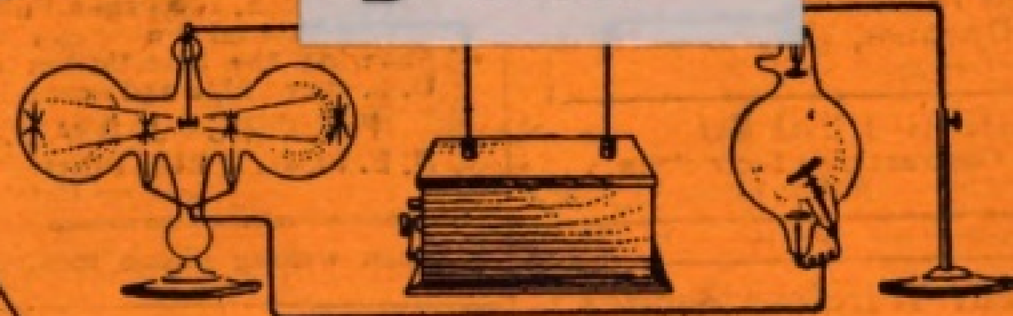
PRICE 10 CENTS

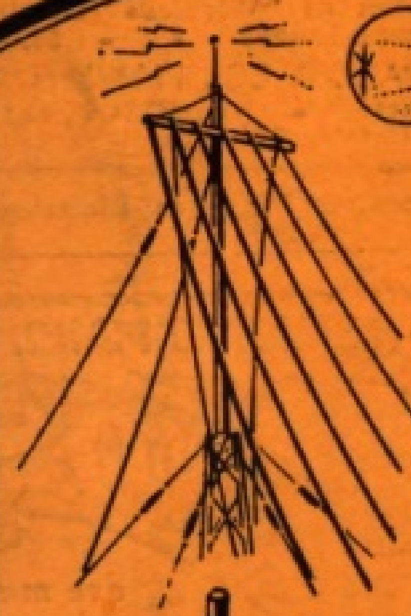
OCTOBER, 1909

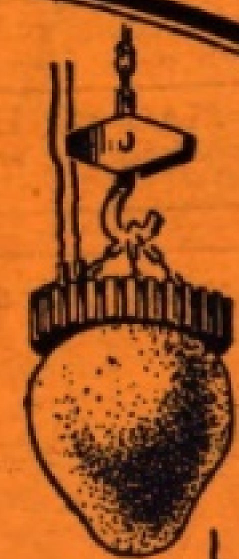
Vol. II.

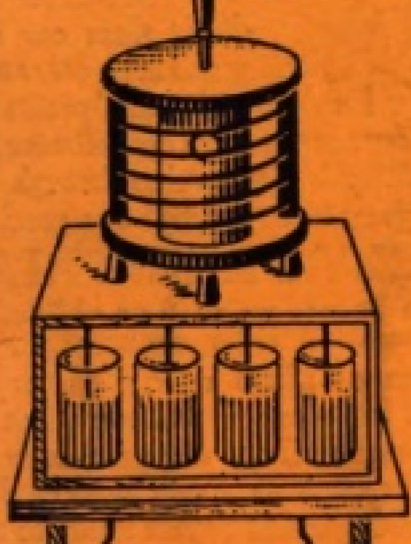
No. 7

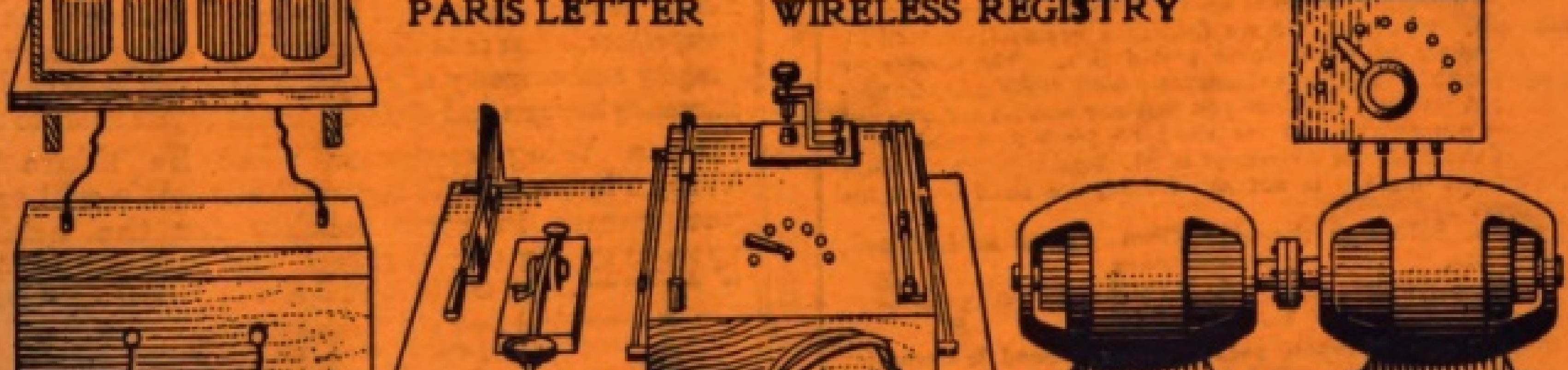
MODERN ELECTRICS



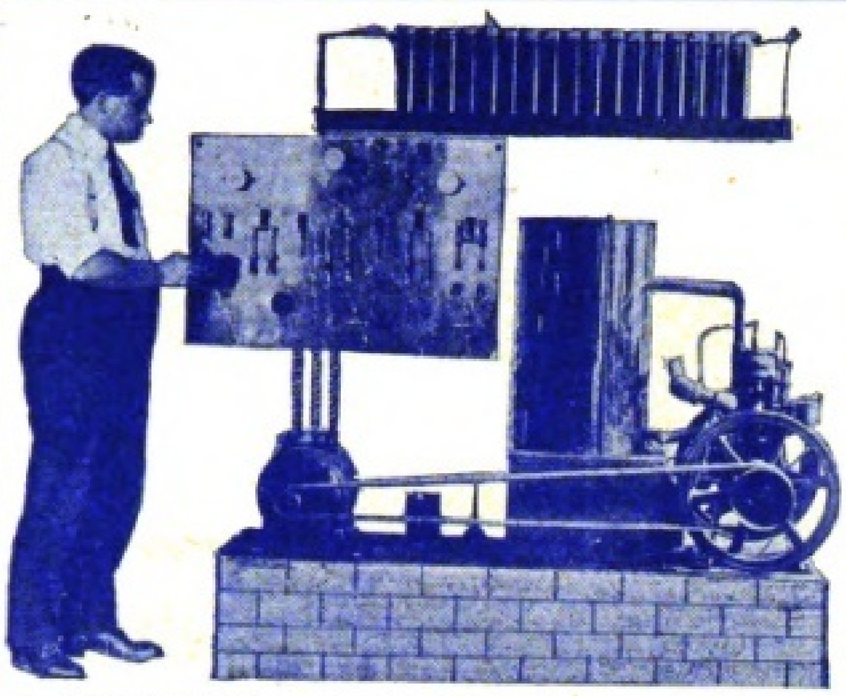








"THE ELECTRICAL MAGAZINE FOR EVERYBODY"



COMPLETE Electric Lighting Plants, consisting of Engine, Dynamo, Storage Batteries, Switchboard and lamps, with complete instructions for installing. Engine can be operated on Kerosene, Gasoline, Alcohol, Gas, or Natural Gas.

We can build plants any size from ½ K. W. up.

Special outfit for small country homes, hotels, factories, house boats, etc., **$275.00** up.

Write for interesting Booklet or send particulars for price.

Charging outfits for Electric Vehicles for use where Direct Current is not supplied.

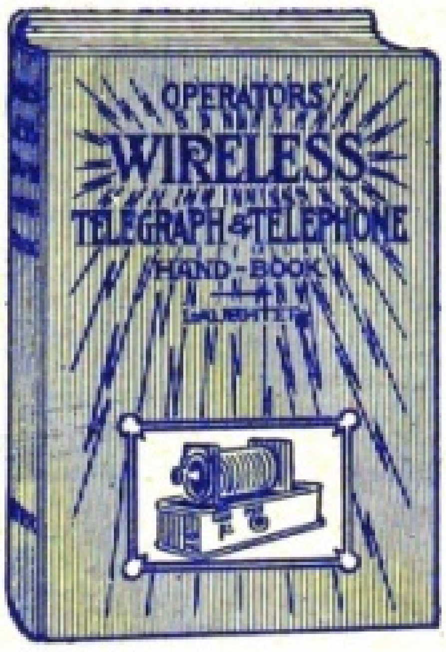
We also can supply *to experimenters* small storage cells, small Dynamos, etc., at prices which never fail to interest.

MACNOR ENGINEERING CO.
Manufacturing and Contracting Electricians
133a CEDAR STREET, NEW YORK CITY

Just From The Press

OPERATORS' WIRELESS TELEGRAPH AND TELEPHONE HAND-BOOK

BY VICTOR H. LAUGHTER



UP-TO-DATE and most complete treatise on the subject yet published. Gives the historical work of early investigators on up to the present day. Describes in detail the construction of an experimental wireless set. How to wind spark coil and dimensions of all size coils. The tuning of a wireless station is fully explained with points on the construction of he various instruments.

A special chapter on the study of wireless telegraphy is given and the rules of the Naval stations with all codes, abbreviations, etc., and other matter interesting to one who takes up this study.

The most difficult points have been explained in non-technical language and can be understood by the layman. Wireless telephony is given several chapters and all the systems in use are shown with photographs and drawings.

By some practical work and a close study of this treatise one can soon master all the details of wireless telegraphy.

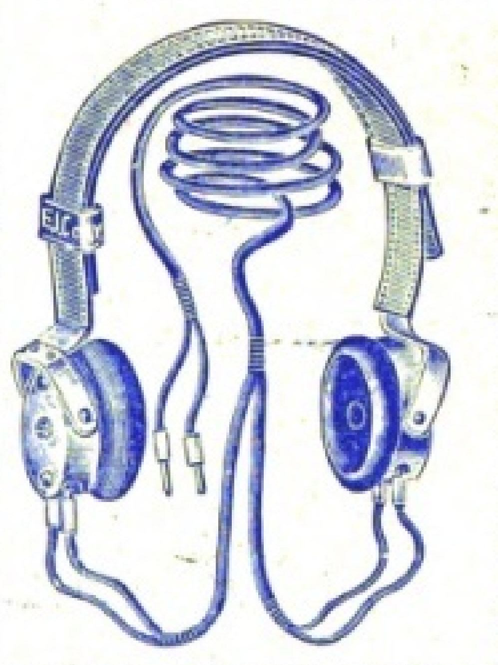
Sold by booksellers generally or sent postpaid to any address upon receipt of price.

12mo., Cloth, 200 Pages Fully Illustrated, and with Six additional Full-Page Halftone Illustrations Showing the Installation of "Wireless" on the U. S. War Ships and Ocean Liners - - $1.00

FREDERICK J. DRAKE & CO., Publishers
M. E. FISHER BUILDING - CHICAGO, ILL.
Send for Catalog FREE.

When writing please mention "Modern Electrics."

"Electro" Amateur Wireless Phones



We herewith present our new amateur type wireless phones which are superior to anything as yet. Our No. 1305 phones which are in use now by the United States Government, Marconi and the United Wireless Co.'s are of course of higher grade but our new phones are in every respect built as carefully, the only difference being that the finish is not so elaborate. These phones have 1000 ohms each receiver and are wound with **No. 30 single silk covered wire.** These phones have double pole magnets which are extremely powerful and made especially for wireless. The head band is **adjustable and leather covered,** and impossible to catch your hair. The receivers fit the head perfectly The weight is 15 ounces. With this set we furnish a beautiful finished six foot green cord with nickle plated tips. The phones are made with swivel arrangements which make good fit possible. A test will convince you that our phones are superior to any other make and we shall be pleased to send you a set of these phones on receipt of $1. deposit, with privilege to inspect same. If not satisfactory we shall refund the money.

No. 8070 two thousand Ohm phones as described, complete,

$4.50

By mail extra 22 cents, packed in box. Send 2c stamp for our new 120 page wireless cyclopedia No. 6 containing lots of information on wireless, diagrams, etc.

ELECTRO IMPORTING CO.
"EVERYTHING FOR THE EXPERIMENTER" — **86-z West Broadway, New York**

When writing please mention "Modern Electrics."

FOR FORTY YEARS A STANDARD PIANO.

WING PIANOS

are made *by us* and are *sold direct from our own factory* and *in no other way.* Dealers' and agents' profits and *every unnecessary cost eliminated.* Every dollar is piano value through and through, the best that 40 years of experience can produce.

AN ABSOLUTELY FREE TRIAL

for 20 days, in your own home, no cost or obligation. ALL FREIGHTS PAID and all risks assumed by us.

Pioneers of the direct plan of piano selling, our unparalleled success has brought forth *many imitators,* but *no competitors,* either as to the excellence of our product or the integrity and economy of our methods. Forty years of daily increasing business and 45,000 satisfied buyers testify to this.

Ask a Wing customer what he thinks of Wing Pianos and Wing methods. We will send you names in your locality for the asking.

FREE "THE BOOK OF COMPLETE INFORMATION ABOUT PIANOS."

A copyrighted book of 152 pages with many illustrations. *A complete reference book on the piano subject.* History of the piano, descriptions of every part, how to judge good and bad materials, workmanship, etc. *Teaches you how to buy intelligently. You need this book.* **Free for the asking** from the old house of

WING & SON, 371-384 W. 13th St., New York

When writing please mention "Modern Electrics."

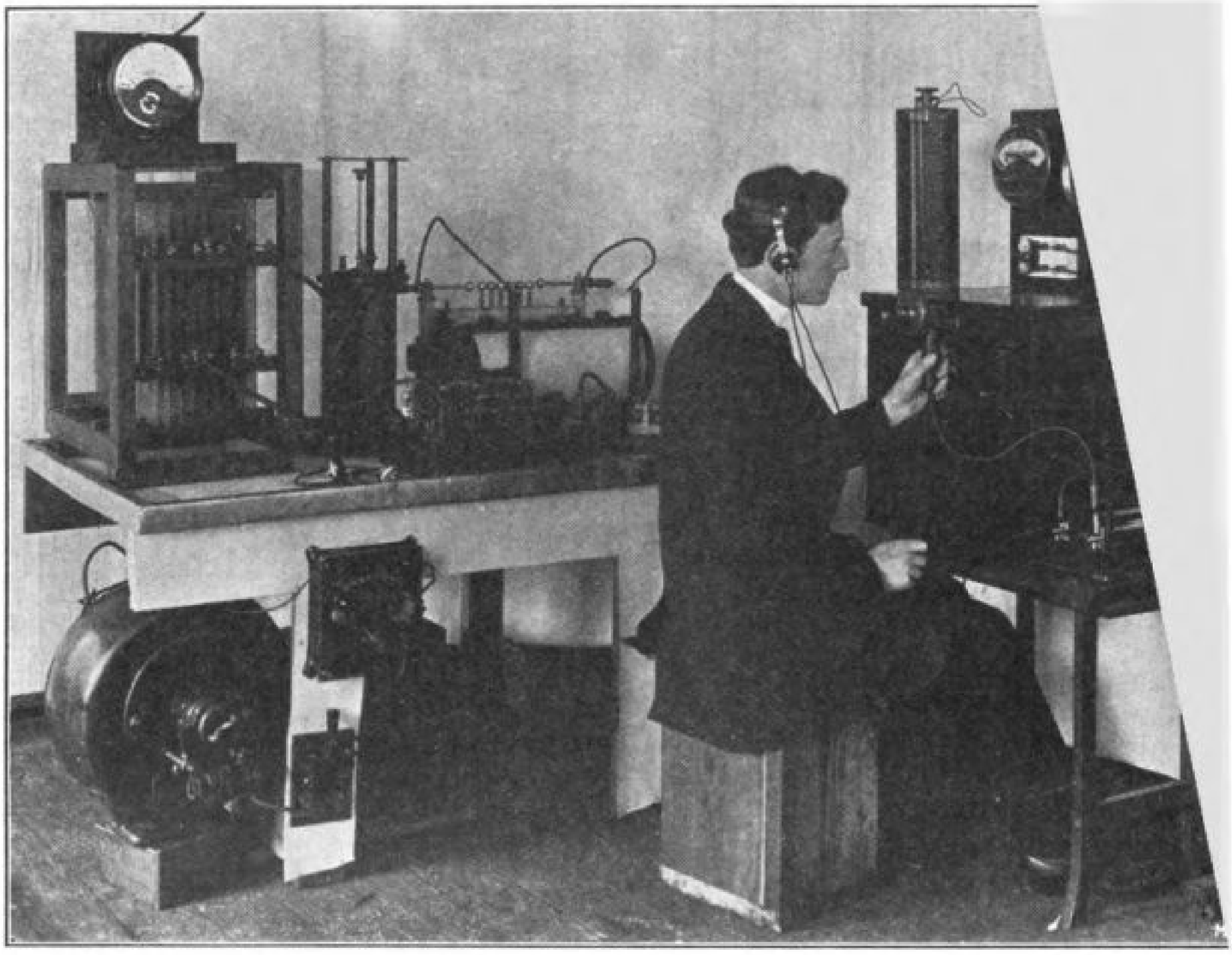
"Modern Electrics" guarantees the reliability of its advertisers.

MODERN ELEC'

Vol. II. OCTOBER, 1909.

An American Combined Wireless and Telegraph Service

By Frank C. Perkins.



While the results obtained by the apparatus used for wireless telephony and wireless telegraphy are vastly different, it is most interesting to note the methods employed are much the same in securing them and it is therefore rendered possible to utilize the same equipment very largely for both purposes.

It is possible to combine the wireless telephone and the land telephone exchanges with the wireless telegraph service and this will be of the utmost importance expecially on the great lakes where the possibilities are unlimited.

One can hardly realize that it may soon be possible to sit comfortably in a cabin of any of the five great steamers plying between Buffalo, Cleveland and Detroit and communicate by telephone with home or office without difficulty.

Communication may be establish with the wireless telephone apparatus connection with the wire telephone any exchange by simply getting in touc with the wireless office, at present whe the steamer is within a range of 70 miles

One may call up his place of business, home or any telephone subscriber whether on land or water and any vessel plying the great lakes may also communicate with each other when properly equipped.

The steamers "Western States." "Eastern States," "St. Ignace," "City of Cleveland" and "City of Detroit" are equipped with wireless apparatus capable of operating a distance of over 200 miles by telegraph and about 70 miles by telephone with shore stations at Detroit, Cleveland and Port Huron, as well as Toledo, Buffalo and Mackinac.

The accompanying illustration shows the wireless telephone and telegraph equipment of the Clark system in commercial operation on 25 passenger vessels on the Great Lakes. Under the operating table in the illustration may be noted the two kilowatt rotary converter used in connection with the wireless transmitting apparatus.

It may be stated that each wireless station has its apparatus attuned to a certain number of vibrations which may be changed by means of a proper switching device. In case a lake steamer is within talking range of Buffalo, for example the operator throws the switch for providing the number of vibrations for that station called.

In repose the wireless instrument on the steamer will drop back to a certain definite number of vibrations, so that it can be reached by any central station calling its number and in this manner each instrument is so arranged that it can take no general calls from any direction or if desired a specific call for its own number.

It is held that one decided advantage of the wireless telephone over the ordinary phone is that the buzz of the wire due to induction is entirely absent.

Three long distance wireless telephone stations are now in service at Port Huron, Cleveland and Detroit, and nearly 200 stations on land and water will soon be in service, the central station being located at Sault Ste Marie.

It is predicted that the wireless telephone apparatus will be developed at an early date so that conversation may be carried on a distance of 1000 miles without the use of wire, and this will open up possibilities which are practically unlimited.

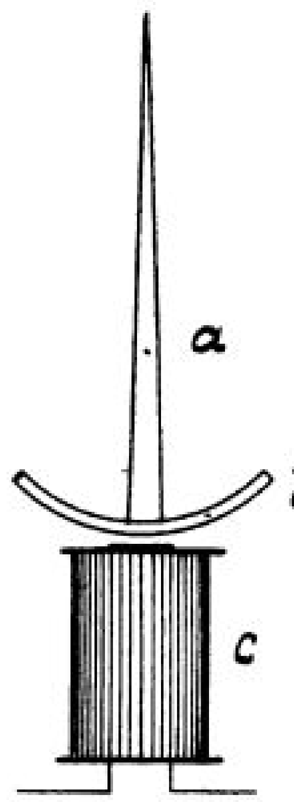
The Buffalo and Cleveland Transportation Company is one of the first to equip its steamers with wireless telephone and telegraph apparatus and other lake and ocean transportation companies will undoubtedly be required by Congress to provide wireless outfits if the present legislation is carried out. While most of the ocean liners are now provided with wireless telegraph installations the government has taken up the matter and laws will undoubtedly be passed to the end that all vessels are so equipped for the safety of the public.

The government has also taken great interest in wireless telephone and telegraph equipment for use in torpedo boat destroyers, battle ships and cruisers of the fleet as well as at Forts, Lighthouses and other land stations.

A HOME - MADE BATTERY GAUGE.

By J. CARLTON PAULMIER.

The illustration represents a simple form of battery gauge, which will indicate with a fair degree of accuracy the condition of a battery or set of batteries.



The instrument consists essentially of an electromagnet C, acting upon a curved permanent magnet B, to which is attached a needle A, moving on a pivot.

Normally the center of the permanent magnet hangs over the coil of the electromagnet and the needle is in a vertical position. Any current flowing through C, however, tends to attract either the positive or negative pole of B, according to the direction of the current. This attraction is resisted by the weight of B, and the result is that the needle A is moved a distance proportionate to the amount of current passing through.

The permanent magnet B is made of a piece of steel, bent into a curved shape and then hardened and magnetized. The needle may be cut from a piece of sheet brass and fastened to the steel bar with a drop of solder. Care must be taken in doing this not to destroy the magnetism in the steel. The electromagnet may be wound with a few turns of No. 18 wire.

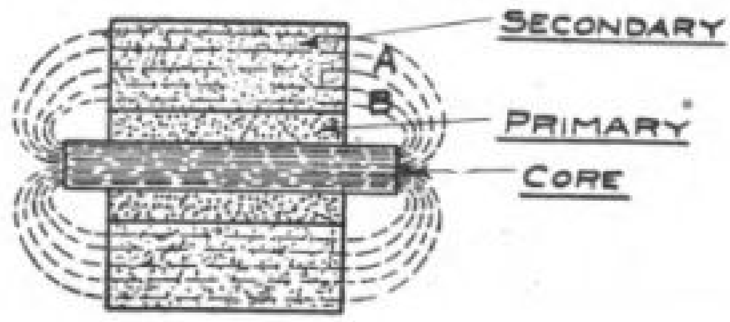
The instrument may be calibrated with an ammeter if desired, and may be adjusted by varying the weight of the permanent magnet and the amount of wire in the electromagnet.

Open or Closed Core Transformers—Which?

By A. Press.

Before going into a discussion of the relative merits of the two types of transformers, it will be well to explain the physical meaning of certain terms used in discussing alternating current phenomena. If we draw a picture of the magnetic field set up about an open core transformer when the current is passing, we arrive at Fig. 1.

Now, of all the lines set up in the core of the transformer, Fig. 1, it will be seen that a number such as "A" circle all the turns of the primary and secondary windings. Such lines of magnetic flux may be said to contribute to the "close coupling" of the primary and the secondary turns of wire. However, certain magnetic lines such as "B," Fig. 1, will be seen to link only a portion of the secondary turns and will thus afford a "loose coupling" magnetically speaking, of the total combined primary and secondary turns. Now it is the lines of flux affording the "loose coupling" that go to make up the so-called internal impedance or inductance of the secondary of the transformer. For a transformer as above, can be imagined as made up of two equivalent transformers separated from each other, and, as stated above, the thoroughly "loose" part

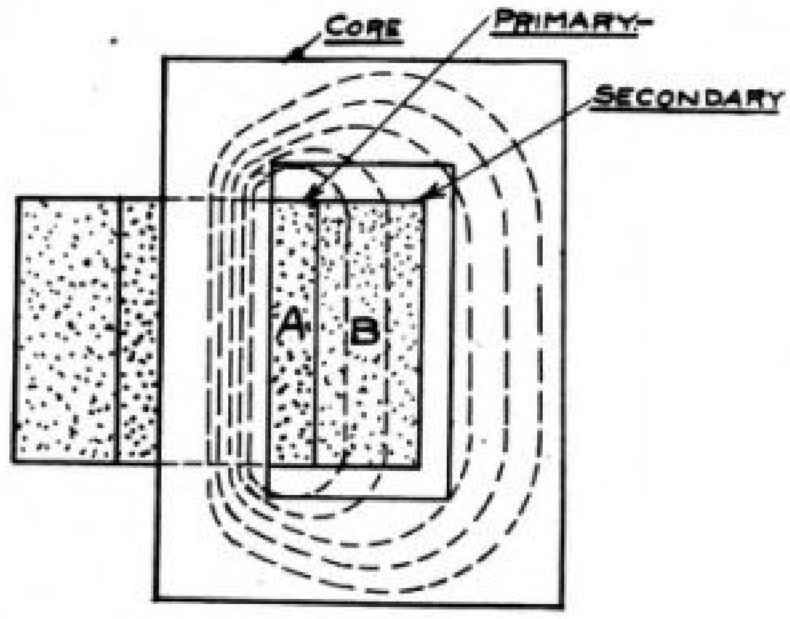


-FIG. 1-

will be the reactance or inductance or internal impedance above referred to.

In the closed core types we have the same sort of phenomena taking place, but of course in a much modified and lesser degree. Fig. 2 shows a possible distribution of the magnetic lines.

The letters "A" and "B" refer respectively as before to the "loose" and "tight" coupling components of the flux linking the primary and secondary, in part, or in full. Now when we refer to the two diagrams, Fig. 1 and Fig. 2, it is easily seen that in Fig. 2 very many more lines will be of character "A" (tight coupling) than will be the case in Fig. 1. This is because for the same amount of flux when the two paths are in air then there is much more chance for the two types of lines to be equal in number. When as in Fig. 2 one of the paths in air is replaced by an all-iron path then the relative number of the "A" lines must be larger and that of the "B" lines smaller correspondingly. Thus the closed core type of transformer is, more correctly



-FIG 2-

speaking, a "tight" coupling transformer, whereas the open core type is of the "loose" coupling variety.

To study now the effects of the two types on the resonant circuit one has but to recall that the effect of the open type is to introduce in reality a high tension reactance ("loose coupling" component) in series with the "tight" coupling component of the transformer. Thus in normal working with an open core type of transformer when the open circuit secondary voltage is, say, 20,000 volts, it will be found in connecting in the spark gap without the condenser (that is, putting on lead) that about 5,000 volts can easily be taken up with the high tension reactance or "loose" coupling component. Now in order to destroy the effect of the 5,000 volts reduction in voltage it is only necessary to connect in the condenser. As is well known the effect of the condenser is to neutralize the reactance or inductance in circuit and thus we have the following condition of things:

First: That the normal voltage set up is practically about what it is on open circuit.

Second: That there is the voltage (consumed in reactance or inductance) due to the "loose coupling" effect of the "B" lines of magnetism.

Thirdly: That there is a voltage equivalent to the above two voltages set up in the transformer as a whole and incidentally capable of wiping out the inductance effect.

In this way it comes about that actually there is more voltage set up across the condenser terminals than is normally set up without a condenser. This is because in addition to the ordinary voltage of the transformer there is the component in the condenser voltage which has to wipe out the effect of the inductance.

An obvious advantage of the above is therefore that the open core type of transformer, although made for lower voltages really has the power of inducing across the condenser, and hence across the spark gap, a voltage larger than that which would be measured on no-lead at the transformer terminals. Thus in the case above cited it would be of the order of 25,000 volts instead of 20,000.

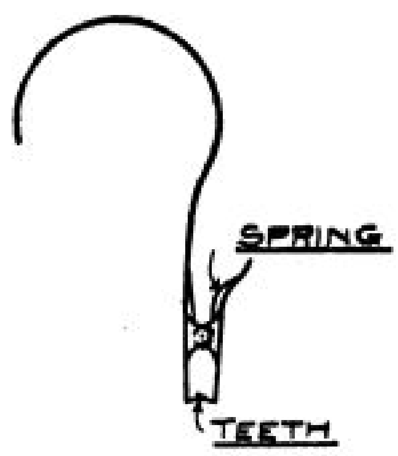
Obviously with a higher potential across the terminals of the condenser—the spark gap being set of course at a lower figure—the faster will the condenser be charged up and of course correspondingly the more discharges per cycle. This much sought for effect can be obtained equally with the closed core types. They have, however, to be made of special and costly construction. The disadvantages of the open core types have heretofore been the poor efficiencies and corresponding damping, due to both the high iron losses and the high copper losses incident to the transformation of voltages. Although these are much smaller in the standard makes of high class transformers it is only recently that the disadvantages above spoken of in the open core types have been considered seriously. In the open core transformers of the Transformer Specialty Co. the iron losses on open circuit have actually been reduced to the low figure of 100 watts in a 1 K. W. to 225 watts in a 5 K. W., and only 315 watts in a 10 K. W. open core transformer. The above figures are within 25 per cent. of what the best companies can guarantee for extra-high tension duty with closed cores.

Thus, whereas the bug-bear of insulation troubles is reduced materially in the open core transformer the drawback from the point of view of efficiency has in at least one instance been reduced so as to make the partisans of the open core type of transformer feel even stronger in their contention that the supremacy over the closed core type is only a matter of time.

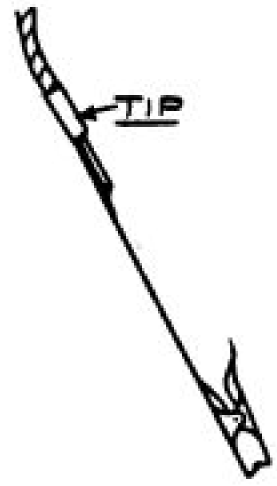
MAKING TEST CLAMPS.

In many branches of electricity, and particularly in wireless experimenting, there is need for a method of quickly making or breaking contact. This need may be supplied by test clamps, but boughten ones are expensive. The home-made ones described below, although extremely cheap, are quite as efficient as boughten ones, and may be used on phone tips, helices, volt meters, etc.

At a notion store procure some of the clips (Fig. 1) used for hanging articles on bars in show cases. These will cost probably one cent apiece, or maybe more



-FIG 1-



-FIG 2-

if made of brass. Get as many of them as you want clamps. Straighten out the bend and make a groove in the end so that the wire or phone tip fits snugly in the groove. Solder in place and clamp is complete.

THE LATEST "A POCKET WIRELESS."

In this age of wireless development, the telegraph, the first adaptation of the principle, has steadily been simplified. Here is the latest development—a small induction frame that can be carried about and messages for a limited distance be received at any point.

The apparatus has been tried with success in England. One objection to it is that it renders still less private the field of the wireless message, as any one familiar with the code can use it.

Construction of a Rotary Variable Condenser

By Bernadotte Anderson.

A variable condenser of large capacity, when connected across a detector in a wireless receiving set, has the function of increasing the strength of weak signals very materially, consequently enabling the operator to read the feeble signals very readily, which could hardly be read otherwise. A condenser of this type, also aids in tuning out unwanted stations.

