IN THIS ISSUE

The Burke Wireless Bill

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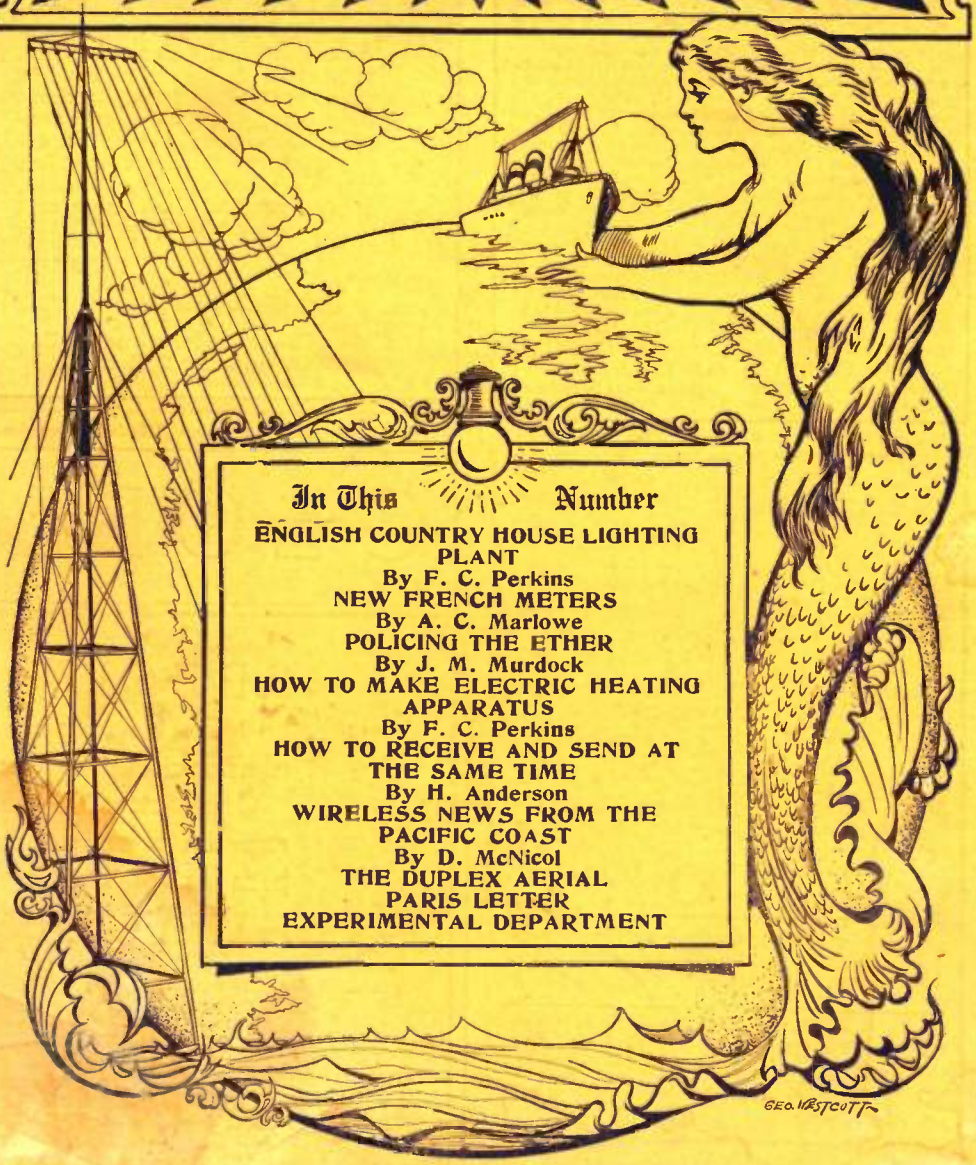
Vol. III No. 1

MODERN ELECTRICS



In This Number

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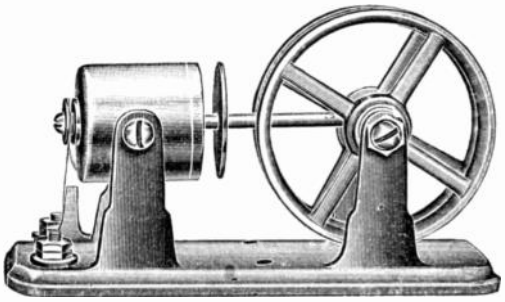

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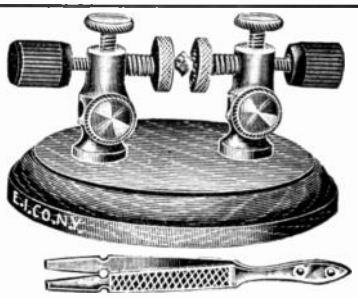

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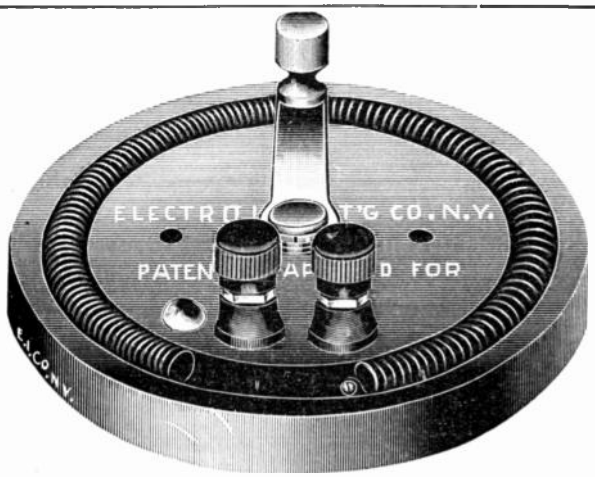

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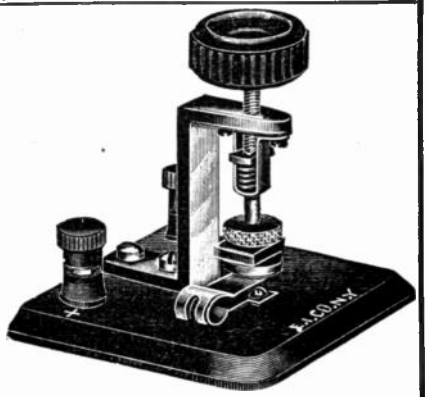

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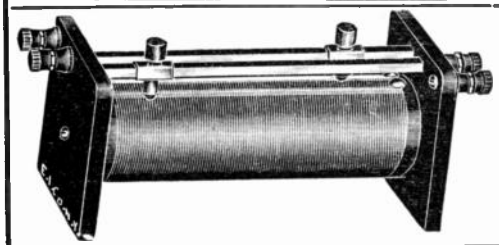

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MODERN ELECTRICS

Vol. III. APRIL, 1910. No. 1

Unique English Country House Electric Plant

By Frank C. Perkins.

THE wind turbine electric plant is becoming quite common in England and is of much interest. The accompanying illustration, Fig. 1, shows a wind turbine installation at Buckenhill Bronyard in Herefordshire at the country house of R. Phitts, Esq. This plant produces current for 100 lights and is utilized for electric cooking, heating and driving machinery on the estate.

The accompanying illustration, Fig. 2, shows an English wind turbine for charging accumulators of electric launches, while Fig. 3 shows a similar equipment for electric cooking demonstration at the Gloucester Royal Agricultural School. The illustration, Fig. 4, shows the complete wind turbine having a diameter of 24 feet, at this installation with the electric cable conducting the electricity to the cottage of the Country Gentlemen's Association, about 220 yards away, for electric lighting, heating and cooking service. It is stated that this plant generates 3,000 units per year with wind averaging 8 miles per hour for that period.

The illustration, Fig. 5, shows an English wind turbine for pumping and for electric light service at a mine, while the installation noted in Fig. 6 is utilized for electric lighting service at the Childs works at Willesden Green.

It may be of interest to note some of the details of the country house wind turbine electric plant at Buckenhill seen in illustration, Fig. 1. The power for electric drive is supplied by a wind turbine and is mounted upon a steel tower 75 feet high, about 435 yards away from the house, on ground which stands perhaps 90 feet above the level of the ground around the house. The generator is placed in a small house at the foot of the tower, and the battery and switchboard are mounted in one of the out buildings of the house. The current is conveyed from the generator to the battery by means of bare copper cables, carried on porcelain insulators mounted on poles in connection with which lightning arresters are fixed. The generator is of a special design, with a speed variation of 400 to 1,600 revolutions per minute, and runs with the armature in a vertical position. It is carried on ball bearings and is driven by a 5 inch belt from the vertical shaft of the wind turbine. The generator is of 4 kw. capacity, with a normal voltage of about 70. In order to have the whole of the control arrangements in the battery room, a separate field wire is carried up to the battery along with the other conductors. The battery consists of 28 cells by Messrs. Pritchetts & Gold, having a discharge capacity of 46 amperes for 10 hours, and is divided into two equal groups at 25 volts, using osram metallic filament lamps. Arrangements are made for using 50 volts for power as the plant in addition to running the lights in the house (about 100 in all) also drives a 50 volt motor for running a chaff cutter, circular saw, and root-pulping machine. This motor is placed in a shed about 80 yards from the house, and is connected to the battery by means of an armored lead covered cable laid in the ground. The chaff-cutting required for the homestead is easily dealt with by this machine, and also a considerable amount of firewood, and, of course, only runs one at a time.

The plant is entirely automatic, being fitted with a special tail gear, which gives very accurate adjustment to the wind. This arrangement consists of three tails, two of which stand out at about 20 degrees with the wheel. Two of these are connected together, so that when the wheel is required to stop, these have only to be pulled into a horizontal position, and the wheel immediately comes up into the wind and stops running. In the same way the tails are so balanced that when the wind reaches a predetermined velocity the tails tend to take the horizontal position, and so bring the wheel out of the wind more or less as the strength of the wind varies. In

the recent gale which swept over the Midland countries, this plant underwent a very severe test of stability; though a very large tree was blown down close to it, the wind turbine suffered not the slightest harm. It is found that the supply

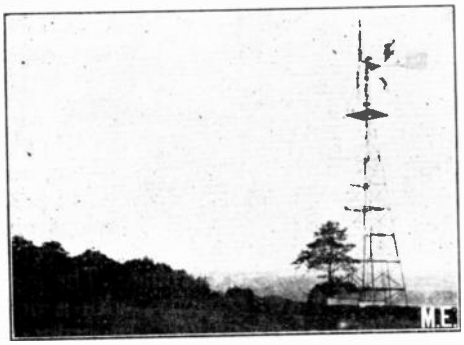


Fig. 1.

from the wind turbine is very reliable, and the plant requires very little attention. All the main bearings carrying load are ball bearings, and the gear is enclosed in a cast iron oil bath, so that if the plant were left for 12 months no harm would result from want of lubrication. As the wind turbine is placed on ground somewhat higher than the house, there is often a good wind blowing at the turbine, when none is felt down at the house.

The wind turbine electric generating plant noted in Fig. 5 was installed at the works of J. D. Childs & Company, Ltd., at Willesden Green, London, England, and has been used for lighting the works for several months past with excellent results. It supplies current to the equivalent of 150 10-watt lamps of the Tungsten type and has been used for cooking and heating as well. It is claimed that this equipment is also adapted for pumping, grinding and operating machinery. The plant consists of a wind turbine on a steel tower 50 feet high and embodies some novel features, particularly in the tail governing gear and the switching gear. As of course is well known, the plane of the turbine wheel should be at right angles to the wind when in working position and to enable it to automatically adjust itself to the varying directions of the wind, the main frame of the machine swings around a vertical pivot and is held in the correct position by three tails, two of which stand out on each side of the wheel, making an angle of about 15 degrees with it. The center tail stands out approximately at right angles with the wheel. All three tails are carried on a light triangular structure at the back of the wheel, which gives support at about 7 feet from the pivot. The small tail on the one side is fixed, but the two larger tails are free to rotate about a horizontal spindle from the vertical plane into a horizontal plane. When these tails are in vertical plane the machine is in the running position with its wheels at right angles to the wind, as the resultant pressure of the wind upon the wheel and the tails maintain that position. But when the two tails are turned into the horizontal position it is evident that the fixed remaining tail is unbalanced and the force of the wind slews the wheel around until the wind is blow-

Fig 2.

ing approximately parallel with the plane of the wheel and thus has no effect on it. To further assist the tails in controlling the wheel, the center of the wheel is about 9 inches away from the center of the vertical pivot, thus producing a tendency on the part of the wheel always to turn out of the positive at right angles to the wind. It may be stated that the two moveable tails are connected by a steel wire rope to a small weight at the bottom of the tower and by pulling this weight and fastening it to a hook, the wheel is permanently thrown out of the wind.

On releasing the rope the tails fall by their own weight into the working posi-

tion. The movable tails are so balanced on their pivot that when the wind rises beyond a certain predetermined limit the tails automatically move out of the vertical position, thus allowing the wheel to

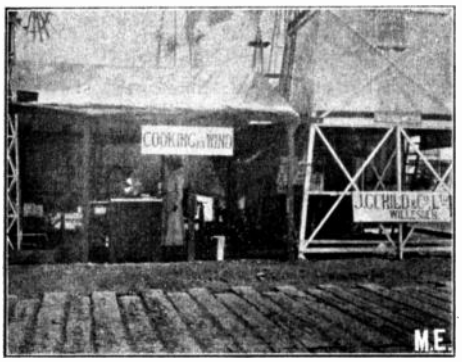


Fig. 3.

turn more and more away from its working position. It is claimed that the effect of this is that in heavy wind the amount of power exerted by the wind on the turbine can be kept within that required for the generator and thus allows the plant to look after itself in the strongest gales, for as it is well known the energy contained by the wind increases as the third power of its velocity and in heavy winds the amount of power will be greatly in excess of that required by the generator designed to work under average conditions.

The electric generator is of two kilowatt capacity and of 130 volts and has a speed variation of from 800 to 1,600 revolutions per minute. Its armature shaft is placed vertically and is driven direct by means of

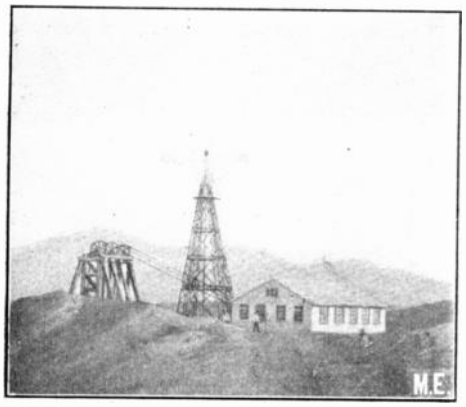


Fig. 5.

a belt from a pulley placed at the bottom of the vertical shaft of the wind turbine tower. The control of the field circuit is maintained by resistance worked by relay switches by the main circuit; in this particular plant there are six steps. It is said that as the velocity of the wind increased the power available on the turbine also increased and it is possible to so adjust the relay switches that they switch resistance in or out of the field circuit, and as the velocity of the wind increases or decreases. Thus instead of governing the speed of the wheel the governing is done on the output of the wheel and in practice this works admirably, the object being of course to

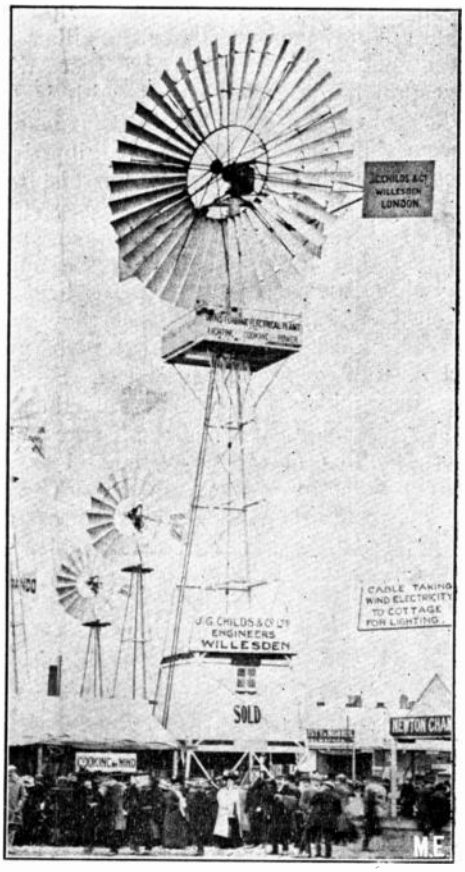


Fig 4.

allow the wheel to run at its most economical speed within the range of which it is designed.

In addition to the relay switches, there are the usual switching arrangements required for charging the accumulators. There is an automatic switch for cutting the battery in and out in accordance with the voltage of the generator, and for this purpose a special switch has been made which enables the plant to be left entirely to look after itself. So reliable are the

(Continued on Page 21)

Policing the Ether

By James M. Murdock.

