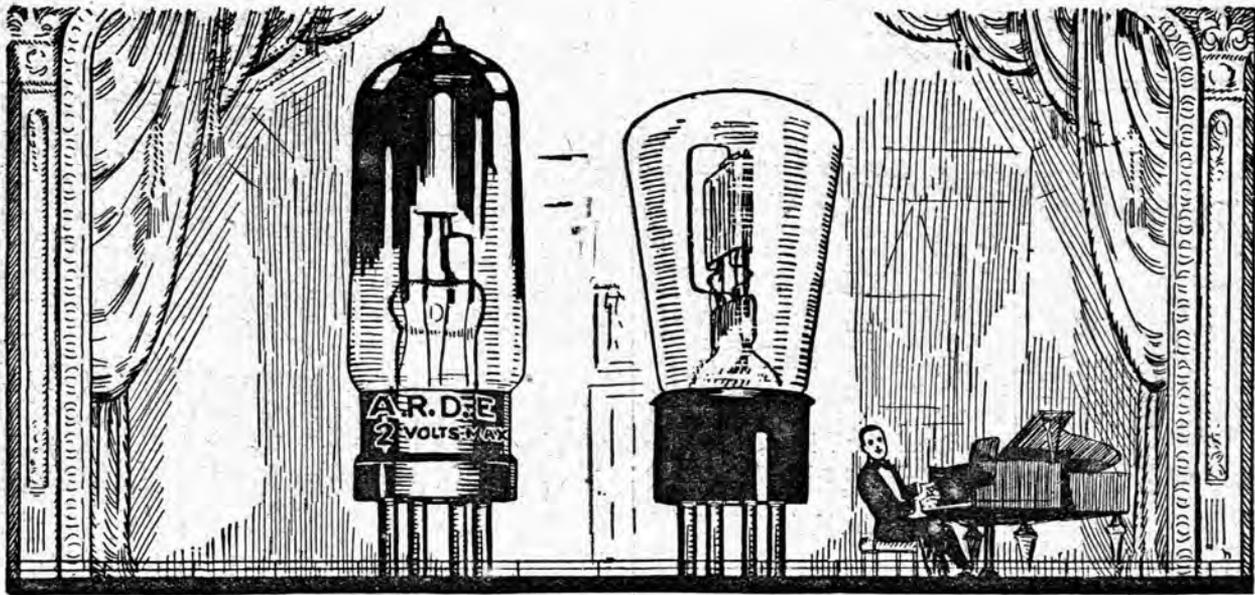
have produced a definitely constant Oscillating Zincite. For all those enthusiasts, proficient in the use of the Oscillating Circuit, we have removed all element of doubt in experiments. It used to be a case

of buy and try and buy again, before a crystal could be found to Oscillate—an expensive business! Now this fascinating branch of Crystal work is cheaper, more certain—more interesting.

From all Stores of Repute, or direct from Russell's, per box 2/6

OSCILLATING ZINCITE

The L. G. RUSSELL Laboratories, 1-7, Hill Street, Birmingham.



Ideal Entertainment by the Ediswan Troupe

- P.V. 6: Hallo! Fancy meeting you! I *am* surprised!
- A.R.D.E.: I'm more surprised at your surprise. You should know better by now. We Ediswans always find each other in the end.
- P.V. 6: That's true, my dear; but we seem to have found each other remarkably quickly in this case. Mr. Owner has only had this set a fortnight, and already you're here and the other Miss 06 has gone!
- A.R.D.E.: Good for you—and for him! Couldn't you get on with the lady?
- P.V. 6: I did my best. But she was very trying. However, I'm always chivalrous—it's in the family. We seem to do more for other valves than for ourselves.
- A.R.D.E.: They need it. We, we always work well together.
- P.V. 6: Of course, my dear. But then, we know each other so well, and are so sure of each others' abilities that—well, it *isn't* work. It's pleasure!
- A.R.D.E.: That's true—and now, I hear F.L.—the Eiffel Tower. Let's get Mr. Owner some pleasure—Ready?
- P.V. 6: Ever—till the end of my life—
- A.R.D.E.: Which is, naturally, a long way off!

EDISWAN VALVES

Will Improve
ANY Set

Always give a Good Performance.

AT ALL WIRELESS DEALERS.

THE EDISON SWAN ELECTRIC CO., LTD., 123/5, Queen Victoria St., London, E.C.4



Incorporate Guaranteed Components

Bretwood Products carry a guarantee for three years. Let this fact guide you in your choice of radio components. Of high grade quality and practical efficiency, Bretwood Products cost no more, often less, than components of minor reputation and manufacture. Get them from your dealer.

THE "BRETWOOD" VARIABLE GRID LEAK

(Patent No. 224295).

The only reliable grid leak. The plastic resistance gives smooth, perfect control, and is absolutely constant in action. Gives accurate readings consistently from 50,000 ohms to over 10 megohms.

PRICE 3/- With Condenser (as illustrated), 4/6.

THE "BRETWOOD" ANTI-CAPACITY VALVE HOLDER

(Patent No. 31371/24).

A valve holder constructed on new and scientific lines, combining the following advantages: Easy to fix; no capacity; no leakage; always perfect contact; saves panel space; back or front of panel mounting; no soldering necessary.

PRICE 1/9.

THE "BRETWOOD" FILAMENT RESISTANCE

(Patent No. 29284).

This instrument is the result of exhaustive experiment along new lines by Bretwood engineers. The Bretwood Rheostat takes up very small space on or behind the panel. It is extraordinarily smooth in action, effects perfect continuous contact, and does not depreciate through long use. It is capable of rough as well as a very minute Vernier adjustment, and is one hole fixing. Extremely well made.

PRICE 5/-.

THE "BRETWOOD" ANTI-CAPACITY (Ball-Bearing) SWITCH

(Patent Pending).

A first-class speciality of 100% efficiency, the principal features of which include absolute freedom from capacity; perfect contact; smooth action; practically no wear and tear; first-class finish and appearance; one hole fixing.

PRICE 5/-.

C We are shortly putting on the market the following new and interesting Bretwood products:

Bretwood Super-Het. Transformer (Tunable).

Bretwood Super-Het. Oscillator.

Bretwood Variable Low Loss Condenser.

Bretwood Variable Low Loss Condenser (Geared).

BRETWOOD LTD.

12-18 London Mews, Maple St., LONDON, W.1

From all Dealers.



THOROUGHLY TESTED



THEN THE IRONCLAD GUARANTEE

Types C.T.08, C.T.15 and C.T.199 (American type) at 12/6.
Types C.T.25, C.T.25B and C.T.201A (American type) at 15/-

The Cleartron test is a real one. It has to be. The Ironclad Guarantee looks after that, because it authorises instant replacement without cost or question of any valve that fails to give the purchaser perfect service—and so long as there is light and life in the valve, this guarantee holds good. Small wonder that every Cleartron must undergo nine distinct inspections before the final Test Room O.K. is affixed. Use Cleartron and be sure of your valves.

If your Dealer does not yet carry Cleartron, order from us with your Dealer's name and address. (Dealers! Write us for samples and technical data.)

CLEARTRON RADIO LIMITED

1, CHARING CROSS, LONDON, AND BIRMINGHAM

Regent 2237/2. Cleartron, Westrand, London.
America's Foremost Valve made in Britain's Newest Factory.

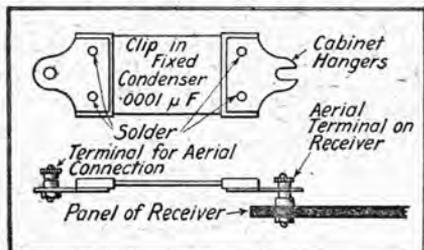
CLEARTRON

BRITISH  MADE

C.A.T.

A simple device for the instantaneous use of constant aerial tuning is described in this article.