Aluminum will enter into the construction of the capacity plates for this condenser, as this metal is unquestionably the best material for same, owing to its non-corrosive qualities, and also the fact that aluminum can be obtained in smooth sheets, which permits easier construction. No specified number of plates will be mentioned, but any number of them can be used, which will depend on the amateur's ability to make them. This condenser will be composed of two individual portions, viz.: the stationary and rotary plates. The rotary plates should be one less in number than the stationary, therefore, assuming the condenser to consist of twenty stationary plates, the rotary part should contain nineteen plates. From No. 22 B. & S. gauge aluminum cut the required number of plates of the form and size shown in Fig. 1, A and B. To cut these plates out with the lugs is rather a difficult matter and spe-

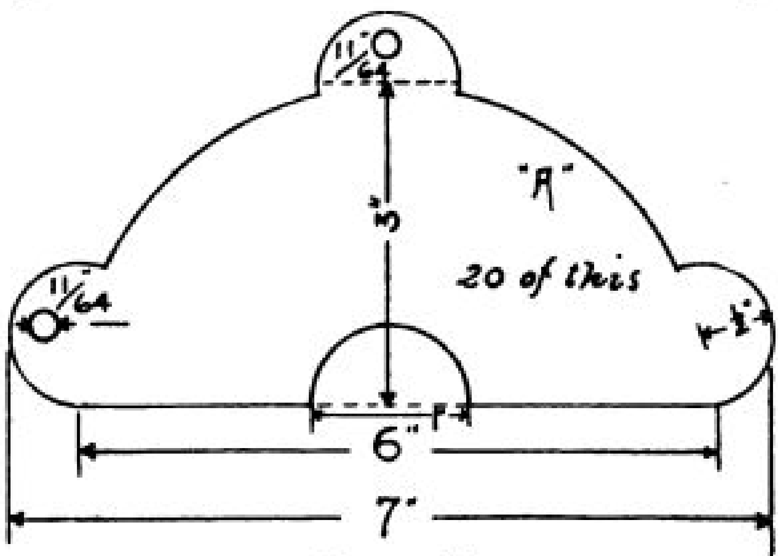


Fig. 1-A

cial shears should be provided, such as pattern makers use in cutting out designs of various shapes. The plates after cut, should be made to lie perfectly flat, so that when they are assembled they will show no buckling. The pile of A and B plates should be clamped together separately and holes large enough to admit a 5/32-inch rod, drilled in the center of the lugs, also in the center of B plates, about 1/8 inch from the edge. It is advisable to have this done by a drill press, which will insure the holes being drilled at right angles to the surface of the plates. Procure about one pound of No. 8 copper burrs (these are about 1/32 inch thick, having a center hole about

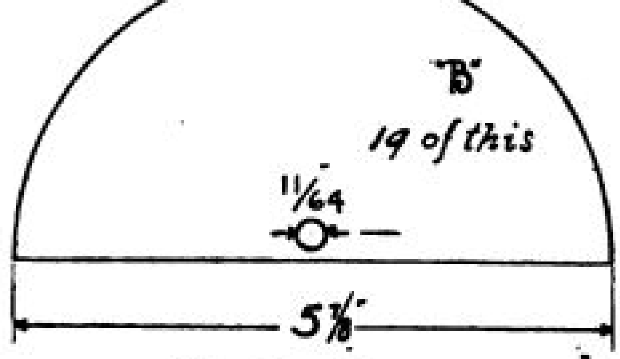
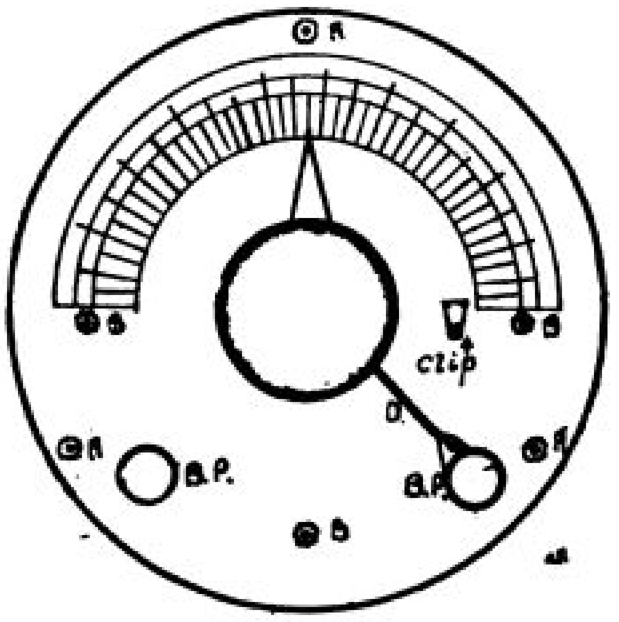


Fig. 1 -B-



A - Nuts for supporting glass casing
B - " " " Stationary Plates.
D - Spring bearing against axle.

Fig. 2.

5/32 inch in diameter), ten feet of 5/32 inch round brass rod, over which the burrs should slip easily, also one dozen 8-32 brass hexagon nuts. Cut the brass rod in one-foot lengths and for the present thread one end of them with 8-32 die about half an inch. However, the rod for the rotating portion should be threaded about one inch, in order to allow enough for supporting same. On these threaded ends fasten the brass nuts. A piece of fibre or hard rubber about 1/4 inch thick, should be cut out in triangular shape large enough to cover two of the brass rods on the stationary part and also extend out far enough in the center to allow for supporting the rotating part. Drill a hole in this extended portion and also drill slotted holes in which this piece is to be fastened to the stationary part. The slotted holes will enable the rotating part to be adjusted to the stationary part after completion. Begin to assemble the parts by slipping the plates over the rods and on each rod between every plate put four of the copper burrs and continue in this manner until all the plates have been used. Of course, the triangular piece is slipped on before beginning to assemble the plates for the stationary part. The rods should now be taken out one at a time and threaded on the other ends and replaced and screwed down tight by the brass nuts. Before assembling the rotating portion, determine the length of the rod to be threaded and then assemble. Two circles of polished hard rubber 1/4 inch thick and eight inches in diameter should be procured, and the edges rounded off and polished. A hole is now drilled in the center of one of these pieces to accommodate the axle on the revolving portion. Holes are also drilled in this piece through which the extending rods of the stationary part are to pass, so that when same is mounted it will be concentric to the rotating part. The two parts are now fastened to this rubber piece by the brass nuts, the lower end of the axle of the rotator having been slipped through the hole in the insulating piece. The rotating portion is now adjusted to the stationary part by loosening the nuts holding the insulating piece, so that the rotating plates will strike in the center between the stationary plates. The extending rods are sawed off flush with the nuts, except the protruding axle of the rotator, which should extend one inch from the surface. A scale should be marked out on the rubber, of any convenient radius, which can be done by scratching the rubber with some sharp pointed instrument. An aluminum pointer is now cut out so that the point will extend to the first line of the scale. Drill a hole in same and clamp it between two of the brass nuts on the axle and have same clear the surface of the rubber enough to prevent scratching same. A spring clip should be provided at the end of the scale, which is connected to the stationary plates, so that the pointer will engage the clip at the end of the scale. This is a good adjunct as it serves to short circuit the detector when sending, thereby retaining its adjustment. A rubber twirler is fitted on the axle. Two binding posts are mounted on top of the condenser on the rubber piece and connections made to the stationary and rotating plates. A German silver spring which bears against the axle is provided, which is connected to one of the binding posts. Three holes are drilled in both of the rubber pieces, equally spaced, to accommodate the 5/32 inch rod. A glass casing about 7 1/2 inches in diameter and of any convenient length is procured and clamped between the two rubber circles by the brass rods. Fig. 3 shows a sectional view of the condenser.

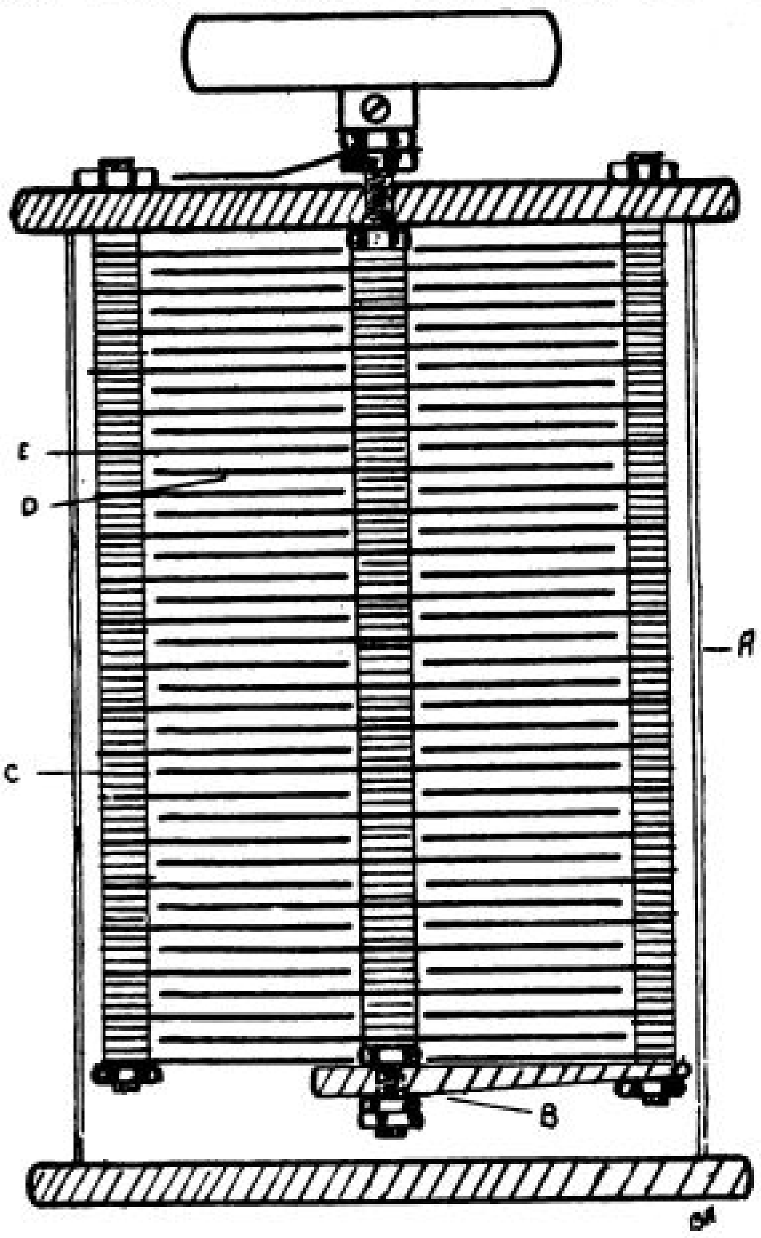


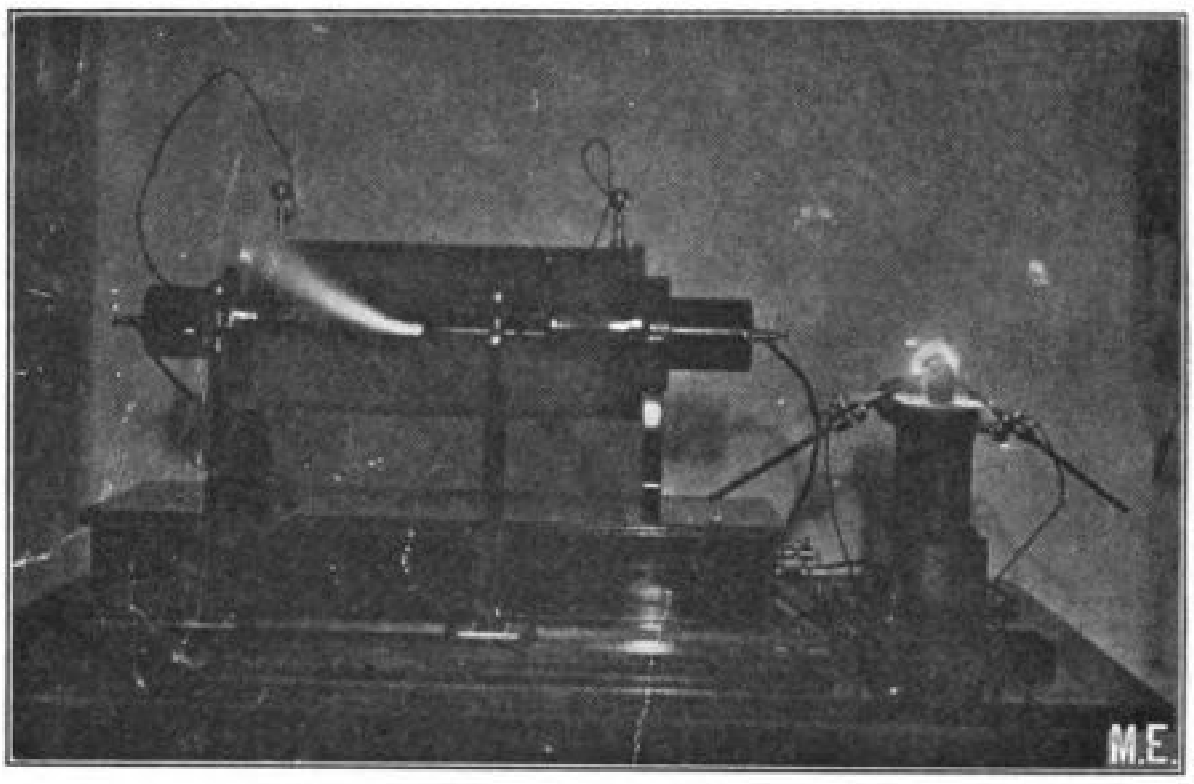
Fig. 3.
A- Glass Casing
B- Insulating Support
C- Copper burrs
D- Rotating Plates.
E- Stationery Plates.

W. A. O. A.

The Wireless Association of America, headed by America's foremost wireless men, has only one purpose: the advancement of "wireless." If you are not a member as yet, do not fail to read the announcement in the January issue. *No fees to be paid.*

A Unique German Induction Coil Flame Arc Interrupter

By FRANK C. PERKINS.



The accompanying illustration shows the arrangement of a novel type of flame arc interrupter in use with an induction coil where a singing flame arc is employed in a strong magnetic field. This apparatus was designed by Mr. Ernst Ruhmer, of Berlin, who is well known for his experiments with selenium cells and wireless telephone apparatus.

It is claimed that this form of interrupter is quite as good as the liquid type of interrupter, as shown by observation by means of moving pictures taken at a high rate of speed, and by means of Braun tubes, the behavior of the current curve being said to be most favorable with the singing flame arc.

It is maintained that the frequency of this unique type of interrupter may be varied from but a few interruptions per second to nearly half a million a second, this range not being equalled by any other form of interrupter now in use.

It is also maintained that the current oscillations produced by this apparatus of German design are very much higher than those of the ordinary singing arc, the flame arc being blown out by the magnetic blower, and enabling very large quantities of electric current to be interrupted.

It is stated that the frequency of the induction coils which are operated by Mr. Ruhmer with this type of flame arc interrupter are so chosen as to bring up strongly the characteristic vibrations of the secondary system.

The accompanying illustration shows the Ruhmer flame arc interrupter operated with an induction coil at the left, giving an excellent idea of the high tension spark and the arc flame which is entirely blown out by the magnetic blower.

It is held that this form of interrupter can be employed to advantage where the nitrogen of the air is to be oxidized for the operation of wireless telegraphic apparatus as well as wireless telephone systems. It can also be employed to advantage in the generation of ozone and the use of X-ray tubes.

Where an induction coil of 30 cm. is used, the frequency will be 1,600 per second, and this is said to correspond to the minimum amount of current used with the arc flame or about 3 or 4 amperes.

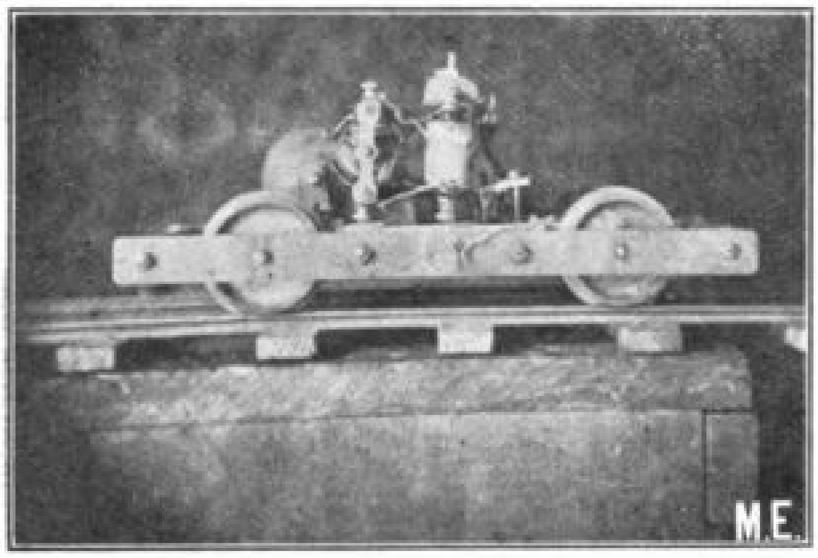
It is said that a Wehnelt interrupter operating with a current of from 15 to 25 amperes will produce effects about equal to the flame arc interrupter above described with the very low current intensity mentioned.

Harnessing sunlight—of course. Why not? But you ought to see my new machine for harnessing moonlight!—"Fips."

How to Build a Third Rail Model Locomotive

By J. S. Welter.

In the following article the writer will try to make plain the construction of a model third rail locomotive of three inch gauge, which can be run in either direction, and stopped or started from a switch located at any distance from locomotive and track, and connected to it with three wires. The construction is

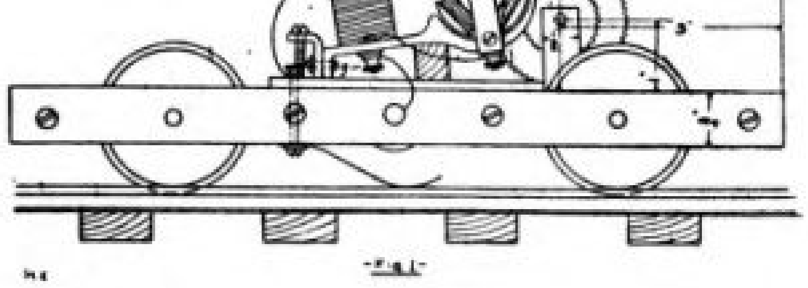


quite simple. The driving wheels are made of brass and all dimensions can be obtained from drawings. A, A, in Figs. 2 and 3, are insulating joints.

The wheels are to be insulated from one another, and also from central gear wheel. B, B, in Figs. 2 and 3, are to be made of red fibre. All parts of Fig. 3 to be a driving fit.

The other set of wheels are made in the same way, except there is no gear wheel on same. All gears are 32 pitch, 3/16 inch face. The gear on motor shaft is 5/16 inch in diameter. The reduction gears 1 7/8 and 1 inch in diameter. Driving wheel gear 1 7/8 inch in diameter.

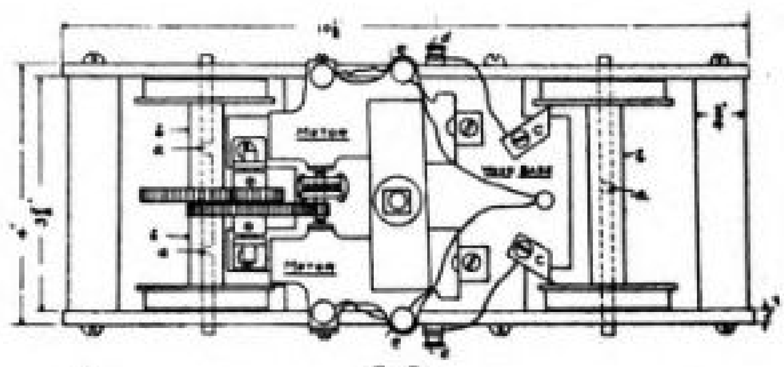
The base of locomotive is of hard



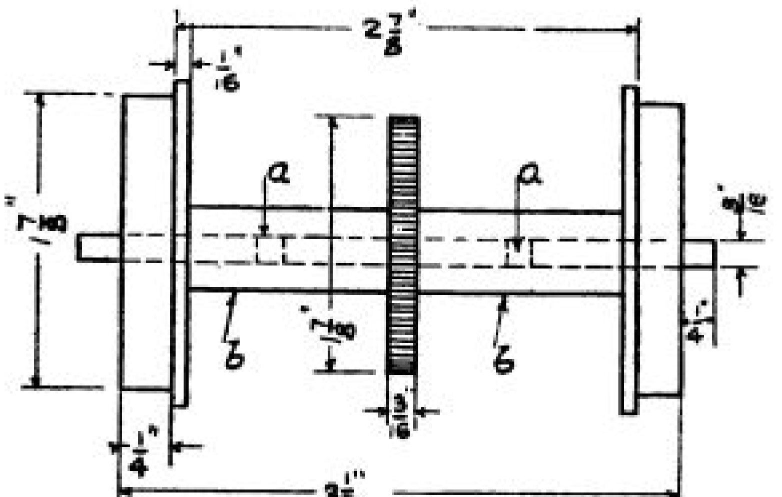
wood. Size, 1 inch thick and 5 1/4 inches long. The brass side bars, 3/16x 3/4x10 1/2 inches, are screwed to frame with round head brass wood screws 1 inch long. The round wood bars at the ends are fastened in the same way. The two motors are the regular $1.50 battery motors which measure about 3 inches high and 2 inches wide, with 2 1/4-inch shaft.

The windings which are on them when obtained will be all right without any change. The 5/16 inch gear is soldered or otherwise fastened on motor shaft, close to bearing on pulley end. Each motor is to have fastened on pulley end of shaft a brass disc 5/8 inch in diameter, and 1/8 inch thick, with holes in opposite sides 1/8 inch in diameter. A disc of red fibre should also be made 5/8 inch in diameter and 1/16 inch thick, with holes to match the ones in sides of brass discs on motor shafts.

After wheels are in place, and brass side bars are screwed in place, proceed to mount reduction gears in place, the two gears are both on one shaft 3/16 inch in diameter by 1 1/2 inches long. They are mounted on base with bearings made from 1/8x1/2 inch brass rod bent to proper shape and fastened with 5/32 inch brass bolts 1 1/2 inches long.

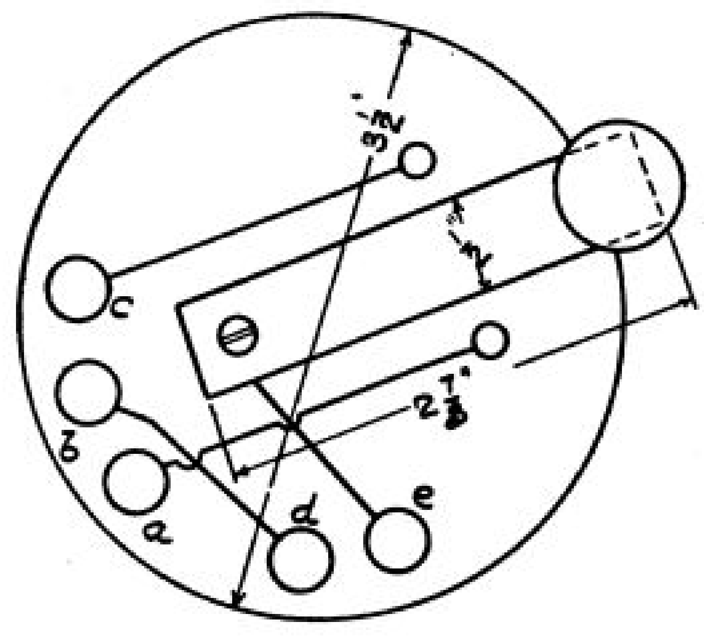


The small reduction gear is in mesh with driving wheel gear. The holes in bearings of reduction gears will have to be located by the biulder in the exact place necessary. Next proceed to mount the motors as shown in Figs. 1 and 2 of drawings. They should be blocked up with wood and clamped in place with a hard wood clamp by a bolt 1/4 inch by 3 1/2 inches long, so that the brass discs on motor shafts are 1/8 inch apart and in exact line with each other, and gear on motor shaft in mesh with large gear of reduction set. Having the motors aligned and in correct position, make two brass angles of 1/8 inch by 1/2 inch rod, with 5/8 inch sides, each side to have a 3/16 inch hole in center of same. Fasten them as shown in Figs. 1 and 2, on lower feet of motors with brass bolts 5/32 inch in diameter, and put 1 1/4 inch round head screws in other holes into base. Now insert the red fibre disc between brass discs of motors, and put strong cord through holes of same and tie. This will



M.E. -FIG 3-

form a perfect insulating joint between motors. The third rail contact shoe is 1 1/2 inches wide and of thin spring brass, and is connected to the upper or E binding posts of motors, as shown in Figs. 1 and 2 of drawings. The lower or G binding posts in Fig. 1 are connected to contact springs, C, C, shown in Fig. 2; also to side bars of locomotive. Great care should be taken that side bars are not electrically connected to one another or to motors except where required. The track construction is as follows: The brass rails may be obtained from any supply house, or one can use 1/4x1/4 inch brass rods. They should be fastened on wood or other insulating material. (See Fig. 5.) The switch for operating is



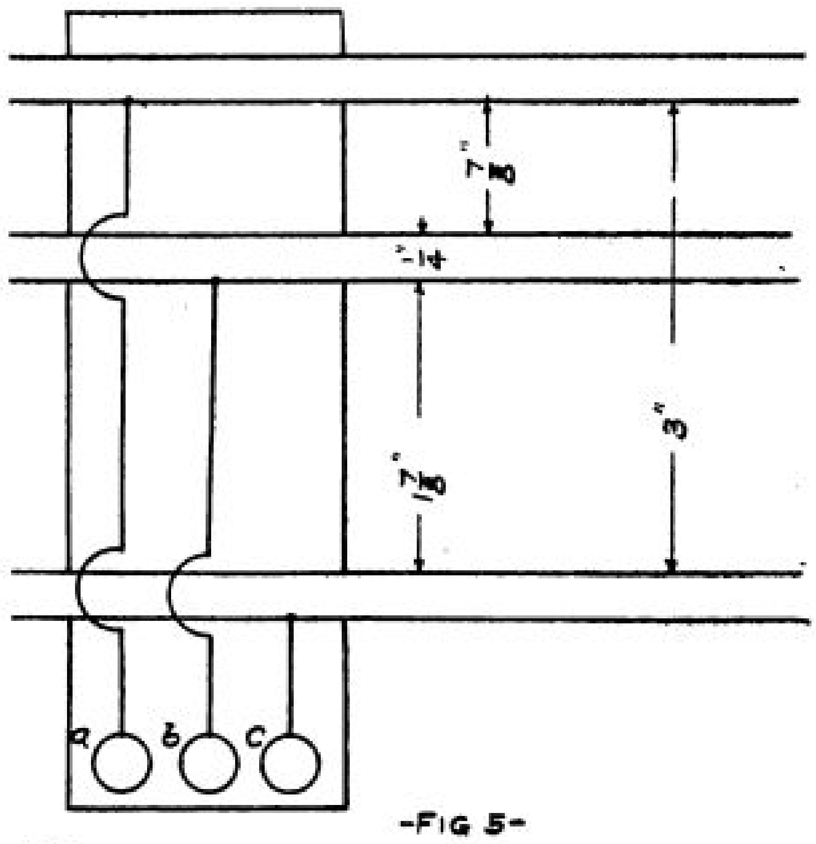
-FIG 4-

M.E.

shown in Fig. 4. The lever is of brass and is mounted on wood base. A, B. C, D, E are binding posts for connecting wires. Any parts and dimensions which the writer has not made clear in this article can be obtained from drawings.

The locomotive is now complete except for cab or other top construction which can be made to suit the builder. To operate connect posts A, B, C of track to posts A, B, C of switch, as follows: A to A, and so on, and posts D, E to about 10 or 12 batteries in series.

When switch lever is moved to one contact the current flows through third rail and one track rail to motor, which also drives the other motor backward through insulating joint, and driving wheels through motor gear and reduction gear,



-FIG 5-

M.E.

and when moved to other contact viceversa, and when in the middle it is stopped. The writer has a locomotive built after the above plans and it works fine.

Did you see the first *real* joke that ever appeared in M. E. in the September issue, page 250? It says there:

"....but if the house is not in a convenient position, you should dig a hole about three or four feet deep to support it."

Why, dig a hole to support a house? First of all, not everybody lives in San Francisco; secondly, an un-reenforced hole is a ticklish affair to meddle with. It reminds me of the formula, how to make a cannon: Take a nice soft hole and pour metal around it, taking care that the hole does not shrink.—"Fips."

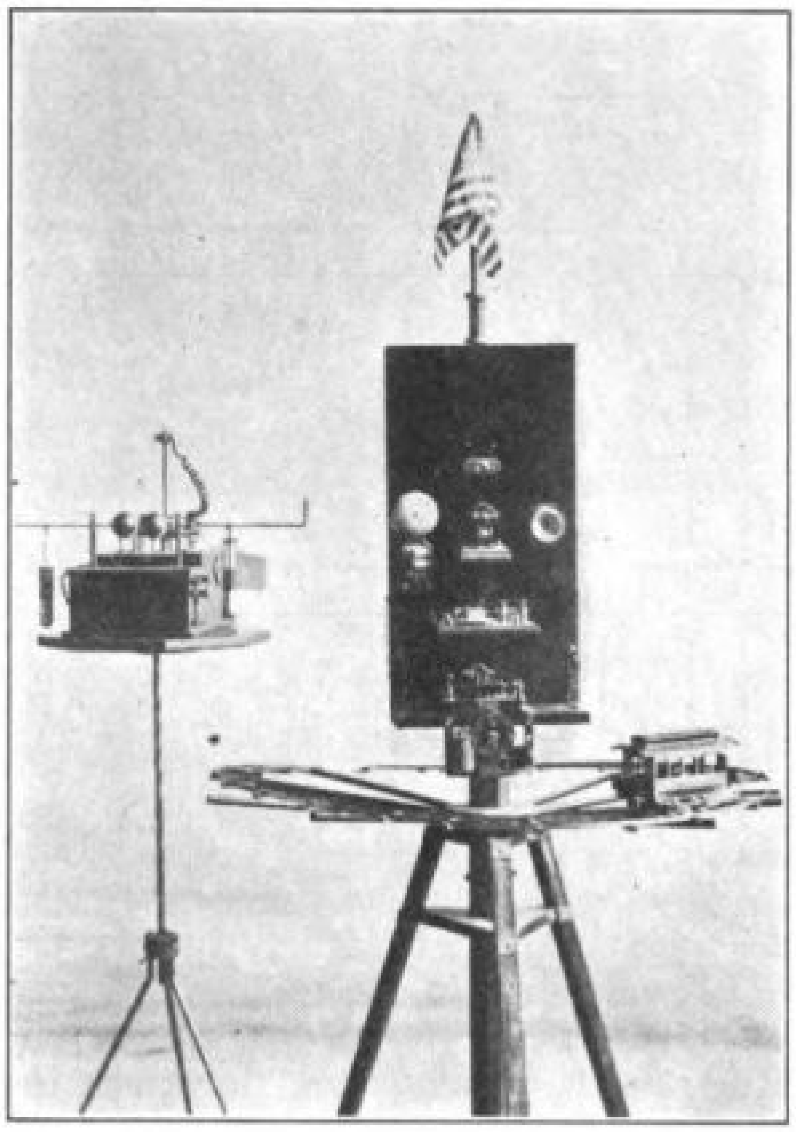
Tests are being made at Brant Rock, Mass., of the wireless apparatus to be installed at the 1,000-foot tower to be erected at Washington.