THE proposed legislation for the control of wireless telegraphic communication suggests a rather curious role in the future for our revered Uncle Sam. It would seem that in addition to patrolling the land with his army, the sea with his navy, and the air with his aeroplane experts, he is going to become the policeman of the ether and make the villainous amateur operators behave. Just what weapon he is to be armed with is unknown at the present writing, but it does seem that he will be fully equipped by legislation before he starts on his beat.

In the good old days, when the ether was free, there were a few seers who predicted that the policing of the ether would come to pass. Now, when the time is at hand, it seems that they were prophets, and like many others of that clan, they were not believed. So, the amateurs kicked kinks in the ether, in their happy-go-lucky, I-don't-care fashion, scoffing at the prophets and telling them that they were talking in circles. Now, in the days of anticipation of official action, which seems inevitable, the same scoffers are wondering how they are going to fare under the oversight of the new policeman on the beat.

Assuming that the expected legislation will provide certain penalties for the violation of the commands therein set forth, the interesting problem is this: How is the policeman going to catch the offenders? It seems at first sight a difficult proposition to set a trap to catch somebody who is operating criminally in such an unsubstantial medium as the ether. For example, let us suppose that an amateur wireless fiend is operating his station with a wave greater than that allowed by law. How is the detective going to get to him, if he is doing this in all secrecy and is not at that particular time communicating with anybody? Looks hard, does it not? Or again, suppose that the same fiend is operating without a license from the government. How is the sleuth to get him? Clearly, there would be a test of the ability of the officials enforcing the law with regard to some sleuthing points not included in the instruction books of the detective of the present day. There are possible means of catching the offender which would seem farfetched to the average man, but in reality are expressly plausible when given careful consideration. The course in the case would probably be somewhat as follows. To an inspector at the government station where the violation is most noticeable, experiments with apparatus designed for the purpose, would prove within a few degrees of the arc, the direction from which the waves were coming. Having determined this interesting point, the inspector estimating from the strength and general characteristics of the wave, the distance from which it came, would go on a still hunt for a likely looking aerial, confining his search to the direction indicated by his previous experiment. The concealed aerial could scarcely enter into a case of this kind, since for purposes such as those of the supposed case, it would be ineffective. The aerial or perhaps several aerials located, the remainder of the case could be worked up by the approved sleuthing methods of shadowing, picking up odd bits of talk from the friends and neighbors, cultivating the friendship of the suspect, and so on. It would take time, but the sleuth would get there, for although the ether is immaterial, in a certain sense the ether waves leave a plain trail.

The supposed case above given is extreme, and would probably be a very rare occurence. Commoner offenses, such as failure to comply with regulations such as required registration and licensing, would be detected even more easily, for the policeman would not have to contend against the secrecy which was necessary in the former case. Any violation of legislation by the ordinary amateur operating near a Government station would be the rankest foolishness. You as an operator are distinguished from other operators by some characteristic of sending. Your wave has its peculiar pitch. Your signals always have earmarks recognizable even though you never sign your interfering taps. They, the police, can hang a man on the evidence of a thumb print. As the fellow who gets away and is afterwards

caught in another suspicious deal, is punished for the first because he carries a thumb which makes a mark like the only evidence left in the first case, you would leave for the guidance of the policeman, an identification mark, good enough to convict you, after each performance.

The really interesting part of the problem is in the method of policing the ether which Uncle Sam would adopt. It seems probable that the power of initiating a search for the violator of wireless legislation would be placed in the hands of the Government wireless experts. With their knowledge of the science and the application of common sense reasoning as applied to the detection of violation of any legislation, the offenders should be speedily brought to justice. Of course, there is and always will be evasion of legislation, but in the wireless field, with licenses and wave lengths and other restrictions, there would not be any great encouragement for malicious evasion. Moreover, evasion is seldom practiced except with a view of profit. The amateur wireless fiend seldom makes anything on his investment, so that motive is out of the question.

When Uncle Sam starts policing the ether, he should have an easy time, for with intelligent legislation, he will find that the amateurs are reasonable and law respecting citizens. One good may result. Discussion about policing the ether, and legislation restricting the operation of wireless apparatus may aid in bringing about the development of secrecy in sending. If we could achieve that, there would be no need of legislation and Uncle Sam could use his club in some other needed direction. Let us hope that the protection which the Government and commercial stations will be afforded by any restrictive legislation will not have the effect of delaying the achievement. Certainly restriction should start the experimenters on the road and perhaps it will result in the much desired secrecy. Wireless is young yet and the great inventor has not brought forth the acme of wireless. We all have the chance. I hope that the policeman will not chase us out of the business entirely. It will be very much like carrying a weapon anyway. You may get a permit to carry a revolver, if the nature of your occupation is such that you need one. But the policeman on the beat will run you in if you use your revolver without a reasonable cause. We will be permitted to carry on wireless business, if we desire to do so. But we will likewise have to observe the restrictions which are printed on our permit. If we do not—well, Uncle Sam will be on the beat, and we will explain to him.

FRENCH WIRELESS CARS.

The French Signal Corps has recently conducted exhaustive experiments with an automobile wireless outfit, and success has been the companion of the tests. The general outward appearances of the car with which the French soldiers worked resemble an ordinary limousine. The mast, its base, and the winch by which it is raised are all carried on the roof and covered with tarpaulins. All sections of the body are movable to permit of rapid ingress or egress and an easy operation of the necessary parts of the wireless outfit.

So far the French army is the only one in the world to possess an outfit of this kind, but it is likely that before long the Signal corps of the United States army will have secured a congressional appropriation sufficient to enable it to carry on thorough experiments and acquire material along these lines.

"ELECTRIC PERPETUAL MOTION."

At the Winnipeg meeting of the British Association for the Advancement of Science, an inventor, S. H. Schneider, exhibited a model for producing electricty which, he claims, will revolutionize the electrical world. It is a waterproof and airtight box so constructed that it opens and shuts like an ordinary folding dinner box. When folded it naturally sinks to the bottom of water, but reaching bottom the contrivance opens by means of a magnet, and, being lighter than the water it displaces, rises to the surface, where it again folds up and sinks. The inventor states that by the action of this box electrical power can be generated, and claims that a "generator" weighing 600,000 lbs. displaces 10,000 cubic feet of water and will generate 831,998,000 foot-pounds per half minute. As no fuel of any kind is required, Mr. Schneider claims power can be generated at a very low price.

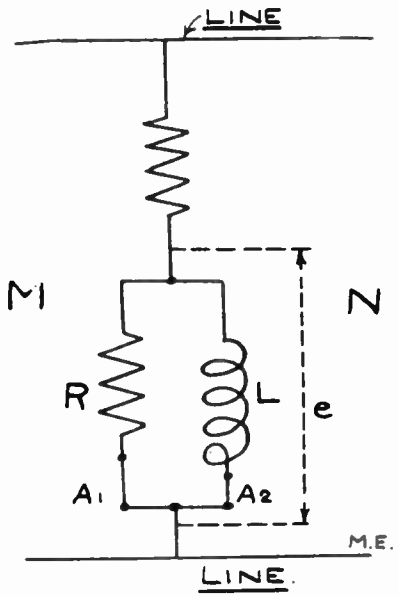
[This beats anything I ever doped out. —"FIPS."]

New French Meters

By A. C. Marlowe,

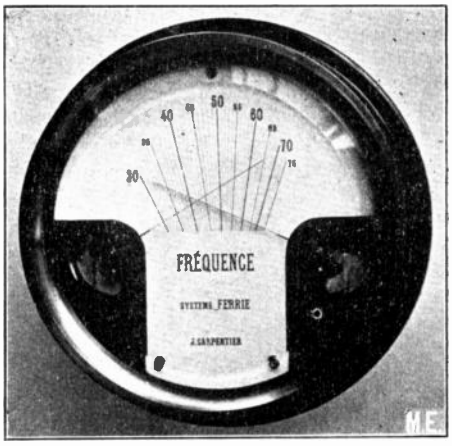
Paris Correspondent, Modern Electrics.

Captain Ferrie, who, it will be remembered, is at the head of the wireless station at the Eiffel Tower, has devised a new method for measuring instruments. On his principle he is able to construct frequency meters as well as instruments for measuring voltage and current, and an interesting application has also been made to measurement of resistances. The same principle underlies the construction of all these different instruments, and this appears to be employed for the first time.



Supposing we wish to find a value A which depends upon two other values, B and C, and that each of these latter can be measured by an instrument which gives the deflection of a needle. We can place the two instruments so that the two needles will cross one over the other upon the surface of a dial, and we utilize the crossing point of the needles in order to make the reading of the desired value, A. Such an instrument is standardized in the first place and a set of curves is traced on the dial so that we can make the reading at any crossing point of the needles.

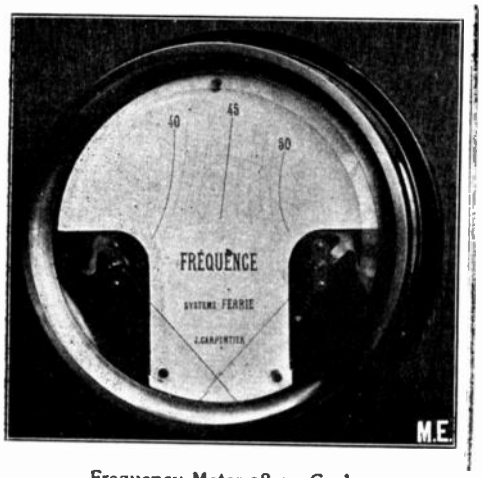
Suppose, for instance, that we wish to apply this principle to a frequency meter. On the line we connect the two parallel circuits M and N. The first of these circuits has in it an non-inductive resistance, R, and an ammeter, A1, while the second circuit includes a self-induction coil, L, and a second ammeter, A2. The two ammeters are disposed in the same casing so that the two needles are made to cross above the main dial of the instrument, as will be observed in the photograph. The instrument is calibrated according to its equations and the observed results, and a set of lines is traced upon the dial, corresponding in the present example to frequencies lying between 30 and 75 cycles. To read the instrument we have only to note the point where the two needles cross each other and at the same time observe one of the ruled lines upon or near which the crossing point lies, say the line numbered 43. This gives us the value of 43 periods per second for the current. Standardizing of the instrument can be carried out by the use of direct current, owing to the principle which is involved here. For the two measuring instruments there are used hot wire milliampere-meters which, like the rest of the device, are constructed at the Carpentier establishment at Paris. Some of the frequency meters which have been already made of this type have a wide range lying from 30 to 75 cycles, such as we show in the present engraving. Others have a shorter



Frequency Meter, 30-75 Cycles.

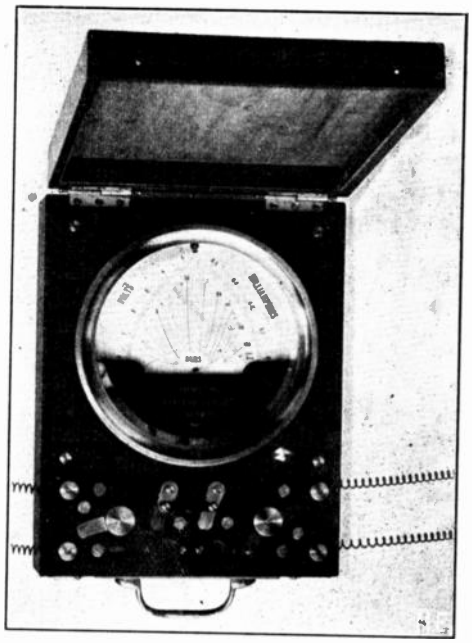
range, but at the same time a closer reading and are used when working about a given frequency, say 42, and the scale reads between 38 and 51 cycles. At the same time a second measurement can be obtained with this type of instrument. If we connect the points of the frequency lines which correspond to the same voltage, we have another series of curves which are preferably traced in another color. On the instrument we observe two such curves for 105 and 110 volts, with the intermediate lines spaced at intervals of one volt, so that we can read the voltage of the circuit at the same time as the frequency. If need be, a resistance can be put in the circuit so as to lower the voltage so that it will be within the range of the instrument. When designing instruments for working above 100 volts and from this point as high as the frequencies of electric oscillations, special precautions must be taken. In this way Captain Ferrie has designed a wave meter of about the same kind as is represented here, and it is graduated in wave lengths from 300 to 1,800 meters.

The same principle is used for an ohmmeter, and this is combined with a voltmeter and milliampere-meter in the instrument which is here shown. One of the hot-wire instruments, for instance, has a needle which moves over a milliampere scale, while the second instrument is a voltmeter and its needle moves



Frequency Meter 38-51 Cycles

upon a scale showing the volts. At the same time the crossing point of the two needles moves over the main part of the dial which has a set of curves laid out in order to read the ohms. Such instruments are remarkable for their lightness and solidity as well as for the multiple use which can be made of them, and we should note also the extremely wide range which can be secured by using a set of shunts and variable contacts, so



Ohm-Meter

that the instrument has a range from 0.02 ohms up to 50 megohms. By varying the contact, we can read either 500, 50, 5, or 0.5 volt per scale division, and from 400 to 0.4 milliamperes per division on the other scale. The readings for the ohms have corresponding values.

Wireless Association of Buffalo.

The Wireless Association of Buffalo was organized on March 4, 1910. The following officers were elected: President, Mr. Harold Schoepflin; Secretary, Mr. George Phipps, 142 Dorchester Pl.; Treasurer, Mr. George Nicholson.

The purpose of this club is to promote amateur wireless in Buffalo and to prevent the interference of amateurs with the commercial and Government stations.

The club has at present a membership of seventeen. Anyone in or near Buffalo having a station of sufficient power to reach members of the club, is eligible for membership. Application may be had by addressing the secretary.

The Calculation of Condenser Capacity

By H. W. Secor.

UNDER the above title the writer will endeavor to show the method whereby the capacity of the various condensers used in wireless work may be calculated sufficiently close for most work, and often nearer the true capacity than if measured by instruments unless they are of a very elaborate nature.

Condensers having glass or other substances for their insulation or dielectric, and those employing common air for a dielectric, will be treated of respectively.

It may be best to state here that the nature or thickness of the metal foil or plates of a condenser have no bearing upon its capacity. The area of the foil or plates is the only factor considered in calculating the capacity. However, the foil should be thick enough to withstand the heat due to heavy charging and discharging, which sometimes blisters it. Copper foil is used a good deal for this purpose, and has many good points to commend it.

We will first consider a Leyden jar condenser of the ordinary type, say 6 in. high by 3 in. in diameter, with a glass wall 1/32 in. from the bottom. The active area of this jar will be:

$$\pi r^2 + 2\pi r l$$

Where:—π=3.1416.

r=mean radius of shell of jar in cm

l=height of shell, covered by foil in cm.

$r = \frac{1}{2}(3'' - \frac{1}{32}'') = 1\frac{31}{64}''$ or 1.4843" or multiplied by 2.54=3.77 cm.

l=4.5" or 11.43 cm.

Active area = π 3.77^2 + 2 π 3.77 × 11.43 =315.41124 sq. cm.

The formula for finding the capacity of the jar for cm. measurements, is:

$$C = \frac{885 \quad K \quad A}{t \quad 10^{10}};$$

Where:—C=Capacity in Microfarads.

K=Inductivity (7 for this case).

A=Area of active glass surface in sq. cm.

t=Thickness of glass in cm.

Wherefore;—A=315.41124 sq. cm.

t=.079375 cm.

Hence $C = \frac{885 \times 7 \times 315.41124}{.079375 \times 10{,}000{,}000{,}000} = .0024. + M.F.$

We will next consider a condenser such as one made from a 5"x7" photograph plate, .05" thick, with foil on both sides 4"x2". The active area of the dielectric=4×2=8 sq. in.

K=3.1355.

The formula for inch measurements is $C = \frac{2{,}248 \quad K \quad A}{t \quad 10^{10}}$;

Hence $C = \frac{2{,}248 \times 3.1355 \times 8}{.05 \times 10^{10}} = .00011 + M.F.$

Thus it will be seen that it is the thickness, active area, and inductivity of the dielectric which control the capacity of a condenser. By active area of dielectric is meant that area actually between metal charging surface. The thinner the dielectric, other things being equal, the higher the capacity will be. Of course it must not be too thin or else it will be punctured by the high voltage charging it. The inductivities of various substances will be given at the end of this article.

A chemist's test tube is often called into use as a condenser, and makes a very handy and efficient unit, especially in making up adjustable condensers. Taking a test tube 6 in. long, with an outside diameter of 23/32 in. and wall 1/32 in. thick, coated with foil 4 in. up from the bottom, the capacity figures out as follows:

The active area, including the spherical end, was found to be 8.71085 square inches.

K=3.355

Hence $C = \frac{2{,}248 \times 3.1355 \times 8.71085}{.03125 \times 10^{10}}$

=.00019 + M. F.

The capacity of any condenser having other than glass or air as a dielectric is found by inserting the proper value for K, or inductivity of the substance used.