Details and construction of the device are shown in the diagram. The material necessary is as follows:—A clip in condenser of .0001 μ F capacity, two cabinet hangers, and a terminal. Solder a cabinet hanger at each end of the condenser, having first slotted one



Cabinet hangers make connecting up a simple matter.

of the hangers, as shown. When it is desired to use constant aerial tuning insert the slotted end in the aerial terminal of the receiver in use. Provide the other end of the condenser with a terminal to which the aerial down-lead is secured. It will be seen that the device is easily brought into use without disturbing in any way the existing arrangements. B. R. A.

FIT DOUBLE HALYARDS

NOTHING is more trying than to have to take an aerial mast down just because the halyard has broken and slipped through the pulley. Of course every halyard should have its ends tied together to prevent it slipping out of the pulley, but one has little control over a broken halyard.

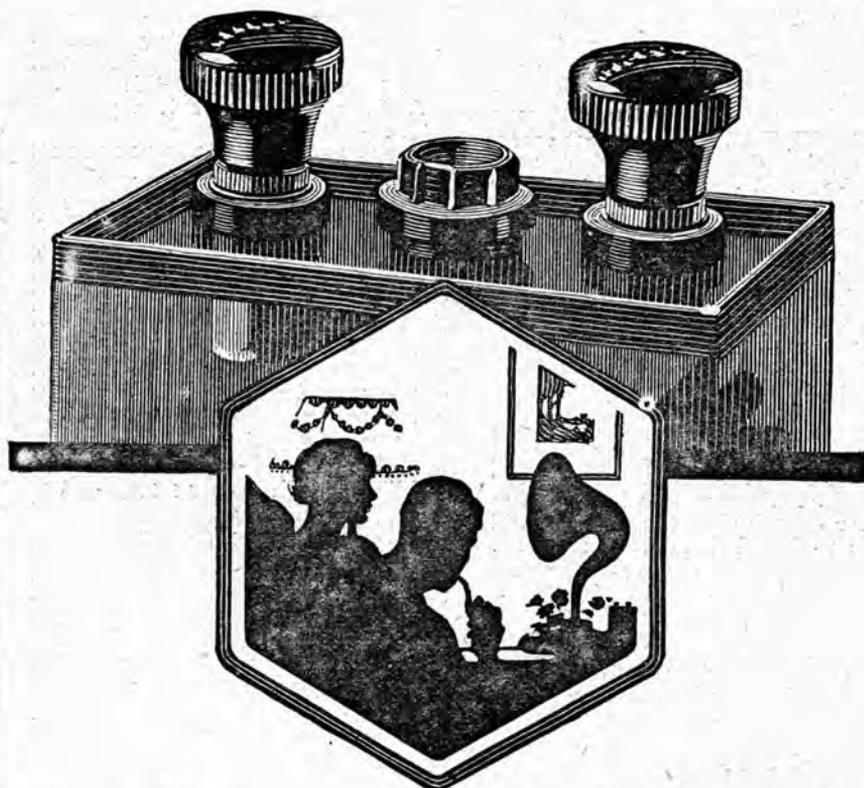
It is best to have either a double or two separate pulleys, with separate halyards, and then, in the event of one breaking, the aerial can be pulled up on the other.

Experimental Advantages.

The double pulley has another advantage from the experimental point of view. The difficulty of comparing two different types of aerials usually lies in the difficulty of quickly changing from the one to the other. The scheme given above makes this a simple matter. Or again, two aerials can be erected, one large one at the top of the mast and a smaller one about half-way up for experimental comparison. A. S. C.

"FROM MY ARMCHAIR."

We regret that owing to pressure upon our space this feature is unavoidably held over this week.



You'll sense the advantages of this new Oldham at once

THINK of all the possible improvements to an Accumulator and you'll find them in this superb new Oldham.

Big coloured terminals which instantly show you correct polarity. Red for positive and black for negative. Terminals that will afford a generous grip.

Then there is the screw-in moulded vent plug. Everyone has experienced the disadvantages of the old-fashioned taper plug which may fall out and permit the acid to spill.

A further refinement about this fine Accumulator is its exceptionally strong case. Best quality celluloid, heavily reinforced where required, and moulded to shape, it is far stronger than is necessary for ordinary use. And finally, most important of all, there are the plates—all made under the Oldham Special Activation Process. Oldham plates last longer, hold their charge better and give an absolutely even output because the Special Activation Process permeates right through the plate. For all its advantages an Oldham costs no more than an ordinary accumulator—an immense demand keeps production costs low.

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ACCUMULATOR TERMINALS

ACCUMULATORS, like most everything else in this world, need attention at times. Seeing that they receive a correct charge and are not discharged too low or left in a discharged condition, is not the only care which is necessary. The terminals must be properly cleaned.

If the terminals are of plain brass the acid of the accumulator will tend to corrode them. This corrosion is due to the acid acting upon the metal and forming a sulphate, which makes contact difficult and will eventually cause the terminal screw to become so fixed that it cannot be unscrewed. It is possible, if the corrosion is allowed to go far enough that the terminal will be so weakened as to break right off.

Keep Accumulators Clean.

These remarks do not apply to lead-covered terminals, unless the coating has worn off.

All accumulator connections should be rubbed bright with fine emery cloth and then given a coating of vaseline. It is as well to also put vaseline on lead-coated terminals and on connecting straps.

Acid should never be allowed to remain on the top of an accumulator

box. It will collect the dust and may also cause a leak between the terminals. Water and a piece of rag will soon remove all dirt of this kind.

A clean accumulator is a pleasure

SOME BROADCASTING ITEMS IN ADVANCE!

Saturday, October 31. 6BM.
Opera by Capt. Featherstone, Herbert Thorpe Enid Cruikshanks.

Saturday, October 31. ZZY.
Sidney Crooke, Vivian Foster, "Vicar of Mirth."

Saturday, October 31. 2BE.
Horace Steven, Grace Ivell, Vivian Worth.

November 6th. 2LO.
Special Guy Fawkes Programme (S.B.).

November 9th. 2LO.
Lord Mayor's Show Special Programme (S.B.).

November 11th. 2LO.
Armistice Day Special Programme (S.B.).

November 12th. 2LO.
Village Concert in the Studio.

November 13th. 2LO.
"Unlucky" Programme.

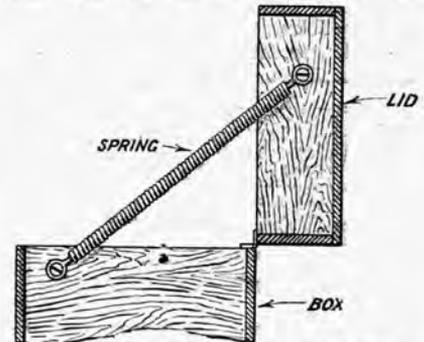
SPECIAL NOTE:—At 2LO, on November 6th, a half-hour will be given from the old opera "Princess Loh," by Walter Tilbury. The composer is coming especially to superintend production. It will be S.B. from London.

to handle, but the sight of a badly-neglected one is very disheartening, and such should never be found in the possession of one who considers himself a real enthusiast.