A Lecture Set

By Burt K. Bunch.

Following is a description of a lecture set the writer has constructed for the purpose of demonstrating some of the possibilities of the Hertzian wave.

No one can make even a rough guess at the number of applications we are likely to witness in the near future of these mysterious waves thrown out by an electrical discharge, and caught up hundreds, and perhaps thousands, of miles away by a little instrument called a "coherer."



The instruments, as may be seen by referring to the photograph, are divided into two parts, viz., the sending and the receiving instruments, each set mounted on a tripod fitted with rollers. The sending instruments consist of a two-inch induction coil, with brass oscillators; telegraph key, Leyden jar condensers, and an E. I. Co. electrolytic interrupter fitted with an ordinary attachment plug which may be screwed into a lamp socket.

By means of this arrangement the lighting current of 110 or 220 volts, either direct or alternating, may be used, making it unnecessary to carry batteries wherever lighting current is available.

With this apparatus it is possible to send out waves powerful enough to cause the coherer to respond at a distance of one hundred feet or more without the use of either ground or aerial.

The receiving instruments are mounted on a vertical board in plain view of the audience, thus making it easy for them to follow each experiment. They consist of a fire alarm (electric bell), a small motor, fog horn (electric whistle), electric light, miniature electric railway car, and a cannon. The cannon may be seen mounted on the top edge of the board and is simply a large wooden spool in the bottom of which are two small brass contacts and across these is stretched a very fine German silver wire. When the current from the batteries—on the back of the board—is made to flow through this wire it instantly becomes heated, thereby igniting a small quantity of gunpowder. A loud explosion follows, blowing a cork from the top of the spool, which in turn releases a weight heavy enough to hoist Old Glory from its hiding place at the back of the board to the top of the antenna pole in a truly patriotic manner — thus making a very pretty finale to an evening's entertainment.

The automatic seven-point switch, seen at the bottom of the board, makes it possible to start and stop the motor,

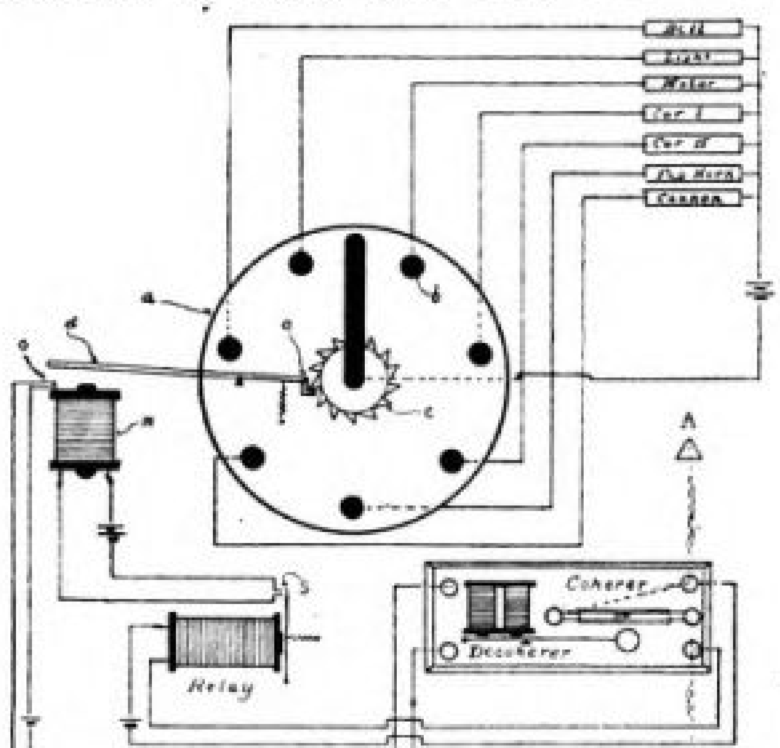


Fig 1

light and extinguish the light, start, stop and reverse the car, ring the bell, explode the cannon, etc., in regular succession without leaving the sending key.

For the benefit of some fellow experimenter, who may wish to construct one of these switches I will describe it in detail. The description may be best understood by reference to the diagram, Fig. 1.

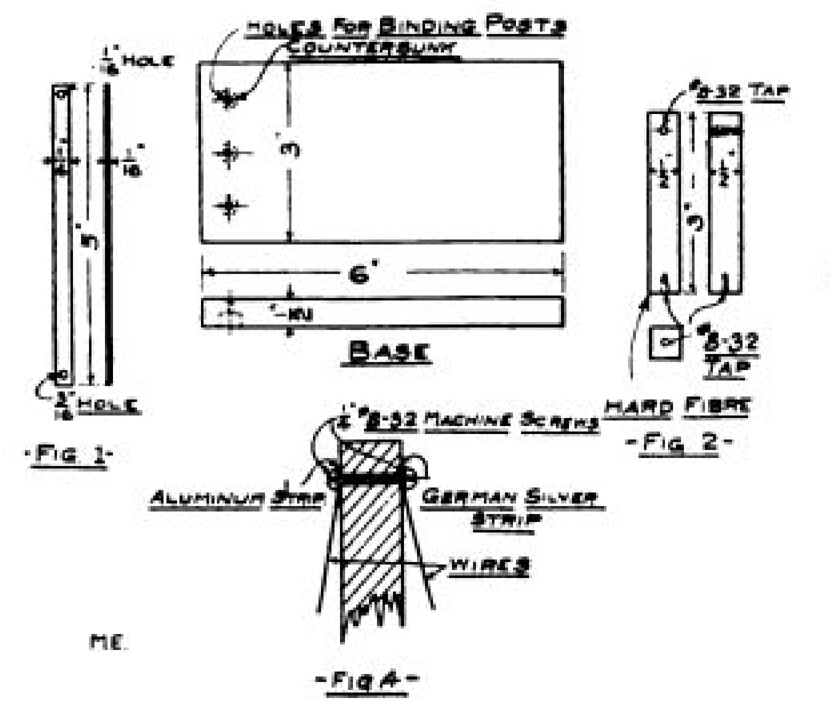
The dial A is of hard rubber, three inches in diameter and has set flush with its face seven contacts made of copper rivets. The small brass rachet wheel C was taken from an old clock movement and contains just twice as many teeth as there are contacts on the dial. The armature D has a pawl hinged at E, which engages the teeth on ratchet C and turns it one space each time the magnet M becomes active. The wiring, I think, will be clearly understood from the diagram. The action is as follows: The coherer acts directly on the primary of the relay, which in turn closes the circuit at S, thus the magnet M becomes active, attracting armature D, and moving the pointer on and off the different contacts. When armature D closes contact O, the decoherer is thrown into circuit, thus causing armature D to be released.

The entire outfit can be knocked down and packed in two suitcases, thus making it a very compact and portable little outfit for the purpose for which it was designed.

A THERMO BATTERY AS A SUBSTITUTE FOR POTENTIOMETER AND BATTERY IN WIRELESS WORK.

By G. B. Sayer.

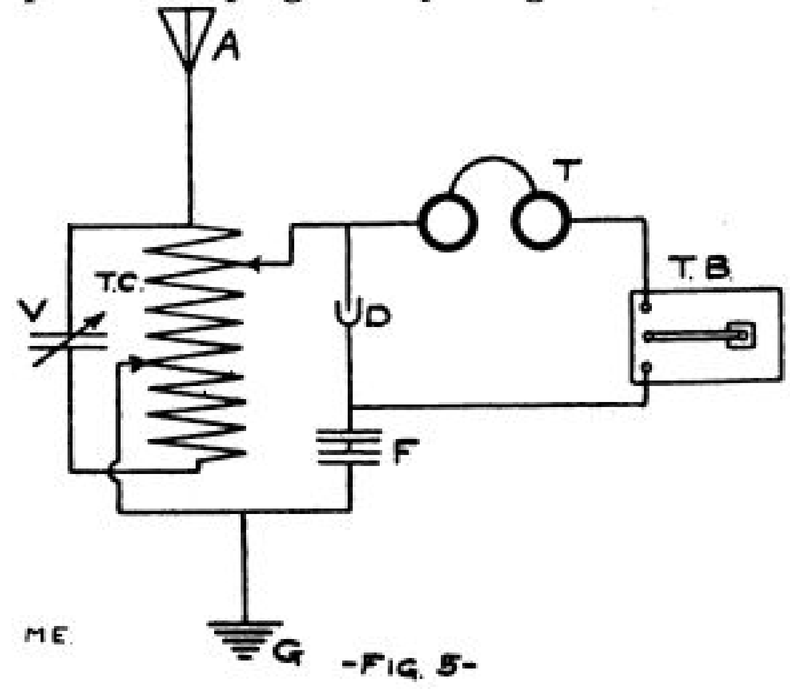
The instrument described below if carefully constructed, will well repay the maker for his trouble. Same is now being used by the writer very successfully. The materials needed for construction are few, easily obtained from



any good electrical supply house and are quite cheap.

Procure a piece of german-silver and a piece of aluminum 1/4 inch wide and 5 inches long and drill them both as per Fig 1. Rivet them together at A with a brass rivet.

Now get a piece of hard fibre 1/2 x 1/2 x 3 inches and drill as per Fig 2. Make a base of hard wood as per Fig 3, and place the fibre upright on the base, now put the metal strips (Fig. 1) on the top of the upright as per figure 4.



A-AERIAL D-DETECTOR
V-VARIABLE CONDENSER T-RECEIVERS
T.C.-TUNING COIL G-GROUND
F-FIXED CONDENSER T.B.-THERMO BATTERY

Bring the wires down to the binding posts and connect as in Fig 5. Now get a small alcohol lamp and set on the base so that the strips come in the top of the flame. Signals may be received a few seconds after the flame is started. If the current is too strong move the lamp closer to the fibre post or if too weak get the end in the top of the flame.

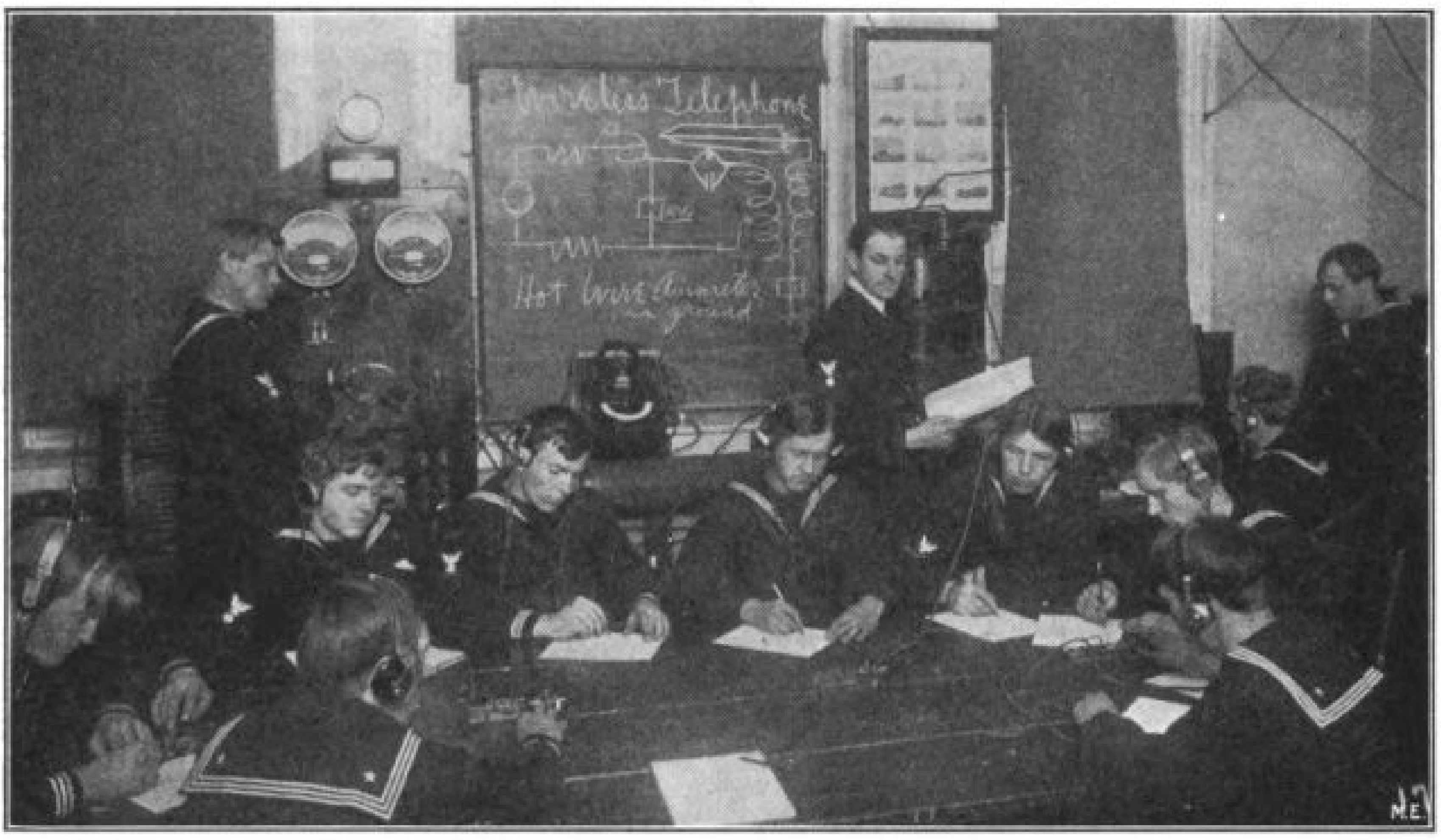
The use of this instrument opens up a new field of experiment in which many phenomena may be observed and results obtained impossible to duplicate when using a potentiometer and an ordinary battery.

MARCONI'S WIRELESS PLANS.

Signor Marconi is now at Glace Bay inspecting the installation of new apparatus to take the place of that destroyed in the recent fire. It is said that the station will be in operation by January first, and that as soon as it is in regular operation they will be in full competition with the cable companies, expecting to transmit commercial messages across the Atlantic for ten cents per word, and press messages at half that rate. It is also said that the new apparatus to be installed is much more efficient than that which was destroyed by the fire, and that communication across the Atlantic at all times is practically assured.

The Wireless Telephone in the Navy

By Frank C. Perkins.



With the recent wonderful development of the wireless telephone and telegraph and its use in the United States Navy, it has been found necessary, of course, to train men for operating the same on war vessels as well as at land stations, in forts and elsewhere.

The accompanying illustration, Fig. 1, shows a class of United States Navy electricians being drilled in the theory and practice of the radio wireless telephone and supplementary telegraph. The diagram on the blackboard shows the principles of the system as explained to the New York navy yard boys learning to receive and send messages with the wireless telephone and telegraph.

The accompanying illustration, Fig. 2, shows Rear Admiral Evans using the radio wireless telephone in his cabin on the Connecticut. He was the first naval commander to be in communication with his division and six commanders by wireless telephone. The illustration, Fig. 3, shows the wireless apparatus with Captain Ingersoll, chief of the staff to Admiral Evans, manouvering the great battleship fleet at Hampton Roads, by means of the radio wireless telephone.

The wireless phone will prove of great value to the little torpedo boat and torpedo boat destroyers because of the dense volume of smoke which continually flows from their three or four funnels, almost totally obscuring the vessels and rendering flag signalling almost practically impossible. The wireless phone, owing to its speed and absolute certainty in transmitting messages, orders and signals, will, it is believed, be adopted exclusively in the future as the best method for signal and inter-ship communication instead of wigwagging the semaphore and the night lights.

It may be stated that in wireless telegraphy the electric or ether waves have to be interrupted at periodic intervals corresponding to the dot signal of the Morse code. In wireless telephoning the waves are in a state of continued disturbance, and their operation is accomplished differently. The wireless phone is based on the principle of the modulation by an ordinary telephone transmitter of trains of waves of high frequency oscillations. To properly transmit vibrations which correspond to the vibrations caused by the voice, it is necessary to interrupt or vary the waves at intervals, depending upon the case of a human voice. It has been ascertained that the vibrations have an average of about five hundred a second, extending up to 20,000 a second for overtones. The rapid oscillations produced by talking into the mouthpiece cause expanding invisible sound waves to rush off from the antennae in all directions through space at the rate of 186,000 miles per second. These outgoing trains of resonant waves are detected and picked up and the human voice tones are reproduced by a most sensitive electrical apparatus termed the "audion." This apparatus does the work which is accomplished in wireless telegraphy by the detector, or coherer. Two pancake tuning coils, with movable lever, are on the top of the instrument and these furnish the agent for tuning the voice.

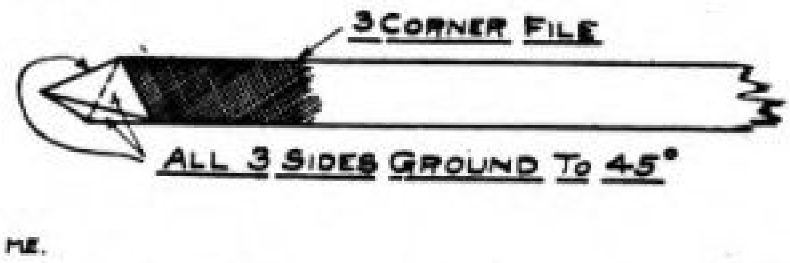
It is said that a mile or more of copper wire is used in the construction of these pancake tuners, two of which are located in the transmitter. The tuning device is adjusted until the loudest desired clearness of tone is obtained, with the aid of

a listening key. When this is secured the instrument is ready for operation, and the voice is transmitted clear and sharp to the receiver at the station required.

Correspondence.

Modern Electrics Publication,
New York City.

Dear Sirs.—This may be of importance to your readers who want to mount some of their instruments on a piece of plate glass and have not a drill handy with which to cut holes in the glass: Take a three cornered file as per enclosed drawing, and grind off the point on a 45 degree bevel (be sure and not burn the point), and you can use the file in a carpenter's brace. To drill in glass make a ring of putty around the spot you wish to bore and fill same with turpentine and bore with very little pressure on brace. The advantage is you do not have to reverse glass and bore from the other side and it will cut better than a drill.



This I got from men who put up plate glass show windows and who cut holes for their corner clamps on the spot. I have used this method and find it very handy.

Hoping this may help some of your readers, I am, Yours truly,

EDMOND G. ROY.

Albany, N. Y., September 18, 1909.

A green wrapper on MODERN ELECTRICS means your subscription has expired. You want to know what's going on in Electrics, don't you? Send in your sub. before you forget it.

If you are keeping your copies for reference, it is necessary to obtain one of our beautiful binders, holding twelve issues. It is made of rich, red vellum, stamped with gold lettering. Price prepaid, 50 cents.

GREEN CARBORUNDUM.

It has recently been discovered that the light green carborundum crystals are about 50% more sensitive than the ordinary crystals and that the green crystals may be inserted into the detector stand regardless of polarity. In fact it does not seem necessary to insert the green crystals in any particular way for all points are equally sensitive.

Wireless Association of America

Wireless Registry

This department has been started with the idea to bring the wireless amateur in closer touch with commercial land and ship stations. Each month a list of new members will be printed here and once each year an official BLUE BOOK will be issued by MODERN ELECTRICS giving a list of all the members who registered during the year. Each member will receive the Official Blue Book free of charge. The Blue Book will also contain a complete list of commercial and government stations, their call letters, wave length, etc.

To register a station requires: Total length of aerial (from top to spark balls), spark length, call letter, (if none is in existence M. E. will appoint one) name and address of owner.

Fee for Registry (including one Blue Book) 25 cents.

Name and Address of Owner.	Call Letter.	Approximate Wave Length in Meters.	Spark Length of Induction Coil.
G. C. Carpenter, New York, N. Y.,	G.C.M.	300	ins.
R. J. McLoughlin, Rutherford, N. J.,	R.M.	200	1 "
C. H. Pfeifer, Ridgewood, N. J.,	C.H.P.	200	1 "
Fred Frerichs, Monongahela, Pa.,	L.D.M.	400	3 "
Oliver DeCalle, Chicago, Ill.,	A.D.	95	2 "
Irving Vermilga, Mt. Vernon, N. Y.,	V.N.	350	3 "
Alfred O. Bragg, Foxcraft, Me.,	A.B.X.	200	1 "
C. L. Jordan, Somerville, Mass.,	B.S.J.	200	"
Harry Atkinson, Philadelphia, Pa.,	H.3.A.	65	1½ "
N. S. Walker, Staten Island, N. Y.,	N.W.	60	2 "
A. T. Loomis, East Lynn, Mass.,	A.F.	240	"
F. Kuehn, New York, N. Y.,	B.W.B.	240	½ "
A. R. Benedict, Leptondale, N. Y.,	A.R.B.	75	"

Name and Address of Owner.	Call Letter.	Approximate Wave Length in Meters.	Spark Length of Induction Coil.
G. C. Howard, Higham Ct., Mass.,	G.E.H.	80	"
Joseph Tate, Ridgway, Ills.,	L.F.	110	"
Norman C. Hurd, Dover, N. H.,	N.H.	360	1 "
J. G. Goodsell, Tropico, Cal.,	J.G.	85	1½ "
J. Michiner, Dobbs Ferry, N. Y.	J.M.	120	2 "
Phillips B. Wilde, Woods Hole, Mass.,	P.B.W.	175	1 "
Fred. Small, Baker City, Ore.,	C.T.	100	"
R. A. Egbert, Alpine, Tex.,	R.A.	50	½ "
D. K. Caldwell, Hollywood, Cal.,	P.25.	200	1 "
Charles Breetz, Hudson, N. J.,	C.B.	30	½ "
E. J. McShane, Boston, Mass.,	W.M.	100	2 K.W.
Wm. Lee Graves, South Orange, N. J.,	L.G.	75	½ "
John F. McMahon, So. Norwalk, Conn.,	G.F.M.	150	2 ins.

NOTE: Parties having registered after May 1st are **not** entitled to the present Blue Bnok, but to the one to be published May, 1910.

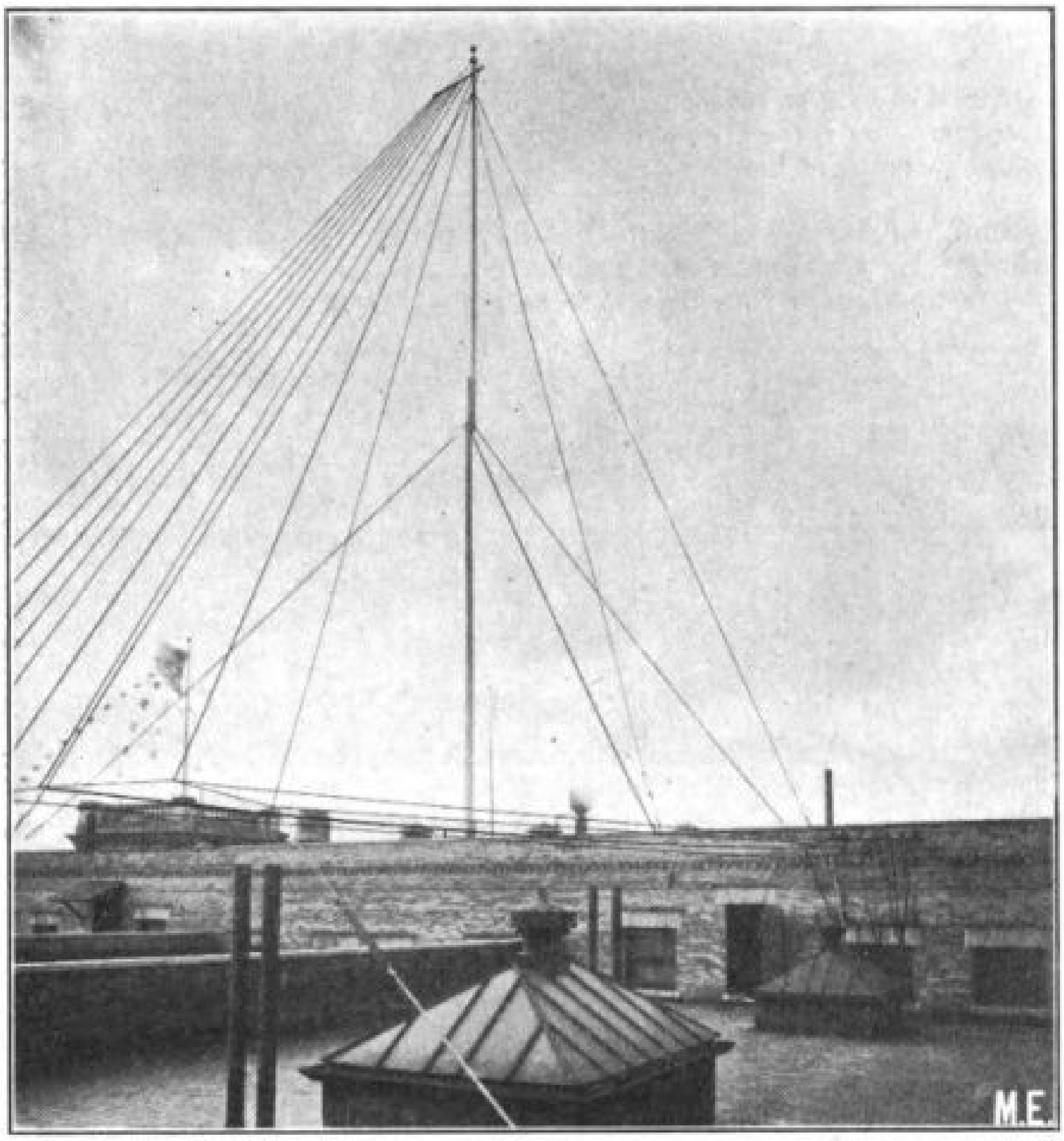
TORPEDO RUN BY WIRELESS.

A submerged torpedo propelled and controlled by electricity transmitted by the wireless method, is the work of Carl Abrahamson, of San Diego, Cal. The invention is simple. The propelling force is manipulated on the same principle as the wireless telegraph. Electricity is transmitted from aerial wires on shore to aerials supported by cork floats and connected with the propeller wheel of the torpedo, which is submerged. A current powerful enough to send a sixteen-foot torpedo through the water at a speed of thirty-two miles an hour can be transmitted. Control of the device is secured by magnets set on each side of the propeller and connected with the steering gear. These magnets are of different degrees of sensitiveness and are susceptible to varying degrees of power in electric currents. The steering is thus made possible by a variation in the amount of power sent to the torpedo.

We wish to buy a number of back issues from April, 1908, to September, 1908, inclusive. We shall pay a good price for these issues, if in good condition. We would like to hear at once from readers who desire to dispose of above copies.

Wireless Stations About New York

No. 3.—Station at 42 Broadway.



This is the principal station owned by the United Wireless Telegraph Co., and is located on the twenty-second floor of the building at 42 Broadway. The executive offices of the company are located on the nineteenth floor of the same building. The station itself is 250 feet above the level of the street. Aerial consists of 9 wires, and is of the inverted fan type, the pole being 110 feet high. This was the first commercial station installed by the company and was erected in 1904. The apparatus has been much improved of late, and they are now using an inductive tuner for receiving. Three variable condensers are also used in the circuit. More actual commercial business is handled by this station (operators being on duty night and day) than any other station now in operation. The output of the station is 2 K. W., and messages are handled direct from Boston, Mass.; Bridgeport, Conn.; Long Branch, N. J.; Philadelphia, Pa.; Baltimore, Md.; Wilmington, Del.; Washington, D. C.; Tangier Island, Va (with which place there is no other means of quick communication); Tampa, Fla, and Chicago, Ill.

Chief Operator J. B. Duffy, who may be seen at the right of the photograph, claims that this is now the most efficient station owned by the company, and states that the only reason long distance records are not made more frequently is that the operators are kept so busy that they have no time to do close tuning.

The operator on duty, M. H. Paine, is at the left of the photograph, and is shown in the act of sending a message. The spark may be seen slightly in the peep-hole of the muffler and in the anchor gap. The instrument shown at "A" in the photograph is a new type of muffler, designed and patented by J. S. Murphy, the company's chief electrician, and is the first muffler to have an actual outlet, yet which entirely cuts out the crash of the spark. It is simply a box with a thick sound-proof lining and a regular gas engine muffler on each end. It is said that this will shortly come into use by all stations. The old

style muffler, enclosed in the helix, was being used when the photograph was taken, the new one not having yet been installed. Ventilation of the old type is being taken care of by a small blower fan which is turned on at the same time as the dynamo which sends a strong blast of air through a rubber tube into the muffler, thus aiding in keeping the spark gap cool.

The Automatic Operator

By O. A. Shann.

There are doubtless many operators that read your wireless magazine who have found at times that they needed a silent partner to operate for them while experimenting with wireless telegraphy.

The device about to be described is simply a circuit breaker to be placed in the primary circuit in series with the sending key. Its motive power is not derived from an ordinary closed circuit motor, but from the vibratory action of the armature of a common call bell.

A clear understanding of the working of same may be had by referring to sketch. Part "A" is an electric bell with gong removed. The tapper in the armature is removed and a longer round rod, "B," is fastened in. This round rod is bent up square at the end and a thin brass strip, "C," is bent over it and made to move freely.

The other end of strip "C" is bent up and pointed to resemble a pawl. A small spring "K" is secured to strip "C" and rod "B" as shown on sketch.

Now the three clock wheels, "D," "E" and "F," mounted on suitable frame, are located near to brass strip "C" so that this strip will engage teeth in wheel "D." When wheel "D" turns rapidly, wheel "F" is made to move slowly.

On cog wheel F a wood block G is fastened. A thin strip of brass is bent around block and soldered at the joint. This brass ring is connected electrically by a small wire to shaft of wheel "F."

An ordinary binding post I, with a brass rod pointed at one end is screwed to the board near wheel F so that the pointer will bear on the brass ring H. The pointer must have tension on it so a spring is used pulling against the brass strip. A wire is soldered to framework of cog wheels and another one to binding post with pointer. To these two posts is connected the primary sending circuit of the spark coil.

The bell is connected in series with battery and also a rheostat regulator. Electro Importing Co. type used on this one.

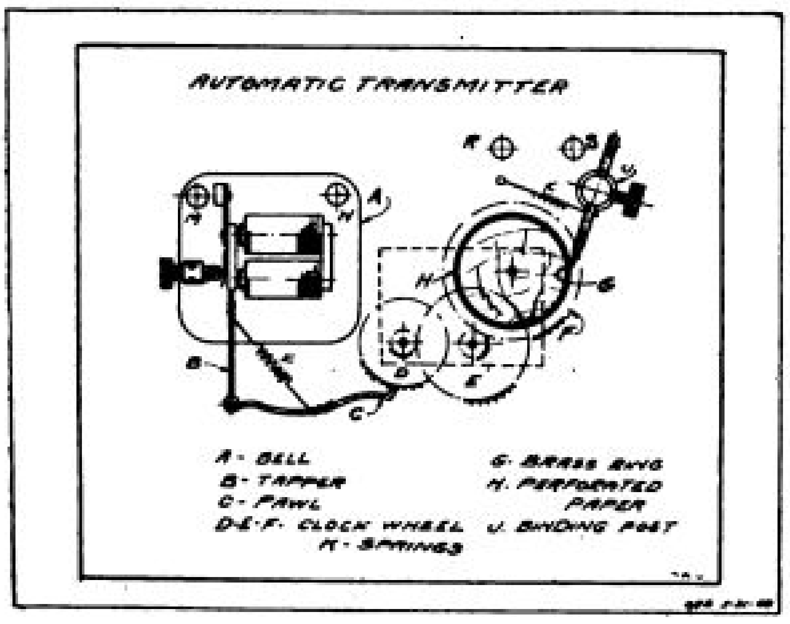
A thin tough strip of paper H was firmly fastened to the brass ring on cog F. Before doing this, however, the paper was perforated with holes to allow pointer to make contact on brass, these holes were composed of dots and dashes to represent signal or call letters.