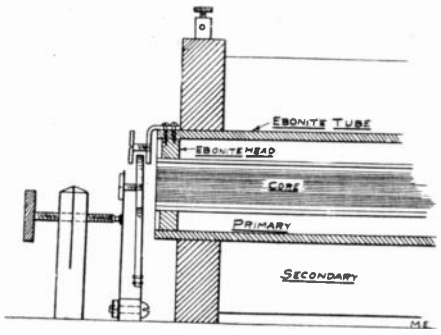
The capacity of condensers having air as a dielectric, such as rotary and sliding variable condensers, may be computed much more accurately than those which have some other substance for their dielectric, owing to the differences which may occur in their chemical composition, etc.

(Continued on Page 21)

How to Build an Efficient Vibrator

By John B. Allington.

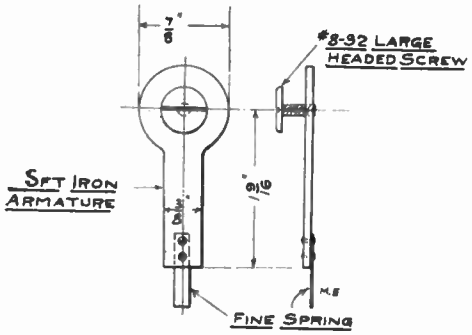
IN building a coil as a rule the amateur does not give enough attention to building a good vibrator. The old



-FIG. 1.-

style vibrator with heavy iron armature is antiquated. I will try to give full instructions for building a good core type vibrator or to change the old vibrator so as to make it more practical and at a very low cost.

The advantage in this type of vibrator lies in the fact that there is a very rapid



-FIG. 2.-

hammer-blow action both to and from the contact point, one contact being literally jerked from the other and the range of the armature being limited to a very small arc. By use of this method the efficiency of the coil is increased about 50 per cent., the mainspring is relieved of all strain, and there is very little sparking at the contact points.

For the complete construction and assembling refer to Fig. 1.

The armature, Fig. 2, is cut from soft iron 1/16 of an inch thick having threads cut in the center of the head for the large headed screw shown in the drawing. Attached to the bottom of the armature is a fine steel spring also represented in Fig. 2, and is necessarily limber as in operation it opposes the mainspring. A short piece of a watch spring will do nicely for this.

The mainspring (Fig. 3) is a stiff spring of phosphor bronze bearing the platinum contact.

For the contact post see the drawing in Fig. 4. The sawcurf is to keep the contact screw from getting out of ad-

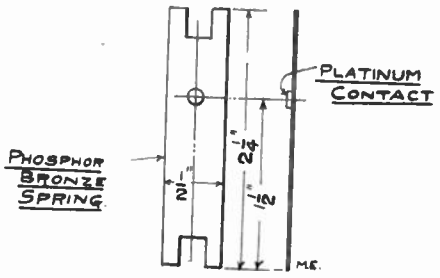
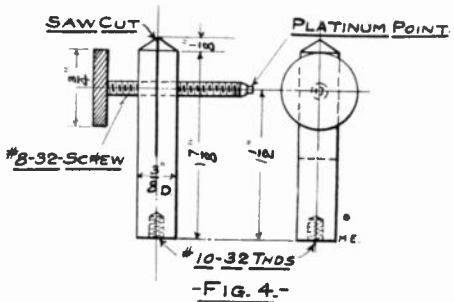


FIG. 3.-

justment. If desired a set screw or jamb-nut can be substituted for this.

A small strip of brass is bent to a right angle and a large headed screw like that used in the armature head is fitted to it. This is fastened to the coil head by screws and its use is to limit the range of the armature and shorten the time for its recovery.

By adjusting the screws the operator can



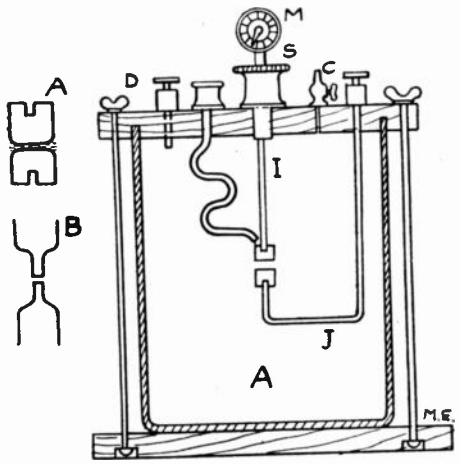
-FIG. 4.-

easily get an adjustment suited to the coil. and he will find that there is no sticking of contacts nor disagreeable noise, the sound made being only a slight humming.

Paris Letter

NEW DUDDELL OSCILLATOR.

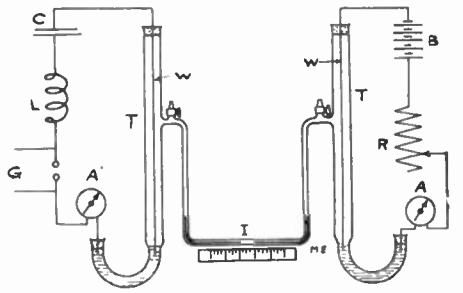
WE present an improved form of oscillator of the Duddell type for producing continuous oscillations. The electrodes are formed of metal rods or castings having a central discharge area with the edges beveled off (A) or cut away and then beveled off (B). For high voltages the part of the electrode which is cut away is filled with insulating material such as kaolin or steatite, papier-mache or superposed layers of thin silk, such as are seen here. The electrodes can be placed in a mass or a thin stream of oil or glycerine or the arc is formed in dry compressed air or various gases, the products of combustion being absorbed by soda lime. In the diagram,



the lid of the glass chamber A bears the electrodes I, J, a gas inlet valve D, a pressure gauge M, stop cock C, for the escape of gases and an adjustment screw S for regulating the upper electrode. Both electrodes can be of aluminum, iron, zinc, etc., or we can use an iron anode or cathode opposed to zinc. Therefore these combinations can be used with alternating current. An iron or steel anode can be used with a cadmium cathode or a cobalt anode with a zinc cathode. The two choke coils in the supply leads are wound on the same iron core so as to form a closed magnetic circuit. The inductances used on the oscillation circuit are preferably in the form of flat spirals.

NEW FLEMING INSTRUMENT.

Professor Fleming has brought out a new apparatus for measuring the value of the current in high frequency circuits. Referring to the diagram, the device contains two glass tubes, ww, each of which is about ten inches in length and 1/10 inch diameter. The apparatus is designed specially for measuring the current which passes in different wires of various diameters and material. Such wire is stretched inside each of the glass tubes, so as to have an equal length of it within the latter. The tubes are well closed at the bottom by a mercury joint and also at the top by a suitable stopper. At the middle point of each tube there is a branch tube which leads to a differential pressure gauge, this being composed of a capillary U-tube which has a column of colored water. An air bubble in the center of the column is designed to move over a horizontal graduated scale. The whole device is put inside a containing box and the position of the air bubble on the scale is observed through an opening. One of the stretched wires carries high frequency current produced in the circuit which contains the inductance L, condenser C, and a spark gap G. The wire is heated by the current flowing in it, and the heated air in the glass tube tends to drive the bubble toward the right over the scale. But this action is compensated by the effect of the other wire, as it receives direct current from the battery B. This is reg-

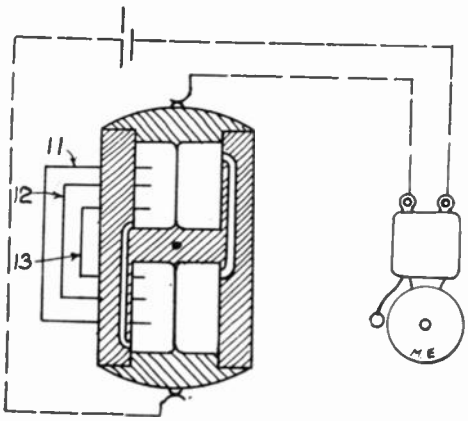


ulated by the adjustable resistance coil R, so that the bubble is brought back to zero. We read the current upon the ammeter A so as to find the corresponding current in the high frequency circuit.

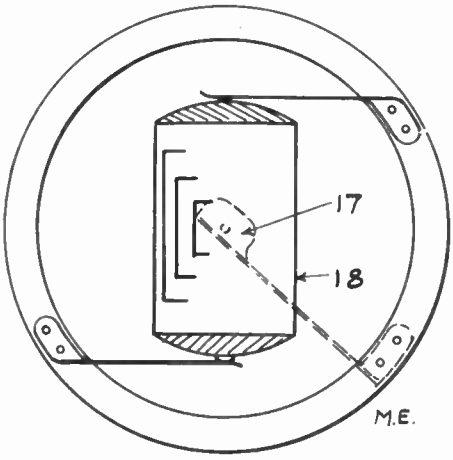
AUTOMATIC SIGNALLING.

The Russian inventor Popoff has devised an apparatus for sending out a

certain set of impulses so as to produce a signal which is peculiar to a certain station. Such an apparatus can be used for instance for lighthouses and other wireless stations where it is desired to keep repeating an automatic signal. An ordinary rotating contact device could be



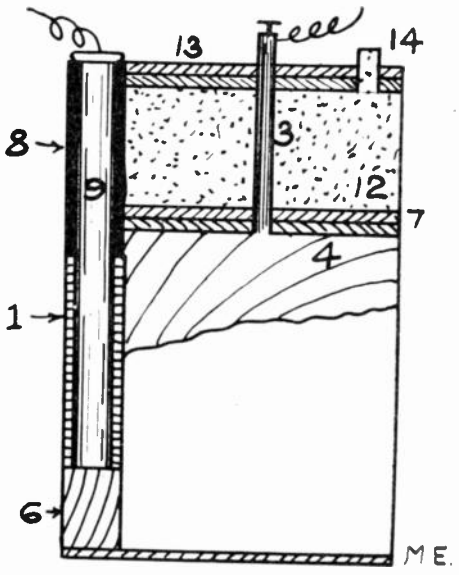
used for the purpose, but the present method is a simpler one. Referring to the diagram, the contacts are made and broken by mercury or other conducting liquid flowing from one chamber to another. We have the two-chambered box which is mounted on pivots so as to be turned through 180 degrees, and the mer-



cury then flows from the upper to the lower chamber. The circuits through the device are alternately made and broken at the surface of the liquid by the wires, 11, 12, 13, which project into the chambers. A flat stop, 17, is keyed on to the spindle of the box and acts together with a fixed spring so that the box will be always rotated through half a revolution at a time.

NEW BATTERY.

We illustrate a recently-invented dry battery in which the zinc is inserted at the time when the cell is to be used. The sheet metal box, 1, is coated inside with tar, etc., and has a carbon plate or rod, 3, imbedded in an agglomerate block, 4, which is covered with canvas and held in place by packing pieces of wood, 6. A rubber tube, 8, for receiving the zinc, 9, passes through the cover, 7, of waxed



or otherwise treated cardboard and is sealed in the top of the vessel by the cardboard disc, 13. The tube, 8, is closed by a rubber stopper when the zinc is absent. The space, 12, between the cover, 7, and the disc, 13, is filled with sawdust and has the gas holes, 14. A gelatinous electrolyte is used.

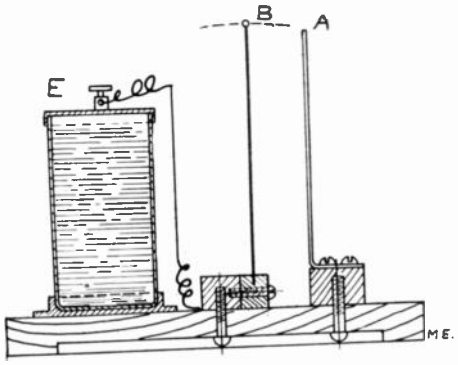
A NEW THERMO-ACTION.

Two German physicists, J. Weiss and Koenigsberger, have made experiments on thermo-electric effects, and find that the use of certain minerals will give a much higher voltage than we are accustomed to produce by employing metals. Such effects are from ten to twenty times what is usually obtained. Using copper on one side and one of the minerals on the other, they find the following results in volts per degree of heat, between 20 and 80 degrees C. For silica we have —0.00044 volts per degree and for iron pyrites, +0.00013. Molybdenite gives the highest result, this being +0.000727 volts. The positive sign indi-

cates that the current flows from the mineral to the copper through the thermo-electric joint.

CURIOUS FREQUENCY METER

Frequency meters have been already devised which consist of a set of tongues of unequal length and acted on by electromagnets in such way that only one particular tongue corresponding to a certain rate of vibration, say 100 per second, will be set in movement when the frequency of the current has that special value, and we thus observe the rate of frequency. Not long since, a German inventor has brought out a frequency meter which uses a set of vibrating tongues, but in this case the tongues are set in movement by electrostatic action. He uses the combination of an upright fixed plate, A, which is well insulated from the base, and opposite it is mounted the vibrating metal tongue, B, which is tuned for a certain vibration period. It is connected to the source of current at E. When the current has the proper value



corresponding to the tongue, this latter is set in vibration. In practice we use a set of tongues whose range lies within the frequencies which we are using.

WIRELESS NEWS FROM THE PACIFIC COAST

By D. McNicol.

THE writer recently returned from a vacation spent upon the Pacific coast. Being very much interested in the development and practice of wireless telegraphy a considerable portion of my time was spent looking over wireless stations and gathering information from wireless enthusiasts.

On the Pacific coast the United Wireless Company and the Continental code seem to be supreme. The U. W. Co's. operators on boats and at shore stations are neatly uniformed in navy blue suits, and insignia in gold letters on caps.

Along the coast there are several large stations, starting with the government station at Point Loma, near San Diego, Cal., on the south, and extending all the way up to Alaska. These include the commercial stations at Boyle Heights, Los Angeles, San Pedro Harbor, San Catalina, San Francisco, Aberdeen, Wash., Seattle, Wash., etc.

At Los Angeles there is a magnificent station and aerial structure erected some years ago by the old Pacific Wireless Co., but which is now out of commission. Also on the top of famous old Mount Tamalpais, near San Francisco, there is the remains of the storm wrecked station erected some six or seven years ago by the same company and which was never rebuilt.

In San Diego, Los Angeles, Oakland, San Francisco and all other coast cities there are hundreds of well built amateur stations, some of the aerials are really excellent structures and would be a credit to a going concern. The apparatus, too, in most cases is well up to date, and most amateur stations are equipped as both sending and receiving stations.

During the A. Y. P. exposition at Seattle the Japanese naval vessels being all equipped with wireless, kept the ether sizzling with their unintelligible jabber.

During the time I was at Avalon Island, fifty miles out in the Pacific from Los Angeles, the German cruiser Arcona, equipped with Telefunken apparatus, spent a day or two in those waters and the United Wireless boys had considerable amusement filling the ether with "Sauer Kraut" and "Frankfurter," but all they could get out of the Germans was "Hoch Der Kaiser."

While on the coast I learned at first hand the distressing details regarding the death of operator George Eccles, who went down with the S. S. Ohio, north of Seattle during the fall. I was particularly interested in the account, as Eccles and myself were boys together and learned telegraphy on the same line twenty-one years ago, afterwards working together at several points in the West. He was one of the fastest senders and most beautiful penmen I have known in the business.

(Continued on page 29.)

How to Make Electric Lamp Cooking and Heating Apparatus

By Frank C. Perkins.

THE greatest difficulty arising in attempting to utilize electricity in heating and cooking, is not always the high price of current, as in many places central station managements have made reduced rates for day load service for heating, cooking and power service.

The high cost of electric cooking and heating apparatus has been the greatest

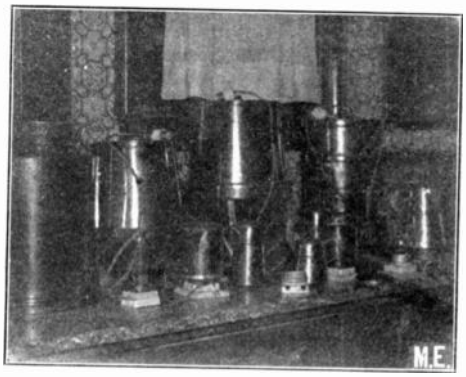


Fig. 1.

objection to it, together with the fact that great care must be exercised in washing the utensils, the heaters of which are often permanently connected and easily injured.

The renewals of the heating units are often expensive, and in many cases no great care has been taken to economize current and reduce heat radiation losses to a minimum.

The accompanying illustrations and drawings show the details of construction of some unique electric heating and cooking utensils which are cheap, being made of ordinary tin ware, made in lots of hundreds of thousands for other ordinary purposes for use with coal or gas, thereby differing from electric cooking apparatus. A circular hole is cut in the bottom of the utensil, and an ordinary dredge can or baking powder can inserted in an inverted position, to take the incandescent heating lamp.