A. S. C.

DEVICE FOR CABINET LID

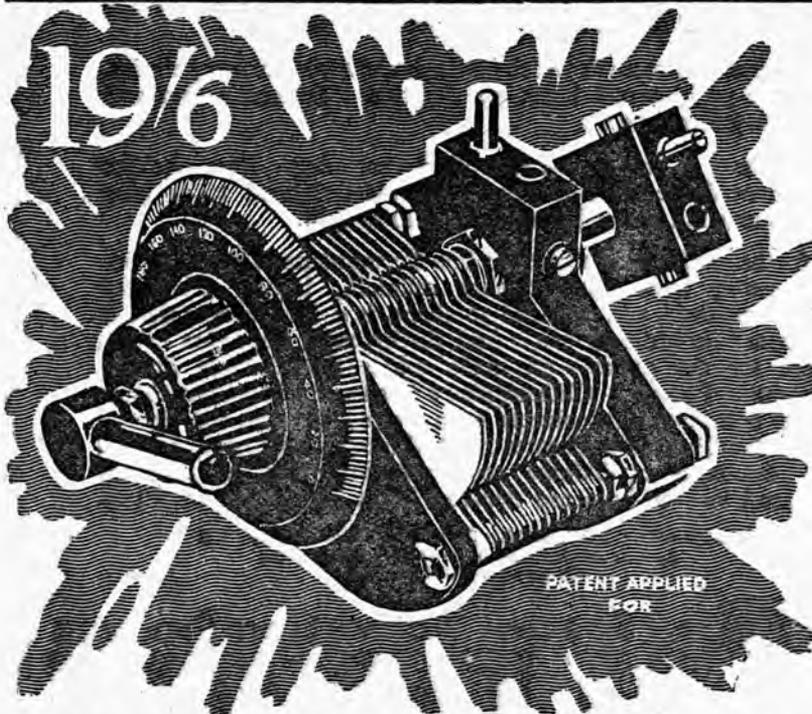
A simple device for preventing the lid of a cabinet from falling backwards is illustrated in the accompanying diagram. All that is necessary is a length of spring. A very suitable spring is a "taut" curtain rod, which is equipped with eyelets at each end. Cut off the desired length and



The spring prevents the lid falling backwards with possible disastrous results.

replace the eyelets at each end. Secure one eyelet to the inside of the cabinet and the other eyelet to the inside of the lid by means of screws, as shown.

F. O. R.



This is the Seamark Connode.

Striking a balance

Tuning your set is very much like balancing a see-saw on a trestle. By bringing up your reaction coil, the balance is upset and the receiver "howls"; then you dash across to the condenser dial and reduce its reading, thereby stopping oscillation. In this way a balance may be struck by alternate adjustments, first on one dial and then on the other.

How much easier it would be to combine these two adjustments on one component, to introduce a balance over our trestle, as it were. The Seamark Connode is the only instrument which does this. It allows reaction or condenser to be increased and decreased until a balance is obtained, without removing the hand from one dial to another.

Moreover, increase of reaction by the coil holder can be obtained in the same direction as increase of capacity is obtained by the condenser. If one adjustment introduces instability, a compensating re-adjustment may be made on the Seamark Connode without even altering the direction in which the hand is moving.

If any difficulty is experienced in obtaining, write direct to the

Sole Patentees and Manufacturers,

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COMPONENTS

All useful and ingenious aids to the set builder. Designed with an expert knowledge of the essential, and combining strength and reliability under the most exacting conditions, they are sought by discriminating radio enthusiasts.

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For use in every wireless circuit. The only terminal on which an ordinary tag can be used. Insert telephones tag and no further adjustment is needed. Box of 6 complete sets, with soldering tags ... **2/3**
(12 for 4/6)

Special non-soldering tags, 2d. each.
Sets of 12 with these tags ... **6/-**

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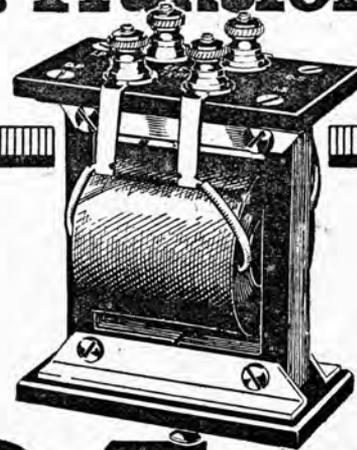
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is the recognised amplification ratio for speech frequencies without distortion. The Efesca Type "C" L.F. Transformer is wound to this ratio and should therefore be employed in multi-valve circuits for the second and subsequent stages of low-frequency amplification.

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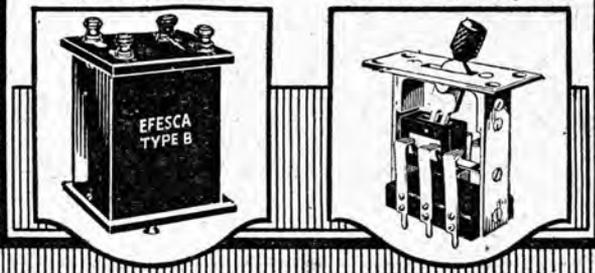
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Efesca Electrical Works,
83-93, FARRINGTON ROAD, LONDON, E.C.1.
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EFESCA TYPE "B" TRANSFORMER, 21/-

EFESCA ANTI-CAPACITY SWITCH, 8/-



Some Readers' Results with "Wireless" Sets

ST100.

SIR.—I have made modifications to my ST100 receiver, in accordance with the details given in No. 1 of WIRELESS, and thought you would like to know of my success. I have up to the time of writing this letter logged no less than 15 stations, including Belfast, Aberdeen, Glasgow, Newcastle, Birmingham, several German stations, Brussels, Toulouse, etc., all in about 30 minutes on September 28. I find the spilt coil of immense benefit, a few turns on a basket former being all-sufficient for reaction purposes. All success to WIRELESS.—Yours faithfully,
London, E. N. B. REEVE.

The Half-Hour Crystal Set.

SIR.—In order to save a 50s. set from being spoilt by my boy, aged nine, I built this set, but even more roughly than described. The immediate results were sufficiently good to justify making it up again a little more neatly and efficiently. Using a 1s. detector and four terminals insulated by ebonite screwed over large holes cut in the board, and with the coil mounted "at the back of the panel" (coil made of 34 turns bell wire wound round a 1-lb. jam jar), the results obtained with two pair of phones were such that I have given my little boy the 50s. set and entirely given up the idea of building a one-valve amplifier!—Yours faithfully,
London, N. BERNARD ELSTON.

Mr. Harris Heard on His "Own" Set!

SIR.—Upon reading through the first issue of WIRELESS I was particularly interested in Mr. Harris's article on the "Half-Hour Crystal Set." I set to work upon the set described, and within twenty minutes I received telephony from the London station through Daventry. This was on Friday evening, and, to my surprise, the talk was from London by Mr. Percy W. Harris about his recent tour in America! Considering the distance from the Daventry station the signals were perfectly good, and the set, although most unpretentious in appearance was extremely successful.—Yours faithfully,
JOHN C. BROWN.

Douglas, Isle of Man.

A Peckham Success.

SIR.—I have made one of the sets described by Mr. Harris in WIRELESS No. 1. I am pleased to say that it is a complete success and I find it considerably louder than a variometer set which I have.
I have in the house a two-valve Reflex set, and, using only one valve, this little set is as loud, if not louder, than the valve.—Yours faithfully,
S. W. WAREHAM.

Peckham, S.E.15.

The MASTER Crystal
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Trade Mark
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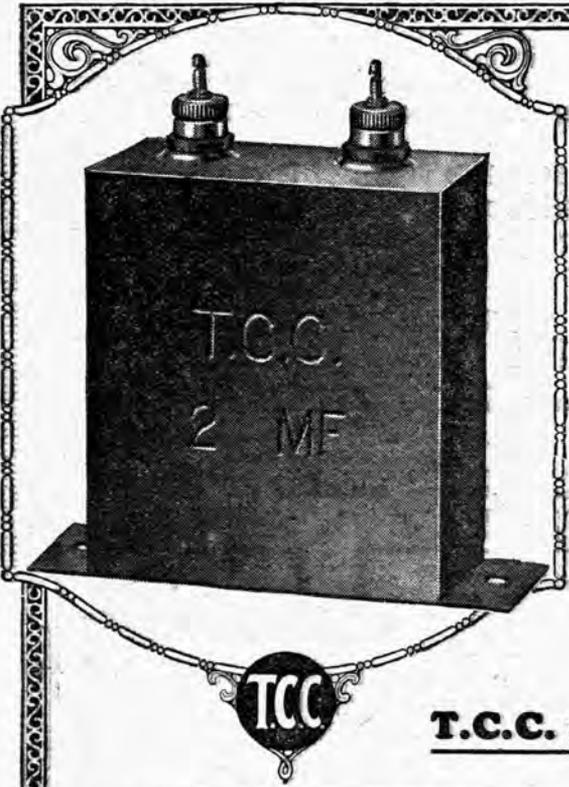
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THE new T.C.C. Mansbridge Condenser—the famous Condenser in the green metal case preferred by radio technicians for its accuracy and constancy—is now fitted with Duplex (patent applied for) terminals. Soldering is optional. If you want to use a quick "hook up" for experimental work you can use the milled heads, and obtain perfect electrical contact. The top of every T.C.C. Mansbridge is now all-metal and is, of course, quite impervious to the heat of the soldering iron or the action of the atmosphere.