Therefore when paper passed under pointer no contact was made, but as soon as hole was reached the circuit was completed.

By looking at the diagram it can be seen that when the armature of bell is drawn over by magnets the brass strip C grips one of the teeth in the wheel D and forces it around a little. When current is interrupted the armature drops back and the brass strip (pawl) catches another tooth.

The more the current in the bell, the faster the armature will move and consequently the sending speed will be increased.

The December, 1908, issue of MODERN ELECTRICS shows an arrangement of cutting in some batteries when an alarm clock goes off.



This can be applied to the bell circuit and the wireless sender will operate at any desired time, perhaps when the experimenter is off somewhere listening for his own station.

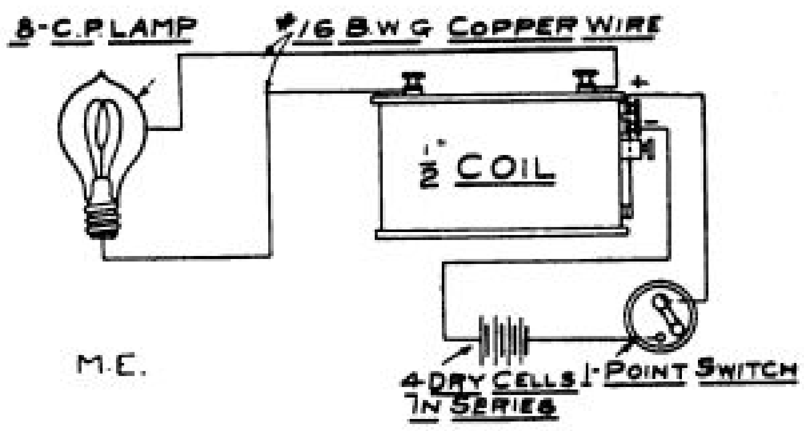
Care must be taken to have brass contact ring clean.

The writer has had quite some success with the above described transmitter.

AN INTERESTING EXPERIMENT

The other night I performed an interesting experiment, using an 8 candle-power incandescent lamp. The lamp was connected to one side of the secondaries of a 2-inch coil, the other side of secondary, using a 16 B. & S. gauge copper wire, was laid on the globe of lamp.

On bringing the coil into operation the filament of lamp came to one side of

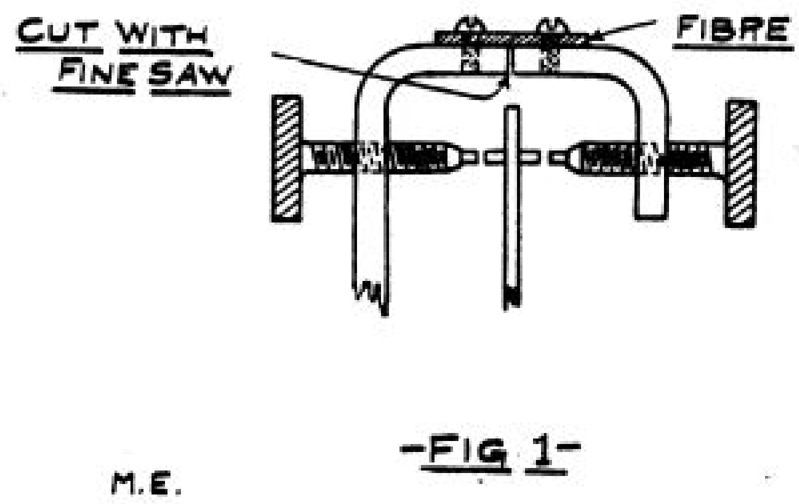


lamp. At once I noticed the filament had broken in three parts. What was the cause of same?

Contributed by RAYMOND ANDRECOS.

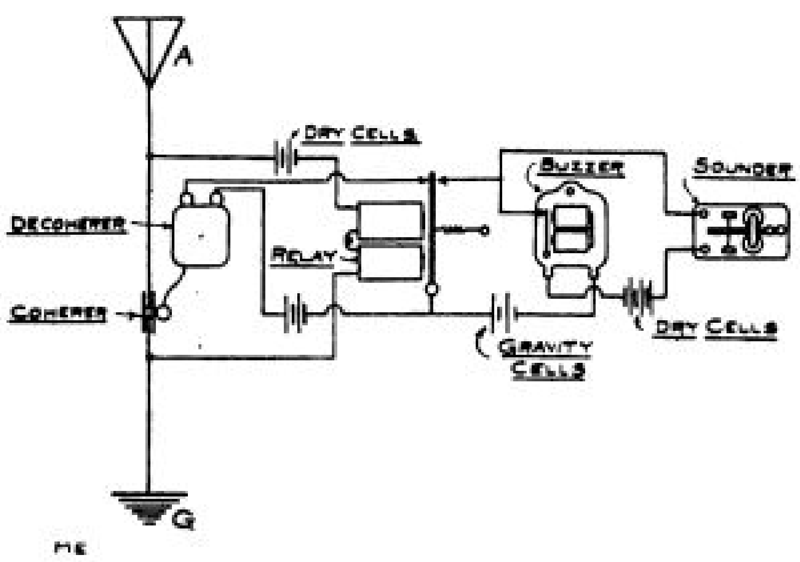
SOUNDER CIRCUIT.

I had trouble with my sounder vibrating the same as my decoherer when connected on a relay in the decoherer circuit, so I devised the following:



-FIG 1-

I sawed my relay contacts apart as per Fig. 1, and fastened the parts together again with a piece of fibre. I



put a platinum point in screw A and connected as in Fig. 2, and I had no more trouble.

Contributed by GORDON B. SAYRE.

MODERN ELECTRICS

A Magazine devoted entirely to the Electrical Arts.

PUBLISHED MONTHLY BY

Modern Electrics Publication

NEW YORK CITY, N. Y.

H. GERNSBACK, EDITOR.

Subscription Price: For U. S. and Mexico $1.00 per year, payable in advance.

New York City and Canada, $1.25.

Foreign Countries, $1.50 in Gold.

Stamps in payment for subscriptions *not accepted.*

Checks on out of town Banks cannot be accepted unless the usual exchange is added.

SINGLE COPY, 10 CENTS.

Forms close the 20th of the month preceding date of publication. Advertising rates on application.

The Editor will be pleased to receive original contributions of timely interest pertaining to the electrical and the affiliated arts. Articles with good drawings and clear photographs especially desired. If accepted, such articles will be paid for on publication, at regular rates. No manuscripts will be returned unless return postage is enclosed.

Address all communications to:

MODERN ELECTRICS PUBLICATION

84 West Broadway, New York, N. Y.

Chicago Office: 112 Dearborn Street
Paris Office: 136 Rue d'Assas.
Brussels Office: 23 Rue Henri Maus.

Entered as Second Class matter March 31, 1908, at the New York Post Office, under the Act of Congress of March 3, 1879.

Vol. II. OCTOBER 1909. No. 7

EDITORIALS.

Despite the fact that the daily press and in particular this magazine, have time and again told the unscrupulous amateurs refrain from using the sacred signal of distress: C. Q. D., it is with the greatest regret that the Editor notes that the big stations, and in particular the ocean-going ships, are now forced to adopt a new signal of distress because some directly criminal amateurs used the C. Q. D. signal to play "jokes" on friends or on large stations.

Now, this state of affairs is distressing and aggravating in the highest degree, and must be stopped under all circumstances.

To the Editor's mind there is no greater coward than the man who, sitting in his attic, where he feels himself safe from detection, operates his key and misuses the signal of distress, sacred to every honest and fair minded man. If this abuse of the C. Q. D. were reported from darkest Russia, one would think it natural, but that it should actually come from the United States, where fair play and respecting the rights of others is almost second nature, is incredible. But still the facts are there.

Let us ask the wireless criminal if he would have the courage to tap a telegraph line and thus call for help as a joke. You can be certain he would be too much of a coward to risk it, but up in his attic where nobody sees him, he is full of courage, of course.

It is too bad that there is as yet no law that can put such a man in jail who misuses the signal of distress, but the Editor will use all his influence to have such a law passed through Congress, as it is the only way to safeguard the future of wireless, and more important than that, it will save thousands of human beings.

Does it not seem strange that a man can be arrested for wilfully turning in a wrong fire alarm, and that a man who is the direct cause of sending six ships from their course to assist an imaginary sinking ship cannot be punished?

The new signal of distress now used, which it is earnestly hoped will not be misused hereafter, is:

S O S

... .

and must under no circumstances be used unless there is real danger at hand.

WIRELESS TELEGRAM.

The following message was received by the Editor a few days ago:

To the Editor of Modern Electrics:

The United States battleship Rhode Island, while at anchor in Hampton Roads, Va., in the early morning of September 18th, was in perfect wireless communication with Chicago, Ill. The operator of the high-power station at Chicago told the battleship that he could hear him perfectly, asking his position, etc., which was given him. The naval operator doubted his hearing at the time, and communicated with Manhattan Beach, N. Y., a long distance station, to make sure he was not being deceived by some nearby vessel. The Rhode Island is equipped with one of the lowest power wireless sets in the around-the-world battleship fleet.

L. E. ANDREWS,
Electrician, U. S. N., United States battleship Rhode Island.
New York, N. Y., Sept. 26, 1909.

ECONOMIZING THE TIME OF THE BUSY EXECUTIVE.

Nothing is more important to the profitable conduct of business, in these days of intense competition, than the economy of time. The old saying that "time is money" is no longer a careless figure of speech, it is a serious, and often a very disturbing fact. More is done in an hour now than our grandfathers thought it necessary to do in a day; and every minute of every sixty in every hour of the business day has a definite value. For that reason inventive ingenuity is occupied almost continuously in the effort to devise means to simplify work in a way that will give more time for other work.

One of the most remarkable of the latest inventions in this class is the Dictograph, a sort of glorified telephone, for interior use chiefly, though adaptable to any kind of telephonic service. What this small, but wonderfully effective instrument can do as an office economist approaches the incredible. If it were not already in extensive use in the large cities of the country, in banks, insurance offices, railroad offices, in great mercantile houses, etc., etc., and if applications for it from similar institutions had not overtaxed the factory capacity, as the manufacturers have announced, some of the things credited to the Dictograph would hardly be believed. But experience has given them proof and the demand for the little "electric marvel" is growing accordingly.

The apparatus is a small box that can be set under the pigeon holes of a desk or otherwise disposed to the convenience of the user. In the upper part of the face is a circular opening into which is fixed a transmitter—the ear of the Dictograph. This is the extraordinary feature, for this transmitter is so wonderfully sensitive that it takes up a whisper that the human ear could not catch at the same distance and, by a peculiar mechanism (the Dictograph's exclusive patent) the delicate sound is so intensified that the listener at the other end of the wire, no matter how far away, can distinctly hear the whisper that was inaudible to any one standing near the one who did the whispering.

That quality is the basis of the service value of the Dictograph. Because of that combination of sensitiveness and sound-increasing function the Dictograph can do what it does. The system consists of a master station and sub-station with connecting wires on a special plan. One master station can be connected with any number of sub-stations or other master stations, so that all parts of a building or series of buildings may be brought into relation by one service. The master station (a box eleven inches long by six wide) has under the transmitter a series of levers that mark the various connections with sub-stations or other master stations. It also has a loud speaking receiver, and a small ear piece receiver to be used when it is desired to have conversation strictly private.

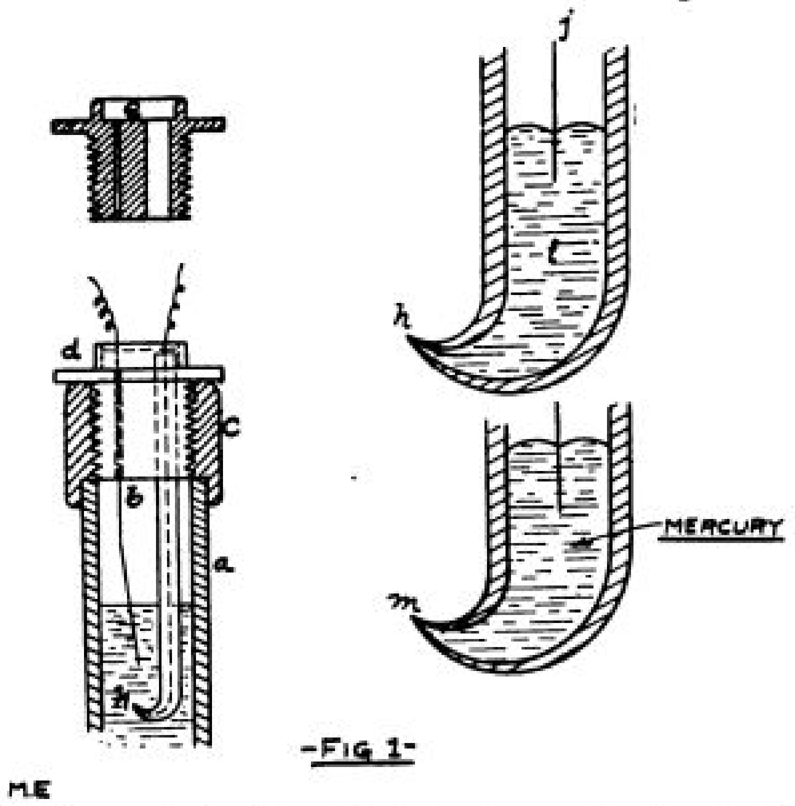
In speaking to the Dictograph, it is not necessary to approach the instrument; you can speak to it from any distance within fifteen feet and the person at the sub-station or other master stations can hear you perfectly. You can hear the reply while standing where you first spoke. There is no "Central;" you speak direct to the person called without having any intermediary. Press down the lever that calls the desired person and you are ready to talk. No delay, no bother with Central; no interference; action is immediate. A manager can in this way give instructions to one or a dozen subordinates one after the other or to all at the same time as he pleases without leaving his desk or taking them from theirs. It is obvious that such a system is a tremendous time saver in a large and busy establishment. In a smaller way the professional man at the desk can dictate to his stenographer in another room with equal convenience. After pressing the lever he talks, in every position, from any part of the room,

(Continued on Page 327)

Paris Letter

IMPROVED ELECTROLYTIC DETECTOR.

An improvement in electrolytic detectors is brought out by the Carpentier-Gaiffe-Rochefort firm of Paris. The liquid is contained in a small cylinder of celluloid, and this is mounted so that the terminals do not need to be disconnected for cleaning the cell. Another new point lies in the construction of the fine wire tube. The celluloid cylinder A containing the two electrodes, is mounted integral with the threaded collar C, so that the cell as a whole can be screwed up into

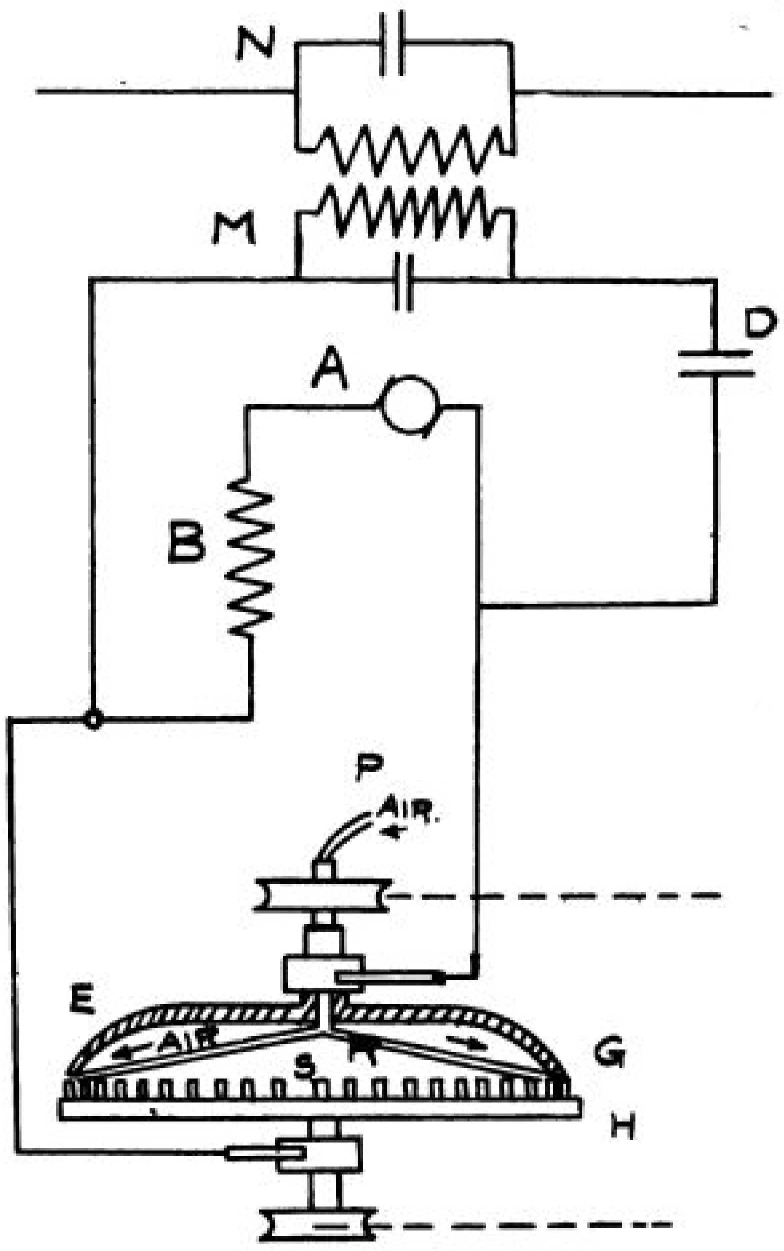


-FIG. 1-

the threaded plug D, this latter being held fixed in a suitable support. In order to uncover the electrodes we need only screw off the celluloid cylinder while the electrodes remain held in the support. A sealing composition is flowed into the top E of the plug so as to surround the ends of the terminals. The tube holding the Wollaston wire has the pointed end turned upwards at H and has but a small piece of wire going through. The lower part of the tube contains mercury I, into which dips the terminal wire J. It is found that the mercury alone can be used, as seen at M, in order to form the end of the electrode, without using the Wollaston wire.

NEW METHOD FOR PRODUCING HIGH FREQUENCY OSCILLATIONS.

A German inventer (Heinicke) uses the following device for producing electrical oscillations: Two discs lying parallel are made to rotate in contrary directions by an electric motor. The lower disc H has a set of projecting teeth I, say 200, and on the upper disc G there are disposed two contacts E, F, so that when one contact is on a tooth the opposite one lies in the space between two teeth. Both discs are rotated at a speed of 2,000 r. p. m. Given twice 200 or 400 contacts made per revolution, since the discs turn at the same time we have 800 such contacts, and 800×2,000 revolutions gives 1,600,000 contacts per minute. We connect this in a circuit containing the dynamo A and choke coil B. In parallel on the first circuit we use an oscillatory circuit M connected either direct or using

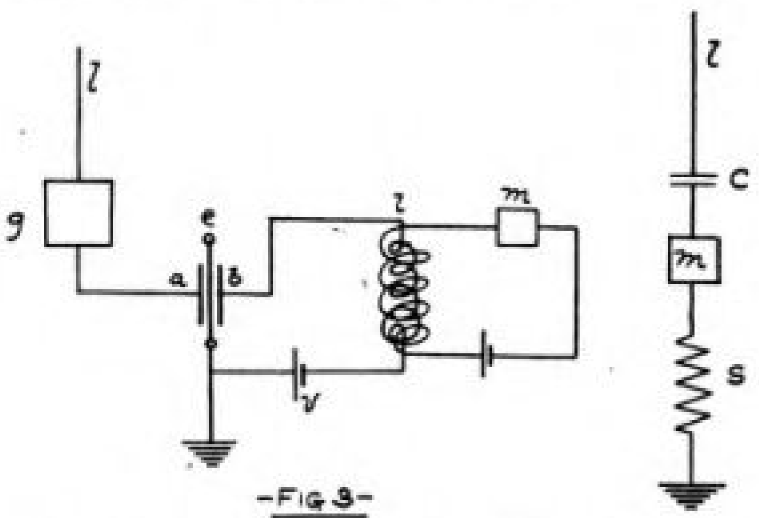


-FIG. 2-

a condenser at D. Electrical oscillations are thus produced in this circuit, due to the sparks of the contact breaker. Such oscillations are of two kinds, in the first, the frequency depends upon the number of contacts per second of the breaker, and in the second it depends on the capacity and self induction of the oscillatory circuit. But in practice we are able to bring both these sets of waves into concordance by proper tuning. The oscillatory circuit acts inductively on a second oscillating circuit N, which is entirely closed and is mounted with the aerial and ground. The energy which is radiated by the aerial is thus found to be considerable. For blowing the contacts so as to prevent an arc from forming there is used an air current supplied at P, R, S.

NEW METHOD FOR INFLUENCING EMITTED WAVES.

For radiophony there have been used condensers having a diaphragm which receives the sound waves, either directly or indirectly, so as to change the capacity of the condenser in this way and form a transmitter. When used indirectly, one part of the condenser is an iron plate forming part of a magnetic circuit and it is acted upon by current from a separate microphone. But with a single iron plate we cannot make a condenser which follows the sound waves and has enough energy. Should we use several plates the result is faulty owing to acoustic effects, interference, etc., when spoken against directly and is not practicable when used with a microphone. An inventor uses a membrane which is influenced not by magnetic but by electrostatic forces. Sound is transmitted to the membrane from an extra microphone. We use the condenser-telephone, with fixed disc B, and a diaphragm E, this latter forming a second condenser with a fixed disc A. This disc is connected to the aerial L, which is supplied by the generator G. Speaking into the ordinary microphone M, the current waves are sent by the induction coil I to the condenser, A, E. B,



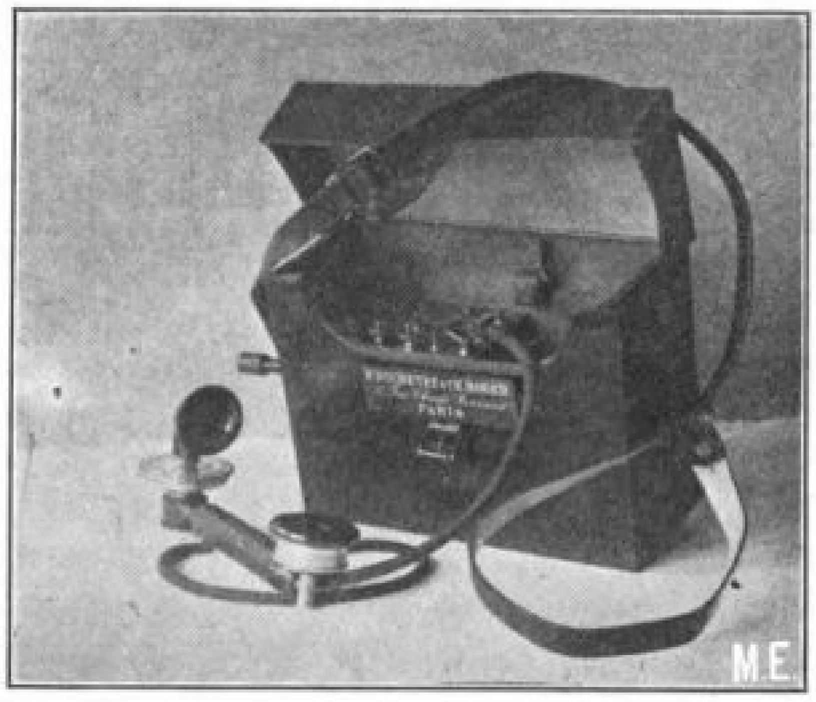
-FIG 3-

using an extra battery V. The movement of the diaphragm E changes the capacity of the condenser A E and therefore the wave length of the aerial.

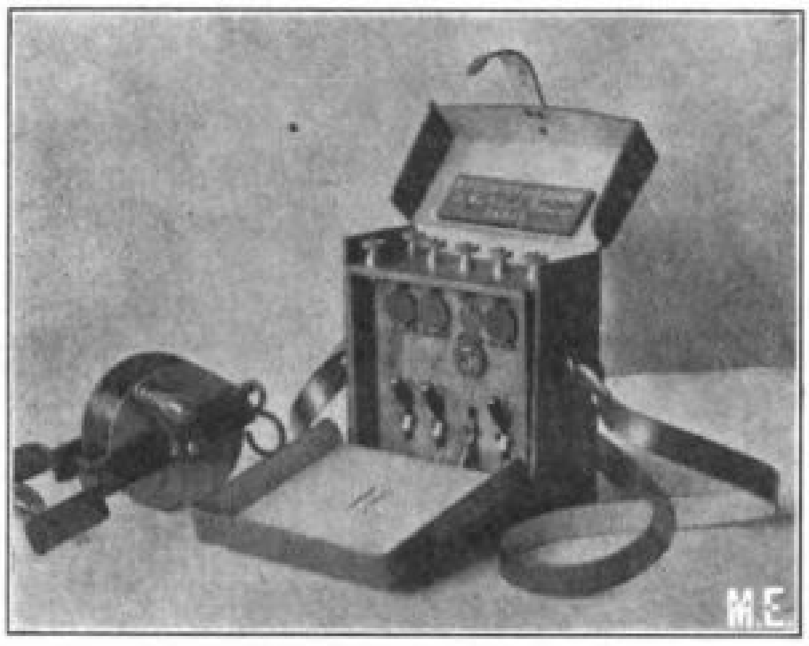
We can mount the microphone at some distance from the condenser, so that the high frequency currents do not pass into the microphone, but if we do not need this advantage we can dispense with a special source of current for the microphone and supply it with the high frequency current as shown at B. The aerial is put in vibration by the coil S, in connection with a generator of high frequency, this being in series with the microphone M and the condenser-telephone C. Its own period is somewhat higher than the frequency of the excited circuit. When the microphone receives sound waves its electrical resistance lessens and a stronger current passes in the aerial and the condenser membrane is attracted. Therefore the aerial approaches its resonance position so that it again receives more current.

COMPACT FIELD TELEPHONE.

The Ducretet firm constructs a new type of field telephone for military use which is based on long experience and is well adapted for the purpose. It is contained in a small leather case. A small magneto is placed in the bottom of the



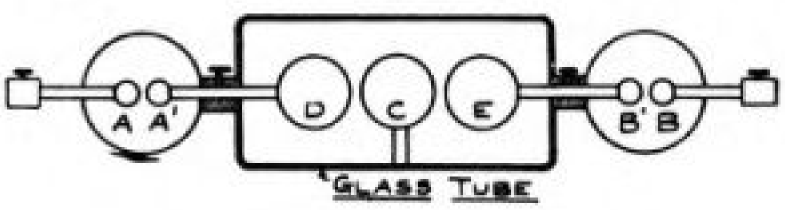
box, and its handle is screwed in without removing the apparatus. It will work for 15 miles distance. The microphone and the receiver in aluminum are mounted together on an insulating hand piece. With each post there is a reel containing 1,500 feet of wire and several extra reels. A novelty is the use of a wire covered with a very thin and strong enamel so that the diameter is not increased, which would make the bobbin too large. Thus 1,500 feet of 0.7 millimeter wire can be wound on a reel of 4.4 inch diameter and 2-inch width. By removing a pin we take out one reel and replace another in the support. A contact on the reel makes connection with the apparatus regardless of the length of wire unrolled. Grounding is done by sinking a metal point in the earth. When an officer is to connect with say, four different posts, there is used a second case with an annunciator and a set of levers. When the levers are raised, the annunciators are connected with their lines. Should one post wish to speak, the operator turns his magneto, which drops the annunciator disc, say, No. 3, and the bell rings at the same time. The chief turns down the lever No. 3 which puts his telephone in the circuit in place of the an-



nunciator. When the officer calls up one of the posts, he lowers the corresponding lever and turns his magneto, pressing on the button B. Each outside post can connect with another one after having the connection made by the chief station.

NEW SPARK GAP.

For oscillation we have generally a self induction and a spark break with two balls or discs, but to have a good yield the spark should be sudden and thus made for a very short time in proportion to the duration of the wave. If we need heavy discharges we must separate the balls to such a distance that the spark does not always give a good yield. The Charbonneau device secures a good result as follows: There are used two spark



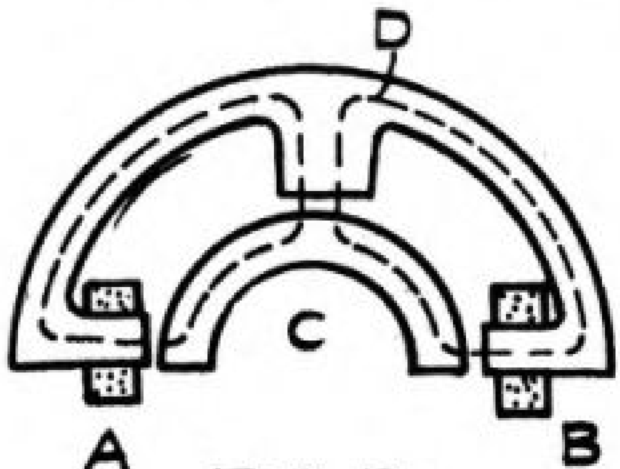
-FIG 4-

ME

breaks, AA', and BB'. Mounted in the center is a glass tube holding a sphere C of high capacity, this being insulated from the rest. At the sides are two other spheres, D and E, having a less capacity than C, and they are connected to A' and B', respectively, by rods which work in iusulating slides. We thus have four sparks, at AA', CD, CE and B'B, but only the sparks CD and CE are of an oscillatory nature. Sparks AA' and BB' are only used to charge the spheres D and E. There is an oscillatory discharge between CD and CE only when D and E have received enough charge. We regulate by adjusting the distance between the large spheres. The essential point is that we can secure a high oscillation effect without needing large sparks. With 1-inch balls at AA and BB' we use 1/2-inch gap between these, and only a 1/250-inch gap at CD and CE. With the ordinary method using only two 1-inch balls we would require 4 inches gap for the same effect.

ADJUSTABLE INDUCTIVE RESISTANCE.

An adjustable inductive resistance devised by a German inventor has two or more coils, A, B, placed on pole pieces which are mounted on a common iron core, and there is used a movable armature C so that the magnetic effect of the circuit can be changed continuously. As here shown, we have a rotating armature C, which closes the magnetic circuit of the coils A and B through an extra pole piece D. Otherwise we can complete the



-FIG 5-

ME.

magnetic circuit for the coils so that they oppose each other. The number of coils and extra poles can be varied, and the extra pole pieces can be wound so as to have a different polarity from the others.

W. A. O. A.

The Wireless Association of America, headed by America's foremost wireless men, has only one purpose: the advancement of "wireless." **If you are not a member as yet, do not fail to read the announcement in the January issue.** ***No fees to be paid.***

Send today for free membership card. Join the Association. It is the most powerful wireless organization in the U. S. It will guard your interest when occasion arises.