The cost of the lamp being only from 10 to 30 cents, makes the renewal of this heater unit a mere trifle. The illustration (Fig. 1), and drawings (Figs. 2 and 3), show the general design and the details of construction of a unique form of electric fireless cooker, using incandescent lamps as heaters, as well as electric teapots and coffee pots, the latter having an outer shell or cover to retain the heat and increase the efficiency of the apparatus.

The combined electric plate warmer and egg poacher noted in illustration Fig. 4, also shows an electric lamp vapor heater for sterilizing dentists' or surgeons' instruments in the dental office or hospital, or for razors and manicure instruments in the barber shop and hair dressing parlor. The construction of the lamp curling heater and shaving cup is also indicated in illustration Fig. 5 and drawing Figs. 6 and 7, while drawing Fig. 8 shows a glue heater or cereal cooker, both being designed along the same lines.

The sealing wax heater is seen in illustration Fig 9, as utilized in the shipping or mailing department, factory, shop, bank or office where packages are sealed at frequent intervals throughout the day.

It is true that very few people realize

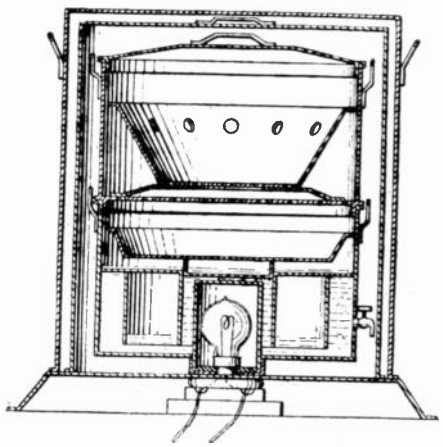


Fig. 2.

the amount of heat produced by the continuous operation of a 16 or 32 candle power incandescent lamp. It is of interest to note that by means of the ordinary carbon filament lamp of 4 watts per candle, of low lighting efficiency about 5 per cent., high heating efficiency about 95 per cent., a most simple, cheap, and efficient electric heating and cooking apparatus is obtainable, with which food

may be cooked and material heated to temperatures of 300 degrees F., or thereabouts, with the least possible loss in heat. A large number of most interesting and unique electric heating and cooking devices have been designed and constructed using incandescent lamps for supplying the necessary heat.

A number of different devices may be used with the same lamp base and cord as a heater, and a dozen articles may be thus obtained at the cost of one electric heating device as now on the market.

It is essential to note in considering these devices, that water is not a good conductor of heat when circulation is interfered with, but is a great absorber of heat. For instance, a test tube several inches long, filled with water, may be held in the hand without discomfort at the lower end, while the water in the upper portion may be boiling at 212 degrees F. from the heat of a Bunsen burner flame. In ordinary steam cookers and other similar devices, where a considerable quantity of water is heated in order not to boil dry, a large amount of heat is wasted when the cooking has been accomplished, by throwing away this large amount of water which has absorbed an enormous amount of heat.

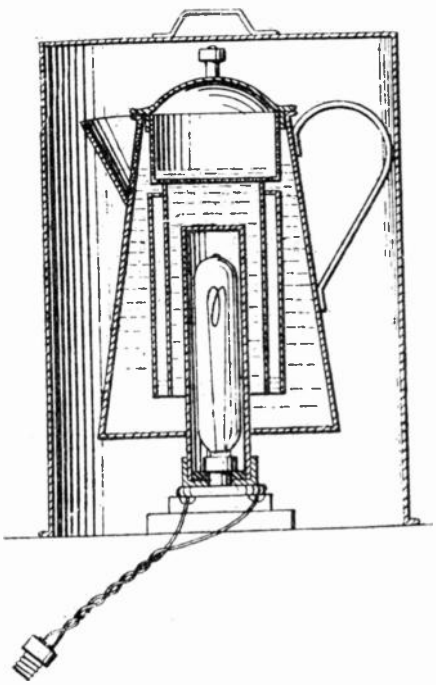


Fig. 3.

Again, *all* of the water must be heated to the temperature of 212 degrees or thereabouts before any of it will boil, when the heat is applied from the bottom in the ordinary manner.

It will be generally conceded that for cooking itself the actual amount of heat required is really very small as compared with the heat loss by radiation from a stove, and absorbed by the water which

Fig. 4.

is discarded after the cooking has been accomplished.

These electric steam and vapor cookers with incandescent lamps, require the heating of only a small film or thin layer of water to the boiling point or thereabouts, the vapor or steam arising from this small amount of water doing the cooking in the steamer, while the remaining quantity of water is at a much lower temperature, and is utilized only as a source of supply or storage, while it is at the same time absorbing heat which is ordinarily wasted by radiation.

It may be mentioned that the principle utilized in the ordinary fireless cooker, is that the vast amount of heat absorbed by a body of water when brought to the boiling point, is given up to the food to be cooked, when the whole is enclosed in a chamber well insulated by straw, asbestos, or other material, which prevents the heat from escaping to the outside of the cooker.

As it is well known that dead air space is one of the best heat insulators, this is taken advantage of in this electric fireless cooker, by providing air chambers and outer shells, with air space between the same for retaining the heat, the water boiling in the center, while the outer shell is comparatively cold, while with the ordinary fireless cooker, the heat is all first absorbed by the water heated by a flame, and then given off to the food

during the night; the electric cooker applies only a small amount of heat electrically and continuously for a considerable length of time, the food being hot and ready for service immediately in the morning.

With the ordinary fireless cooker, not only must outside heat with a flame be applied to boil the water in the first place, but the food, while thoroughly cooked, must still be reheated a trifle in the morning before serving, which is a

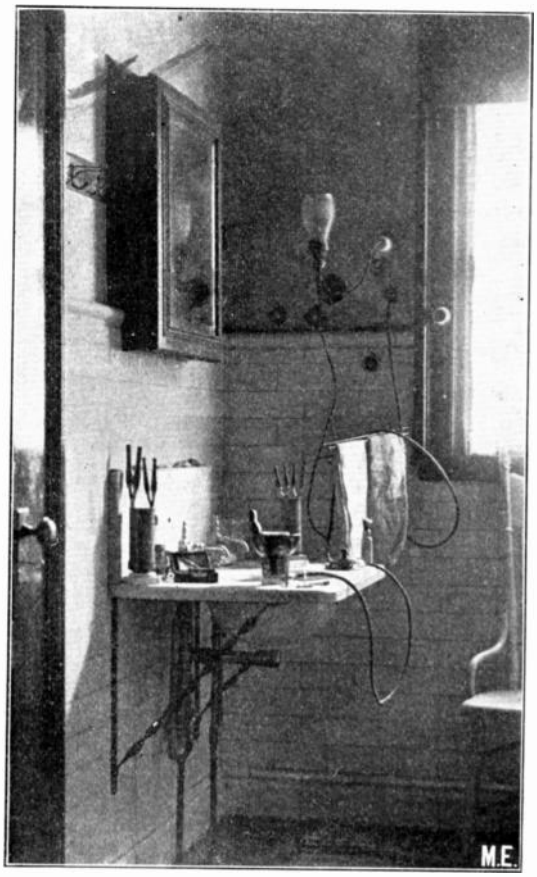


Fig. 5.

great annoyance and loss of time, and the food might as well be directly cooked at once by ordinary means.

In the accompanying illustrations at the right, Fig. 1, is shown an electric vapor or steam cooker, consisting of a heat insulating slate base, on which is mounted a porcelain electric heating lamp support, with electrical connections, the novelty of which consists of a porcelain cylindrical support, with a white surface for reflecting the rays from the heating lamp to the black lined metal heat-absorbing shell which it supports, on the outside of the other support.

It will be seen by this that the heat

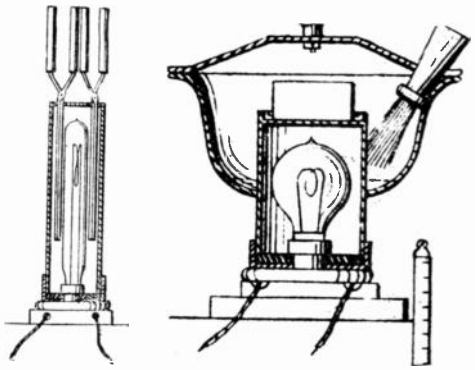


Fig. 6.

from the electric lamp is absorbed by the inner black surface of the metal shell, and is communicated by conduction to the water surrounding this shell, which is in a cylindrical, or cone-shaped chamber, containing only a thin layer of water, which may therefore be quickly brought to a steaming temperature. The drawing shows that an additional air or steam chamber is provided, surrounding this layer of water acting as a heat insulator, to prevent the rapid transfer of heat from the steaming water to the storage water in the outer surrounding chamber.

There is a small hole at the bottom communicating with the steaming water, allowing the passage of liquid from the storage chamber forced by the heated air in the upper part of the same, also by the heated air or vapor passing through the hole near the top of this chamber, and communicating with the air or steam insulation; outer shells are provided to retain the heat within the cook-

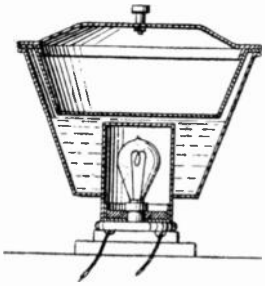


Fig. 8.

ing apparatus, and as the water is vaporized in the steaming water cylinder, it is continuously replaced by reason of

(Continued on page 51.)

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EDITORIALS.

MODERN ELECTRICS, with this issue, begins its third year.

It seems but a short while ago since MODERN ELECTRICS began its career and worked its way to the front rank.

It started with 2,000 copies; of this issue over 30,000 are printed and circulated and we hope to see this figure tripled during the third year, as the demand for the magazine is rapidly increasing and we hardly ever lose a subscriber or a reader.

Not alone in America, but also in the many foreign countries MODERN ELECTRICS is now looked upon as an authority and almost monthly, various items from its pages are quoted in the foreign press. As far as can be ascertained, articles or items are copied or mentioned regularly in no less than 8 different languages in the foreign press—a rather flattering record for a two-year-old!

During the third year, as in the two previous ones, the Editor will stand by his motto, printed in the first copy of MODERN ELECTRICS two years ago, namely: "To print what the readers WANT, not what strikes the Editor's fancy!"

In the following pages we present the Burke wireless bill.

It goes without saying that the Editor heartily endorses it and it will surely be endorsed by every law-abiding amateur and experimenter who respects the rights of others.

As will be seen Representative Burke's bill does not impose any license fees for operating a station, as the Roberts bill does. It simply calls for registration of stations by the Secretary of Commerce—a law which when passed will certainly be just and fair to all.

It will also do away with the "Wireless Tramp," and mischief maker, who should be banished from the map with all possible speed.

In connection with this the Editor wishes to call particular attention to Mr. Murdock's article in this issue.

The Burke Wireless Bill

(*MARCH 8, 1910*)

A BILL

To regulate and control the use of wireless telegraphy and wireless telephony.

Whereas the unrestricted use of wireless telegraphy and wireless telephony has reached such a state that the transmission of public and private messages, including calls from vessels in distress, have been interfered with to the detriment of public and private interests; and

Whereas it is deemed necessary to prescribe certain regulations for the transaction of such business within the United States and the possessions thereof, including public and private vessels of the United States: Therefore

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all persons and corporations owning or operating apparatus for the transmission or receipt of signals or messages by wireless telegraphy or wireless telephony within the jurisdiction of the United States shall, on and after the passage hereof, observe and obey all of the regulations and requirements hereinafter set forth, or for failure to do so shall for each and every such failure be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to the punishments, penalties, and forfeitures hereinafter prescribed.

I.

The owner or owners of every station designed for the transmission or receipt of signals or messages by wireless telegraphy or wireless telephony within the jurisdiction of the United States, including all such as are or may be installed on vessels of the United States, before engaging in business or uttering or transmitting any signal or message, shall file with the Secretary of Commerce and Labor a sworn statement, showing its ownership, location, and construction. The said Secretary shall preserve a record of all such stations, and upon the filing of any such statement shall issue to the owner or owners of the station described therein a certificate, containing a designation or number by which such station shall be known and which it shall always use and employ when uttering signals or calls and when acknowledging the receipt of the same. And every such station shall at all times, while authorized to operate or engage in business as aforesaid, be in charge, or under the supervision, of a person or persons licensed for that purpose by the Secretary of Commerce and Labor. For violation of this regulation the penalty shall be a fine of not more than one hundred dollars or imprisonment for not more than three months, or both, in the discretion of the trial court, for each and every such offense, and the owner or owners of any station failing to observe and obey this regulation shall forfeit the right to register or operate the same for a period of six months after conviction of any such failure, and any person who shall operate any such station without being licensed as aforesaid shall be liable to a fine of not more than fifty dollars or imprisonment for not more than two months, or both fine and imprisonment, in the discretion of the trial court. Every person so licensed who in the operation of any wireless station or stations shall fail to observe and obey the regulations hereinafter set forth, or any one of them, shall, in addition to the punishments and penalties hereinafter prescribed, suffer the suspension of his said license, and the same shall not be renewed for a period of one year from and after the date of his conviction of any such failure.

II.

For the purpose of uttering or acknowledging the receipt of any call for the purpose of establishing communication by wireless signals between two or more shipboard stations, or between a shipbard station and one or more shore stations, or between a shore and one or more shipboard stations, there shall be used a wave length to be designated for that purpose, from time to time, by the Secretary of Commerce and Labor, and the wave length so designated shall not be used otherwise or for any other purpose, and no station, except as hereinafter authorized, shall continue any such call or acknowledgment of a call for more than fifteen consecutive seconds or repeat such call or acknowledgment at intervals of less than five minutes. In transmitting all messages or communications, made or exchanged by or between any such station or stations, subsequent to the preliminary call and acknowledgment aforesaid, it or they, except as hereinafter provided, shall not use a wave length having a variation from the wave length designated by the Secretary of Commerce and Labor, as aforesaid, of less amount than the said Secretary shall prescribe from time to time. The penalty imposed upon the owner or operator of any wireless station for violation of this regulation shall be a fine of two hundred and fifty dollars, or imprisonment for not more than three months, or both fine and imprisonment, in the discretion of the trial court, for each and every such offense.

III.

A shipboard station on a vessel in peril may utter a distress signal or call and continue the same as long as the peril remains imminent, using the wave length designated by the Secretary of Commerce and Labor as provided by regulation second. During the continuance of any such call or distress signal no other station or stations within range thereof shall transmit any call or signal, except for the purpose of answering such distress signal or call, using a wave length having a variation from that of the distress signal or call of less amount than the Secretary of Commerce and Labor shall from time to time prescribe. The penalty imposed upon the owner or operator of any wireless station for violation of this regulation shall be a fine of not to exceed one thousand dollars, or imprisonment for not

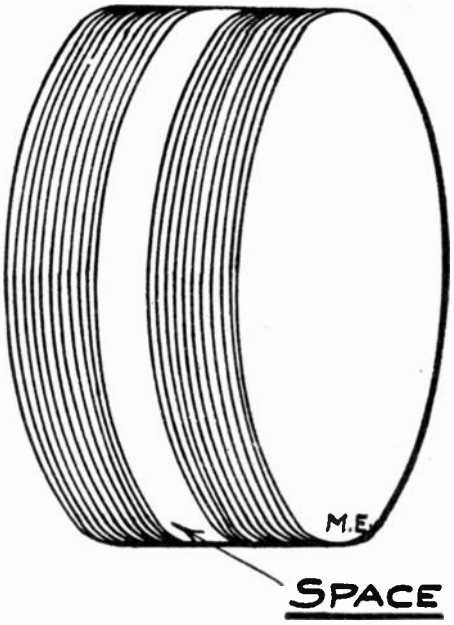
(Continued on Page 44.)

Variometer for Amateurs

By M. H. Hammerly.

IT is strange that this simple but efficient tuning device has not been described before so that amateurs could make it for experimental purposes. To make one of these instruments, proceed as follows: First make a box, with cover, 6½x6½x6½ inches (inside dimensions), In the center of the bottom bore a¼-inch hole half way through the wood and another ¼-inch hole through the center of the top.

Get two cardboard tubes 5 and 6 inches in diameter, each to be 2 inches wide. Wind each with No. 18 or 20 wire, No. 18 annunciator is good. When winding, leave a space about ⅜ in. wide along the middle (Fig. 1) and be sure to put the

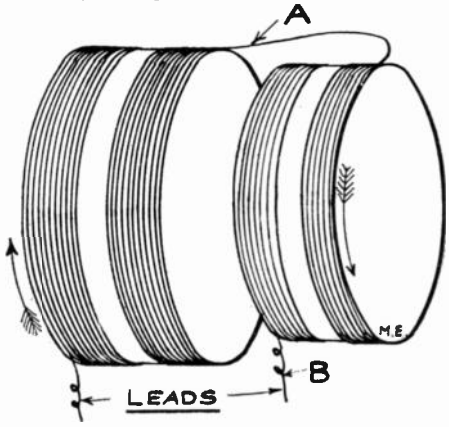


-FIG. 1-

same amount of wire on both tubes. This is important because of the inductive effect. Fasten the wire in place with shellac or melted paraffine.