T.C.C. Mansbridge Condensers have been made by the million, everywhere they are recognised as the standard fixed condenser for wireless use where a large capacity is required within a small compass.

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Not all variable condensers can be judged by appearance and price alone. It is unlikely that the condensers produced by any but long-established Radio Engineers can be fully efficient.

The "Polar" Junior Condenser.



5/6

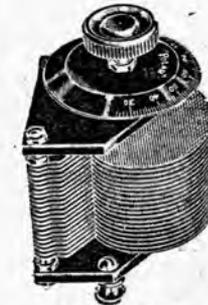
It is, further, unlikely that nondescript, cheaply-assembled condensers will carry anything like the UNCONDITIONAL written GUARANTEE enclosed with every "Polar" Condenser. It is a guarantee against original defects, as well as against breakdown or the development of faults in ordinary use—for a period of ONE YEAR.

All Capacities.

Possesses all the characteristics of the well-known Polar "Straight-Line-Frequency" condenser. Gives a straight line of frequencies, with an approximately even movement of dial in relation to change of wavelength. Low minimum self-capacity; one-hole fixing; 300 degrees dial; perfectly screened; remarkably compact; occupying minimum space behind panel.

All constructors of Radio Sets have an appreciation of quality in appearance, as well as of quality in performance; yet not all are equally able to indulge in the expensive class of components. For this reason, we have introduced the "Polar" Junior Condenser, at a price of 5/6 for all capacities—putting a product of high quality (backed by a great reputation) within the reach of all.

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The "Polar" Cam-Vernier Variable Condenser.

Compensated square-law design of vanes; this means that the Condenser functions in the square-law manner, not on the bench, but on your set. Its shape of vanes compensates for the inherent self-capacity of your coils and aerial, with the result that the figures on the dial indicate definite wavelengths. You can recognise the Cam-Vernier Variable Condenser, if by nothing else, by the specially engraved dial which commences at "20"—recognising that no aerial tuning system can have a zero capacity. It embodies the well-known Cam-Vernier device, giving 10 degrees of vernier movement in any position; and the vernier readings register on the dial.

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Sold by all reputable Radio Dealers. Ask your Dealer, or write to us, for the Polar Condenser Booklet.

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Find plates guaranteed hand polished ebonite free of surface leakage and of low dielectric loss. The maximum capacity is guaranteed. A very low minimum capacity. Negligible losses 0.05 ohms. Specially designed spacers. Precision spindle and bearings giving a delightfully smooth movement to the centre vanes.

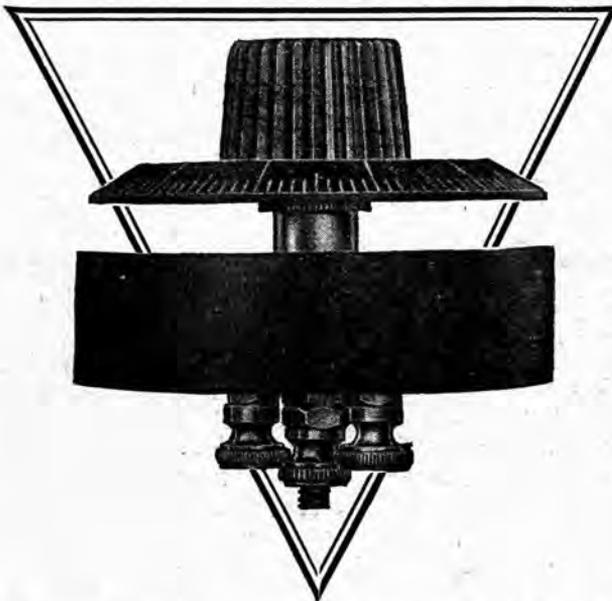
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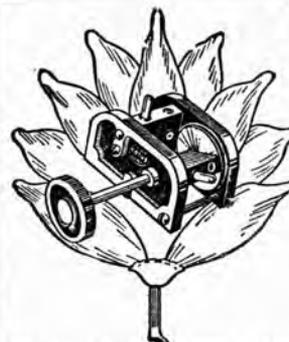
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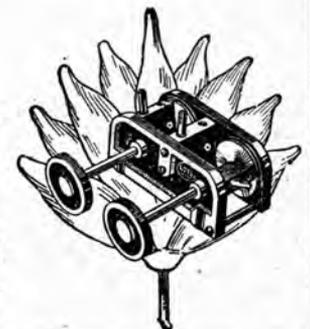
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THE "LOTUS" cut geared Vernier Coil-Holders are fitted with Vernier movement actuated by three sets of encased precision cut gears representing a reduction of 8 to 1.



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Made from Bake-lite Mouldings with Nickel-Plated Parts.

Retail Selling Prices:

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With six-inch handle for inside mounting

Two-way - - - 1/- extra.
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THE WIRELESS EXHIBITION



Making and testing fixed condensers at the Exhibition.

THE opening day of the Wireless Exhibition was marked with scenes of great enthusiasm by the general public, and when we arrived on the scene on Saturday it was only to find some of the gangways almost completely blocked with interested sightseers. There were exhibits of interest to all classes of radio enthusiasts, from the humblest of crystal users up to the owners of multi-valve sets.

Loud-Speakers.

Loud-speakers, valves, condensers, coils and many other components of all conceivable shapes and sizes were to be seen, some absolutely new to the already existing field of radio products.

In loud-speakers, what was probably the most imposing show was exhibited by Messrs. Western Electric Co., Ltd., and this consisted of a demonstration of their latest model, the "Kone." The demonstration was given in an elevated position, and from this source the majority of the music was provided. A very large Kone and two smaller models were arranged in a particularly handsome framework, illuminated very well on all sides, and



The "Repecco" Coil was exhibited for the first time and our photograph shows a giant model.

incorporated in a receiver, the whole forming a decorative asset to any room.

Messrs. S. G. Brown, Ltd., had exhibited on their stall a complete range



The "M.P.A. Celestion" Loud-Speaker.

of all their popular makes of loud-speakers, among others the new "Crystavox," with which it is claimed possible to get good loud-speaker reception on a crystal set.

The "Daily News" Fund.

In wending our way round the exhibition, we were constantly meeting girls in fancy dress, who were collecting on behalf of the *Daily News* appeal for hospitals.

Demonstrations were by no means lacking, and a very attractive show was arranged by Messrs. Sel-Ezi Wireless Supply Co. Here was exhibited the process of grading mica for making "Therla" fixed condensers.

Super-Heterodyne Components.

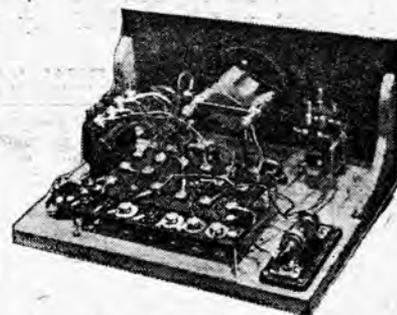
Messrs. Igranic Electrical Co., Ltd., held one of the largest stalls, and exhibited a comprehensive range of good quality components. Of special

For the benefit of readers who were unable to visit the Exhibition at the Horticultural Hall, we give below a brief report upon some of the exhibits.

generally it proved a source of great attraction to visitors.