The Elements of A Telephone Equipment For Rural Lines

By F. B. Urig.

The construction of rural and independent telephone lines is at the present time of such general interest that the following elements of a good telephone equipment may be of benefit to those interested. The construction of the lines over which telephone service is carried is quite apart from the actual equipment of such lines.

The function or object of any commercial telephone is a means of communication by speech or conversation. Therefore, the Transmitter, Receiver, Induction Coil and Batteries—the part of the apparatus through which the talking is done—should be given first consideration.

TRANSMITTER.

The transmitter comes first and is the most important part of the talking apparatus. A good receiver can not repeat from a poor transmitter.

The heart of the transmitter is the carbon, and it is essential that the carbon should be the most carefully selected material entering into the construction of the telephone; and that the source from which the carbon is selected is one that has been given a thorough investigation and a mineral vein that has proven out its reliability.

It is also essential that the transmitter be one that will require a uniform battery consumption and will consume the minimum amount of current.

The object of the transmitter is to convey the voice of the person talking to the end of the line, and the transmitter that will convey the voice in its most natural tone and most distinctly the longest distance can be considered the best transmitter. It is not a noise that is to be conveyed—the noise should be avoided. One of the leading manufacturers of telephones has spent a fortune to overcome the noise passing through the transmitter; the nearer you can come to confining the transmission entirely to the words spoken directly into the transmitter, the more perfect the telephone conversation will be.

In addition to the talking qualities, the transmitter should be substantially built, but not cumbersome, and should harmonize in appearance with the balance of the set.

RECEIVER.

A good transmitter is useless without a good receiver. The permanent magnets, pole pieces and diaphragm are the important and essential parts of the receiver. The magnets should be made only of a selected special grade of steel and the pole pieces of a special annealed Norway iron.

The ear piece should be so designed as to fit the ear snugly, and the oldest and largest manufacturers have made a study of the design and this part of the receivers of such manufacturers will be found very nearly alike.

As a rule, the transmitter and receivers are generally purchased in pairs and the manufacturer of the best transmitter will necessarily have a high class receiver.

BATTERIES.

The batteries are an important part of the talking equipment. The cheapest battery is not always the most economical, nor is the battery showing the greatest initial strength the best to use or the cheapest to buy. The tests to which some batteries are subjected by the use of pocket meters is at the best unreliable, as it is very difficult to get these instruments reading accurately. Successful transmission requires a uniform and constant current; and, again, the simile can be used, that the runner who shows the greatest strength and speed at the beginning of a Marathon race is not the one who is certain to win, more likely it is the one who knows his distance, best times himself to a uniform gait and uses no useless exertion.

The Western Electric Company, the largest manufacturer of telephones and telephone apparatus in the world, and which furnishes the entire Bell telephone equipment, as well as other companies, has found through thirty-two years of experience that it is necessary to have a telephone battery for telephone service; they have thereupon perfected telephone batteries and placed them on the market at a reasonable price. The largest telephone companies are using these batteries, and in no case do they buy or recommend batteries that are cheap in price. The best battery is none too good.

SIGNALLING APPARATUS.

In addition to the talking equipment, the signalling apparatus should be dependable. This apparatus consists principally of the switch hook, generator and ringer.

The hook should be compact, self-contained and substantial but not clumsy; all of the contacts should be of the best grade of platinum and all the springs mounted vertically so no dust can settle on the contacts but will fall through the springs.

The generator for distances of five miles and over with more than five instruments on a line, should be a five bar generator of heavy substantial construction, with large bearing and one in which the crank and armature will turn easily, even on the heaviest loaded lines, so as to readily distinguish the various code rings. The latest sets placed on the market will operate satisfactorily on lines 30 miles long with 40 telephones on the line, and in the case of one manufacturer the telephone has been worked on a line 75 miles long with 75 sets on the line; but this is going considerably beyond what the manufacturer recommends.

The permanent magnets of the generator should be made of specially selected steel and the armature normally short-circuited to give it protection against damage by lightning.

The ringer should be sensitive, very easy to adjust, and one that will stay adjusted. The one that can be adjusted with an ordinary screw-driver with one or two simple turns is the best. The resistance of the ringer should be 1600 ohms or 2500 ohms, some manufacturers claiming 1600 ohms is the best and others that 2500 ohms will operate equally as well. Care, however, should be taken that the ringers on the same party line should be of the same resistance; that is, telephones containing 1600 ohm ringers should not be operated over the same party line with telephones containing 2500 ohm ringers.

The gong posts should be mounted on the ringer frame and not on the woodwork of the set.

Large brass gongs produce the greatest volume of sound. After long experience and careful study by the most competent engineers on the part of one of the leading manufacturers, a gong 3 inches in diameter was found to be of the best size. In purchasing a telephone there is this distinction to be remembered, that the function of the ringer is to attract attention and the function of the transmitter is to convey conversation and not noise.

WOODWORK.

The woodwork of the telephone should be attractive and is generally furnished in oak. It should be well put together.

The door should open to the left so that when inspecting the set and adjusting the ringer, the generator can be turned and the operation of the ringer watched at the same time.

The writing shelf, generally composed of two pieces, unless reinforced with dowel pins between the two pieces, is likely to break off.

The backboard should be slotted the entire length so the lines can be brought in from the top or bottom.

It is preferable to have all binding posts inside, so the telephone can not become short-circuited by having scissors or other metal articles laid across the binding posts.

LIGHTNING ARRESTERS.

The telephone should be protected by a lightning arrester, and this arrester should not be mounted on the telephone. The object of the arrester is to protect the telephone and the person who may be using it during a storm, and the greater distance this arrester is placed from the set and the nearer to where the lightning is likely to enter the building on the line, the more certain is the protection. The usual place is just inside the window casing where the wires enter the building. Care should be taken that it is placed far enough away from the lace curtains to avoid damage from their catching fire. This practice of mounting arresters is followed by all of the leading companies in the large cities and is the standard practice.

IN GENERAL.

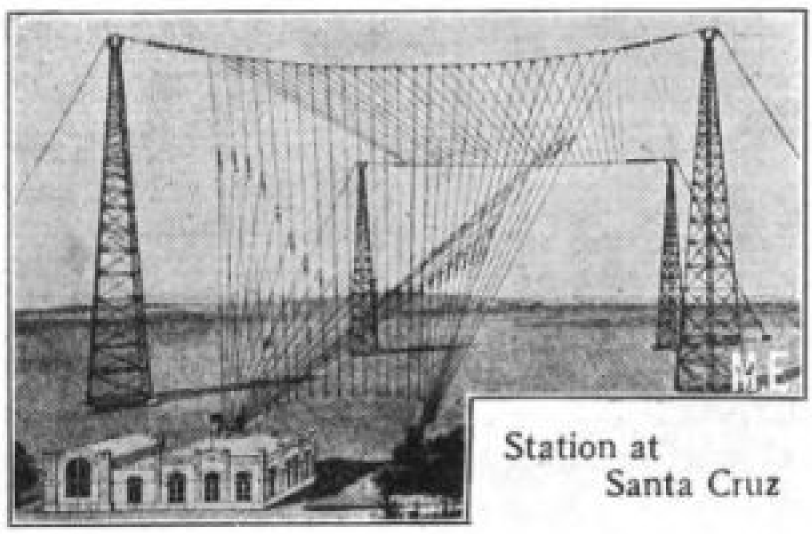
It should be remembered that the telephone is a wonderful, delicate and useful instrument. It has required years to perfect it as it is to-day, talking over a distance of more than 1500 miles, and that the most dependable and best instruments are those sold by the oldest and largest manufacturers, and that a prospective purchaser will always get the best bargain if he trusts to the experience and

(Continued on Page 324)

New Wireless Station in Spain

By Our Paris Correspondent.

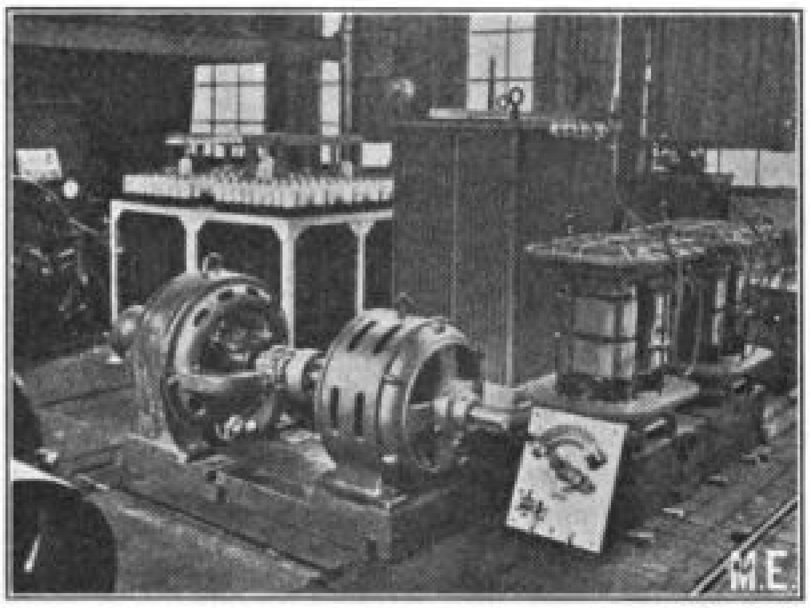
Wireless operations in the neighborhood of Gibraltar are to be carried out on a large scale by a recently formed Spanish company in connection with the Paris Wireless Company, of which M. Victor Popp is the president. He furnishes us with the following points about the extensive island and coast system which is now in progress. Seeing that the object of a wireless company is to establish inter-oceanic services and thus compete with the submarine cables, as well as to erect posts along the coast in the most useful regions, especially in the centers where vessels pass most frequently and on the islands lying in the route of vessels, the present operations are carried on in this direction. Gibraltar is without doubt the most important center of the kind in southern Europe, seeing that all the vessels passing between the Atlantic and the Mediterranean are obliged to go through the strait. On the other hand, the Canary Islands form the best point for exchanging wireless messages between the ports of the Continent and the vessels of the leading steamship lines of South America, seeing that all the steamers of these lines stop at the Canaries. From this point there are many



Station at Santa Cruz

telegrams sent by cable relating to the business of the steamship lines without counting the private messages. Last reports show 3,300 vessels passing annually by the two ports of Las Palmas and Santa Cruz de Teneriffe, and the telegraph traffic by the cable which runs to the Spanish coast at Cadiz is 5,000 words per day.

The wireless service in this region is to be operated at present by two large stations which are erecting in the Canaries, one at Santa Cruz and the second at Las Palmas, with a shore post located at Cadiz. These stations will allow the vessels at Las Palmas and also enroute for a distance of 2,000 miles, to keep up a connection with the Continent, and this will be obviously a great advantage. We represent the type of wireless station which is erecting in the Canaries and on shore. During the night it is expected to cover 3,500 miles. The aerial is formed of a set of horizontal wires which are supported by two main cross wires, the

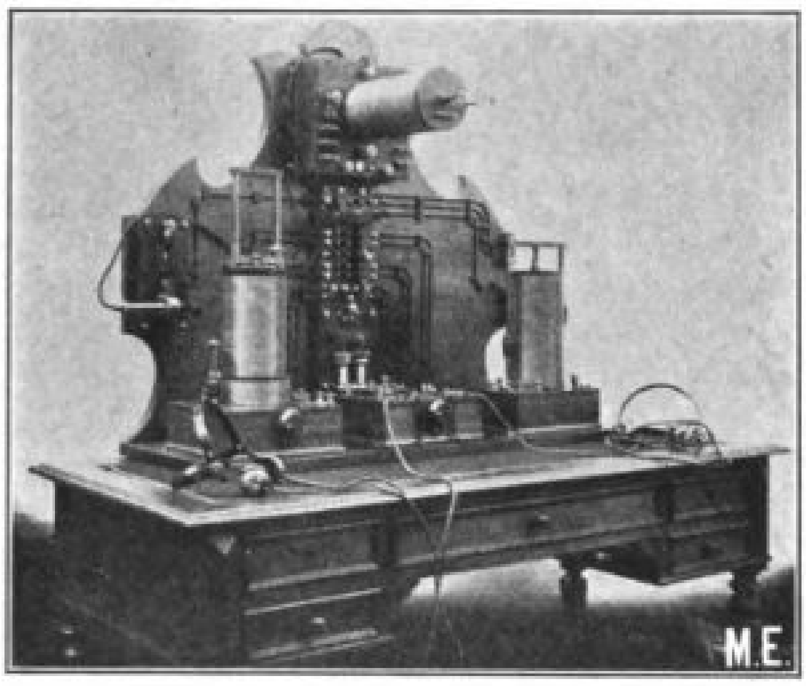


Transmitting Apparatus

whole being held on four iron towers anchored in concrete. The station building is located in front of the set of towers. For the horizontal wires of the antenna there are used bronze telegraph wires of a special kind, and the distance between towers is 330 feet one way and 400 feet in the other. The ground is formed by zinc plates and has 500 square yards surface.

For the present high power, using 45 horse power engines, transformers with open magnetic circuit are rejected, and there is used a closed circuit transformer of the electric lighting type. Experiment shows that a very close tuning can be obtained in this way, provided the transformer is properly designed. The Bethenod transformer is used here, and it gives excellent results. In order to handle the currents in the proper way there is employed a relay in connection with the oscillator, so that the heavy currents are operated indirectly. The condensers have a total capacity of 7/10 microfarad. The battery of condensers has to support about 60,000 volts, and this can be done by using the Moscicki condenser, which we expect to describe later. A standard wave-length of 1,500 meters is adopted here, but a change can be made to a 600-meter wave by working on the aerial in harmonic (or $3\times600=1,800$ meters), this being carried out in a single operation. A wave of 300 meters can also be employed for the receiving. An Oudin oscillator is used, with a spark gap formed of two zinc plates having a strong air draught.

The station uses a steam engine of 45 horse power and there will be used an alternator driven direct from the engine and a direct current machine working on storage battery. In the latter case we have an alternator and generator mount-



Receiving Instruments

ed on the same engine shaft, so that we can use the battery to work the generator as a motor for driving the alternator, thus having a useful combination system, or either machine can be used separately. The station will contain engine and dynamo rooms, storage battery room, high-tension apparatus room, also quarters for the transmitting and receiving instruments, reception room and office. The engine and boiler room is separate from the dynamo room in order to keep the dynamo free from coal dust.

We illustrate also the apparatus of the receiving side. Using a self-induction for the aerial which has a long winding of low resistance wire and is added to the jigger, we can vary the wave-length of this circuit between 1,800 and 4,000 meters by means of a slide. There are five condensers for the aerial, ranging from 1 to 10/1,000 microfarad so as to secure variable capacity. Messages are taken by a type of electrolytic detector which is used in the French army and marine. Aside from the fine wire part it is entirely metallic, and a lead vessel containing the liquid is used as one electrode. Sullivan telephones of high resistance (7,500 ohms) are connected on the detector.

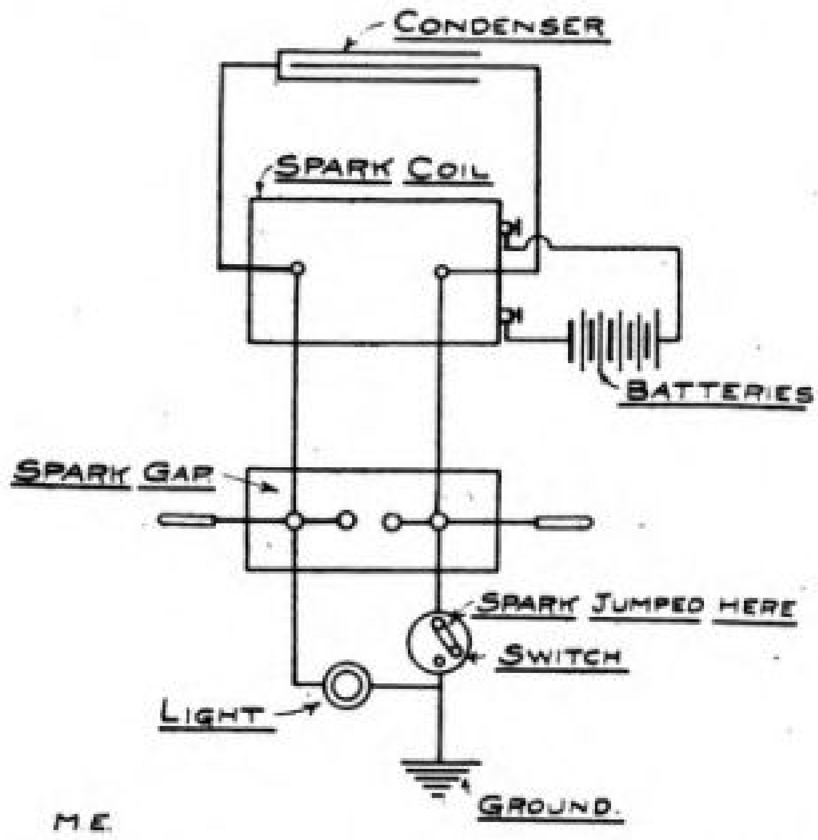
THE ELEMENTS OF A TELEPHONE EQUIPMENT FOR RURAL LINES.

(Continued from Page 322)

reputation of a manufacturer in preference to attempting to use his own judgment in selecting from the various makes he finds on the market.

LIGHTING LAMPS ON HIGH TENSION CIRCUIT.

While experimenting with my wireless apparatus I put a 3-volt lamp in a circuit as shown in diagram. By spreading the spark gap beyond the sparking distance and leaving the switch open so that lamp was in series with the



spark the lamp would light up in the same way as if running on a battery current.

Contributed by CLARENCE D. TUSKA.

A green wrapper on MODERN ELECTRICS means your subscription has expired. You want to know what's going on in Electrics, don't you? Send in your sub. before you forget it.

Nice feast up at Marconi's, Glace Bay, the other day. We take from the menu at random:

Fried detectors, a la Atlantic.
Boiled transformers, a la oilsmell.
Broiled tuners a la cut-it-out.
Hot condensers on roast.
Steamed ground clam(p)s.

Wireless Telegraph Contest

Our wireless Station and our Laboratory Contest will be continued every month until further notice. The best photograph for each contest is awarded a monthly prize of Three ($3) Dollars. If you have a good, clear photograph send it at once; you are doing yourself an injustice if you don't. If you have a wireless station or a laboratory (no matter how small) have a photograph taken of it by all means. Photographs not used will be returned in 30 days.

PLEASE NOTE THAT THE DESCRIPTION OF STATION MUST NOT BE LONGER THAN 250 WORDS, AND THAT IT IS ESSENTIAL THAT ONLY ONE SIDE OF THE SHEET IS WRITTEN UPON. SHEET MUST BE TYPEWRITTEN OR WRITTEN BY PEN. DO NOT USE PENCIL. NO DESCRIPTION WILL BE ENTERED IN THE CONTEST UNLESS THESE RULES ARE CLOSELY ADHERED TO.

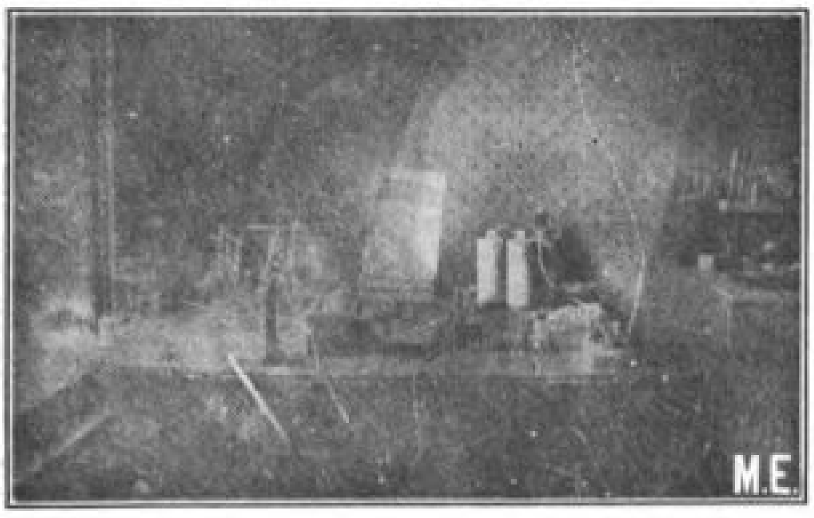
It is also advisable to send two prints of the photograph (one toned dark and one light) so we can have the choice of the one best suited for reproduction.

This competition is open freely to all who may desire to compete, without charge or consideration of any kind. Prospective contestants need not be subscribers for (the publication) in order to be entitled to compete for the prizes offered.

FIRST PRIZE THREE DOLLARS.

Enclosed please find photo of my wireless station, which I have had in operation about four weeks.

The transmitter consists of an E. I. Co. one-inch coil, a Gernsback electrolytic interrupter, and a key from an old telegraph set. These are all connected in series on the 110-volt A. C. circuit, properly fused and controlled by a D. P. S. T. switch under the right side of



the table. I also have a glass plate condenser and two Leyden jars from an E. I. Co. Wimshurst machine connected to the home-made zinc spark gap. For sending I use a 3/16-inch spark, 1/4 inch thick. The electrolytic interrupter helps to make the spark hot and crackling.

The receiver consists of a double slide tuning coil of 400 meters capacity, a variable condenser and a potentiometer, which are home-made, and an "Electrolytic 'Bare Point' Detector," 75-ohm receiver and 4 dry batteries. At the left of the table is a D. P. D. T. switch for changing from transmitting to receiving, or vice versa.

The aerial is made of two aluminum wires 40 feet high, running from the house to the barn (100 feet long), and back to the window of the "wireless room." The ground wire is attached to a hot water radiator in the room. With this set I have heard many stations within a radius of 30 miles. Nearly all I know about wireless I found in MODERN ELECTRICS. CLARENCE H. PFEIFER.

Ridgewood, N. J.

HONORABLE MENTION.

Enclosed find a picture of my wireless station and shop. I have been experimenting with wireless for about a year.

I have a three-quarter inch coil and also a quarter-inch coil. They can be seen at the left of the picture. I use a test tube condenser with which I get very good results. There is also a zinc spark gap and key bought from the E. I. Co. My current is derived from eight dry batteries.

My receiving set is made up of tuning coil, fixed condenser, potentiometer and silicon detector. They all come from the E. I. Co. There is to be seen in the middle of the table a knife switch used for changing the aerial from receiving to transmitting. My aerial is seventy-five

feet long, made of four strands of No. 14 aluminum wire. With this aerial I have had great success. At the back of the picture can be seen my work bench which I made myself, and the table which my instruments are on I also made myself.

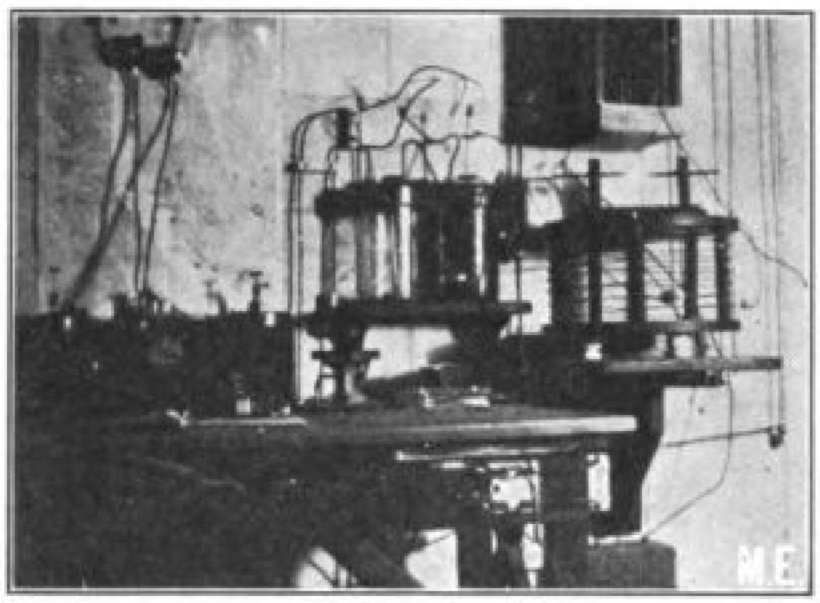
I am not a subscriber to MODERN ELECTRICS, but get it every month, and take great pleasure in reading it. It is the best magazine I have yet found for wireless.

JULIAN P. HANKIN.

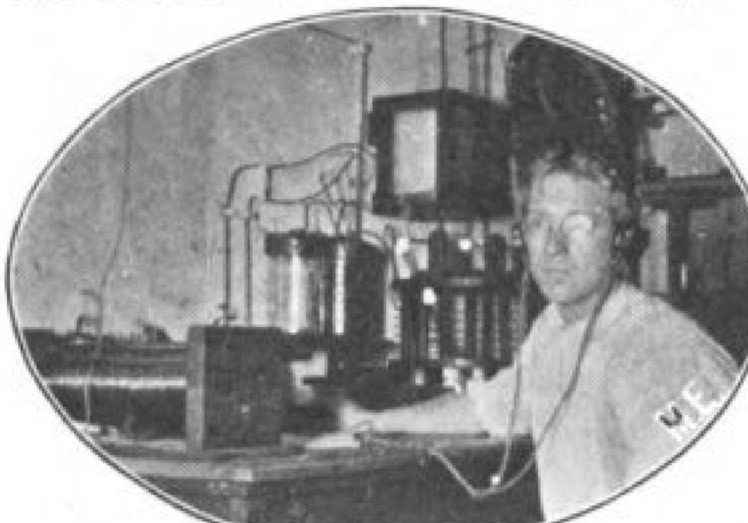
Nutley, N. J.

HONORABLE MENTION.

Enclosed please find photograph of my wireless station. I want to compete for the prize. Length of aerial, 8



wires, 70 feet; height, 40 feet; detectors, silicon and carborundum; 1,000-ohm phones, I. M. P. make. Notice the detectors upon the box. For sending I use a transformer coil and an Electrolytic interrupter. I use two; when one gets hot I use the other. Notice the spark jump-



ing in picture. Ten plate condenser above aerial switch to the right of detector box. All home made, with exception of phones. Can't see tuning coil; it is to the left of table.

EUGENE C. SKINNER.

San Diego, Cal.

HONORABLE MENTION.

Enclosed find photograph of my wireless outfit.

In the middle background of the picture of the station is the receiving tuning coil, which is wound with No. 20 S. C. C. wire. It is 19 inches high and 5 inches in diameter. A cardboard tube, which used to be the casing of a night piece last Fourth of July, is the foundation for the coil. On it 365 turns of the above mentioned wire were wound. Then the whole thing was placed in melted paraffine until the bubbles of air stopped coming out. I tried painting this, but found that the paint would not dry on the paraffine, so I glued a piece of stiff wrapping paper over the coil and painted that with black Jap-a-lac, which makes it look well. The sliders are ball bearing, and insulated with fibre.

To the left of the coil are the sending condensers, which consist of four quart Leyden jars and an "Electro" adjustable. In front of the latter is a D. P. S. T. switch which controls the current to the coil. The coil, which was taken from a French automobile, has given 1 1/4

inches on four volts. In front of the coil is the spark gap, which is of the vertical type with zinc tips. To the left of the gap is the sending tuner which is of the pancake type. It is wound with 20 feet of No. 8 copper wire.

To the right of the receiving tuner is a fixed condenser composed of 10 sheets of foil separated by waxed paper. On the right of the fixed is an "Electro" variable, which is a valuable addition to the set. In front of the last mentioned is the key for sending the messages.

To the right of the key is a single point switch to short circuit the detectors when sending. In front of that is a four-point one to throw in any one of four detectors, which are, viz., electrolytic, carborundum, microphone and iron pyrites. I have found that the carborundum is by far the most reliable of the four, because it doesn't need adjusting so often. The iron pyrites is satisfactory when used properly.

On the wall over the condensers is a

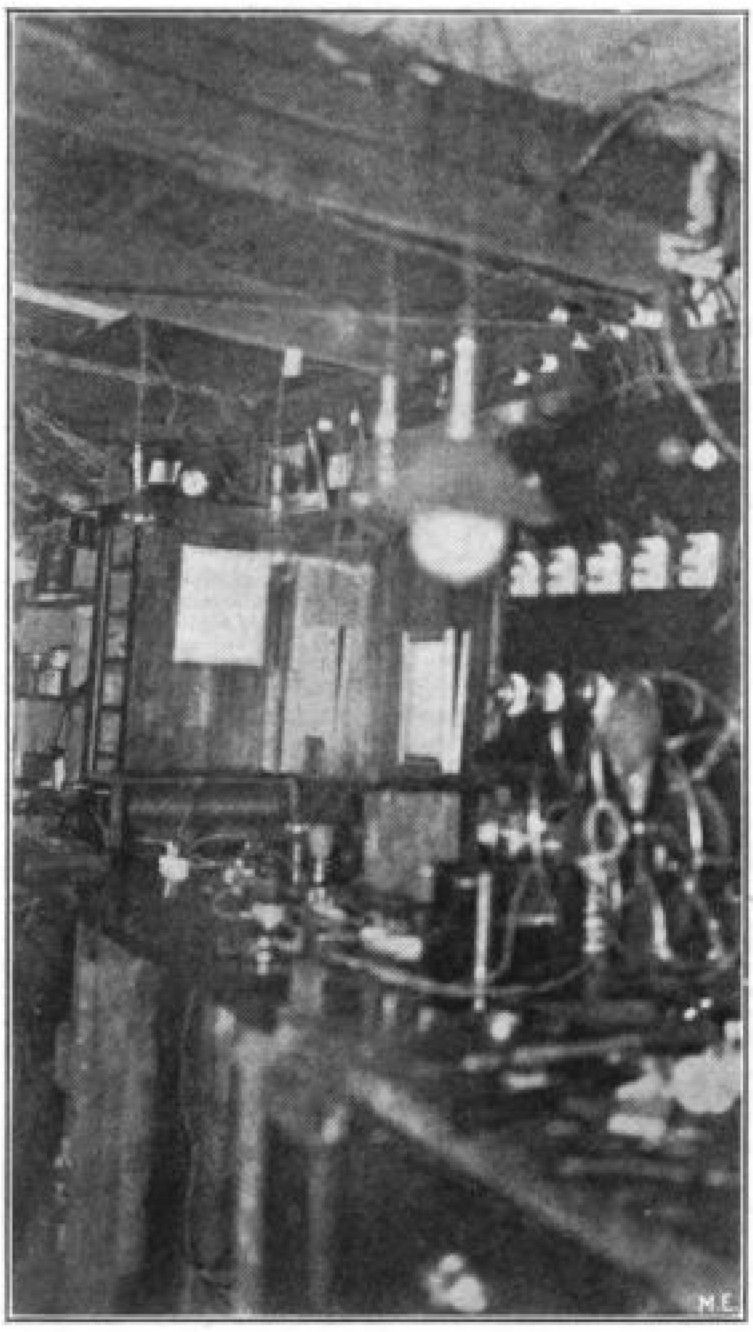
list of the call letters of all the stations which I have been able to get. They are arranged in alphabetical order with the names after them, so that when I hear a call I can tell in a moment where it comes from. In the frames are the names of the stations arranged in alphabetical order and also giving their call letter, wavelength, system, and whether they are in operation or not.