Next procure a piece of ¼-inch brass rod 8 inches long (brass plated curtain rod is all right). Turn to the coils again and in both make two holes at opposite points that the rod will slip through. The coils are now connected together as in Fig. 2, using about 8-inch lengths of flexible cord at points A and B. The arrows show direction of winding.

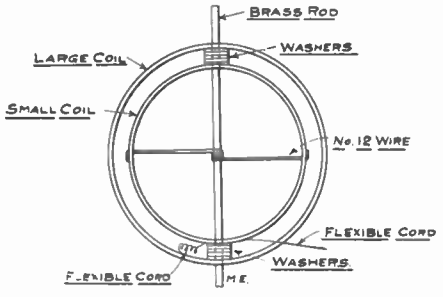
The smaller coil is now slipped into the larger one and the rod put through the holes, using washers at the two



-FIG. 2-

points indicated (Fig. 3). The inner coil must now be fastened to the rod, so that both will turn together. This may be accomplished by soldering a No. 12 wire about 6 inches long to the middle of the rod and forcing the ends through the 3/8-inch space left in the winding and bending the ends over (Fig. 3). This must be done after the coils are in place.

The whole is placed in the box and the outer coil fastened by means of a cord or wire so that it cannot move. The lower end of the rod is put in the hole

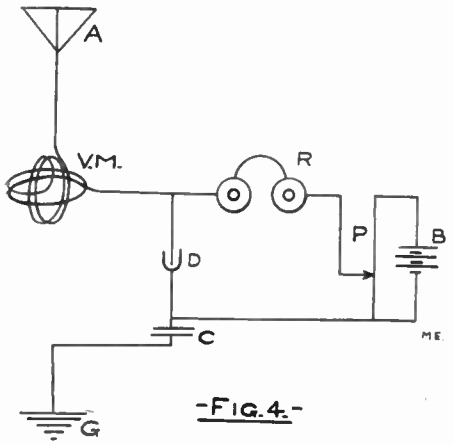


-FIG. 3-

in the bottom of the box and the cover put on, the upper part of the rod going in the hole. Before cover is put on, the two leads are connected to two binding posts on one side of the box. A rubber or wooden knob is put on the end of the

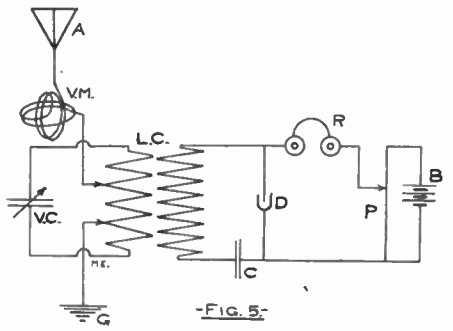
rod and a pointer arranged to travel over a graduated scale.

Two diagrams are shown. In the sec-



-FIG. 4.-

ond, the sliders will probably be in a very different position than in using the loose coupler alone. The variable condenser



-FIG. 5.-

must be adjusted very carefully, in fact it may often be used instead of changing the position of the sliders or variometer.

THE CALCULATION OF CONDENSER CAPACITY.

(Continued from Page 10)

As an example of this type of condenser, take a rotary receiving condenser having 12 stationary plates and 11 moving plates, each plate being half of a 5 in. circle. The plates are separated by a 1/32 in. air gap. K, for air being unity or 1. The total active (maximum) area of dielectric exposed to charging surfaces is:

$$22 \times (.5\pi 2.5^2) = 215.985 \text{ sq. in.}$$

It will be seen here that two active dielectric surfaces are figured for every one moving plate. The maximum capacity is now found in the usual way:

$$C = \frac{2248 \times 1 \times 215.985}{.03125 \times 10^{10}} = .0014 + \text{M. F.}$$

The minimum capacity may be found by allowing the moving plates to be turned nearly out of the stationery plates. and then figuring on the active area resultant; which, when put in the above formula, will give the minimum capacity. Of course, it is understood if the moving plates are turned completely out of the stationery plates, the capacity is then zero.

Inductivities of Various Substances:

Air, at normal pressure: Standard = 1.0000; methane, 1.0009; paraffin, clear, 1.68—2.32; paraffin, solid, 1.9936—2.32; beeswax, 1.86; resin, 1.77—2.55; petroleum, 2.03—2.42; Manila paper, 1.500; ebonite (hard rubber), 2.05—3.15; turpentine, 2.15—2.43; India rubber, pure, 2.22—3.84; shellac, 2.74—3.60; sperm oil, 3.02—3.09; sulphur, 2.24—3.84; glass, common, 3.013—3.258; mica, 6,000 average; porcelain, 4.38; flint glass, very light, 6.57; flint glass, light, 6.85—7.

UNIQUE ENGLISH COUNTRY HOUSE ELECTRIC PLANT.

(Continued from Page 5.)

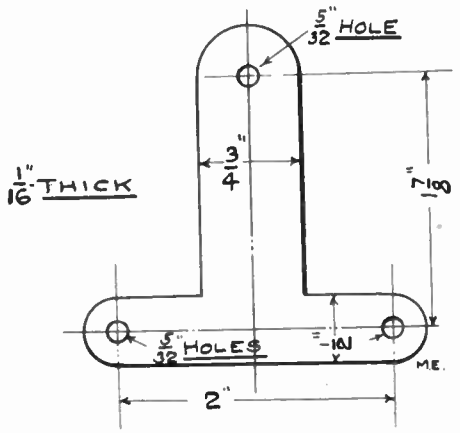
arrangements that charging can go on day and night and through week ends without any attention whatever, and the winds whether light or strong are made use of.

The principal parts, including those of the motor, run on ball bearings. The gear runs in oil enclosed in a cast iron box. The results obtained by these running arrangements are most satisfactory, as the plant requires scarcely any attention in the direction, and the cost of lubrication during the year at the works will be almost nil. It is claimed that the plant running at the works referred to is capable of producing about 1,500 kilowatt hours per year, with the conditions of the winds such as occur in London at the height of fifty feet, but by running the tower higher better results would be obtained.

How to Receive and Send at the Same Time

By Hallam Anderson.

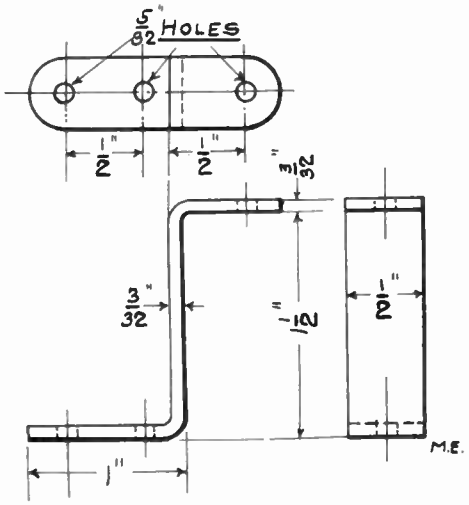
EVERY month I see a number of articles on how to make and perfect aerial switches. What is the good of an



-FIG. 1-

aerial switch at all? With my arrangement you can literally send and receive at the same time on the same aerial without any danger of getting a "jolt."

The good points of this arrangement are: (1) if you are sending and some-

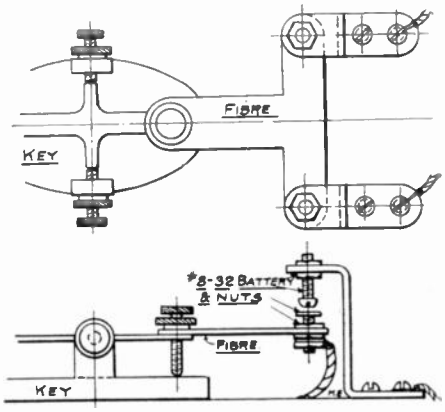


-FIG. 2-

one "butts in" that you know, the fellow you are sending to cannot read you through, you can stop and wait till the intruder gets through; (2) if the party you are sending to misses part of the message he can break in and tell you so the minute he misses it; (3) if you are sending a long message to somebody and the other person knows about what you are going to say he can break in and say "O. K." and go ahead with the answer. The only drawback that I know of is that it won't work with a loop aerial.

Take a piece of 1-16-inch fibre and cut it as shown in Fig. 1. Then take two pieces of 1-16-inch brass and cut them as shown in Fig. 2.

Then fasten the piece of fibre on the end of the key handle as in Fig. 3. Also screw the key and the two brass pieces



-FIG. 3-

on a board as shown in Fig. 3. Then take four battery posts and file the heads flat and place them as shown. By studying Fig. 3 carefully you can see how it is put together.

Then connect it up as shown in Fig. 4. Be sure that the helix clips make contact and that you don't use an anchor gap.

After this is done adjust the contacts so that the back contacts touch before the regular contacts do. It will make it necessary to have quite a little bit of play in the key.

I have found by experimenting that receiving through the helix does not cut

down the strength of the signals any. The detector shunt on the key is necessary or the detector will get out of adjustment. This will help to keep the amateurs from interfering with the commercial stations; take for instance, that one amateur was sending quite a long message to another and a commercial

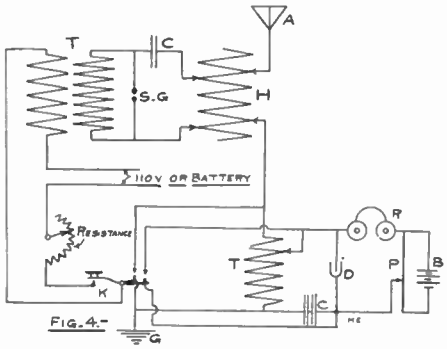


FIG. 4.

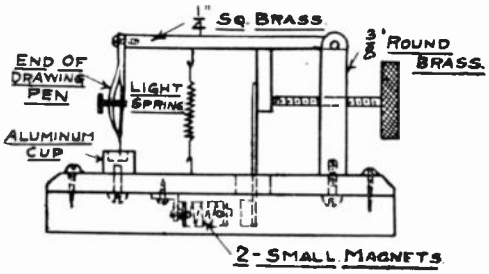
station started to send. Then the amateur could wait till the big station finished before continuing.

I would like to give credit here to Terrance Scott of Oxnard, Cal., as he suggested the idea of hearing through the helix, which is really the key to the whole thing.

AN AUTOMATIC RESTORING ELECTROLYTIC DETECTOR.

To many amateurs the electrolytic detector has been one of the easiest to make, yet it has been a hard one for many amateurs to get accustomed to, owing to the fine adjustment required to give best results.

It has been found that the ordi-



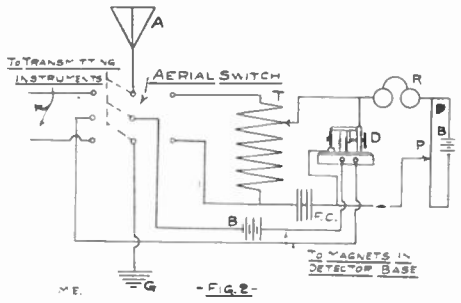
-FIG. 1-

nary electrolytic detector on the market at the present time consists of a cup with a vertical screw for adjustment. When sending it sometimes becomes necessary to remove the point from the cup, and to listen again adjustment is necessary. With the style of detector herewith submitted it is not necessary to change the adjustment as the point is dropped to its normal position when the main cut out switch is placed in the receiving position.

The sketch herewith submitted will give a good idea of the operation of the detector. The two small magnets mounted in the base were taken from an old midget buzzer.

The base is in two parts, the upper section consists of a piece of fibre one-quarter of an inch thick, 3 inches long, 4 inches wide. This is screwed to a wood base one-half inch thick, and cut out in the centre to receive the magnets, the moving armature and connection for magnets and detectors.

Suitable binding posts are placed on the fibre base, to which all connections are made. The small magnets are energized by a couple of dry cells in series, with a spring switch arranged so that it can be opened and closed by the open-



-FIG. 2-

ing and closing of the large cut-out switch. When the switch is thrown in the sending position the small springs are allowed to come in contact, causing the battery current to flow through coils, raising point out of electrolyte. When switch is placed in receiving position the spring is released, opening the battery circuit, allowing the point to drop in the cup in the normal position by dropping against adjustment screw.

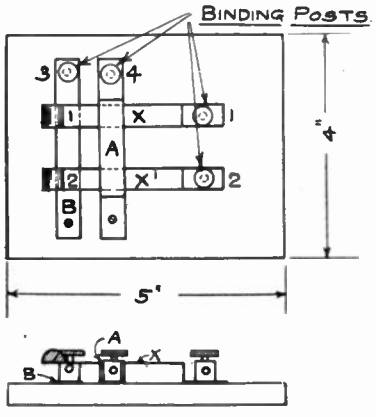
Contributed by D. C. PAUL.

FRENCH RADIOPHONE A SUCCESS.

Owing to the success which Lieutenants Colin and Jeance have had with their method of radiophony, the French Navy Department has decided to begin installing the system on the warships. It will begin with two of the warships, and there will be a radiophone cabin placed upon each of these vessels.

CURRENT REVERSER.

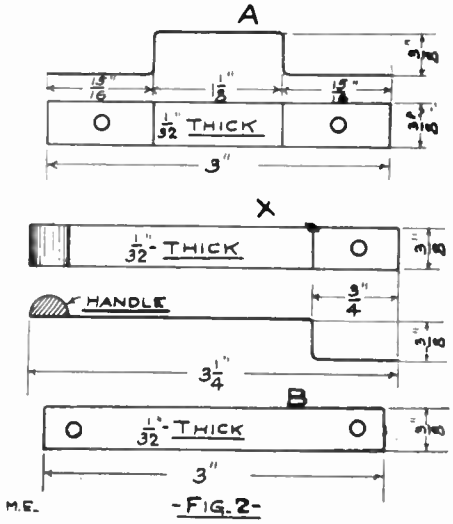
This switch or current reverser, as it is called, can be used in almost all wireless telegraph experiments. Such as



-FIG. 1-

M.E.

changing aerials from one detector to the other, or for any place where a reverser is needed. This one which I will describe was made for 25 cents. The



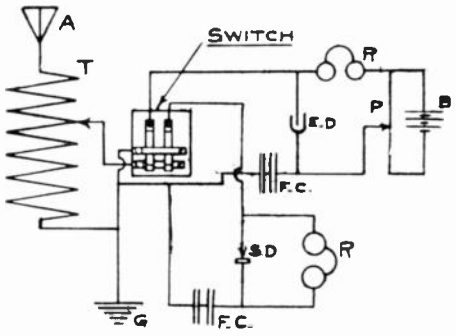
M.E. -FIG. 2-

materials needed are described in their proper places.

Base is made of hard wood; it is then sandpapered, rounding off the edges to add to its appearance. Shellac or paint the base. S. C. Johnson & Sons' wood dye is very good for this purpose. See Fig. 1 for dimensions.

Copper strips are made of very springy copper, about 1-32 of inch thickness will do. See Fig. II. for dimensions. For putting together see Fig I.

Operation is as follows. Connect aerial toB3, ground to A4. One detector, say silicon, to X1 or binding post 2. Other detector to X or binding post. By pressing down X1 the silicon detector is in circuit with the aerial. By pressing down X the aerial will be in circuit



-FIG. 3-

with the other detector that you may have. See Fig. III.

Contributed by B. VON PEUTZ.

HOW TO MAKE AN INSULATED THUMB NUT FOR A DETECTOR.

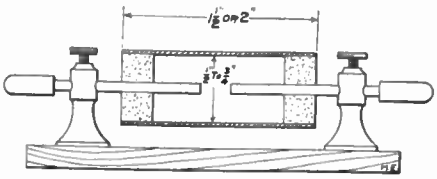
Take a small pill-box the size of the required head, fill it with hot sealing-wax (black preferred), then while still soft place the head of the bolt or screw in it and allow it to cool. A piece of bent tin may first be soldered to the head of the bolt to give the wax a good grip. When cool the paper box may be washed off and the wax touched up with a hot knife blade; milling may be put around the edge in the same way.

Contributed by G. OGILVIE.

AN EFFICIENT SPARK GAP MUFFLER.

An efficient and easily made spark gap muffler is always a welcome addition to the station of the wireless amateur, es-

pecially if the people in the house object to the merry crashing of the spark. Place two corks that fit snugly in the ends of a thin glass tube, being from one-half to two inches long and from one-half to three-fourths of an inch in diameter. Make holes in these corks for

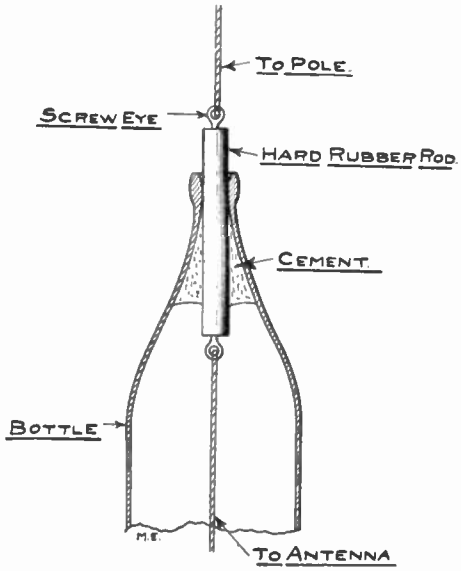


the rods. Place on the gap as shown. This muffler has given fine results.