Messrs. C. F. Elwell exhibited something entirely new in loud-speakers. It is known commercially as the "Statophone." This loud-speaker, it is claimed, will respond to the very weakest of signals, and it has for a diaphragm a very thin sheet of mica. The finished instrument is

interest to the home constructor could be seen a complete set of parts for making a six-valve supersonic heterodyne



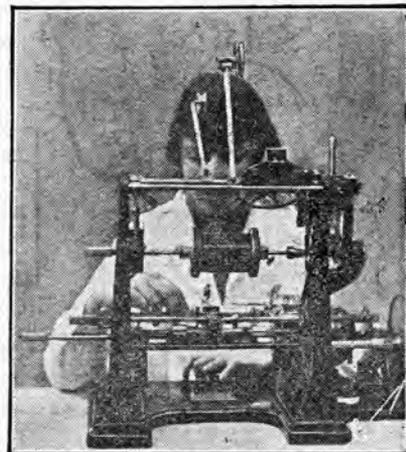
One of the exhibits was a receiver connected up by means of "Newey" Snap terminals.

receiver, which included a specially designed Igranic self-stabilising reactance unit.

Another entirely new component was the Eureka reflex transformer, exhibited by Messrs. Portable Utilities Co., Ltd., which is claimed by the makers to be ideal for reflex work.

Cabinet Work.

A particularly good example of careful workmanship was shown in the new "M.P.A. Celestion" loud-speaker, exhibited by Messrs. M.P.A., Ltd. The instrument is built in a beautiful mahogany cabinet, and it is claimed that with this model perfect reproduction is possible.



Another demonstration given at the Exhibition was the winding of L.F. transformers.

SNAKE COILS

Coils with a guaranteed Wavelength.



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A perfect and efficient coil with no loose ends to interfere with reception. Each wire is airtight—giving low self-capacity and low absorption factor. Highest possible efficiency at a reasonable price.

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Wave lengths with '0005 Mfds. Condenser in Parallel. Passed and approved by National Physical Lab.

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35	115 to	475 Metres
56	250 "	700 "
80	400 "	1,000 "
92	625 "	1,450 "
105	950 "	2,000 "

These Wave Lengths are Guaranteed.

If your dealer does not stock, a complete set of five coils will be sent, post free, for 5/6. Special Daventry Aerial Coils, 1,600 metres, 2/- Ditto Reaction, 2/6 Snake Adapters .. 1/6 each 3/- per pair

Manufactured by **THE LONDON WIRELESS CO.,** London Road, Liverpool. Trade enquiries invited.



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at prices and quality that will compete with any other Phones on the world's market, be they of British or foreign manufacture.

BONTONE ORIGINALS 11/6

BONTONE LIGHTWEIGHTS 12/6

Post Free.

We guarantee to forward by return of post. We guarantee to replace if phones do not give entire satisfaction and same are returned to us within 10 days of purchase undamaged.

SPECIFICATION.—Simple adjusted, comfortable and highly polished "featherweight" Headbands. Specially designed permanent magnets. Perfectly matched coils, wound to a total resistance of 4,000 Ohms. Best quality 5 ft. 6 in. cords, serrated Swedish Iron Pole Pieces, beautifully polished Trolite Earcaps.

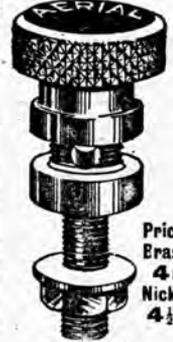
Remember, that behind this offer is the name of BONTONE, with a sale exceeding 100,000 Phones. Better value than the above cannot be obtained at double their purchase price.

BONTONE PHONES may be obtained from all Radio Stores, or direct from the actual manufacturers.

B. D. & CO. (ED. A. BOYNTON), Admiralty & War Office Contractors, 167-173, GOSWELL ROAD, LONDON, E.C.1.

Internal Metal Chuck to grip 14 to 44 gauge wire or flex. Price: Plug 4d. Socket 2d. Indicating Ring 1d.

"BELLING-LEE" INDICATING TERMINALS & "MULTY-KONTACT" PLUGS & SOCKETS



Price: Brass 4d. Nickel 4 1/2d.



(Handles and dome-shaped Indicating Rings in Red or Black) Stocked in the following indications:

Aerial, Earth, Phones +, Phones -, L.T. +, L.T. -, H.T. +, H.T. -, Input +, Input -, Output +, Output -, L. S. +, L. S. -, Grid +, Grid -, A. T. I., Reaction, Ap. Aerial, H. T. Medium, and Blanks.

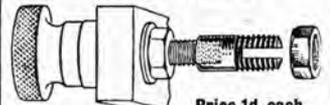
DIAL INDICATORS



Solid cast metal, with raised, polished letters showing white on a black background. Single hole fixing, complete with nut. Stocked in Tuner, Filament, Reaction, Aerial, Anode, H. F. Tuner, Secondary, Rejector.

Price - 6d. each.

SUB-CONNECTORS Eliminate Soldering.



Price 1d. each.

Perfect connection; lowest possible self-capacity; low resistance; connection changed in an instant. Tapped to screw on to 2, 4, 5 and 6 B. A. threads; also T connectors for joining wires.

Every high-class dealer stocks them, but in case of difficulty send to **BELLING & LEE, LTD.,** Queensway Works, Ponder's End, Midx.



An Interchangeable Fixed Condenser.

THE "K" TUBULAR FIXED CONDENSER

has simplified the method of changing circuits on the same experimental panel. Only the clips fix to the panel, and then capacities can be snapped in or out in a few seconds.

How different to the old method of changing a Fixed Condenser and having to work behind the panel with a screwdriver and soldering iron.

Send at once for our New Illustrated Free Catalogue, giving particulars of this and many other of our Specialities.

PRICES:

'0002	} 1/9 each
'0003	
'0005	
'001	} 2/- each
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'003	
'006	} 2/6 each

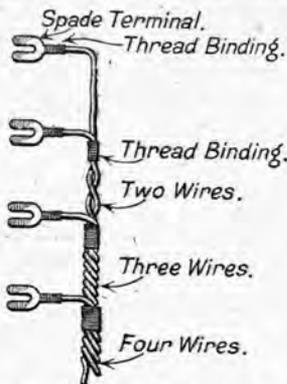
WATERS BROS., LIMITED

Head Office: 12/14, Gt. Queen St., Kingsway, W.C.2
Phone: Gerrard 575-576. Grams: "Zywateseng, Westcent." Works: LONDON and BIRMINGHAM

A LEAD FOR BATTERY CONNECTIONS

THE appearance of a receiver may be greatly enhanced if the leads which connect it with the batteries are neatly made.

The best wire to use is ordinary electric light flex, its appearance, mechanical strength, and insulation



By using lighting flex quite a neat battery lead can be made.

being fairly good. Being sold with two wires laid round each other, it is best to first unravel these, taking care that the curl in the wire is not stretched out.

First roughly measure off the required lengths of wire, and to one end of each attach a spade terminal. When this has been done, pull the silk braiding over the shank of the spade terminal, and bind it there with a length of thin thread. The binding thread may be of different colours to indicate each lead.

Now attach the leads to the receiver terminals in their respective order and arrange them neatly in the required position. An example is shown in the accompanying figure. Next lay the wires round one another, the curl in each wire fitting in the curl of the next.

Then bind each lead into the main cable with strong thread, as shown. The battery ends may be arranged in the same manner.

W. H. F.

CATALOGUES RECEIVED

We have received an interesting little catalogue from the Climax Radio Electric, Ltd., of Quill Works, Putney, London, S.W.15.

It is entitled "The Magazine Catalogue, 1925-26 Edition," and is a new departure in Radio catalogues.

The combination of publicity for their products, together with articles by several authors, is well carried out.

Though priced at 1s., readers of WIRELESS may obtain a copy post free.



Soft and Silky Movement

brought about by a worm and pinion action, together with a compensating spring to take the weight of the moving coil, makes the L. & P. coil-holder the finest on the market.

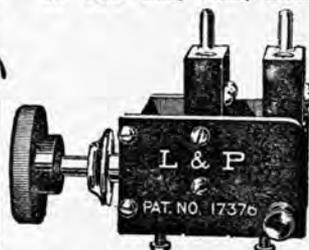
That fraction of a movement so needful for logging distant stations can be given to your coil with this infinitely fine tuning device.

Do not buy a coil-holder of any description until you have sent for our Booklet. From all Good Dealers or write at once for list. Sent free on request.