I have made all the instruments except the variable condensers, receivers, induction coil and battery, which are cheaper to buy than to make.

FRANK B. HANFORD.
East Orange, N. J.

HONORABLE MENTION.

I am enclosing flashlight photo of my wireless station which I constructed myself. My aerial consists of four No. 14



copper wires, 70 feet high, 65 feet long and 18 inches apart. For receiving I use two tuning coils, potentiometer, adjustable condenser, fixed condenser, and two detectors, electrolytic and silicon; also 1000 ohm receivers. I have not had very good results with my sending station, and am reconstructing same. I find MODERN ELECTRICS a great help.

Ohio. CHAS. F. WARE, JR.

ECONOMIZING THE TIME OF THE BUSY EXECUTIVE.

(Continued from Page 317.)

just as he would if the stenographer were in his presence. Each talks to the other in ordinary tones, without effort. No talking into a mouth-piece, no painful holding of a receiver to the ear. It is a wonderful convenience.

Another remarkable thing is that the Dictograph, because of the really marvelous sensitiveness of its "ear" or transmitter, can be concealed in the drawer of a desk, or set into the wall and covered with paper, so that it is entirely concealed from observation, and it will report what is said to the distant stenographer just as clearly as if it were openly on the desk. That suggests a multitude of uses to which the instrument can be put. Its many values are so well recognized in the business and professional world that the National Dictograph Company, whose offices are at 1265 Broadway, New York City, is having more business offered than it can handle, and is now enlarging its factories and adding to its equipment to meet the urgent demand. Besides being in use in the principal cities of the country for general business purposes the Dictograph is installed in several of the Government Departments at Washington.

BACK ISSUES.

We wish to buy January, 1909 copies. We will pay a good price for same if in first class condition. We should be glad to hear from any of our readers who desire to dispose of these copies.

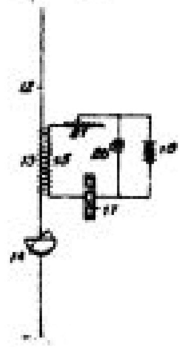
W. A. O. A.

The Wireless Association of America was founded solely to advance wireless. IT IS NOT A MONEY MAKING ORGANIZATION. Congress threatens to pass a law to license all wireless stations. The W. A. O. A. already has over 2,000 members—the largest wireless organization in the world. When the time for action arrives, the thousands of members will exert a powerful pressure to oppose the "wireless license" bill. This is *one* of the purposes of the W. A. O. A. There are more.

Electrical Patents for the Month

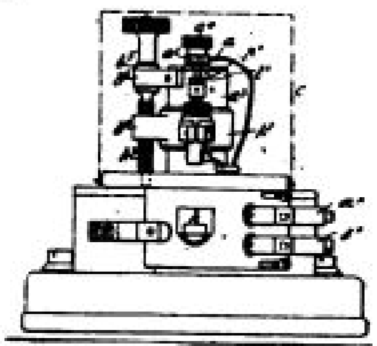
932,111. PRODUCING HIGH-FREQUENCY OSCILLATIONS. REGINALD A. FESSENDEN, Washington, D. C. Filed Dec. 14, 1905. Serial No. 291,739.

1. A capacity changer for electromagnetic electric circuits comprising a condenser and means to rapidly move its effective coöperating members relative to each other, to produce oscillations in the circuit.



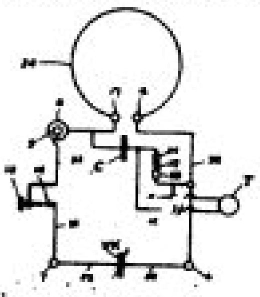
924,883. WIRELESS TELEGRAPHY. SIDNEY G. BROWN, London, England. Filed June 3, 1904. Serial No. 211,006.

1. For use in wireless telegraphy, a receiving instrument comprising superposed contacts having arranged therebetween an electrically-deposited peroxid of lead which is obtained from the lead terminal of a storage battery.



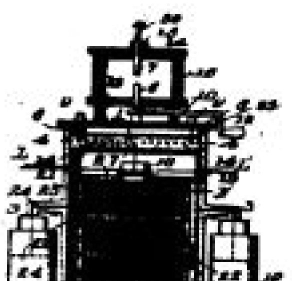
920. TRANSMITTING APPARATUS. HARRY SHOEMAKER, Jersey City, N. J., assignor to International Telegraph Construction Company, a Corporation of New York. Filed Aug. 19, 1907. Serial No. 389,132.

932,819. OSCILLIAMETER. HARRY SHOEMAKER, Jersey City, N. J., assignor to International Telegraph Construction Company, a Corporation of New York. Filed Dec. 11, 1906. Serial No. 347,271.



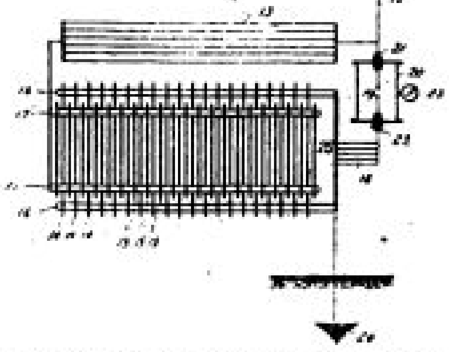
1. In a combined wave meter and wave producer, the combination with a condenser, of an inductance, said condenser and inductance being common to said wave meter and to said wave producer, a spark gap, a wave-responsive device, means for associating either said spark gap or said wave-responsive device with said condenser and inductance, and a calibration scale for indicating the natural period of the combined condenser and inductance.

934,675. WIRELESS-TELEGRAPH TRANSMITTER. CLIFFORD D. BABCOCK, New York, N. Y., assignor to United Wireless Telegraph Company, a Corporation of Maine. Filed June 11, 1908. Serial No. 437,970.



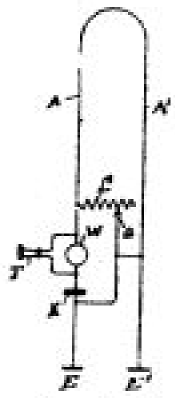
1. In a wireless transmitter, the combination of a suitable transformer; a condenser joined across the terminals of the secondary of said transformer; an impedance calibrated to given wave lengths in series with one of said terminals; a spark gap terminal; a lever joining the same; and a series of contacts corresponding to the calibrations of and joined to said impedance over which said lever plays for connecting said impedance, said terminal being provided with a scale for showing the lengths of the sparks employed, the whole forming one complete and single apparatus requiring no connections other than joining the aerial and ground leads to the oscillating circuit, and the primary circuit leads to the primary terminals of the transformer, substantially as described.

932,112. LIGHTNING-ARRESTER. REGINALD A. FESSENDEN, Brant Rock, Mass. Filed May 9, 1908. Serial No. 431,943.



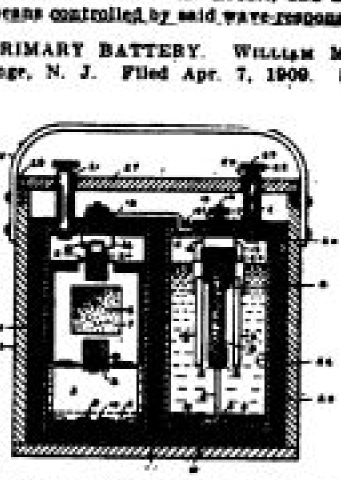
1. A lightning arrester comprising a discharge gap adapted to be automatically restored to original insulating resistance with great rapidity, and a shunt circuit around the gap containing inductance, capacity and resistance, said resistance being proportioned to make the shunt circuit a highly damped one, and being constructed to safely absorb a large amount of energy, substantially as described.

932,913. RECEIVING APPARATUS. HARRY SHOEMAKER, Jersey City, N. J., assignor to International Telegraph Construction Company, a Corporation of New York. Filed Apr. 28, 1905. Serial No. 257,834.



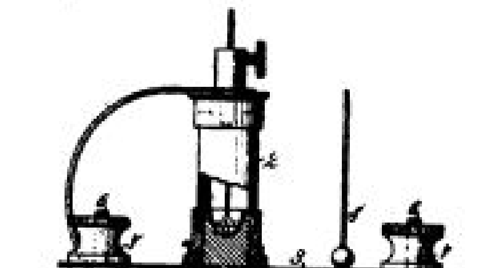
1. In receiving apparatus, a looped aerial conductor, a wave-responsive device connected in one leg of the loop, an adjustable inductance bridging the legs of the loop, a condenser connected with said wave-responsive device and said inductance in a closed local circuit, and a signal reproducing means controlled by said wave-responsive device.

933,325. PRIMARY BATTERY. WILLIAM M. BRODIE, East Orange, N. J. Filed Apr. 7, 1909. Serial No. 488,462.



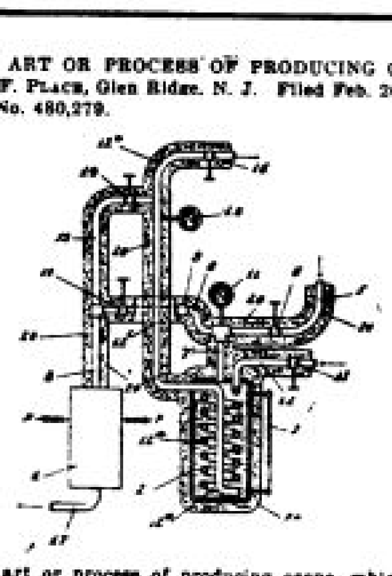
1. In a battery cell, the combination of an inclosed metallic jar, positive and negative elements inclosed therein, means for resiliently securing one of said elements to the bottom of said cell and separate means for resiliently securing the other element to the top of said cell.

932,799. COHERER. WALTER W. MASSIE, Providence, R. I., assignor to Massie Wireless Telegraph Company, Providence, R. I., a Corporation of Rhode Island. Filed Aug. 16, 1905. Serial No. 274,445.



1. The combination of a pair of supports having threaded extensions rising therefrom, a coherer, a bridge of continuous construction to which the coherer is fastened and from which it rises, said bridge having at one end a longitudinal open ended slot and a transversely disposed open ended slot near the other end, the threaded extensions fitting in said slots, jam nuts on the threaded extensions to bind the bridge to the supports, and a tapper to engage the upper side of the bridge.

932,898. ART OR PROCESS OF PRODUCING OZONE. JAMES F. PLACE, Glen Ridge, N. J. Filed Feb. 26, 1909. Serial No. 480,279.

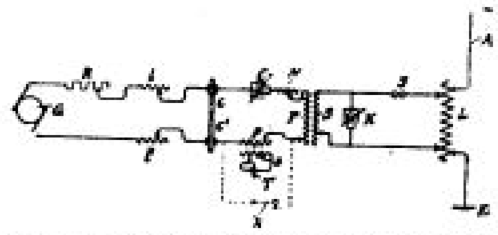


1. The art or process of producing ozone, which comprises evaporating liquid oxygen by heat drawn from a column of air in a pipe submerged therein, and subjecting the cold vapor and oxygen gases from said evaporating liquid to an electric current in an ozoniser.

934,714. ELECTRIC CONDENSER. EDOUARD DENISPORT, Suresnes, France. Filed May 23, 1908. Serial No. 434,569.

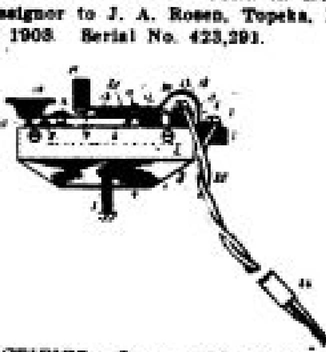
1. In a condenser of the character described the combination of a plurality of superposed washers of dielectric material lined at their surface with a lining of conducting material projecting alternately at the outer edge and at the inner edge of the washers and extending respectively inward and outward only to a certain distance short of the inner and outer edge respectively, the projecting edges of the said conducting linings being electrically connected both at the outer and the inner periphery thereof, and means for conducting current to both sets of washers, substantially as and for the purpose set forth.

932,821. TELEPHONE AND TELEGRAPH TRANSMITTING APPARATUS. HARRY SHOEMAKER, Jersey City, N. J., assignor to International Telegraph Construction Company, a Corporation of New York. Filed July 23, 1908. Serial No. 445,294.

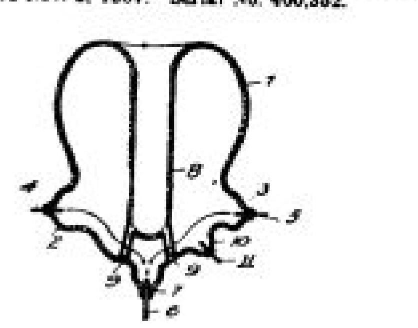


1. In transmitting apparatus, an arc, means for supplying current thereto, a circuit including said arc, capacity and inductance, and having a natural frequency higher than the limit of audition, and means for deriving from the energy in said circuit high frequency oscillations, and a radiating conductor associated with said means.

932,019. TELEGRAPH-KEY. JOHN A. HULIT, Topeka, Kans., assignor to J. A. Rosen, Topeka, Kans. Filed Mar. 20, 1908. Serial No. 423,291.



931,806. RECTIFIER. CHARLES W. SIECH, Los Angeles, Cal. Filed Nov. 2, 1907. Serial No. 400,352.



1. A rectifier comprising a body part in the form of a bulb, anodes extending through the walls of the body part, a cathode extending through said walls and below the anodes, and an introverted part extending through the bulb between the anodes and below the plane of said anodes to prevent direct current flow between the anodes and to confine current flow to paths between the anodes and the cathode, said introverted part being open at both ends to the atmosphere whereby air may circulate therethrough to carry away heat generated by the current flow within the bulb.

Original Electrical Inventions for Which Letters Patent Have Been Granted for Month Ending September 21st

Copy of any of the above Patents will be mailed on receipt of 10 cents.

Queries and questions pertaining to the electrical arts addressed to this department will be published free of charge. Only answers to inquiries of general interest will be published here for the benefit of all readers. Common questions will be promptly answered by mail.

On account of the large amount of inquiries received, it may not be possible to print all the answers in any one issue, as each has to take its turn. Correspondents should bear this in mind when writing, as all questions will be answered either by mail or in this department.

If a quick reply is wanted by mail, a charge of 15 cents is made for each question. Special information requiring a large amount of calculation and labor cannot be furnished without remuneration. THE ORACLE has no fixed rate for such work, but will inform the correspondent promptly as to the charges involved.

NAME AND ADDRESS MUST ALWAYS BE GIVEN IN ALL LETTERS. WHEN WRITING ONLY ONE SIDE OF QUESTION SHEET MUST BE USED; DIAGRAMS AND DRAWINGS MUST INVARIABLY BE ON A SEPARATE SHEET. NOT MORE THAN THREE QUESTIONS MUST BE ASKED, NOR SHALL THE ORACLE ANSWER MORE THAN THIS NUMBER.. NO ATTENTION PAID TO LETTERS NOT OBSERVING ABOVE RULES.

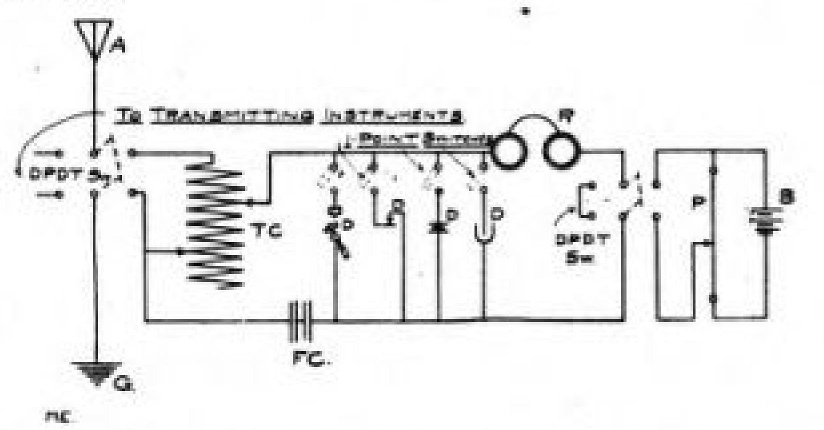
If you want anything electrical and don't know where to get it, THE ORACLE will give you such information free.

RECEIVING CIRCUIT.

(333.) R. L. HART, Pennsylvania, asks:

1.—Please give diagram for connecting up following instruments: Two small D. P. D. T. switches, one T. P. S. T. switch, double slide tuning coil, fixed condenser, silicon detector, perikon detector, E. I. Co.'s electro-lytic detector, carborundum detector, E. I. Co.'s potentiometer, D. P. D. T. aerial switch and a pair of 2,000-ohm receivers. I wish to use the silicon and perikon detectors without battery or potentiometer.

A. 1.—Diagram given below. We cannot find a use for the triple pole single throw switch.



2.—What is the approximate distance that I should be able to receive with above instruments, my aerial being 50 feet long, 75 feet high, 5 wires?

A. 2.—200 to 300 miles.

3.—How do the above detectors compare as to sensitiveness?

A. 3.—Electro-Lytic, perikon and carborundum, respectively.

TRANSFORMER ON 220 V.

(334.) DAVID HUGHES, California, writes:

In the description of the 250 watt closed core transformer, in the April number of your magazine, it states that a current of 110 volts is to be used.

Can this transformer be used, without any change in the construction, on a voltage of 220 volts, by putting one 110 volt lamp in series in the primary, and which of the following should be used, an 8, 16, or 32 C. P. lamp?

A. 1.—No; but you might use 12-32 C. P. lamps in multiple series with the primary; or a water rheostat. However, we suggest that you use some form of variable resistance or reactance instead.

PLATES FOR CONDENSER.

(335.) OLIVER S. EVERETT, Massachusetts, asks:

1.—Where may I obtain the aluminum plates and hard rubber sheet used in the construction of the revolving condenser described in the April number of MODERN ELECTRICS, and what will be the price of same?

A. 1.—From the Electro Importing Co., 86 West Broadway, N. Y. City.

2.—What length of cylinder, 4 inches in diameter, would be required to wind two (2) lbs. of No. 20 enameled copper magnet wire on?

A. 2.—About 16 inches.

3.—Can German silver resistance wire be obtained with enamel insulation, and if so, where and at what price per lb. for No. 26.

A. 3—Not as far as we know.

RECEIVING DISTANCE.

(336.) WM. K. TOBOLDT, Pennsylvania, writes:

1.—How far can I receive with the following instruments: Aerial: composed of four strands aluminum wire, each 30 feet long and 8 inches apart, suspended between one 17 foot pole and a 6 foot pole, on the roof of a two-story house. Instruments: E. I. Co. Jr. tuner, silicon detector, E. I. Co. No. 1307 telephone receiver, and E. I. Co. large tuner?

A. 1.—100 to 200 miles.

2.—How far can I send with automobile coil giving a 1-2 inch spark, with a condenser made of a test tube shunted across the secondary. E. I. Co. No. 9270 sending helix?

A. 2.—About one mile.

3.—What is the ohmic resistance of E. I. Co. No. 1307 telephone receiver?

A. 3.—1,000 ohms.

TRANSMITTING CIRCUIT.

(337.) JOHN D. KATTENHORN, JR., New York, asks:

1.—How many one-quart Leyden jars are needed to get good results on a two-inch E. I. Co. coil?

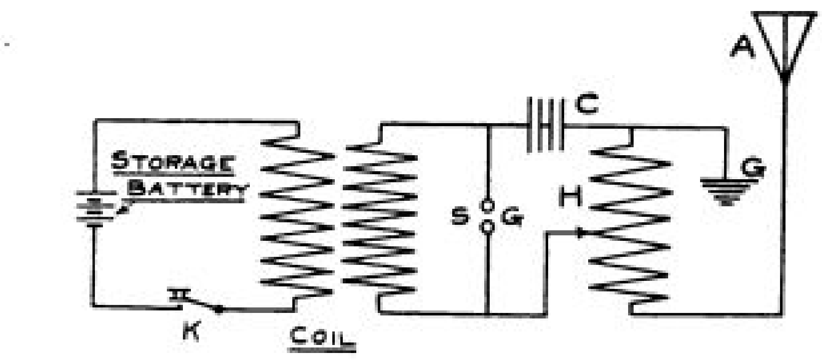
A. 1.—Two or four one-quart Leyden jars may be used.

2.—How many watts does an E. I. Co. two-inch spark coil consume?

A. 2.—From 30 to 40 watts.

3.—Please give a diagram for transmitting, when using a two-inch coil, Leyden jars, helix, 6-volt, 6-ampere storage battery.

A. 3.—Diagram given below.



ME.

TUNING COILS.

(338.) Wm. J. Vandermeulen, Michigan, writes:

1.—What are the dimensions of a 400 and 600 meter tuning coil, and what size and amount of wire used?

A. 1.—A 400 meter drum would be about 6 inches in diameter and about 12 inches long, and you would need about 1 1-2 pounds of enameled wire, No. 20, to wind same. A 600 meter drum would be about 6 inches in diameter and about 16 inches long and you would require about two pounds No. 20 enameled wire to wind same.

2.—How far would I be able to receive with a tuning coil, variable and fixed condensers, potentiometer and a molybdenite detector with my aerial about 35 feet high and about 90 feet long?

A. 2.—100 to 200 miles.

SHUNTING RECEIVERS WHEN SENDING.

(339.) Howard L. Auerbach, Long Island, writes:

1.—Is the semi-variable condenser described by T. W. Huntington, Jr., on page 256 of the September issue of Modern Electrics, for sending or receiving?

A. 1.—Receiving only.

2.—Could same be used to greater advantage if each point of the switch cut in one more condenser until all were being used?

A 2.—Possibly so, but you could not do this with the switch described.

3.—Is it necessary to shunt a 1,000-ohm telephone receiver if it is near the sending circuit and it buzzes when it is not shunted and I am sending?

A. 3.—Yes.

RECEIVING DISTANCE.

(340.) A. B. Colpitts, Delaware, writes:

1.—In query No. 214, A. 3, of your May, 1909, issue, would 3,000-ohm receivers be better for long distance work, instead of the 2,000 ohm receivers, using a six-wire aerial 30 feet long and 40 feet high?

A. 1.—Possibly a trifle better.

2.—What would my receiving distance be with the above aerial and the 3,000-ohm receivers?

A. 2.—200 to 300 miles.

2a.—With 2,000-ohm receivers?

A. 2a.—It is impossible to estimate the difference.

VARIABLE CONDENSER.

(341.) Edmund Kuser, Pennsylvania, asks:

1.—Can a variable condenser be made of 3 movable glass plates 4x5 inches sliding between 4 stationary plates, spaced 1-16 inch apart and all seven coated on both sides with tin foil?

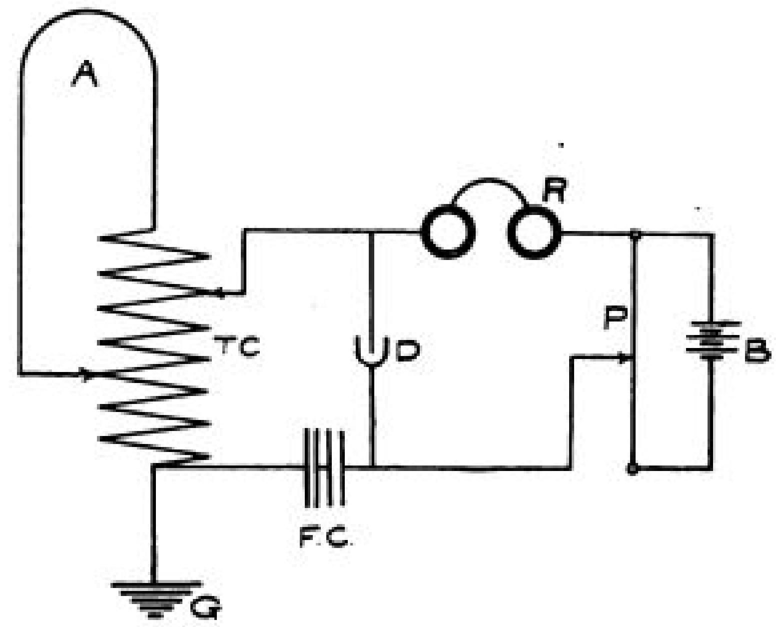
A. 1.—Yes; but the instrument will not be as efficient as if the plates were of metal.

2.—Can above condenser be used for receiving and sending?

A. 2.—No; receiving only.

3.—Give diagram for connecting loop antenna with receiving instruments.

A. 3.—Diagram given below. As you do not state what instruments you are using we show double slide tuning coil.



ME

TROLLEY WIRE FOR HELIX.

(342.) Chas. T. Beeching, Ohio, writes:

1.—Where can I obtain, or how make an insulating glue of considerable strength that is capable of holding hard fibre at the temperature of boiling paraffine?

A. 1.—We would suggest that you write some of the glue manufacturers.

2.—How many sheets of what size of tinfoil separated with coupon bond paper should be used in a fixed condenser for use on an electro-lytic detector?

A. 2.—Eight sheets 5x5 inches. The bond paper is not very suitable, as a dielectric for this class of condenser as the heavy static discharges will very soon puncture it.

3.—Can standard trolley wire be used in a sending helix for a six-inch coil with good results?

A. 3.—Yes.

TRANSMITTING DISTANCE.

(343.) Harry Johnston, California, asks:

1.—With an aerial 40 feet high, and 120 feet long, consisting of 4 wires (No. 14 copper), using 1-4 K. W. transformer, 6 plates (16x20), used for condensers, helix coil, and four 32 C. P. lamps in multiple on the secondary side. How far would I be able to send?

A. 1.—50 to 75 miles.

2.—Using the above aerial, on the receiving circuit, same being made up of the following: Electro Importing Co.'s double slide tuning coil, non-inductive potentiometer, condenser, 2 dry cells, carborundum detector and a pair of 2,000-ohm receivers, what would be the receiving distance?

A. 2.—300 to 500 miles.

3.—How is a light fixed around the key, so as it will burn when not transmitting (current being on), and as soon as you start to transmit the light will go out?

A. 3.—We cannot conceive of any method by which this arrangement can be carried out unless a double circuit key is used.

STORAGE BATTERY MATERIALS.

(344.) E. L. PRINCE, Texas, writes:

1.—Where can I procure nine lead strips 69 inches long, 1-8 inch thick and 1-2 inch wide, to be used in making storage battery plates as described in the July issue of MODERN ELECTRICS?

A. 1.—Electro Importing Co., 86 West Broadway, New York.

2.—How much red lead does it require to fill one plate?

A. 2.—About two pounds.

3.—Which has the most ampere turns and which is the most sensitive, a receiver wound to the resistance of 1,000 ohms with enameled No. 40 wire, or one that is wound with No. 50 S. S. wire to the same resistance?

A. 3.—Receiver wound with No. 50 single silk covered wire has the largest number of ampere turns within a given space, but the receiver wound with No. 40 enameled wire has more ampere turns because more wire must be used to get the same resistance. The receiver wound with No. 50 single silk covered wire is by far the most sensitive.

COIL DESIGN.

(345.) N. SEMEL, New York, asks:

1.—What will the spark length be of the following coil, and how many volts and amperes should be used: Core, 10 inches long by 1 inch wide, composed of No. 18 soft iron wire. Primary coil 4 layers No. 20 insulated copper wire. Secondary coil 1 1-2 lbs. No. 30 insulated copper wire. Condenser 100 sheets tin foil 7x9 inches?

A. 1.—We think the coil described is very badly designed and would not be at all satisfactory.

2.—Give the dimensions of a 2-inch coil.

A. 2.—Core, 7 1-2 inches long, 1 inch in diameter, wound with 12 ounces No. 14 wire. Secondary, 5 1-2 inches long, 3 inches in diameter, wound in forty sections with 2 1-2 pounds No. 36 wire. Condenser, 60 sheets tin foil 7x5 inches. Volts, 12; amperes, 4.

DETECTOR PARTS.

(346.) J. S. HAU, Ohio, writes:

1.—How far could I receive with following instruments: Tuning coil, variable condenser, fixed condenser, "Electro" universal detector stand and 1,200-ohm telephone receiver with head band?

A. 1.—100 to 200 miles.

2.—Which do you consider best, a carborundum detector or universal detector stand?

A. 2.—Carborundum may be used in the Universal stand. The Universal stand is not a detector in itself.

3.—Where could I obtain parts ready to put together for the perikon detector as described in the June issue of MODERN ELECTRICS, page 106?

A. 3.—We would suggest that you write the wireless supply houses who advertise in our columns.

INFORMATION ON WIRELESS.

(347.) WALTER SOMERFELDT, Oregon, asks:

1.—Can you please tell me how I can make a wireless station working ten or fifteen miles?

A. 1.—See answer to question No. 2.

2.—Where can I get a book describing a station and instruments?

A. 2.—We suggest that you write some of our advertisers for catalogues.

3.—How far will the station described in "A B C of Electrical Experiments" work?

A. 3.—About one-half mile.

GROUND CONNECTION.

(348.) RICHARD H. FOSTER, Rhode Island, writes:

1.—I intend to erect a receiving station for experiments, but am confronted with a severe difficulty. The aerial will be erected on a sandy cliff 180 feet above sea level. What bothers me is how to make my ground connection. The ground is very dry. My idea was to run a heavy wire from the instruments over the edge of the cliff to the edge of the ocean and connect it to a metal rod which was to be driven into the wet sand. Would this plan be practical? Would the wire have to be insulated?

A. 1.—We would suggest that you run a heavy uninsulated wire down the cliff and connect it to a large piece of netting or metal anchored underneath the water below the low tide mark.

2.—I have accidently damaged my W. A. O. A. button. Will the association sell me a new button?

A. 2.—Yes, we think so. We would advise you to write to them.

3.—By wetting the spark gap I find that the spark is fatter while the gap is moist. Is this spark any better?

A. 3.—No, we do not think so.

ELECTRIC LIGHT ON TRAINS.

(349.) GEORGE WOERDEMAN, New York, asks:

1.—How are the trains on the New York Central and other lines lighted when running?

A. 1.—By a dynamo when the train is moving, the dynamo charging storage batteries at the same time. When the train stops the dynamo is automatically disconnected and the storage batteries run the lights.

2.—Which is used the most, gas or electricity, for this purpose?

A. 2.—Gas at the present time, but electric light is coming into vogue.

TRANSMITTING DISTANCE.

(350.) HARRY MINNERS, Brooklyn, asks:

1.—Please tell me how far I would be able to receive with the following set: Carborundum detector, variable condenser, E. I. Co. $4.00 single slide tuning coil, two 75-ohm receivers, aerial 65 feet high and 60 feet long, 4 wires.

A. 1.—100 to 150 miles.

2.—How far can I transmit with a one-inch coil, condenser, zinc spark gap, Morse telegraph key?

A. 2.—Three to five miles.

3.—How far can I transmit with a 3-4 inch coil, two Leyden jars, brass spark gap, Morse telegraph key?

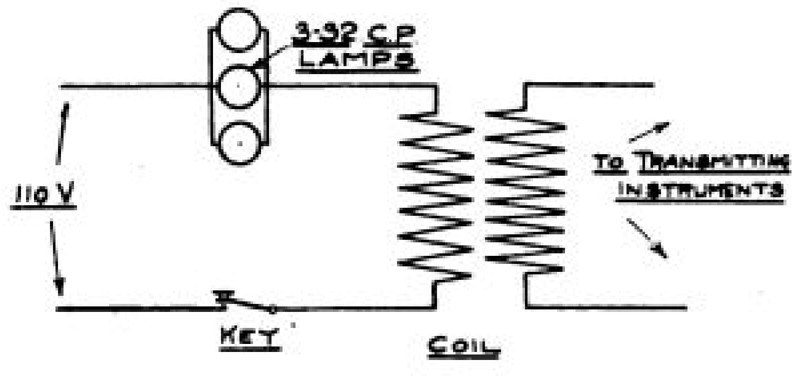
A. 3.—One to three miles.