Contributed by L. H. ECKLEMAN.

AERIAL INSULATOR.

What most amateurs need is a good aerial insulator. The following are directions for a very good one. First procure an old beer bottle, and break the bottom out by tying a string around the bottom of the bottle. Then saturate the



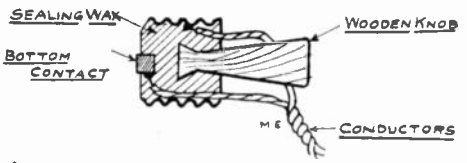
string with gasoline, and light it with a match. After the string has burned up drop a piece of iron or steel into the bottle heavy enough to break the bottom out. Next get a piece of hard rubber rod about six inches long and large enough to fit the neck of the bottle very tightly. Then fasten a screw eye in each end of the rubber rod. Turn the bottle up side down and pour some cement around the rod which has previously been fastened in the neck of the bottle. Be sure that all openings between the rod and the neck of the bottle are filled with cement. Have the bottle hang as near vertical as you can. Follow the diagram closely and you will have no trouble in making this insulator.

Contributed by RAYMOND CROWDER.

A SIMPLE PLUG.

This attachment plug, which is very handy in the experimental laboratory, can be easily made from the base of a miniature electric bulb. A candelabra base may also be used, but of course only in a candelabra receptacle.

First, remove all the plaster of paris from the base, and clean it thoroughly with a sharp knife, but leave the porce-



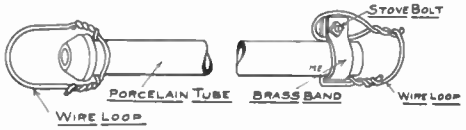
lain bottom intact.

Bore out the hole in which the lamp wire is soldered, and in it solder one conductor of a double flexible cord. Solder the other conductor to the rim of the base on the inside. Hold the two wires apart, and pour in some melted sealing-wax. Before the wax begins to harden, place a small wooden knob, as shown in the cut.

When the wax hardens you have a neat little attachment plug, much more convenient for connecting to the circuit than the ordinary binding posts. The conductors can be made any desired length. Contributed by J. M. WALSH

A SIMPLE AERIAL INSULATOR.

Large hard rubber and Electrose aerial insulators are usually too expensive for most amateurs. A very efficient and cheap insulator can be made with a small amount of labor. I will try to describe



to the readers of MODERN ELECTRICS a simple insulator that I have made and used with much success.

Very little description is necessary, as will be seen by the drawing. A loop of strong wire is fastened around a porcelain tube on the end which has the

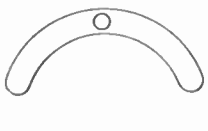
flange. On the other end a loop of wire is also fastened by means of a brass band bound tightly around the tube by a small stove bolt.

The porcelain tubes are the kind used in electric wiring and can be obtained up to 24 inches in length and 3½ inches in diameter. The tubes will break easily if struck a hard blow, but they will stand a great direct strain; in fact, I have one 12 inches long and 5/8 inch outside diameter, that holds a four-wire aerial three hundred feet long with sixteen foot spreaders.

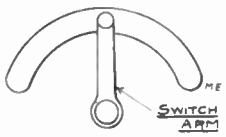
Contributed by A. L. ANDERSON.

CONDENSER SWITCH.

Switch for semi-variable condenser, described in September, 1909, issue: Out of a piece of brass spring 1 inch wide and 3 inches long, cut a piece as shown

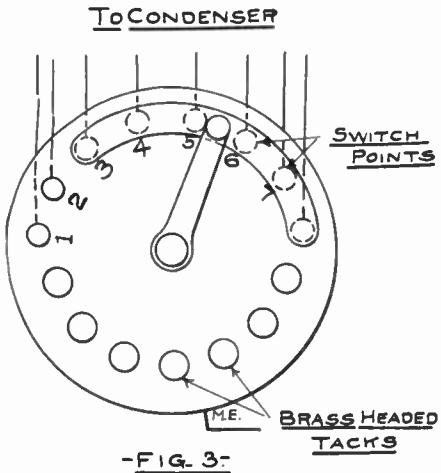


-FIG. 1-



-FIG. 2:

in Fig. 1, and bore hole in center. Fasten to switch arm with screw, as shown in Fig. 2. Nail brass headed tacks on



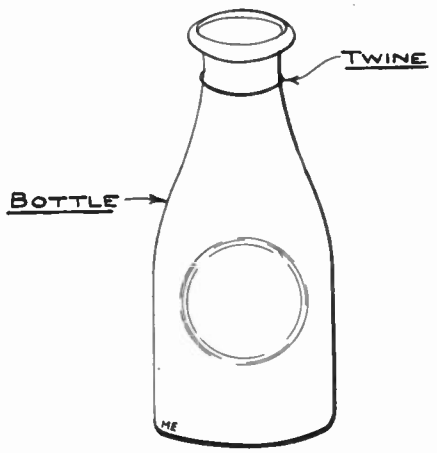
-FIG. 3-

switch base for switch arm rest. Connect as shown. With this switch and condenser very satisfactory work can be done.

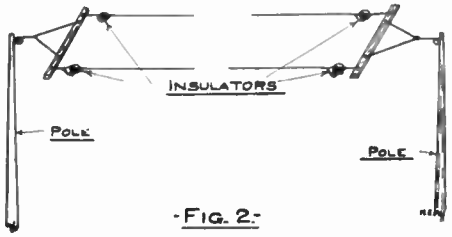
Contributed by W. B. FORD.

HOW TO MAKE GLASS INSULATORS.

Very good glass insulators for insulating aerials can be made from the necks of milk bottles. Get a large quart size milk bottle and from the top of the bottle measure down 1¼ inches and make a mark at this point. Now wind a piece of twine around this mark as shown in Fig. 1. Before tying the twine around the bottle soak it in a little alcohol. Now



-FIG. 1-



-FIG. 2-

set the piece of twine on fire and hold the bottle vertical, then turn the bottle around so that the string burns all around. Just as soon as the twine has burned drop a few drops of water on the neck of the bottle and a perfect ring will break off. The insulators should be fastened to the aerial as shown in Fig. 2. These insulators were made by the writer some time ago and proved worth while to make.

Contributed by WILLIAM DETTMER.

REMOVING INSULATION ON TUNING COIL WIRE.

After I had wound my receiving tuning coil with double cotton covered wire, I took the regular pyrographic set which is used to burn wood. Then placing a straight metal edge, as of a ruler, on the

wire to mark the outlines or edges of the bare place, with the platinum point red hot, I ran it along the wire and pressing the point against the ruler as in drawing a line with a ruler and pencil. When both sides of the desired bare place are burned in this way the insulation between them may be burned off freehand.

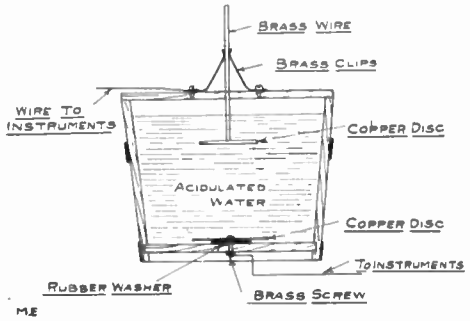
Some pyrography dealers say that the point when hot must touch no metal but my point was not injured in the least. This method not only gives a good contact, but a much better appearance than if sandpaper were used.

Contributed by BAYARD H. CLARK.

HOW TO MAKE A RHEOSTAT.

Procure a small wooden pail or bucket. After it is dried thoroughly, give the inside a good coat of melted paraffine.

Cut two discs of copper, one and three inches in diameter, respectively. Clean the discs thoroughly by scouring with emery cloth. Fasten the larger disc to the bottom of the pail by a one-inch round - headed brass wood screw passing through the bottom. Place a



rubber washer between the disc and the bottom before the screw is driven in to prevent the acidulated water from attacking the screw. A little solder will make a good contact between the two metals.

Then solder the one-inch plate to a straight brass or copper wire, about No. 10 B. W. G., and eight or ten inches long—at least three inches longer than the pail is deep. Make a wooden support long enough to reach across the pail and drill a hole in the centre large enough to let the wire slide through. Bend two pieces of spring brass to the shape shown and fasten with screws so that the free ends grip the rod and holds it in position, and at the same time form a sliding connector. The wire leading from the top should be soldered to both clips, thus reducing the resistance at this point. The rod is pushed through the hole and the wooden strip nailed to the pail.

A solution is then made to fill the pail to within one inch of the top, composed of twenty parts of water and one part sulphuric acid. The acid renders the water a conductor.

When the upper disc is withdrawn from the solution, the circuit is broken, but as it is pushed down towards the bottom, the resistance decreases until the two discs come in contact. Thus the quantity is regulated from nearly zero to full strength. The less acid mixed with the water, the greater will be the resistance, as pure water is not a very good conductor.

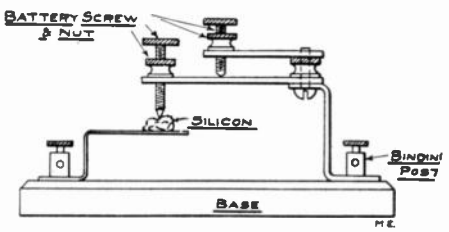
This is a very cheap rheostat, and readily built by anyone at home in a short time. It is adjusted within great limits and has a large capacity, and if a heavy current was passing, the heat generated would be readily absorbed by the solution. The acid will not attack the copper and if well made will last a long time.

Contributed by CLIFFORD ANDERSON.

IMPROVED DETECTOR.

In the January issue of your magazine there was a description of a silicon detector which I thought was very clever and I started to build one. In the making I put one of my own ideas to work, and it worked out very good.

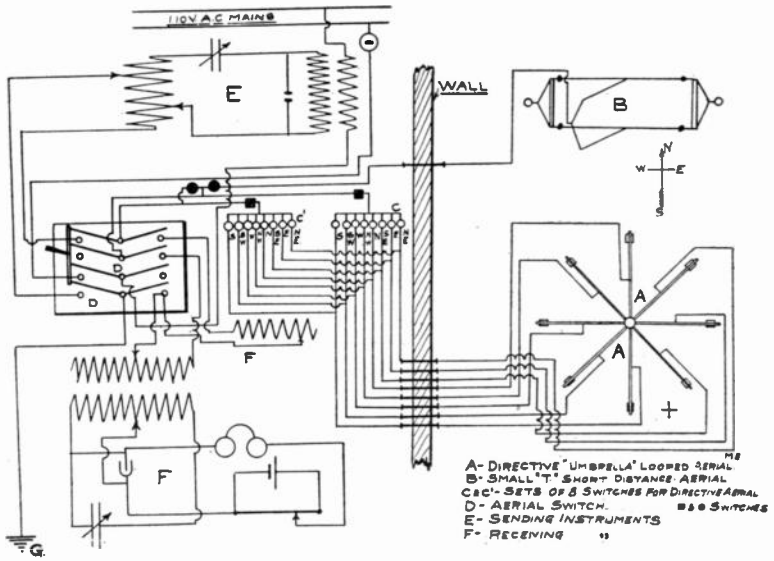
Instead of having an 8-32 screw 3½ inches long, I bent a piece of copper in the shape of a Z. I then bored holes in each end to fit a screw taken off of an



old battery. I fastened one end to the base; the other end was fitted with a battery screw. The rest of the detector is the same as the other one.

Contributed by JAMES H. SMITH.

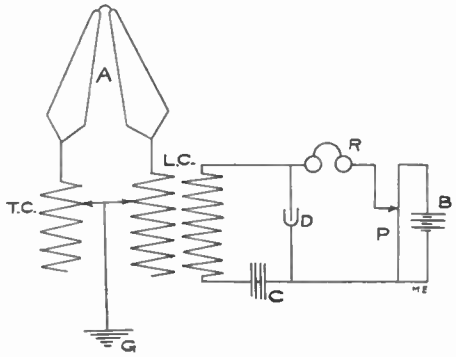
The Duplex Aerial



A COMPLETE AMATEUR EQUIPMENT.

By Ernest Brennecke.

In the accompanying diagram is shown a complete amateur equipment, embracing a large "umbrella" type aerial, and also a smaller "T" form aerial, for short distance work. The large one is both directive and looped. It has eight wires, each one pointing to one of the points



Detail of Umbrella Aerial Connections.

of the compass. Any of these may be thrown in by means of the set of eight small switches. Another set of eight controls the other end of the loop, through a tuning coil to the ground. If the operator wishes to receive from a station in the direction of + on the diagram, he uses the N. and N. W. aerial wires, and loops the s. and s.w. wires, through different inductance, to the ground. When he throws the aerial switch to the sending side, the aerial is no longer looped. It is advisable, however, to use the small "T" aerial for sending short distances.

The sending instruments consist of a transformer, spark gap, condenser and helix. The aerial switch is quadruple point, double throw. Only three bars are used on the receiving side. The extra one for sending is used to break the primary circuit when sending. The receiving instruments are an inductive tuner, a single slide tuner, detector, variable condenser, battery, potentiometer and telephone receivers.

Such an equipment is as complete and selective as any amateur could wish. With the instruments and aerials mentioned, his station rivals a good many commercial ones. But the actual working distance depends upon the make of the instruments and the height and capacity of the aerials.

FRASER DUPLEX AERIAL.

I enclose a drawing of my idea which I think will satisfy the amateur if used with a sending helix.

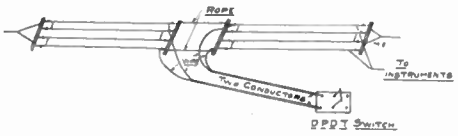
Any amateur may simply cut down his wave length by cutting it in half and wiring it into two separate aerials, as shown in diagram.

Then take two pieces of light but strong rope, and connect the two aerials, but be sure now that there is no short-

circuit between the two aerials.

Then wire as per diagram. The wires from switch to aerial must be well insulated.

When you want to send without interfering just break the circuit in D. P. D.

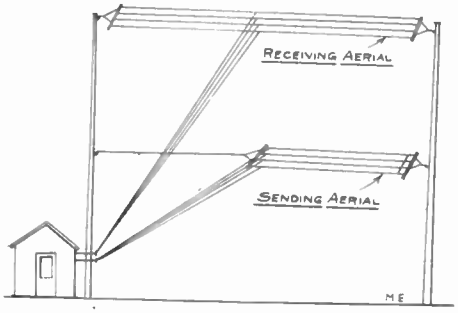


T. switch. When you want to get the full benefit just close the circuit.

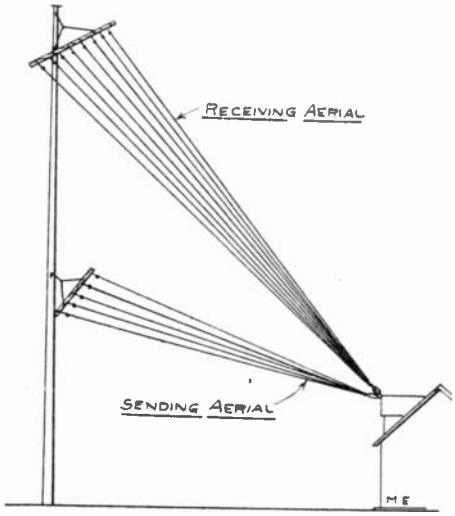
IRVING P. FRASER.

WINDER DUPLEX AERIALS.

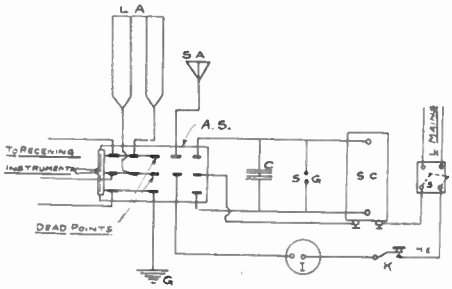
Inclosed please find sketches of new duplex aerial, showing flat top or fan aerial.



Also find sketch of T. P. D. T. aerial switch that will allow for loop aerial on



receiving side, straight away, low sending aerial on sending side and the breaking of primary circuit to protect receiving instruments against accidental depression of key while receiving. The above is accomplished by leaving the two hinge



points indicated, dead, and adding four inside points.

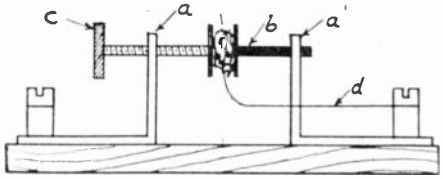
J. Z. WINDER.