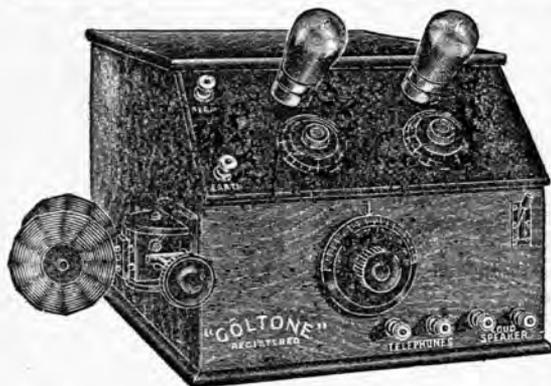
LONDON & PROVINCIAL RADIO COMPANY LTD.
37, Colne Lane, Colne, Lancs.



L. & P. Coil-holder now reduced to **8/6**



Other leading "Eliante" Lines.—L. & P. Valve Windows enhance the appearance of any set. Small size 2½d. each. Large size 3½d. each. L. & P. Miniature Switches, D.P.D.T., 1/6 each. L. & P. Pull and Push Switch—positive action, positive satisfaction—only 2/- each.



"GOLSTONE" (Regd.) BRITISH MADE RECEIVING SETS & COMPONENTS

THE Set illustrated is our "Type B, TWO VALVE RECEIVER," eminently suitable for Loud Speaker reception within a radius of approximately 50 miles.

Fitted in polished Oak Cabinet providing separate compartment for the Batteries and ample space on top of Panel for Loud Speaker.

Designed for reception on any Wave Length. Price includes 5 Plug-in Coils covering all the British Broadcasting Wavelengths, including "DAVENTRY."

£6 : 12 : 6. Plus Marconi Fees, 25/-.

Send for Catalogue W/112 illustrating an extensive range of Crystal and Multi-Valve Receivers and Radio Components, free on request. Dealers should enclose Business Card for special Trade Terms and Discounts.

HIGH TENSION WANDER PLUGS

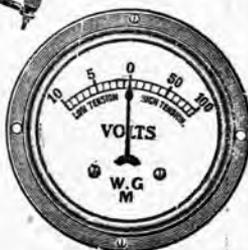
EASIFIX RADIO ASSEMBLIES

For connecting to the High and Low Tension and Grid Bias Batteries. Eliminates all ugly loose wiring and minimises the risk of burning out valves. Each conductor is distinctively coloured and enclosed within an outer braiding. Complete with Wander Plugs.

PRICES:	4 Ways ..	3/-
	5 " ..	4/-
	6 " ..	5/6
	7 " ..	6/6

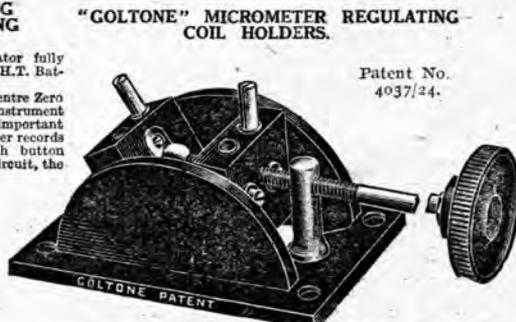
64 IN LONG OVERALL

TO HIGH & LOW TENSION PANEL TERMINALS.



"GOLSTONE" DOUBLE READING CENTRE ZERO PANEL MOUNTING VOLTMETER Patent applied.

Is your Accumulator fully charged? Is your H.T. Battery run down? The "Golstone" Centre Zero Panel Mounting Instrument answers these important questions. The meter records by pressing a push button connected in the circuit, the state of your high and low tension batteries. Price 12/9 each. Two panel mounting push buttons for use with above. Price 1/6 pair. To ensure the genuine instrument insist on our initials or Trade Mark on dial



"GOLSTONE" MICROMETER REGULATING COIL HOLDERS. Patent No. 4037/24.

Excellent design. Recommended by the leading experimenters. Enables fine and accurate tuning, considerably increasing the selectivity and reliability of the receiving set.

TWO COIL TYPE, 7/-, THREE COIL TYPE, 10/6. These lines are stocked by the leading Radio Stores. Write direct if unobtainable.

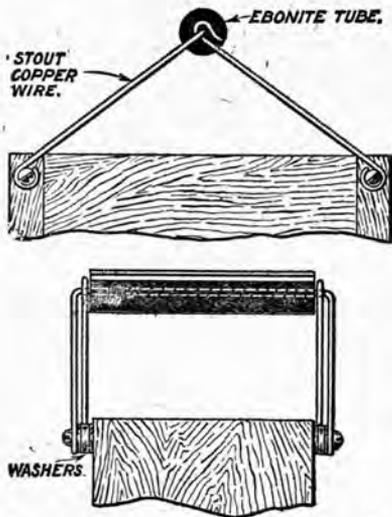


To ensure satisfaction insist on the Trade Mark being on box.

Address all Communications to — Head Office & Works .. PENDLETON, MANCHESTER. Stocks also held at Glasgow Depot, 95, FITT STREET.

A Carrying Handle for Accumulators

An efficient battery box carrying handle may be made from some stout



The method of securing the handle is extremely simple.

copper wire about 1/8 in. dia., a length of ebonite tubing and screws, etc. Details of construction are shown in the diagram. The dimensions, of

course, are made to comply with the size of the battery box.

First cut off a piece of ebonite tube equal in length to the length of the box. Pass through the centre of the tube a length of copper wire and bend over each side as shown. At each extremity of the copper bar form an eye. Secure to the sides of the box by means of stout screws, having first interposed a spacer washer and friction washers, as shown, to allow for clearance of the other handle. To complete, take two lengths of copper rod, bend an eye at one end of each, the other end of each rod being made to form a hook. Each eyeletted end is secured to the box sides by means of screws, a friction washer only being interposed. The hooked ends catch into the handle side as shown for carrying purposes. When not in use, both sides drop flush with the sides of the box. F. O. R.

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 "Reorganising British Broadcasting"
 Exclusive to "Wireless."
OUT NEXT TUESDAY.

Is Daventry Calling?

For perfect Crystal reception see that your set is fitted with the

'HERBO' PATENT KITTENWHISKER

Obtainable from all good Wireless Dealers, or post free 6d. postal order, from the actual makers and Patentees—

HERBERT BOWYER & CO.,
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When ordering please state whether enclosed or open Detector.

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REPRESENTATIVES with good connection amongst Factors and Dealers Wanted all districts. High-class lines, commission basis exclusively, only first-class men need apply. Send particulars to—Box J. 10, Bertram Day's Advertising Offices, 9-10, Charing Cross, S.W.1.

EBONITE PANELS

Every Panel stamped & guaranteed. Matt finish 3/8" thick 3/4 d. for 2 sq. inch.

1/2" d. " 1 " " "

Post. and Pack. 6d. Any circuit drilled 9d.

Cabinets and Component Parts Quoted For on Application.

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CABINETS

SENT ON APPROVAL

Beautifully Polished Mahogany

For 12 x 12 Panel... 45/-

.. 12 x 15 .. 55/-

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Estimates and Lists free—Send Sizes!

Panels Drilled and Engraved

Pickett Brothers (W.P.) Works, Bexleyheath, S.E.

Model de Luxe Polished

Accessories Post Free

Quality RADIO

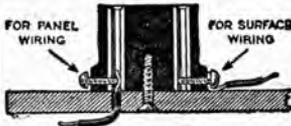
COIL HOLDERS & COMPONENTS

GAM VERNIER

2-coil holder, 9/-; with reaction reverse switch, 12/6

Postage 4d.

Pat. No. 231,251.



LEGLESS VALVE HOLDERS

Is fixed by a single screw in centre, the holder itself acts as a jig for drilling the holes for panel wiring. For surface wiring clamp the wires under the heads of screws. Has safety insulated plate socket.

(Prov. Prot'd.)

PRICE 1/6 each, postage 2d.



BASKET COIL HOLDER

1/3 postage 2d.