TRANSFORMER COIL.

(351.) H. L. WINANS, California, writes:

1.—Is there any way to regulate the power of an E. I. 1-2 K. W. transformer coil by using lamps in series with the primary, and if so, please publish diagram in MODERN ELECTRICS.

A. 1.—Yes, diagram given below. By using more or less lamps in the circuit the amount of amperage may be regulated.



GROUND CONNECTION.

(352.) CHESTER M. CAPEN, Massachusetts, asks:

1. Would a 1,500-ohm and a 75-ohm receiver work all right in a wireless station, if connected in series?

A. 1.—Yes.

2.—I have two ground connections—one to the water pipe, which is about thirty-five feet from my instruments. The other is connected directly to the ground by burying a Crawford zinc three feet, about eight feet from my instruments. Which is the best ground for a wireless station?

A. 2.—The water pipe ground.

RECEIVING DISTANCE.

(353.) R. OVERTON, New York, writes:

1.—What will my receiving range be with 1,000-ohm receiver, 800 meter tuning coil, double slide, silicon detector as described in May and June issues of MODERN ELECTRICS, condenser for detector and variable condenser?

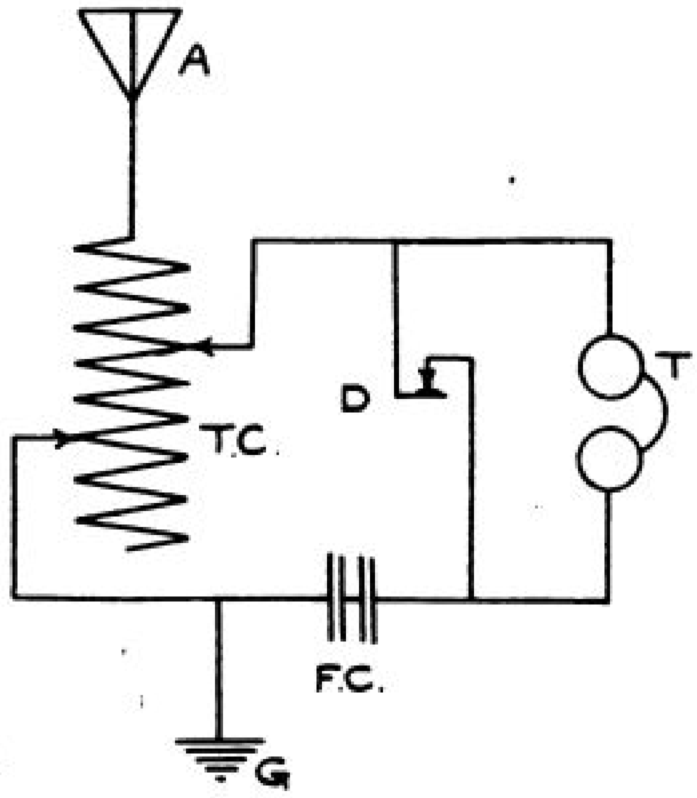
A. 1.—300 to 500 miles.

2.—How can I construct a variable condenser having enough capacity for silicon detector, as described in May and June issues of MODERN ELECTRICS?

A. 2.—Any one of the forms described in the recent issues of MODERN ELECTRICS will serve this purpose very well.

3.—Please show me correct diagram for 1,000-ohm receiver, double slide tuning coil condenser and silicon detector.

A. 3.—Diagram given below.



MAGNETISM LOST IN CORE.

(354.) EDMUND KUSER, Pennsylvania, writes:

1.—Have a 75-ohm watch case receiver, the core of which has lost its magnetism; what is the cost to have it re-magnetized?

A. 1.—The iron used in the core was probably poorly annealed and consequently did not hold the magnetism for any length of time. It would be cheaper for you to buy a new receiver than to have it re-magnetized.

2.—What issue of MODERN ELECTRICS contains a description of the variable condenser?

A. 2.—We refer you to our April, 1909, issue.

SPARK LENGTH.

(355.) J. R. GRAY, Illinois, asks:

1.—I have an 1 1-4 inch coil that is supposed to send up to 5 miles, but I can not send up to two feet. I use an "Electro"-Lytic detector and watch case receiver of 75 ohms and aerials of the same height. My batteries are strong and I adjust my vibrator every way I can think of, and the spark will jump a gap of 1 1-4 inches.

A. 1.—The above question shows up the greatest mistake which the average amateur makes. The great majority think that the spark should be 1 1-4 inches long when sending with a coil which has a rated spark length of 1 1-4 inches. This is absolutely incorrect and if the spark is made to jump this length, or as much as it will jump with the aerial capacity thrown in, the operator will certainly not be able to send even three feet. However, if the spark length is cut down to 1-16 or 1-8 of an inch then a coil rated at this spark length will send about five miles.

ANTENNA QUERY.

(356.) RAYMOND POLLY, Buffalo, N. Y., asks:

1.—How far can an E. I. Co.'s 1-inch coil, 2 pint Leyden jars, zinc gap, fifty foot aerial, water pipe ground, send? The antenna is made of 2 strands of No. 14 aluminum wire, a foot apart and 36 feet long.

A. 1.—From three to five miles.

2.—How far would an "Electro"-lytic detector, a tuning coil made of 115 turns of No. 18 bare tinned copper wire, two 1,000-ohm receivers, with the same antenna and ground as above, receive?

A. 2.—75 to 150 miles.

3.—Could you suggest a better antenna than the one described? I can only have it 36 feet long and 50 feet high.

A. 3.—We would suggest that you use 4 wires 4 feet apart, which will give you approximately 10 per cent. better results.

TRANSFORMER QUERY.

(357.) GORDON HIGNELL, Canada, writes:

1.—Is a looped aerial more sensitive than a straightaway one, with double slide tuning coil?

A. 1.—We do not think so.

2.—Please show by diagram how to connect up a complete receiving outfit having a looped aerial with two tuning coils and a tuning transformer.

A. 2.—We do not think the two tuning coils will be needed in addition to the tuning transformer. As we have shown several diagrams for connection of the tuning transformer, we would refer you to our back issues.

3.—Would the secondaries of two 1-4 K. W. transformers connected in series be as powerful as a 1-2 K. W. transformer?

A. 3.—No.

RECEIVING DISTANCE.

(358.) WM. HILBERT, Maryland, writes:

1.—With an aerial 46 feet high and 45 feet long, 4 wires No. 14 and a silicon detector 1,200-ohm receiver, fixed condenser and double slide tuning coil, how far can I receive?

A. 1.—200 to 400 miles.

2.—With a perikon detector?

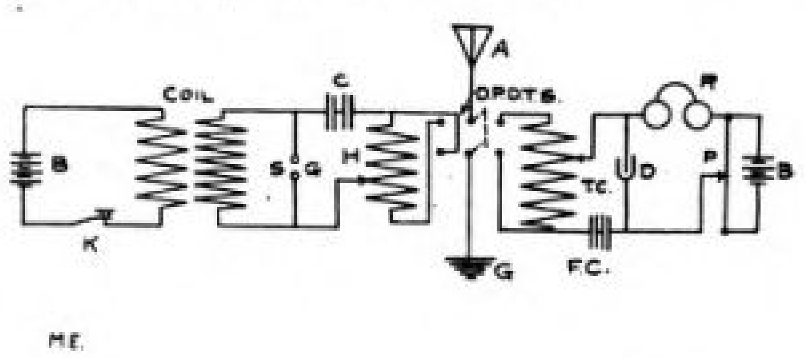
A. 2.—300 to 500 miles.

LIGHTNING PROTECTION.

(359.) CLARENCE SMITH, Washington, writes:

1.—Please diagram the best wiring plan for lightning protection in the following diagram:

A. 1.—Diagram given below.



2.—Are Leyden jars absolutely needed with a 1-2 K. W. transformer?

A. 2.—Yes.

3.—Is a wireless telephone receiving outfit different than a wireless telegraph receiving outfit; and if so in what way?

A. 3.—Yes, both in method of tuning used and the detector.

SWITCHING DEVICE.

(360.) FRANK KEILING, JR., New Jersey, writes:

1.—Can the pachytrop sold by the Electro Importing Co. be used on 110 volts, d. c.?

A. 1.—No.

2.—How many amperes would it safely carry?

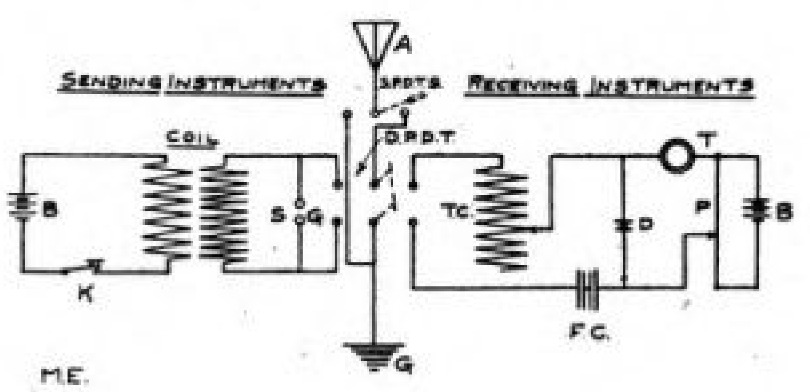
A. 2.—Not more than 10 amperes.

WIRELESS CONNECTIONS.

(361.) WM. SPOON, Washington, writes:

1.—Please show by diagram how to connect the following receiving and sending sets: Receiving—Single slide tuning coil, potentiometer, batteries, detector and receivers. Sending—Spark coil, spark gap, helix and condenser.

A. 1.—Diagram given below.



INTERFERENCE.

(362.) WM. STAFFORD, Indiana, writes:

1.—Would telephone lines interfere with sending or receiving if aerial is about same height and about 10 or 20 feet away?

A. 1.—Not to a great extent.

2.—Is powdered carbon from dry battery all right for coherer?

A. 2.—We do not think this would work very well.

3.—About how far could I receive with this coherer, 75 ohm receiver one dry cell, aerial 25 feet?

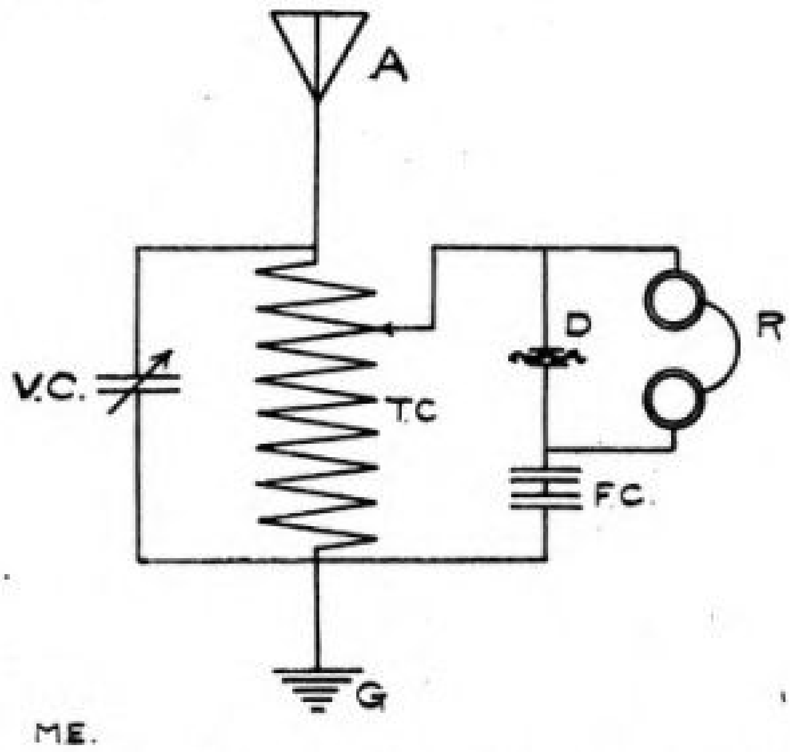
A. 3.—Possibly 25 miles.

RECEIVING CIRCUIT.

(363.) W. L. SEIBERT, New Jersey, asks:

1.—Please show diagram for the most efficient arrangement of the following apparatus, receiving tuning coil (one slide) fixed condenser, molybdenite detector with E. I. Co.'s universal stand, and 75-ohm telephone receiver.

A. 1.—Diagram given below. We would advise the use of a variable condenser as shown.



2.—How far could I receive with an aerial 50 feet long and 30 feet from the ground?

A. 2.—About 50 miles.

3.—There is an arc lamp quite close with its feed wires parallel to my aerial. How can I overcome the effect of this?

A. 3.—Diagram shown will probably overcome the untoward effect.

IVER JOHNSON
SAFETY AUTOMATIC REVOLVER

We point to the difference between the positively and absolutely safe Iver Johnson Safety Automatic Revolver and the imitation near-safeties. *They* have some device *added to* them to make them near-safe. The safety feature of the Iver Johnson *Safety* is the firing mechanism itself—not some spring or button device to pull or press. That is why you can, in perfect safety—*not* near-safety—kick it, cuff it, knock it, or

HAMMER THE HAMMER

"SHOTS," our booklet, tells all about it in a plain, simple way, so you can't go astray on the SAFE revolver question. Send for it—FREE.

Iver Johnson Safety Hammer Revolver

Richly nickeled, 22 calibre rim-fire or 32 calibre center-fire, 3-inch barrel, or 38 calibre center-fire, 3¼-inch barrel, - - - **$6** (Extra length barrel or blued finish at slight extra cost)

Iver Johnson Safety Hammerless Revolver

Richly nickeled, 32 calibre center-fire, 3-inch barrel, or 38 calibre center-fire, 3¼-inch barrel, - - - - - - - - - - **$7** (Extra length barrel or blued finish at slight extra cost)

Sold by Hardware and Sporting Goods dealers everywhere, or sent prepaid on receipt of price if dealer will not supply. Look for the owl's head on grip and our name on barrel.

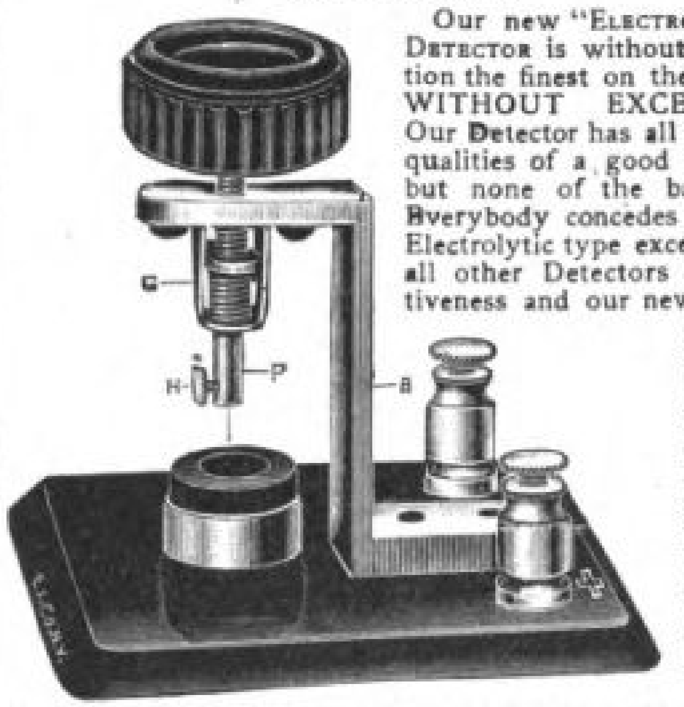
IVER JOHNSON'S ARMS & CYCLE WORKS, 323 River Street, Fitchburg, Mass.

New York: 99 Chambers Street. San Francisco: Phil. B. Bekeart Co., 717 Market St.
Hamburg, Germany: Pickhuben 4. London, England: 13 Cullum Street, E. C.

Iver Johnson Single Barrel Shotguns and Truss Bridge Bicycles

When writing please mention "Modern Electrics."

The "ELECTRO"-LYTIC BARE POINT DETECTOR
(PATENT PENDING)



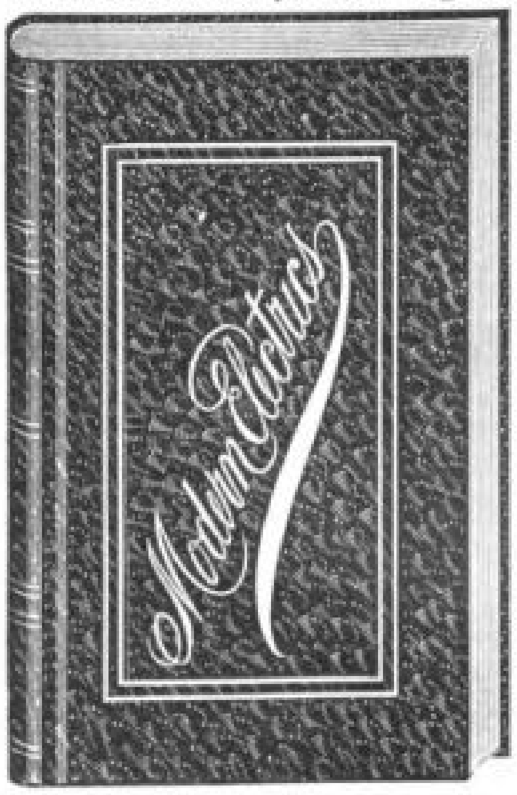
Our new "ELECTRO"-LYTIC DETECTOR is without a question the finest on the market WITHOUT EXCEPTION. Our Detector has all the good qualities of a good Detector but none of the bad ones. Everybody concedes that the Electrolytic type excels by far all other Detectors in sensitiveness and our new type—already adopted by two of the leading wireless companies—is without doubt the acme of perfection. Please bear in mind that our new Detector has been designed for *hard commercial work,* it is not an amateur contrivance. Here are a few points: Hard rubber base ½ in. thick, hard rubber thumb nut 1 in. diameter, graphite-carbon cup moulded in brass cup (under hydraulic pressure,) heavy cast brass standard, etc. The most important part is that the 1-10,000 inch Wollaston wire does not need to be soldered, as in all other Detectors, a screw holds it in a unique manner. The last 1-16 inch piece of wire is utilized, new wires inserted in 10 seconds, etc. By means of an ingenious plunger movement, the fine wire is raised and lowered with greatest precision—less than 1-10,000 inch at a time. The wire cannot turn in a circle, (as wires do, *directly* attached to thumb screws,) it can only move *up or down,* not sideways, etc. This has been found is of tremendous importance. ALL METAL PARTS ARE HEAVILY SILVER PLATED, as we found that silverplate is not attacked by fumes of the acid. We also furnish bottle to hold acid, and and one pipette to fill acid in cup.

Introduction price, **$1.50** By mail extra 12 cents
Write for new Pamphlet on this Detector.

Electro Importing Co., 86-Z W. Broadway, New York

Modern Electrics Binder

Here it is. You've waited long enough for it. You do not have to hunt all through the house to find a particular copy of **MODERN ELECTRICS**—our new M. E. Binder keeps them together. It is the most up-to-date binder ever gotten up and will last a lifetime. It works automatic and you can add each month a new copy Will hold 12 copies and at the end of the year you will have a beautiful BOUND book containing more PRACTICAL information than any electrical cyclopedia three times as large. The binder is made of a beautiful dark red vellum. All lettering is impressed in genuine gold and is guaranteed not to wear off. New copies can be inserted in 10 seconds. You will never be without one once you've tried it. Only by ordering 10,000 binders are we enabled to sell it at the ridiculous low price of **50 CENTS PREPAID.**



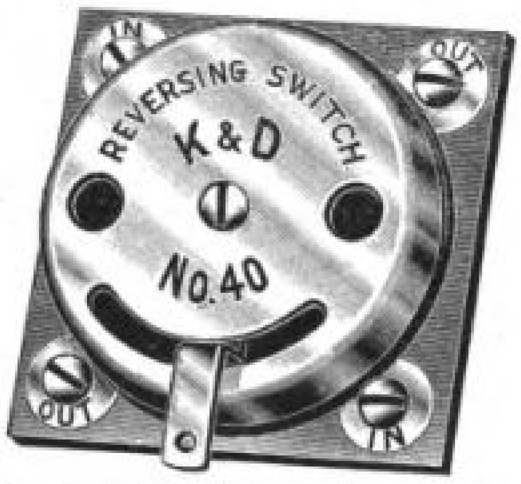
We know that every "M.E." reader will send for it. All other magazines ask $1.00 for identically the same binder.

No stamps, nor out of town checks accepted (except if 10c exchange is added).

MODERN ELECTRICS PUBLICATION

84 West Broadway **New York City**

Neat and Efficient Reversing Switches



No. ME40 K. & D. Starting, stopping, pole-changing or reversing switch. Suitable for use in any position where the current to be carried does not exceed 15 amperes.

The base is of hard fiber; the exposed metal parts are nickeled. Made to standard gauges—parts interchangeable. Cut shows switch about ¾ actual size.

PRICE 75 CENTS

No. ME41. This switch has the same working parts as No. ME40, but has no cover. It has a polished wood base. Cut about ¾ size.

PRICE 60 CENTS

MANUFACTURED BY

KENDRICK & DAVIS

Lebanon - New Hampshire

GET THE K. & D. BOOK OF ELECTRICAL GOODS No. 9

De Forest Apparatus

DESIGNED BY EXPERTS

WIRELESS TELEGRAPH AND TELEPHONE

RECEIVING OR TRANSMITTING

HIGH CLASS APPARATUS OF ALL SORTS AT REASONABLE PRICES

Variometers, Loose Couplings, Variable Condensers of all sizes, Helices and Spark Gaps, large and small, Heavy Transmitting Keys, Audion and Radion Detectors, Wavemeters, Telephone Receivers of extreme sensitiveness, Complete Commercial Tuners, etc., etc.

Our R. J. Variometer comprises two instruments in one—a Variable Tuning Coil without sliding contacts, and a loose coupling of novel design. Our R. J. Wavemeter comprises THREE instruments in one—it will measure either SENT or RECEIVED wave lengths, is a Tuned Receiving Circuit, or can be used as a Variable Tuning Condenser. We find our Radion the best of mineral-type Detectors.

Technical advice and assistance will be gladly given to all purchasers by our expert engineers.

If you wish a REAL Wireless Station go to those who KNOW HOW! Address

SALES DEPT.

RADIO TELEPHONE CO.

1 Madison Avenue, New York City

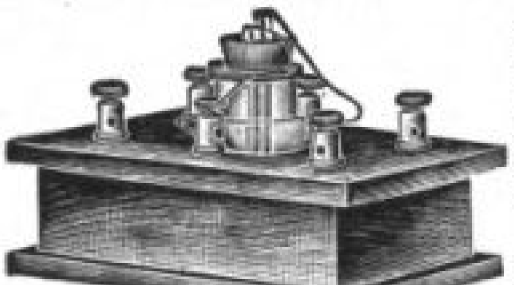
STAR SAFETY RAZOR

Reputation from accomplished facts and not promises has carried the Star Safety Razor through thirty successful years. The expense of large advertising space prohibits going into detail in regard to the Star Safety Razor. You get value in this article and are not paying for the advertisement. Men who have used this Razor for many years, and who have also tried numerous thin blade Safety Razors, state that THERE IS BUT ONE SAFETY RAZOR that gives entire satisfaction—and THAT IS THE "STAR."

Catalogue sent upon request.

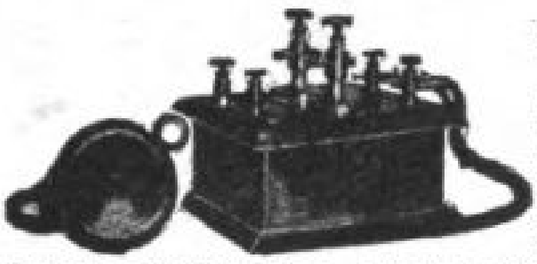
KAMPFE BROTHERS, 28 Reade St., New York.

SEALED POINT ELECTRO-LYTIC DETECTOR



Always in adjustment. Won't leak. Very easy to handle. Ready for use in an instant. Price complete with diagram, **$2.50.** Mail $.12.

Send 2c stamp for Catalogue and set of Circulars.

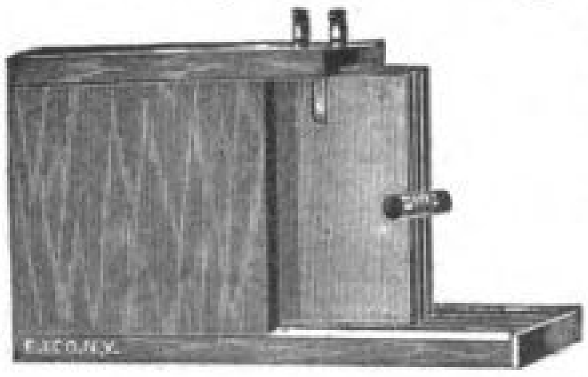


MASSIE DETECTOR with CONDENSER

Has condenser in base. Very sensitive. Price complete without pony receiver, **$1.95.** Mail $.15.

American Wireless Instrument & Novelty Co.
96-A Warren St., New York City

"C. Q. D." We are sounding a general call to inform all Wireless experimenters and amateurs located in and around Cleveland, to come and look over our new stock of Wireless Goods.



All goods for the Wireless experimenter carried in stock. Satisfaction and good treatment assured. Send for our new Wireless catalog.

ERNER ELECTRIC CO.
122a E. St. Clair Ave. - Cleveland, O.

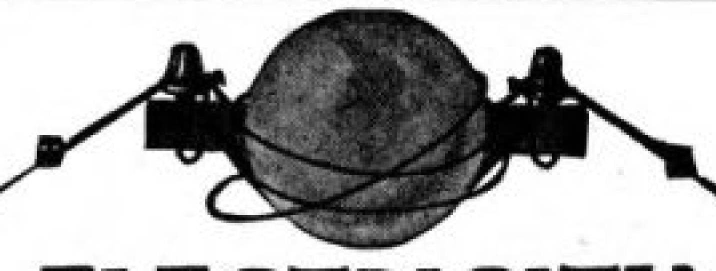
The Schoen Printing Co.

Printers

Magazines
Catalogues
Stationery, etc.

13 Vandewater Street, - NEW YORK

When writing please mention "Modern Electrics."



ELECTRICITY

Practically and Individually Taught

Our pupils actually handle the tools and machinery. Instructors stand beside them, directing, criticising and showing them how to work.
Day and evening sessions.
Call and inspect our school and equipment or write for Prospectus.

New York Electrical School.
44 West 17th St., New York.

WIRELESS

Don't buy any wireless goods until you get our prices. We sell any and all the different wireless goods manufactured. Just tell us whose make goods you want and we will quote you our lowest prices on same. Special prices for this month: Old style Electrolytic Detectors No. 9001, **50 Cents** each. Carbon Cups for these detectors, **15 Cents** each. Extra strong spring Vibrators, heavy platinum points, suitable for spark coils up to 2 inches, while they last, **$1.00** each.

Our Electrolytic Detectors for **$1.50** cannot be beaten for the money.

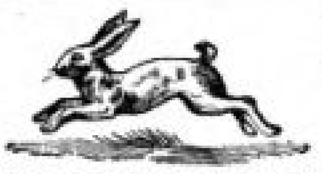
Wollaston wire. 00001 per inch, **25 Cents.** ¼-inch square brass rods highly nickle-plated, **25** and **30 Cents,** Sliders to fit same, **25 Cents** each. Small gasoline torches, **$1.00** each guaranteed. Also many other articles equally as cheap and too numerous to mention. The above prices do not include postage. Enclose 2c stamp for our catalogue.

M. TANENBAUM
728a Broadway :: Brooklyn, N. Y.

Attention Wireless Operators

High Grade Receiving Set, including the celebrated **Ferron Detector**, with a **Proven Range**—Actual and Demonstrated—of **1400 miles**, for only **$12.75**. Fully twice as great a **Proven Range** as any other set for the price. Will receive from any high power station. Send 3c stamp for our New Big Catalog of **Anything Electrical**, 25 pages of wireless instruments alone.

J. J. DUCK, 432 St. Clair St., TOLEDO, OHIO



GROBET SWISS FILES

And Other High Grade Tools

Are shown in our catalog. Send your name and address on postal and mention this paper and we will send free our catalog.

MONTGOMERY & CO.,
103 Fulton Street, New York City

When writing please mention "Modern Electrics."

Perfect Health Without Medicine
Scientific Discovery

OXYDONOR

DESTINED TO REVOLUTIONIZE THE ART OF HEALING

Its record of cures is so astonishing as to be almost unbelievable. It has cured the most obstinate ailments and weaknesses. The nature of the disease makes no difference. No matter how severe your affliction, no matter how long standing, no matter how many other treatments you may have tried, you have no right to believe your case hopeless before you have tried **OXYDONOR**, a self home treatment, without drugs. Most convincing proofs in our descriptive booklet, sent free to all.

DR. H. SANCHE & CO.

67 Wabash Ave., Suite 236 **Chicago, Ill.**

When writing please mention "Modern Electrics."

Faucet WATER MOTORS

Complete with emery wheel, buff wheel, pulley **$2.50** to run sewing and washing machine, polish. In some cities where we have no agents, and where the water pressure is good, a **sample motor** will be given **free**; apply at once if you want to make some extra money, or if you can devote your whole time, liberal salary and commission will be paid.

ALCOHOL STOVES, LAMPS AND FLAT IRONS.

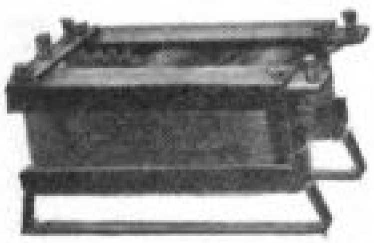
ENGINEERS WANTED to send for catalog of indicators, Reducing Wheels, Planimeters. Address,

LIPPINCOTT M. S. CO.,
52 Columbia St.,
Newark, :: :: New Jersey

When writing please mention "Modern Electrics."

Talk It Over With Our Engineer. **Tel. 864 Cort'd**

A New Wireless Transformer



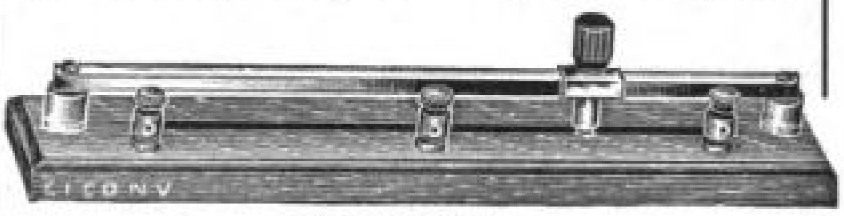
By actual test 5 times more powerful than any equally rated Transformer on the market : : :

¼ K.W. with Adjustable Reactance... **$26.00**
½ K.W. with Adjustable Reactance... **45.00**

THE TRANSFORMER SPECIALTY CO.
136 Liberty Street, New York
—Let Us Do Your Experimental Engineering—

When writing please mention "Modern Electrics."