WIRELESS NEWS FROM THE PACIFIC COAST.

(Continued from page 14)

The operators employed on the U. S. naval vessels seem to have considerable latitude in the matter of arrangement of connections and in the use of apparatus, to the end that each man is given plenty of opportunity to try out new ideas.

The man on the cruiser California, for instance, in using the electrolytic



M E.

detector places a small wad of cotton batting in the cup and soaks it well with the prescribed admixture of acid. Upon gradually withdrawing the anode by means of the adjusting screw one or more of the minute threads of the batting adhere to the platinum point. This provides a most sensitive adjustment and one that will remain constant in action for many hours, regardless of vibration or jars.

The design of crystal detectors most generally employed is shown roughly in the accompanying sketch, where A and A1 are brass standards; B, an insulated post; C, an adjusting screw; d, a short piece of steel wire, the latter leading directly from one of the binding posts rests lightly upon the crystal being used.

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.

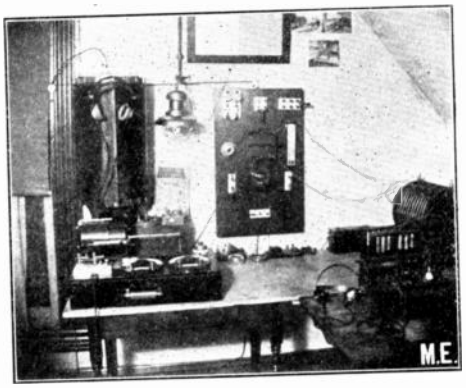
It is also advisable to send two prints of the photograph (one toned dark and one light) so we can have the choice of the one best suited for reproduction.

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 flashlight photo of my wireless station. On the sending side I am using a two-inch E. I. Co. spark coil, two E. I. Co. condensers, helix and spark gap made according to information received from MODERN ELECTRICS. It adds greatly to the sending distance, and makes a very attractive piece of an instrument, as well as a durable one.

To the right of the transmitting outfit is one of my receiving outfits, which consists of two tuning coils of 600 meters



each, one 500-ohm potentiometer, choke coil, one electrolytic detector, one silicon detector, and two condensers in series, and a 75-ohm head set. With this outfit I am able to pick up stations within a 150-mile circle. To the left side of table is my long distance receiving outfit, which consists of two rotary condensers, one tubular condenser, Ferron detector, transformer tuning coil, and two thousand-ohm E. I. Co. head phones. With this set I am able to read all stations within a nine hundred-mile circle, being able to read H. B., New Orleans, two K. W. outfit; Mobile, Ala.; Tampa, Fla., and all coast stations from Boston to Savannah, Ga., as well as all lake stations from Milwaukee and Manitowac, Wis., to Buffalo, N. Y.

In the frame just above switchboard is a copy of a message received from H. B., New Orleans, as was sent from that station to Cape San Antonio, Cuba, to be relayed to Limon, C. R., and reply from operator at New Orleans stating that message was entirely correct, and signed by George S. Davis, chief operator, Wireless Department. As this is practically 900 miles overland, and they only use a 2 K. W. outfit. Mr. Davis thought this a remarkable record.

Just underneath switchboard is my buzzer outfit, used in testing out my detectors, and same gives the results O. K. Just back of the last-named receiving set is a large tuning coil and a E. I. Co. potentiometer, as well as an E. I. Co. electrolytic detector, which I use for experimental purposes. The coil was built as per instruction shown in June, 1908, issue of MODERN ELECTRICS.

Having been a wire operator for fifteen years, and an experimenter with wireless for past 3 years, I get a great deal of pleasure out of my instruments, and am a constant reader of MODERN ELECTRICS, of which I have every publication issued and would not take fifty dollars for them now, as it is impossible to get any more of the first issues.

J. B. HYATT, Ohio.

HONORABLE MENTION.

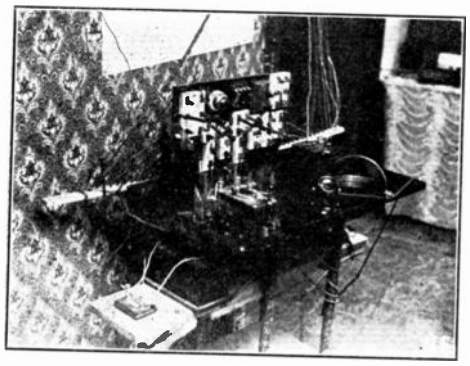
Enclosed please find photo of my wireless station. The entire apparatus, with the exception of key, sounder and storage battery, was made by myself. All are finished in black walnut and highly polished.

The transmitter consists of a five-inch coil wound with No. 34 S. C. magnet wire; condenser composed of four 2x8 glass tubes; helix composed of 20 turns

of No. 8 copper wire, 6 volt 60 amp. storage battery and key.

The receiving apparatus consists of the electrolytic, coherer-decoherer and autocoherer systems. They are composed of a two slide 400 meter tuning coil, 300 ohm potentiometer, electrolytic detector, autocoherer, 150 ohm relay, sounder, coherer-decoherer and a pair of 800 ohm receivers that were wound by myself.

My aerial is of the looped style and is 75 feet high. It is composed of four strands of No. 14 copper wire, 80 feet long.



I am a constant reader of three electric magazines and will say that I consider MODERN ELECTRICS the most instructive and helpful to wireless experimenters.

HARRY SIEGFRIED.

Kansas City, Mo.

HONORABLE MENTION.

Enclosed herewith you will find photo of my wireless station. Sending side

consists of silicon detector, perikon detector, condenser adj., condenser fixed, 2,000 ohm double receiver, testing bell and push button and battery sending side; one-half K. W. open coil type transmitter, four 3-pt. Leyden jars, one set 8 in. by 10 in. plate glass condenser, spark gap, sending helix, aerial switch, four 75 ft. lengths of No. 14 bare copper, 40 feet high at one end and 60 feet high at other end for aerial, and one ground switch.

STANLEY KNOCHEL.

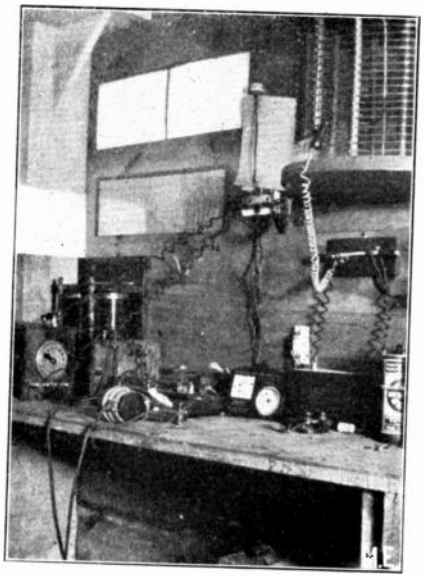
Maryland.

HONORABLE MENTION.

Enclosed please find flashlight of my wireless station. With this apparatus I have received from Wellfleet and other nearer stations, and have sent to other stations in this city.

My sending set consists of a 1½ in. spark coil and home-made helix and spark gap.

My receiving set is composed of an E. I. Co. adjustable condenser and potentiometer, a pair of 1,000-ohm H. C. re-



ceivers, and a home made silicon detector, doughnut transformer and two single slide tuning coils.

My aerial is made up of four aluminum wires, each 87 feet long, which are suspended from a pole 97 feet high and a cupola on a barn which is 45 feet high.

I am a subscriber to MODERN ELECTRICS, and consider it to be the best wireless magazine published.

RAYMOND FOSS..

New Hampshire.

HONORABLE MENTION.

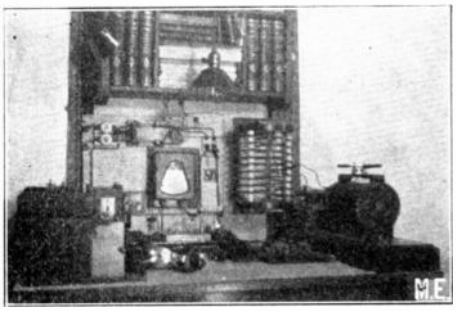
Enclosed please find a flashlight of a wireless station owned by my brother Robert and myself. Most of the instruments are home-made, and our success

with these home-made instruments is due largely to information received from MODERN ELECTRICS.

Our station is equipped with the following instruments:

Sending Station—Home-made induction coil, wound with S.C.C. wire, No. 32. This coil operates on 110 volts V.-D. C. through an electrolytic interrupter, and gives a very hot, fat spark, or rather flame, 1 inch long. With condensers we get a spark from 3/16 to 5/16 inch long and 3/16 inch thick.

Sending Helix—Ten turns of No. 3



copper wire helix, is about eight inches in diameter. Sending condenser consists of four one-pint Leyden jars mounted in a walnut case. We use ordinary Morse key for sending, and have a large condenser shunted around it. We also have an Electro Importing Co. aerial switch.

Receiving Station—We have a double sliding tuning coil of about 1,000 meters wave length, a Ferron detector, electrolytic and microphone detector, one home-made potentiometer of 300 ohms, an E. I. Co. variable condenser, fixed condenser, and a pair of 3,000-ohm double head receivers.

We have a Morse sounder and key working through an 8 C. P. lamp for practicing the continental code. We know the Morse code pretty well.

Aerial—Our aerial is 75 feet long, and consists of four strands of No. 12 tinned copper wire, on spreader, and 20 inches apart. The aerial is 60 feet at one end, and 40 feet at the other.

We have worked very successfully with a friend a little over a mile away, our signals coming in so loud that he can hear us across the room with a 75-ohm telephone receiver.

Our signals were also heard by another boy ten miles away.

HARRY AND ROBERT DUNAVON.

Kansas.

HONORABLE MENTION.

You will please find enclosed a flash-light of our wireless station. With this set we have been able to receive messages at a distance of 75 miles, and have sent messages at a distance of 10 miles. We can hear Waldorf-Astoria very clearly.

Our sending set consists of a high tension legless key, a 1½ spark coil, spark gap, and a one-pint Leyden jar condenser. Our helix has not yet been completed.

Our receiving set is of the Long Distance Telegraph Co. You will notice on the left of the picture, in front of me, the improved silicon detector which we have made with the help of your magazine. We have two pairs of wireless receivers, which are of 2,000 ohms. We are now using two detectors, silicon and iron pyrite. Our antenna consists of 4 strands of aluminum, No. 14, forty feet long, 17 inches apart, and the highest end of my pole is 95 feet from the ground. the lowest being 70 feet.

Way over on the right of the picture you will observe a telegraph board, to which we have connected the key of a buzzer, so that during our spare time we

telegraph little pieces out of the newspapers, which gives us a fair training.

My other partner is not in the picture.

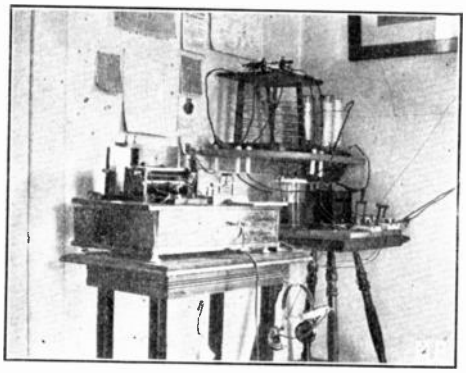
ANDREW CASOLINO, AND
ANDREW ANASTASIO.

New Haven, Conn.

HONORABLE MENTION.

Enclosed please find my photo of wireless station. My receiving instruments will be seen at the left of the picture. They consist of E. I. Co. variable condenser, double slide tuner, 2,000-ohm head receivers, silicon and Ferron detectors.

Sending apparatus is at the right, and is composed of E. I. Co. half K. W. transformer coil in series with a Gernsback interrupter. Antenna switch, key, and fuse block are on the table in front of coil and interrupter. On the shelf



above the table will be seen the helix and spark gap. The former is of my make.

The antenna is composed of seven wires one foot apart, one hundred and twenty feet long, one hundred feet high at one end and thirty at the other.

With the receiving apparatus I have copied Charleston, S. C.; Wilmington, Del.; New York, and many other stations within that radius, as well as ships far out at sea. I have gained many helpful ideas from MODERN ELECTRICS.

WM. F. CROSBY.

New York.

HONORABLE MENTION.

My set consists of a large size two-slide tuner, potentiometer, wet battery,

a variable condenser, silicon detector two fixed condensers, a 1,000-ohm and a 1,500-ohm receiver.

My sending outfit consists of a 1½ in. spark coil, helix, condenser, zinc balls for spark gap, key, 5 Fuller wet batteries, besides the various switches. My antenna is 100 feet long, and two strands No. 14 bare copper wire, 110 feet high at one end and 100 feet at the other.

I have installed my apparatus in the Oliver Ames High School. I get stations any time I wish to listen for them. I have received the most of my knowledge of wireless telegraphy from MODERN ELECTRICS, which is a wonderful book.

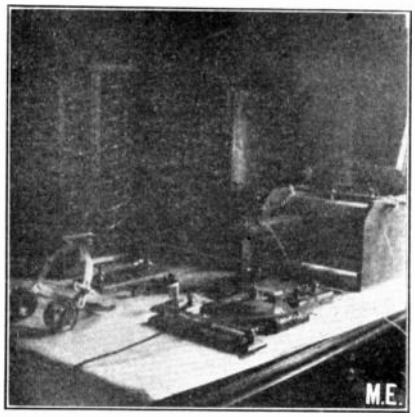
In the photo is my brother and I. I, the owner of the apparatus, am seated at the left, and my brother at the right. Our call letter is, M D, continental code.

ARTHUR J. CARLSON.

Massachusetts.

HONORABLE MENTION.

Enclosed find photograph of my wireless outfit, with which messages can be sent and received.



The receiving side consists of a double slide tuning coil, fixed and variable condensers, potentiometer, electrolytic and silicon detectors, three dry batteries and a pair of two-thousand ohm receivers, all E. I. Co. make, except the silicon detector, which I made myself. With this set I get excellent results.

The sending instruments consist of a helix, a spark gap, eight dry batteries and a one-inch spark coil.

My antenna is made of four number twelve copper wires on four foot spreaders seventy-five feet long and forty feet high.

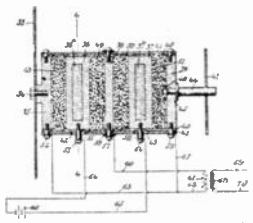
I am a member of the W. A. O. A., and a subscriber to the helpful magazine, MODERN ELECTRICS.

FREDERICK STEINMETZ.

Baltimore, Md.

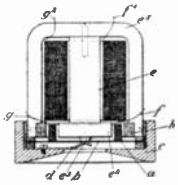
Electrical Patents for the Month

951,864. TELEPHONE-TRANSMITTER. WALTER WHITTEN, Schenectady, N. Y. Filed Aug 11, 1908. Serial No. 447,943.



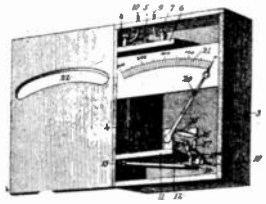
1. In a transmitter, the combination of a main diaphragm, a plurality of supplementary diaphragms, some of said supplementary diaphragms being weighted, the weighted diaphragms being disposed intermediate the other supplementary diaphragms, which are not weighted, and semi-conducting material disposed intermediate said supplementary diaphragm

951,695. TELEPHONIC APPARATUS. PEDRO M. OLIVER, Barcelona, Spain. Filed June 10, 1909. Serial No 501,312.



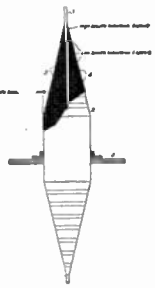
1. In a telephonic receiving apparatus, the combination of an annular coil secured to the vibrator plate, and a magnet having one pole provided with a heel within the annular coil and adapted to contact with the vibratory plate, while the other pole terminates outside the annular coil; substantially as described.

953,498. COMBINED SPARK-COIL AND INDICATOR. JAMES V. THORNDIKE, Randolph, Nebr. Filed Oct. 23, 1908. Serial No. 459,125.



1. The combination of an electric circuit, a spark coil connected therewith for increasing the voltage of currents flowing through said circuit, a movable armature for said spark coil, and indicating mechanism connected with said movable armature and actuated thereby for disclosing when said spark coil is energized.

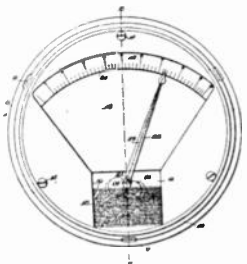
952,467. INSULATING MATERIAL. ARTHUR B. REYNDERS, Wilkinsburg, Pa., assignor, by mesne assignments, to Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa., a Corporation of Pennsylvania. Filed July 6, 1908. Serial No. 442,195.