If your dealer has not got them we send post free if you mention his name and address. LIST POST FREE.

GOSWELL ENGINEERING CO., Ltd.,
 95/98, WHITE LION STREET, LONDON, N.1.

LIBERAL TRADE TERMS.

Phone: North 3051.

The Curtis Constant-Tuned H.F. (Aperiodic) Amplifier eliminates the potentiometer—all the tendency to self-oscillate and guarantees absolute stability with maximum Radio efficiency. Indispensable for maximum Efficiency and Purity of Reproduction, with all High Frequency and Super-Heterodyne Circuits.

CURTIS CONSTANT TUNED 800-3000 H.F. AMPLIFIER

USED IN THE FAMOUS DUODYNE RECEIVERS

PRICES

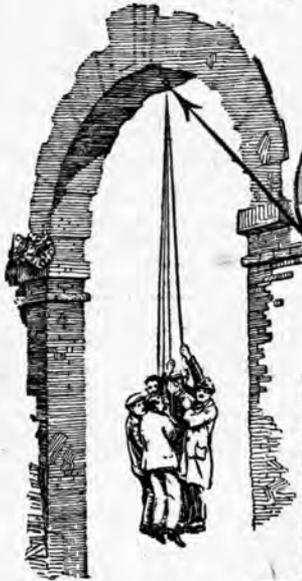
Type A. 250 to 800 Metres. Price 15/-
 Type B. 800 to 3,000 Metres. Price 17/6
 Type C. 2,000 to 7,000 Metres. Price 18/6

PETER CURTIS, LTD. 75, Camden Rd., N.W.1

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Five Men held by one No 14 Rawlplug



THIS experiment illustrates the remarkable strain which a Rawlplug can withstand; due to the fact that Rawlplugs grip inside the wall like a vice. In every household there are 100 uses for Rawlplugs—use them to fix hooks, cupboards, bath fittings, etc., and they will remain securely and permanently fixed to your wall whatever the material—brick, plaster, stone, marble or tile.

Builders, Electricians, Engineers, etc., use millions of Rawlplugs a year, and you, too, should have an outfit in the house. No special skill required. **BUY ONE TO-DAY FROM YOUR IRONMONGER, ELECTRICIAN OR STORES.**

Rawlplugs are made to suit all sizes of screws, from 3 to 28.



This actual test witnessed and certified by Sir Banister Fletcher, F.R.I.B.A., F.S.I.

Household Outfit ... 3/6
Amateur Mechanic's Outfit ... 5/6

THE RAWLPLUG CO., LTD., Cromwell Rd., London, S.W.7.

THE PANEL

DE LUXE



THE advantage that a Radion Panel confers on a Receiving Set is much more than merely adding a gold case to a watch. Rather, is it comparable to the addition of that delicate compensating balance wheel mechanism which ensures split-second accuracy. If you aim at 100 per cent. efficiency for your Set you'll naturally start with a Radion Panel. With dials to match.

Radion is available in 21 different sizes in black and mahogany. Radion can also be supplied in any special size. Black 1d. per square inch, mahogany 1 1/2d. per square inch.

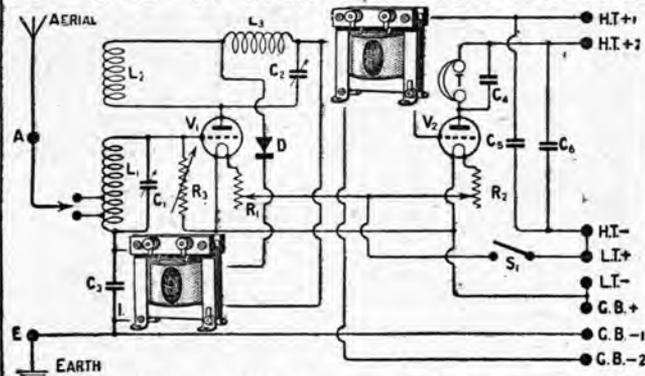
RADION

American Hard Rubber Company (Britain) Ltd.

Head Office: 13a Fore Street, London, E.C. 2
Depots: 120 Wellington Street, Glasgow, 116 Snow Hill, Birmingham.
Irish Agents: 8 Corporation Street, Belfast.

Gilbert Ad. 3758

PUT U.S. IN YOUR NEW ST100 RECEIVER



The RADIO PRESS and the U.S. SUPER



Read below what "Modern Wireless" reports after careful and stringent tests made with the U.S. Transformer.

"The design has been carefully thought out, and really comfortably large and accessible terminals are fitted. The favourable impression given by a first inspection was borne out in actual test. The build-up recorded with this Transformer compared very favourably with that obtained with other standard patterns under identical conditions, whilst the tone was comparable to the best of the others. The present instrument can be heartily recommended, and indicates the vast strides that have been made recently in the design of L.F. Transformers.

British Made and Guaranteed. Supplied in two models. Ratio 3-1. Ratio 3-1.
Price 1 1/6 from all dealers or direct from the manufacturers.

Put U.S. Transformers in your set and guarantee maximum magnification without distortion.

U.S. RADIO COMPANY LTD., (Dent. W.2.), Radio Works, Tyrwhitt Road, Brookley, S.E.4.
Phone: Lee Green 2404. Wires: Supertran, Lewis, London.



THOSE who have not tried a "6-60" have yet a great deal to learn of purity of reproduction and volume.

The Molybdenum-Thorium filament of this remarkable valve and the special construction of grid give Volume without distortion, so that the Valve can be worked always under ideal conditions. The "6-60" is a sensitive detector, as well as a high-efficiency amplifier. The Ideal Loud Speaker Valve.

Molybdenum and Thorium used for the filament of the "6-60" give remarkably High Electron Emission. Filament volts 1.5-2. Filament current 0.3 amps.

"6-60" works at low temperature—this means long life for filament and low current consumption.

Write for interesting literature giving full particulars of this amazing Valve, and testimonials, which will be a revelation to you.

PRICE 14/-

SIX-SIXTY

AMPLIFYING & RECTIFYING

VALVES

Your dealer can supply. In case of difficulty, write the Makers.

THE ELECTRON Co., Ltd., Triumph House, Regent St., London, W

The 'Polar' Cam - Vernier Coil-holder

No more useful or more popular device has been introduced for the simplification of fine tuning than the "Polar," the original Cam-Vernier Coil Holder. Permits 10 degrees of vernier control at any portion of the movement, in either direction. Adjustable tension. Best ebonite, nickelled fittings, locking device for positive drive.

This illustrates the Polar Junior Cam-Vernier Coil-Holder. Two-way pattern obtainable for either right or left-hand drive.

Thousands of satisfied users.

2-way **6/-** 3-way **9/6**

Sold by all reputable Radio Dealers. In case you have difficulty in obtaining, write to—

RADIO COMMUNICATION CO., Ltd.
34-35, Norfolk St., Strand, London, W.C.2.



From **15/-** deposit and easy payment terms.

DUNHAM famous WIRELESS RECEIVERS may now be purchased on the easiest of easy payment terms, and you would be well advised to send two penny stamps for twelve-page illustrated catalogue. Established since the advent of broadcasting, and members of the B.B.C. since its inauguration, Dunham receivers are world renowned for their great efficiency.

The set illustrated is the three-valve cabinet receiver with loud-speaker range of from 350 to 450 miles, and there are thirteen other sets to choose from at all prices to suit YOUR pocket.

C. S. DUNHAM, Radio Engineer
(Late of Marconi Sc. Inst. Co.),
Enquiry B Dept.
234-6, BRIXTON HILL, LONDON, S.W.2

THE NEW TANDCO PLUG-IN COILS.

The most efficient known type of air spaced windings, correctly calibrated and enclosed in neat fibre cases of uniform diameter, 2 1/2 inches, mounted on wedge block, with plated fittings, are among features which place this coil ahead of all others regardless of price.

SUPREME FOR EFFICIENCY, NEATNESS and STRENGTH.