WIRELESS GOODS



POTENTIOMETER

POTENTIOMETER

NON-INDUCTIVE, as cut, with two Resistance Rods, 300 and 500 Ohms,

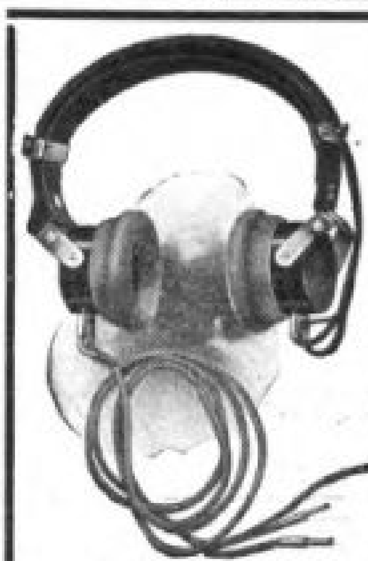
$1.50

Only house in Washington, D. C. carrying a COMPLETE line of Wireless experimental apparatus in stock. Come and look over our stock and judge for yourself. Will gladly demonstrate all goods.

JOHN C. RAU, Electrical Supplies
526 12th St. N. W. Washington, D. C.

All information free and good treatment assured

When writing please mention "Modern Electrics."



HOLTZER-CABOT Wireless Operator's HEAD RECEIVERS

Double Head Band, Leather Covered and Padded, Pneumatic Air Cushions, complete with cords, as shown.

500 ohm	**$10**	1000 ohm	**$11**
1500 "	**12**	2000 "	**13**

Write for **discount** and Booklet No. 20-E-2.

Continental Code Card 7x9 in. **Free** with each Receiver.

THE HOLTZER-CABOT ELECTRIC CO.
Chicago, Ill. **Brookline, Mass.**

When writing please mention "Modern Electrics."

$54.00 PER DAY
The record of the **CAMERA-SCOPE**

And we can prove it. Anyone can operate it, Makes 6 finished button photographs a minute. Price of Camera-Scope, with supplies for making 300 pictures (enough to pay for the complete outfit) **$25.00.** Extra buttons $1 per hundred; extra frames, $1.50 per gross. Be independent and make money for yourself. Write today.

W. S. MOUNTFORD,
100A MAIDEN LANE, NEW YORK, N. Y.

When writing please mention "Modern Electrics."

Murdock Wireless Apparatus

"SOLID" Operators Head Receivers

Are perfect in every respect, combining clear cut resonant talking with the delicacy of operation essential for successful wireless work.

For efficient and sensitive work our Receivers are unexcelled.

STYLE AM.—Fitted with German Silver Head Band, Green Cord and Connecting Block.

COMPLETE

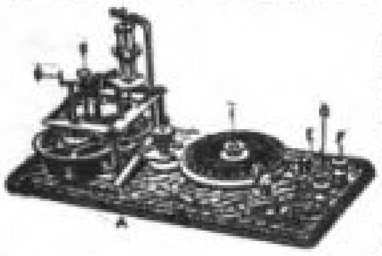
SINGLE		DOUBLE	
100-Ohms	**$2.70**	200-Ohms	**$4.50**
500 "	**3.20**	1,000 "	**5.50**
750 "	**3.70**	1,500 "	**6.50**
1,000 "	**4.20**	2,000 "	**7.50**
1,500 "	**4.70**	3,000 "	**8.50**

POSTPAID

We manufacture all kinds of Wireless Apparatus.
Send for our descriptive list.

WM. J. MURDOCK & CO., :: 40 Carter Street, Chelsea, Mass.

TELEGRAPHY TAUGHT



in the shortest possible time. The Omnigraph Automatic Transmitter combined with standard key and sounder. Sends you telegraph messages at any speed just as an expert operator would. 5 styles $2 up; circular free.

Omnigraph Mfg. Co.
39½ Cortlandt St., New York

Electrician and Mechanic

If you are interested in electricity or wireless, you will find this a magazine of the greatest value. Its articles are practical and descriptive of the latest and best apparatus

Sample Copy Free

Send us a money order for one dollar, the price of a yearly subscription, and we will give you besides the subscription, six back numbers, each containing many wireless articles. Write at once.

JOIN OUR WIRELESS CLUB

Every amateur interested in wireless should join our club, founded for mutual benefit No dues. No fees. The membership button is free. Organize to avert legislation against the amateur. Send your name today.

SAMPSON PUBLISHING CO.
1175 BEACON BUILDING. BOSTON, MASS.

Learn Telegraphy

At My Practical School

Only school graduating full-fledged operators. Established 1874. Housed in its own large, modern building. Equipped with R R. train wire. **Endorsed by Railroad and Western Union officials.** Exclusive methods. Teachers are practical experts. Living expenses earned. Easy payments. Positions always open —I will help you. Correspondence course if desired, Morse or Wireless. Catalog **Free** GEO. M. DODGE, Pres., Dodge's Institute, 6th St., Valparaiso, Ind.

..TRANSFORMER..

250 watt 10,000 volt transformer for use in wireless telegraphy. Special price delivered to any part of U. S., **$30.00.** Will send up to fifty miles. Speaking arcs, transformers, etc. supplied for use in wireless telephony. Drawings and plans furnished. Send for descriptive matter.

VICTOR H. LAUGHTER
University Building Detroit, Mich.

WIRELESS

affords you more genuine pleasure. than anything you have known yet We have the goods—the best made—right in stock. We wish to cater especially to wireless folks in and around Chicago. Our prices are right, our goods still better. Come and look over our stock and judge for yourself.

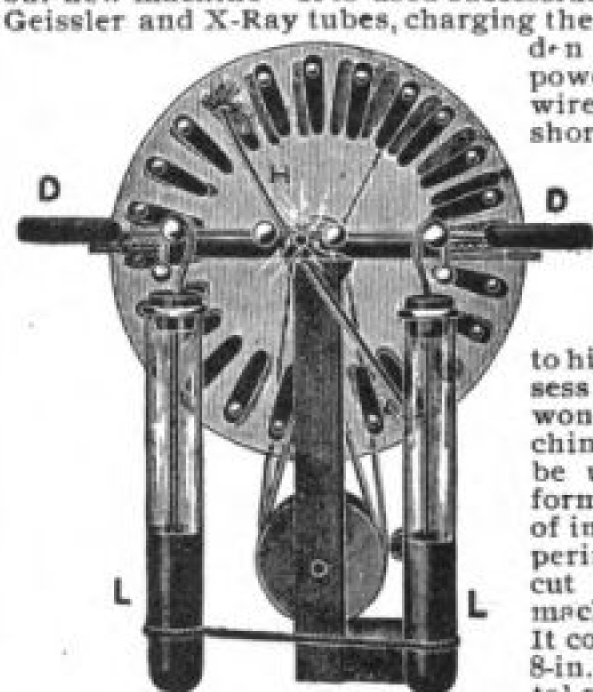
Send 2c postage for our great Catalog

ANDERSON SPECIALTY CO.,
68 & 70 La Salle Street - Chicago, Ill.

... THE ...

"Electro" Static (Wimshurst) Machine

Guaranteed to generate in any kind of weather, no matter, foggy or rainy. The first machine ever constructed which can truthfully claim this. We absolutely guarantee a fat, powerful **3-in. spark** from our new machine It is used successfully to operate Geissler and X-Ray tubes, charging the biggest Leyden jars, firing powder, working wireless sets for short distances raising a person's hair, etc. Anybody interested in electricity owes it to himself to possess one of these wonderful machines which can be used to perform thousands of interesting experiments. Our cut shows the machine plainly. It comprises two 8-in. glass crystal plates revolving in opposite directions, two adjustable oscillator and discharging rods and balls D, collectors H and one iron clamp to fasten body to table. Size over all 11x14 in. Weight boxed 8 lbs. Nothing to wear out, no batteries, no trouble, simply turn the crank, the machine does the rest. **Price, complete boxed, $3.75.** If you haven't got our 114 page electrical cyclopedia No. 5, send 2c stamp postage; contains 100 experiments.



ELECTRO IMPORTING CO.
86-Z West Broadway New York
"Everything for the Experimenter"

WIRELESS

We Sell All Our Goods in Separate Parts

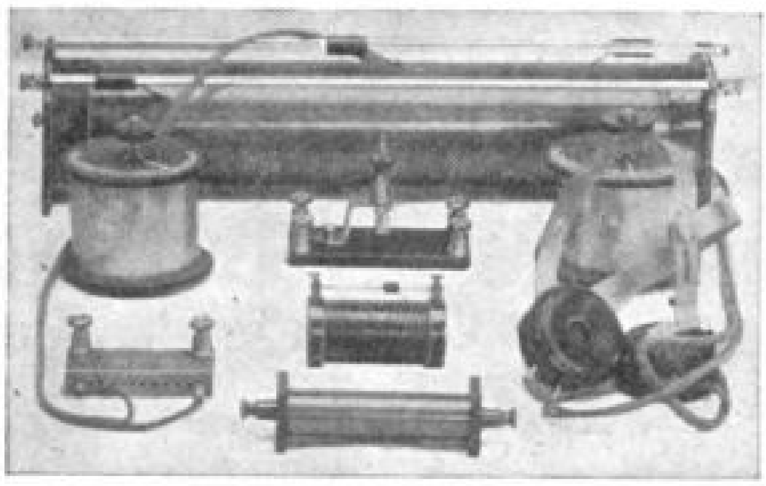
Semicircular variable condenser consists of 11 plates enclosed in a fine oakwood case 9x9 inches, a bargain to you this month only for **$4.00.** Our old style variable for **$2.50!** 2000 ohm telephone rece vers **$6.00.** All guaranteed goods. WE HAVE A NEW DETECTOR. Write for circular. Silicon **40c** per oz. Our double slide tuning coil metres for **$3.50.** A silicon detector for **$1.00**; commercial for **$2.00.** For our calalogue enclose a One Cent Stamp, write now to

Williamsburgh Wireless Telegraph Co.
105a JOHNSON AVENUE, BROOKLYN, N. Y.

When writing please mention "Modern Electrics."

METAL E. KONIGSLOW STAMPING & TOOL WORKS. CLEVELAND, O. DIE MAKERS. HARDWARE SPECIALTIES. **STAMPING**

Wireless Apparatus



This month we wish to call attention to our "Tri-mount Professional Set," Type C, as shown above.

3-slide Coil, high inductance	$5.50
2 Adjustable Air Capacities	8.50
Universal Detector Stand	4.50
Potentiometer	2.50
3000 Ohm Telephones with Headband, seven-foot cord, six-phone Block	8.50
Special "Tri-Mount" Switch (not shown)	3.50
Cost if bought separately	$33.00
OUR PRICE (delivered)	**30.00**

This is a very efficient set. It would give excellent service in a small commercial station.

See our advertisements in previous numbers.

The Tri-Mount Wireless Supply Co,.

R. A. CHANDLER, Manager

13C Irving Street BOSTON, MASS.

PATENTS

TRADEMARKS AND COPYRIGHTS

SECURED OR FEE RETURNED

Send model or sketch and description of your invention for *free* search of the U. S. Patent Office records.

Our **Four Books** mailed Free to any address. Send for these books; the finest publications ever issued for free distribution.

HOW TO OBTAIN A PATENT

Our illustrated eighty page Guide Book is an invaluable book of reference for inventors and contains 100 mechanical movements illustrated and described.

FORTUNES IN PATENTS

Tells how to invent for profit and gives history of successful inventions. Also list of Patent buyers.

WHAT TO INVENT

Contains a valuable list of Inventions Wanted and suggestions concerning profitable fields of inventions. Also information regarding prizes offered for inventions, among which is a

PRIZE OF ONE MILLION DOLLARS

offered for one invention and $10,000 for others.

PATENTS THAT PAY

Contains fac-similes of unsolicited letters from our clients who have built up profitable enterprises founded upon patents procured by us. Also indorsements from prominent inventors, manufacturers, Senators, Congressmen, Governors, etc.

WE ADVERTISE OUR CLIENT'S INVENTIONS FREE in a list of Sunday Newspapers with two million circulation and in the *World's Progress*. Sample Copy Free. Electrical Case a Specialty.

VICTOR J. EVANS & CO.

(Formerly Evans, Wilkens & Co.)

Main Offices, 200 "F" Street, N. W.

WASHINGTON, D. C.

YOU'LL FIND IT

in our new electrical catalog when you want to know anything about any *book* on any electrical subject.

Its complete information about over *900 books* is worth asking for, just write us, on a postal if you like, saying you saw this ad. and we'll send you that 96 page electrical catalog absolutely FREE OF CHARGE.

It makes no difference what branch of electrics you are following, this this catalog will tell you what books you should read to know all about it.

Send that postal now to

D. Van Nostrand Company

DEPT. A

Publishers and Booksellers

21 MURRAY and 27 WARREN STS.

NEW YORK

THIS IS THE WONDERFUL

RED STYLO

INK PENCIL

Impossible to leak, *even if carried upside down.* Writes like a pencil. Has a platinum-iridio feed wire and we therefore guarantee each and every pencil. Order one now.

Over 2 Million of these Pencils now in use.

All editorials and text matter of MODERN ELECTRICS are written with

Red Stylo Ink Pencils

To introduce this marvelous ink pencil to readers of MODERN ELECTRICS we will send One sample prepaid for **$1.00.** Regular price strictly $2.00. Dealers and Agents write for interesting proposition.

We also make electric flash lights, batteries, the famous Universa dry cells, electric scarf pins, Alladin electric gas lighters, electric magic lanterns; also the marvelous DRY alcohol (in chunks) Universal flaming cigar lighter, sample sent by mail for 50c., etc. CATALOGUE FREE.

Universal Novelty Co.

165 W. 29th St., NewYork, N. Y.

Cure Yourself

Right at Home With Vibration

Health is waiting for you! Perfect, abounding, glowing health—such health as you have not known for years, perhaps. And without the aid of doctors, drugs or medicines! No matter what ails you; no matter even if your case has been pronounced incurable—**don't give up hope!**

Vibration, the marvel of the 20th century, has cured uncounted thousands of people who thought they were hopeless invalids.

THE WHITE CROSS ELECTRIC VIBRATOR

is the greatest boon that suffering humanity has ever known. It gives life and health, strength and beauty to all. It sends the good red blood leaping and coursing through your veins, puts new life into disused muscles and nerves. It shakes the disease **right out of your system.**

The White Cross Electric Vibrator is the only instrument in the world which enables you to make use of the **three** great natural forces, Vibration, Faradic and Galvanic Electricity—right in your own home! It is a perfect Massage Vibrator and Medical Battery combined for less than the usual price of **either.**

VIBRATING CHAIR FREE With a simple attachment you can transform any chair into a perfect Vibrating Chair. You can take Vibratory treatments and **Swedish Movements** right in your own home, that physicians and sanitariums charge $2 to $3 apiece for.

CURES THESE DISEASES:

Head Ache	Asthma	Heart Trouble
Catarrh	Neuralgia	Deafness
Insomnia	Earache	Stomach Trouble
Indigestion	Weak Eyes	Skin Diseases
Weakness	Nervous Debility	Scalp Disease
Rheumatism	Constipation	Lumbago

All these and dozens of other chronic and acute diseases can be instantly relieved by Vibration and Electricity.

Valuable Book Given Away

Send us your name and address on the attached coupon at once and we will mail you a copy of the famous book, "Health and Beauty," **absolutely** free and postpaid. Tells how to prevent and cure disease and become healthy, hearty, happy and beautiful in a **natural** way. No matter how well you are **now, you need this book.** It has saved thousands of lives—it may save yours. No obligations—just your name and address.

SIGN THE COUPON

Get the free book at once. Let us tell you about our liberal Free Trial Offer. Get our special 60 day introductory discount. Learn how you and all your loved ones can get well without drugs or doctors. Remember, no obligations, just name and address. Get the free book today.

LINDSTROM, SMITH CO.
253 LaSalle St. CHICAGO
Dept 218x

Lindstrom, Smith Co.
Dept 218x
253 La Salle St.,
CHICAGO, ILL.

Without obligations on me, please send me free your free book "Health and Beauty," Special Reduced Price Offer and Complete Catalog.

Name..............................

....

Address..............................

....

When writing please mention "Modern Electrics."

Come! Quick! Danger!

Are you prepared for this call—no matter from which department it comes? Just think what it would mean to have constantly at your elbow for consultation an expert on the very problems that puzzle you. That's just what you would have in the

CYCLOPEDIA OF Applied Electricity

Six Big Volumes—Bound in Half Morocco—2,896 Pages 7x10 inches—printed on special paper in large, clear type—2,000 full page plates, diagrams, formulas, etc.

written by thirty expert Electrical Engineers, the biggest men in the profession. It is a working guide for the student or practical electrician, or a ready reference work for the expert.

Examine the Books at our Expense

So confident are we that the books are just what you want, that we will send them to you by prepaid express—you keep the books 5 days—examine them carefully, test them, apply them to your every day work. If satisfied that the books are the most complete and comprehensive work ever published on electricity, keep them, send $2.00 within five days and $2.00 a month until you have paid $18.80, the special introductory price—the regular list price is $36.00. If not suited to your needs, notify us. We will send for them at our expense. **Fill in and mail the coupon today—the books will be sent you at once.**

IMPORTANT SUBJECTS TREATED

Electric Wiring—Electric Telegraphy—Wireless Telegraphy—Telautograph—Theory, Calculation, Design and Construction of Generators and Motors—Types of Dynamos and Motors—Elevators—Direct Current Motors—Direct-Driven Machine Shop Tools—Electric Lighting—Electric Railways—Alternating Current Motors—Single Phase Electric Railway—Management of Dynamos and Motors—Power Stations—Central Station Engineering—Storage Batteries—Power Transmission—Alternating Current Machinery—Telephony—Automatic Telephone—Wireless Telephony—Telegraphone, etc.

Special Offer! You Mail Coupon Promptly

For a short time we will include, as a monthly supplement, absolutely free of charge, for one year, the TECHNICAL WORLD MAGAZINE. This is a regular $ 50 monthly, full of Twentieth Century Scientific facts, written in popular form. Also contains the latest discussions on timely topics in invention, discovery, industry, etc.

FREE OFFER COUPON

American School of Correspondence, Chicago, U. S. A.

Please send me Cyclopedia of Applied Electricity for five days free examination. Also T. W. for one year. I will send $2 within five days and $2 a month until I have paid $18.80; otherwise I will notify you and hold the books subject to your order. Title not to pass until fully paid.

NAME..............................

ADDRESS..............................

OCCUPATION..............................

EMPLOYER..............................

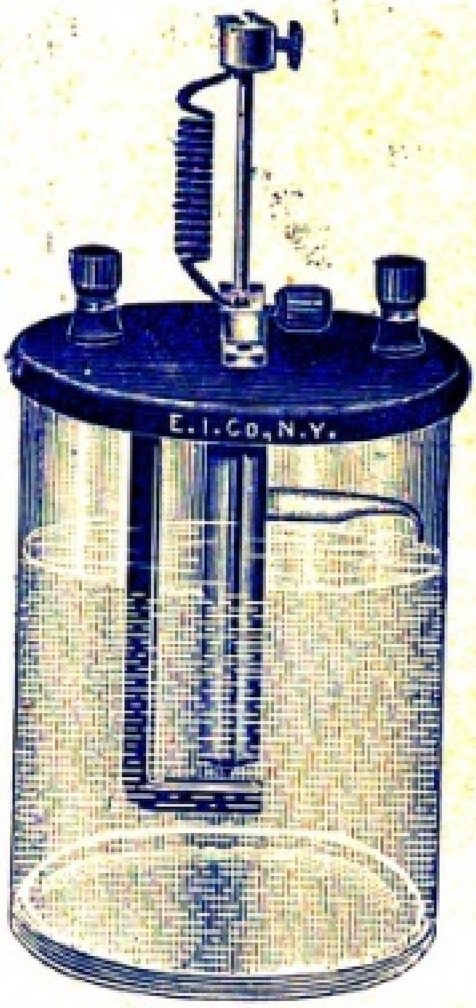
Mod. Elec., 10-09

News

The GERNSBACK ELECTROLYTIC INTERRUPTER

(PATENTS PENDING)

NEW FEATURES



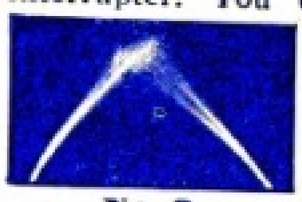
No. 8000

White porcelain top, impossible to melt, even if interrupter is worked for hours. New unbreakable petti coat tube. These new features make it possible to work the interrupter for long hours, without danger of any kind. No short-circuits. No blow-outs.

The Gernsback interrupter is connected in series, with any ordinary spark coil and the 110 V. or 220 V., direct or alternating lighting current supply. No resistance or condenser is used, except a key or switch to break the current in the usual manner. The vibrator of the coil must be screwed up tight as it should not vibrate.

You don't get a thin, meagre sp·rk, as with batteries, but A HEAVY FLAME ¼ INCH THICK. That this is the ideal thing for Wireless is unnecessary to mention. By way of proving our statement look at the two photos taken by Mr. Gernsback. The first one shows the full spark of a 2-inch coil run by a 6 V. 60 A. H. s'orage battery. The second shows the FLAME of the same coil with a 110 V. current and the new interrupter. You cannot appreciate the work you are able to do with this wonderful interrupter till you see it in operation. Not alone do you get a better and a heavier spark, but it is also from 15% to 25% LONGER, all depending on the construction of the coil. If you wish to know more about this wonderful interrupter, don't write us a letter, simply get our Catalog No. 6, which explains all and answers all your questions.

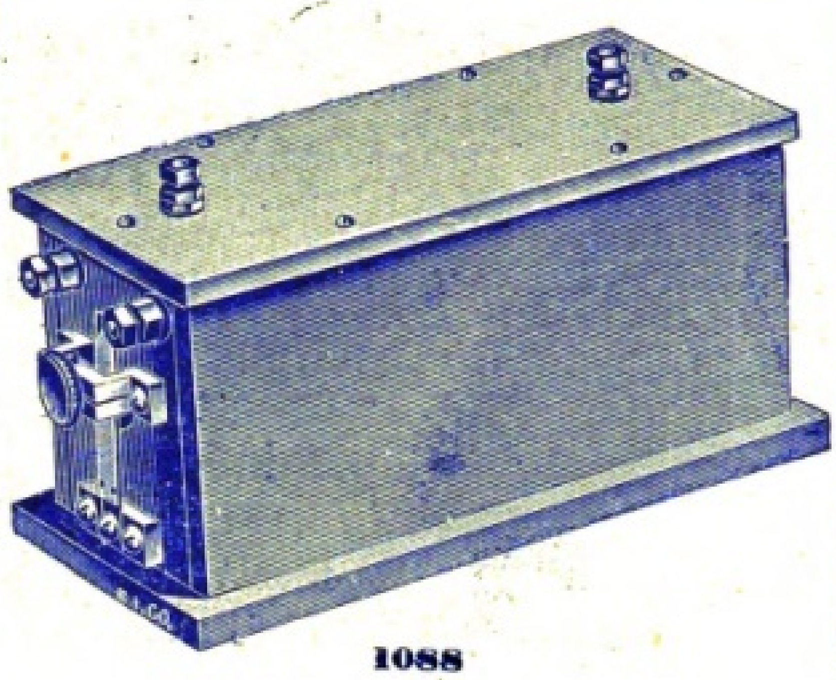
No. 1



No. 2

THE GERNSBACK INTERRUPTER (patents pending) **No. 8000**, as described, size 10½x5 inches. Weight, without solution, 2 lbs. Boxed in strong wooden box, shipping weight, 5 lbs. Price,

$2.50



1088

Our Stock on 1 inch Spark Coils

is too large and we offer 75 of these fine coils almost at cost for a limited time only. Our coils are known so well that we don't have to praise them. **Ask your friend he'll know.** There is no catch to this offer. You get 1 inch spark with a 6 volt battery, or money back. As soon as the 75 coils are gone the price will be $5.00 again. This offer is similar to the one we made on the 100 2 inch coils.

No. 1088 one inch Coil, $5.00, now

$4.50

SPECIAL

For This Month

3 INCH COIL

No. 1090, Regular price, $20.00

NOW **$18.00** Weight 13 Lbs.

ORDER AT ONCE

Fixed Condenser

For Wireless. Built on the same plan as our well known No. 10,000 Condenser, selling at $1.00. Especially built for Silicon and Electrolytic Detectors. A neat but plain wooden case is furnished with this condenser instead of the fine oak hardwood case with which the No. 10,000 is equipped. Inside is almost the same. Partly insulated with mica. No. **10,000a** Fixed Condenser as described,

NOW, EACH **50 CENTS** By mail extra 18 cents

Our new **ELECTRICAL CYCLOPEDIA CATALOG No. 6** containing 120 pages, valuable information, wireless diagrams, WIRELESS CODES, electrical photographs and the most complete assortment of wireless goods, apparatus, novelties, etc. etc., will be sent to you on receipt of 2 cents postage to cover cost of mailing. **2nd EDITION 1909**

¶ *"Everything for the Experimenter"*

Electro Importing Co., 86-z West Broadway, New

The "ELECTRO"-LYTIC BARE POINT DETECTOR

(PATENT PENDING)

Our new "ELECTRO"-LYTIC DETECTOR is without a question the finest on the market WITHOUT EXCEPTION. Our Detector has all the good qualities of a good Detector but none of the bad ones. Everybody concedes that the Electrolytic type excels by far all other Detectors in sensitiveness and our new type—already adopted by two of the leading wireless companies—is without doubt the acme of perfection. Please bear in mind that our new Detector has been designed for *hard commercial work*, it is not an amateur contrivance. Here are a few points: Hard rubber base ½ in. thick, hard rubber thumb nut 1 in. diameter, graphite-carbon cup moulded in brass cup (under hydraulic pressure,) heavy cast brass standard, etc. The most important part is that the 1-10,000 inch Wollaston wire does not need to be soldered, as in all other Detectors, a screw holds it in a unique manner. The last 1-16 inch piece of wire is utilized, new wires inserted in 10 seconds, etc. By means of an ingenious plunger movement, the fine wire is raised and lowered with greatest precision—less than 1-10,000 inch at a time. The wire cannot turn in a circle, (as wires do, *directly* attached to thumb screws,) it can only move *up or down*, not sideways, etc This has been found is of tremendous importance. ALL METAL PARTS ARE HEAVILY SILVER PLATED, as we found that silverplate is not attacked by fumes of the acid. We also furnish bottle to hold acid, and and one pipette to fill acid in cup.

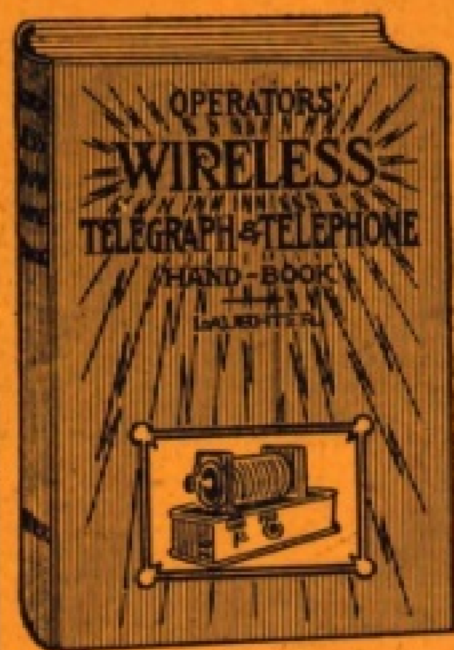
Introduction price, **$1.50** By mail extra 12 cents
Write for new Pamphlet on this Detector.

Electro Importing Co., 86-Z W. Broadway, New York

Just From The Press

OPERATORS' WIRELESS TELEGRAPH AND TELEPHONE HAND-BOOK

BY VICTOR H. LAUGHTER



UP-TO-DATE and most complete treatise on the subject yet published. Gives the historical work of early investigators on up to the present day. Describes in detail the construction of an experimental wireless set. How to wind spark coil and dimensions of all size coils. The tuning of a wireless station is fully explained with points on the construction of the various instruments.

A special chapter on the study of wireless telegraphy is given and the rules of the Naval stations with all codes, abbreviations, etc., and other matter interesting to one who takes up this study.

The most difficult points have been explained in non-technical language and can be understood by the layman. Wireless telephony is given several chapters and all the systems in use are shown with photographs and drawings.

By some practical work and a close study of this treatise one can soon master all the details of wireless telegraphy.

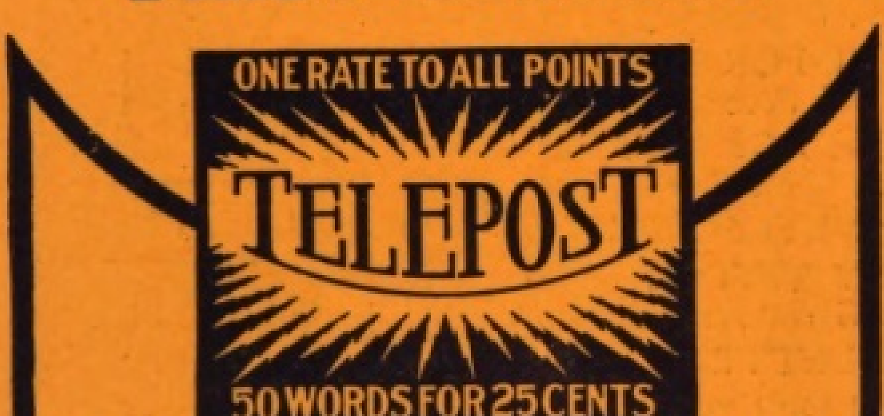
Sold by booksellers generally or sent postpaid to any address upon receipt of price.

12mo., Cloth, 200 Pages Fully Illustrated, and with Six additional Full-Page Halftone Illustrations Showing the Installation of "Wireless" on the U. S. War Ships and Ocean Liners - - $1.00

FREDERICK J. DRAKE & CO., Publishers
FISHER BUILDING - CHICAGO, ILL.

Send for Catalog FREE.

NEW ENGLAND GETS FIRST SERVICE



RESIDENTS of Portland, Me., Old Orchard, Me., Saco, Me., Biddeford, Me., Dover, N. H., Portsmouth, N. H., Exeter, N. H., Haverhill, Mass., Lawrence, Mass., Lowell, Mass., Boston, Mass., and adjacent points, are now communicating by wire at rates so low and service so accurate and prompt that they are wondering at their former patience with exorbitant rates and inadequate service.

¶ New lines will be opened as rapidly as physical and financial conditions permit until every city in the United States will be sending—

25-word TELEGRAMS, any distance, for 25c.
50-word TELEPOSTS, any distance, for 25c.
100-word TELETAPES, any distance, for 25c.
10-word TELECARDS, any distance, for 10c.

¶ An interesting illustrated booklet has been prepared, describing in detail the invention, its operation, its economy, its rapidity and its accuracy. Mailed without cost to anyone asking for Booklet No. 359.

TELEPOST COMPANY 225 Fifth Ave., New York

When writing please mention "Modern Electrics."

WE MANUFACTURE MOULDED AND SPECIAL RUBBER GOODS OF EVERY DESCRIPTION AND CAN FURNISH ANY SPECIAL RUBBER ARTICLE TO YOUR SATISFACTION.

NEW YORK BELTING & PACKING CO. LTD.
91-93 CHAMBERS STREET, NEW YORK.

Send for our large Catalogue "M" containing 94 pages, with useful information.

When writing please mention "Modern Electrics."

"Modern Electrics" guarantees the reliability of its advertisers.