Size	Price s. d.	Size	Price s. d.
25 ..	2 6	150 ..	3 11
35 ..	2 6	175 ..	4 2
50 ..	2 7	200 ..	4 4
60 ..	2 8	225 ..	4 5
75 ..	2 9	250 ..	4 6
100 ..	3 6	300 ..	4 9
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Patents Pending

TRY THEM AT ONCE! YOU WILL USE NO OTHER!

From most dealers or direct by enclosing nearest dealer's address, postage free.

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"SCIENTIFICO" LOW LOSS SQUARE LAW CONDENSERS.
ONE-HOLE FIXING
As illustrated on with EBONITE END PLATES.

PRICES:

Maximum Capacity.	Without Vernier.	With Vernier.
.0001 mt. ..	7/8	11/9
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.0002 mt. ..	3/8	8/-
5-pl. vernier ..	3/-	—
3-pl. vernier ..	2/3	—

"SCIENTIFICO" VALVE HOLDERS, Flush Type.
With Terminals ... 1/-
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Bracket Type, one-hole fixing for upright panels..... 1/-
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SCIENTIFICO SUPPLY STORES, 125, Newington Causeway, London, S.E.1. Branches: 80, Newington Causeway, S.E.1.; 7, St. George's Circus, S.E.1.; 16, Manette St., Charing Cross Rd., W.1.; 291, Edgware Rd., W.2.; 84, Church Rd., Upper Norwood, S.E.23. Phone: HOP 4177.

Here's the better Fixed Condenser you're looking for!

RIGHT along you've wished for a better fixed condenser, and now, at last, such an instrument is obtainable. The Efficient Watmel is my name—a better fixed condenser, superior in all the points that make for highest efficiency. Witness my Test Report, it speaks for itself. Next time you're at your dealer's, ask to see me. Close examination will decide you that I'm the fixed condenser you've been looking for.

PRICES:
Capacities for Standard Grid Condensers.
.0005 to .0005 .. 2/6 each
Standard Fixed Condensers.
.002 to .001 .. 2/6 each
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The Watmel Wireless Co., Ltd.
332a, GOSWELL ROAD, LONDON, E.C.1.
Agent for Lancashire and Cheshire—Mr. J. B. LEVIE, 23, Hartley St., Levens (near), MANCHESTER.

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Compare the price with any other British-made High-Grade Valves. Have you seen the curves in our booklet?

A user writes: "I am really amazed at the result, they are the best valves I have yet come across. Let me thank you for executing my order so quickly, and when I require any more valves I will certainly send to Radions Ltd."

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Send for our booklet: it describes valves, repair service, and gives useful hints. It's free. Write to-day.

RADION
Reliable Valves

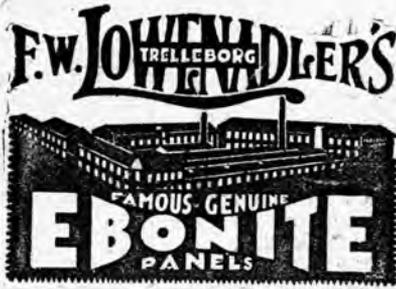
ELECTRADIX RADIOS

Have opened a large City Showroom at 218, UPPER THAMES STREET, E.C.4, and are selling an enormous stock of Radio and Electrical Goods of the highest grade—Marconi, Siemens, Sullivan, Brown, Western Electric, at bargain prices. Send 4d. for illustrated catalogue and price list. The Stores at 9, Colonial Avenue, Minorities, contain tons of goods at sacrifice prices to save removal. Callers only. Telephone: Avenue 4166.

"NEW WESTERN ELECTRIC LOUD SPEAKERS."
Complete with Cord in Makers' Sealed Carton, 20/- Cheaper than elsewhere.
4,000 ohms .. 22/6 2,000 ohms .. 20/- 70 ohms .. 17/6

"THE CATALOGUE THAT SAVES YOU POUNDS"
Its scope ranges from a 5s. pair of British Headphones or a 12s. 6d. Milliammeter to a 30,000 volt Generator, and covers all requirements. If you cannot call and inspect goods in our showrooms between 9 a.m. and 6 p.m. it will pay you to send 4d. for our Catalogue at once. Goods promptly despatched all over the world.

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218, Upper Thames Street, London, E.C.4.; 9, Colonial Avenue, E.1.
Phones: City 191. Avenue 4166.
Address all Post Orders to City Showroom: 218, Upper Thames Street, E.C.4



"EDWARDS" SAFETY ACCUMULATORS.

Always Clean and Dry. No Spilling, Gassing or Creeping, EVEN WHEN CHARGING.

ORDINARY SIZES AND PRICES.

Ideal for Wireless Sets.

ROWLAND EDWARDS & CO., Ltd.
317, High Holborn, London, W.C.1.

The Home for Your Wireless Set!

MORRIS SOLID OAK STANDARD CABINET WITH LOCKS,

to lock up any set and batteries with panel up to 36" x 18"

Sent on approval Trade supplied

Price carriage paid and packing free:

22" wide inside £4 15

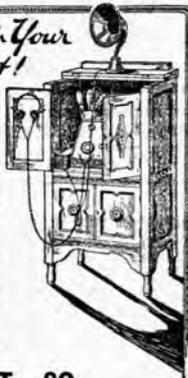
25" " " £5 0

25" model de luxe £5 15

36" " " £8 0

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THE HIGHER YOU GO THE FEWER

valves you require. Write for my catalogue of the lightest, strongest and cheapest **STEEL MASTS** in the world.

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"LIBERTY" PERMANENT DETECTOR
Stops fiddling with cut-whiskers. The Original 1-Hole Fixing Detector.

Refuse inferior imitations. Insist on seeing the name 'Liberty.'
Loud reception permanently, no hunting for that "special" spot, lost by the slightest vibration. The "Liberty" is entirely unaffected by vibration. 1 Hole fixing, clips or connecting to existing detector terminals thus:



50% more efficiency
50% lower price

"THE" 100% DETECTOR

Price 3/6 complete

From all up-to-date Wireless Dealers, or Manufacturers,
RADIARC ELECTRICAL CO., Ltd., Bennett St., London, W.4.

The parts for the Four Valve Family Set shown cost only £6 : 8 : 3. Other Pilot Sets are equally economical

George Williams builds his first Set



LAST week-end I took a run over to see George Williams at his little cottage down in Surrey. A fine old-world place—300 years old, if a day—set in the most wonderful country surroundings. The cosiest house you ever saw—big Elizabethan fireplaces, timbered ceilings, panelled walls, winding staircases, massive oak doors and so forth.

"Hullo, old chap, you are just in time," he said, "to hear this 5-valve Set I have been building." "I didn't know that wireless was one of your hobbies," I replied. "Well, to tell you the truth," he answered, "it wasn't—until last week." "You don't mean to say that you have built up this Set within a week and without knowing anything about wireless?" I asked in amazement, for the Set which George showed me would have been a credit to any wireless expert. "Yes," he said, "eight days ago I couldn't tell a rheostat from a condenser. Of course, you know

that I was never much of a mechanic, and I'm really indebted to my young nephew for this," he said, proudly fondling a magnificent multi-valve Receiver resplendent with its dials and switches. "I thought there was a catch in it somewhere," I said laughingly, "you mean that your nephew really built it and not you." George was most indignant. "No," said he, "my nephew merely put me on the easiest way for a duffer like me to build a good Set. He sent me a copy of a little book called the "Pilot Manual," which told me all about it." And then George explained to me what a splendid idea this Pilot scheme was. How the parts for any well-known Set are all supplied ready to fit together on the panel—how it is really only a matter of assembly and wiring up. I'm sure that if George can build up a 5-valve Transatlantic I can. Anyway, I'm sending for a copy of the "Pilot Manual" to-morrow.

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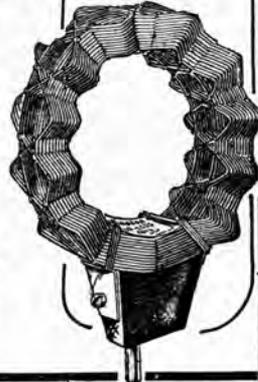
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