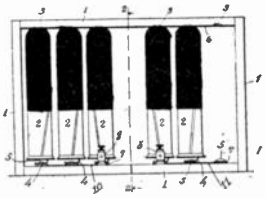
1. An insulating structure, comprising alternate layers of insulating material and conducting material which constitute a series of condensers, the insulating layers being graded as to specific inductive capacity in accordance with their distances from the surfaces of the structure.

952,168. ELECTRICAL INDICATOR. CHARLES WIRT, Philadelphia, Pa., assignor to Charles Wirt and Company, Newark, N. J., a Corporation of New Jersey. Filed Apr 24, 1907. Serial No. 369,689.

1 In an electrical indicator, the combination with the field coil, of a soft iron armature consisting of a plurality of overlapping thin soft iron plates mounted in different angular positions and in parallel planes upon a common pivot and adjustable angularly in constant parallelism so as to produce approximately equal increments of movement for equal increments of current, substantially as set forth.



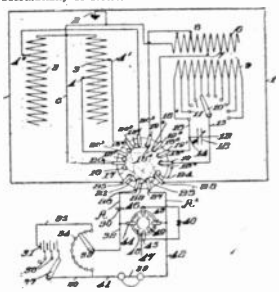
951,783. ELECTRO-ADJUSTABLE CONDENSER. HUGO GRANDBACK, New York, N. Y. Filed Jan 9, 1909. Serial No. 471,406.



1. The combination of a frame, a conducting member fastened to the upper side of said frame, separate conducting members fastened to the bottom side of said frame, a plurality of condenser jars, and spring-pressed means for supporting said condensers between the opposite sides of said frame.

952,403. WIRELESS-TELEGRAPH RECEIVING APPARATUS. CLIFFORD D. BABCOCK, New York, N. Y., assignor to The United Wireless Telegraph Company, New York, N. Y., a Corporation of Maine. Filed Nov. 17, 1909. Serial No. 528,581.

1. In a wireless receiving apparatus the combination of a sensitive element; a direct connected syntoniser adapted to be joined thereto; an inductively connected syntoniser also adapted to be joined to said element; and means for connecting either of said syntonisers at will to said element, substantially as described.

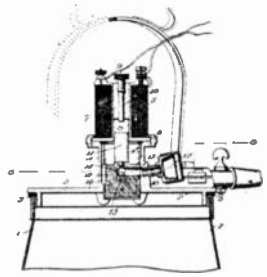


952,276. ELECTRIC-LAMP SOCKET. JOHANN G. PETTERSON, Hartford, Conn., assignor, by mesne assignments, to Marshall Electric Company, Hartford, Conn., a Corporation of Maine. Filed Dec. 17, 1909. Serial No. 533,633.

1. A switch mechanism for electric appliances, comprising a series of inclined faces, and a contact thereon, in combination with a rotary contact plate having spring fingers to pass over said inclined faces and contact, means to intermittently rotate the contact plate, and insulating material carried by the contact plate on the side adjacent to the inclined faces.

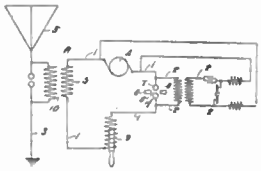
952,978. ELECTRIC VACUUM MILKING-MACHINE. GEORGE B. CRAMP, Duquesne, Pa. Filed June 17, 1909. Serial No. 502,716.

1. In a vacuum milking machine, a series of teat cups, a vacuum milk receptacle, a valve casing, tubes connecting said cups with said valve casing, a common tube connecting said valve casing with said milk receptacle, means for alternately exhausting the air from and admitting to said common tube, and magnetically operated valves in said casing controlled by the flow of milk for shutting off the vacuum from said cups.



953,635. WIRELESS TRANSMITTING SYSTEM. JOHN MITH and CHRISTIAN F. HEINEKE, Cleveland, Ohio. Filed Sept. 25, 1908. Serial No. 454,823.

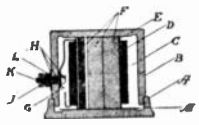
1. A system of wireless transmission of electro-magnetic waves having a source of power conductively connected to the oscillator-circuit and inductively connected with the radiator-circuit.



953,442. TELEPHONE ATTACHMENT. THOMAS W. SMALL, Cleveland, Ohio, assignor to The Acme Automatic Street Indicating Company, Cleveland, Ohio, a Corporation of Ohio. Filed Sept. 10, 1907. Serial No. 392,141.

1. The combination with a telephone having a switch hook, a member adapted to carry the receiver and extend across and bear down on the switch hook, means for supporting the member in any adjusted position and a projecting member carried by the telephone to prevent overturning.

952,692. SPARK-COIL. CHESTER H. THORDARSON, Chicago, Ill. Filed Nov. 17, 1908. Serial No. 463,054.



1. In a spark coil, a cast iron base, a cast iron casing supported thereon, said casing having a permanently closed integral end, a laminated core independent of the casing and its base and arranged within the casing and having its ends presented toward and held between the base and closed end, respectively, of the casing thereby forming air gaps between the ends of the core and the base and closed end respectively of the casing, a single heavy low resistance coil surrounding the laminated core and inclosed within the casing, and circuit terminals for said coil, said terminals extending through to the outside of the casing.

Original Electrical Inventions for Which Letters Patent Have Been Granted for Month Ending April 4th.

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 RADII.

(513.) A. G. S., Philadelphia, asks:

1.—Receiving distance of my wireless station with the silicon detector, pair of 1,000-ohm receivers, double-slide tuner, fixed condenser, aerial 40 feet high?

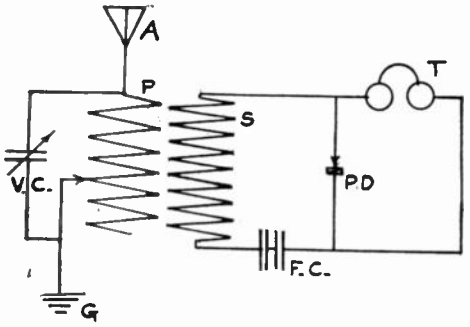
A. 1.—200 to 300 miles.

2.—Receiving distance with perikon detector, pair 1,200-ohm phones, loose coupling tuner, fixed condenser, adjustable condenser, same antenna?

A. 2.—300 to 450 miles.

3.—Give diagram of connection of Question 2.

A. 3.—Diagram given below.



ME.

4.—By making aerial 50 feet high instead of 40, would it increase the distance?

A. 4.—Yes, about 30 per cent.

FIXED CONDENSER.

(514.) LEO MONDOR, Wisconsin, writes:

1.—Will you give me directions for making a fixed condenser for receiving?

A.—Form it of 15 sheets of tinfoil 3 by 3 inches interposed between 16 sheets of paraffined paper 4 by 4 inches. Connect the alternate sheets of foil together.

2.—Where can I obtain my material?

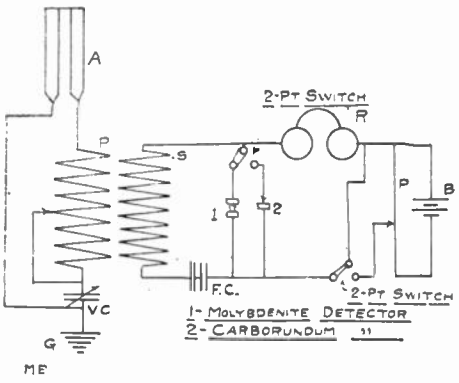
A. 2.—Electro Importing Co., 86 West Broadway, New York City.

WIRELESS QUERIES.

(515.) HUGH E. WILLIAMS, Cal., writes:

1.—Please show diagram for the most efficient arrangement of the following apparatus: Loop aerial, E. I. Co. loose coupler, double slide, E. I. Co. variable condenser, E. I. Co. fixed condenser, E. I. Co. 2,000-ohm head phones, batteries, and carborundum or Molybdenite detectors to be switched in.

A. 1.—Diagram given below.



2.—I have a 20-plate 20 by 20 inches square glass condenser for sending. Why do I get a hum in it when I press the key, and no spark at the spark gap unless I put the gap close together, about ⅛ inch? I use a 1½ K. W. open core oil transformer.

A. 2.—Because the voltage of your transformer is too low to charge such a large condenser. Try a condenser of less capacity and see if you do not get better results.

3.—How far ought I send and receive with the following: Loop aerial, four wires each 100 feet long (aluminum) and 1½ feet apart, antenna elevation 75 feet; receiving E. I. Co. loose coupler, double-slide E. I. variable condenser, E. I. Co. fixed condenser, E. I. Co. 2,000-ohm receivers, carborundum and Molybdenite detectors; transmitting: 1½ K. W. open core oil transformer, 20 plate 20 by 20 inches square condenser,

helix 36 feet No. 1 copper wire, zinc spark gap, 75-ampere key?

A. 3.—Receiving range 500 to 800 miles; transmitting range 150 to 500 miles.

DYNAMO.

(516.) GROVER ZETTLER, New York, asks:

1.—Can a Manhattan Economy motor with a permanent field magnet and a 3-pole armature be made into a dynamo, and how? What size wire shall I use? What will be the output volts amperes, and how fast will I have to run it?

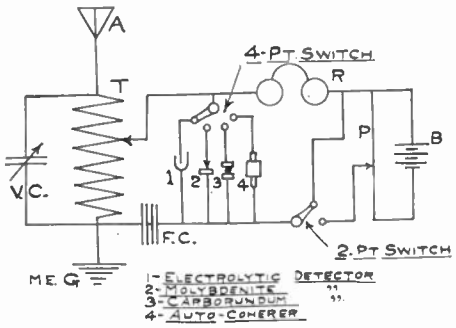
A. 1.—Yes, it will operate just as it is as a dynamo. We are not able to give its output in volts and amperes.

2.—Will a 150-Watt magneto generator operate a 2-inch E. I. Co.'s spark coil?

A. 2.—Yes, if wound to give 12 volts.

3.—Kindly give connections for a double slide tuning coil with four binding posts, variable condenser, fixed condenser, potentiometer and three wet cells, using Molybdenite carborundum, electrolytic and auto coherer as detectors.

A. 3.—Diagram given below. We can-



not answer more than three questions in the "Oracle."

CONDENSER.

(517.) JACK RENWICK, Canada, asks:

1.—To fold up a fixed condenser made up of paper and tinfoil, does this do any harm to the condenser?

A. 1.—It is possible to use a rolled condenser, but it is not so good as a flat one.

2.—Which is the better for sending: a fixed condenser, or a number of small Leyden jars?

A. 2.—A flat plate condenser.

3.—What do you consider a good sending helix?

A. 3.—The size of the sending helix varies greatly with the power of the station and it is impossible to state any dimensions without knowing more particulars.

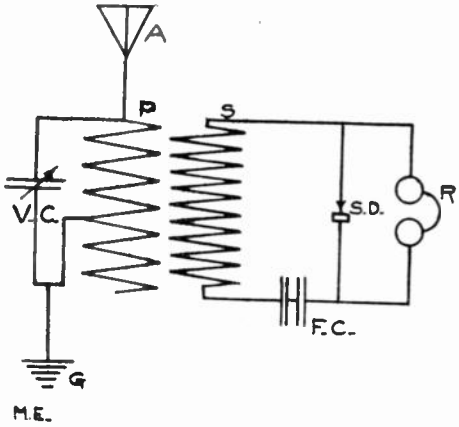
WIRELESS QUERIES.

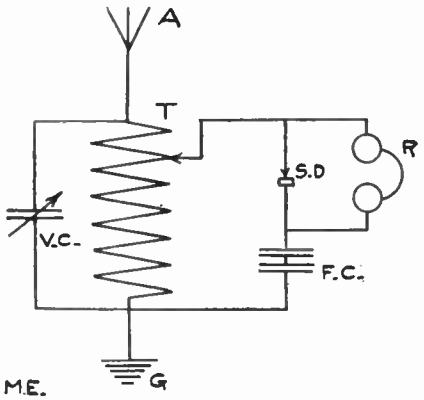
(518.) H. J. CRANDALL, Kansas, writes:

1.—I have an aerial consisting of 4 aluminum wires 100 feet long, strung between two poles 40 feet from ground, instruments are electrolytic and silicon detectors, loose coupled tuner, also single-slide tuner, variable and fixed condensers and 2 receivers rewound to about 500 ohms; have a good ground; am unable to get results with loose coupled tuner, but by using single-slide tuner and silicon detector can hear some

one sending. It is very weak and is not readable. Instruments are connected as per diagram attached; have tried every other diagram but am unable to get results. Can you tell what the trouble is?

A. 1.—We would suggest that you use one of the diagrams given below.





2.—In Query No. 430 in your January number, why does the current not come from aerial through tuning coil and into ground and not affect the instruments, as this seems to be the shortest route?

A. 2.—Part of it does, but only waves of a certain wave length accordingly as the slider is adjusted. The diagram which you illustrated has no direct ground as has this circuit, and is very poor.

3.—Would it be possible to read a 25 K. W. station 1,300 miles with above instruments? They are all home-made.

A. 3.—Yes, if the instruments are well made and carefully adjusted and you use an aerial at least 100 feet high.

INDUCTION COIL.

(519.) A. B. Longstreth, Missouri, writes:

1.—How large a spark can I get from a home-made induction coil 10 inches long, core 1 inch in diameter, filled with No. 22 soft iron wire, primary, four layers No. 16 copper wire, secondary 16 layers No. 14 copper wire or 5½ ounces, with 110 volts and a Gernsback interrupter?

A. 1.—You could not get any spark from such a coil because the secondary does not contain a sufficient number of turns.

2.—How far can I send with above coil, zinc spark gap, telegraph key (strap), and sending condenser described in January, 1910 issue of MODERN ELECTRICS, helix 14 inches in diameter with No. 0 aluminum wire, 10 turns, and an aerial composed of 4 aluminum wires 25 feet long and 75 feet high?

A. 2.—Such a coil would give a 5-inch spark and you could send about 35 miles if you use 5½ pounds of No. 36 wire on the secondary and make the primary up of 2 layers of No. 12 B. S.

3.—How far can I receive with one electrolytic detector, two 1,000-ohm receivers, one potentiometer and aerial same as above and two batteries?

A. 3.—You do not mention the type of tuner you use, and this is an important factor in determining the range of a station. If you use a double-slide tuner and a fixed condenser you could probably receive 200 to 400 miles.

RECEIVING RADII.

(520.) HAROLD JOHNSON, Mass., writes:

1.—Would you kindly inform me in the next number of MODERN ELECTRICS how far I ought to receive with a 50-foot antenna, composed of 4 wires No. 16, two feet apart, 40 feet high on one end and 30 feet high on the other, also a double-slide tuning coil, wound with 1 pound of No. 22 bare wire, a combined silicon detector with condenser, and with one 1,000-ohm receiver?

A. 1.—200 to 300 miles.

AUDIPHONE.

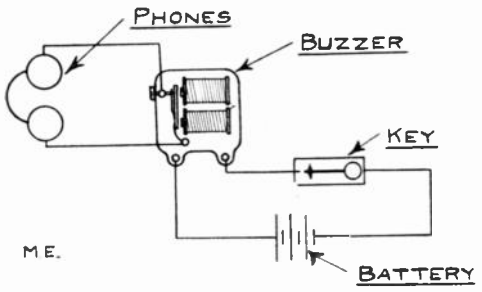
(521.) L. R. SWIFT, Illinois, writes:

1.—Kindly let me know through the Wireless Dept. of MODERN ELECTRICS from what distance I should receive with the following set: Aerial 50 feet high, 4 strands 25 feet long, tuning coil made of 400 feet No. 24 wire wound on a core of wood 6 inches long by 5½ inches diameter, double slide, silicon detector, 1,000-ohm phones, fixed and variable condensers.

A. 250 to 300 miles.

2.—How can I connect a buzzer and phones that I may get a buzz in my phones instead of a click? I wish to get the same effect as the American Wireless Institute's audiphone used by them in the teaching of wireless.

A. 2.—Diagram given below. The tele-



phone receivers are connected directly across the interrupter.

WAVE LENGTH.

(522.) WALTER BURNETT, Cal., asks:

1.—What is the wave length of a tuning

coil wound with 360 turns of No. 24 D. C. wire on a core 2¼ inches in diameter?

A. 1.—About 280 meters.

2.—How far can I send with a 1-inch spark coil, Gernsback electrolytic interrupter, glass plate condenser, zinc spark gap, aerial 30 feet high 20 feet long, water pipe and gas pipe ground, using 110 volt current?

A. 2.—5 to 8 miles.

3.—How far can I receive with the same aerial and ground, single slide tuning coil, silicon detector and 1,000-ohm receiver?

A. 3.—75 to 200 miles.

SYNTONIZER.

(523.) D. WILDE, Michigan, writes:

1.—Please explain working of a syntonizer of a loose coupler.

A. 1.—A syntonizer is an instrument used to tune a transmitter to emit a given wave length. The syntonizer is adjusted until its circuits have a natural period equal to that which it is desired to obtain on the transmitter. The sytonizer is then connected so that when the transmitting condenser and helix have been properly adjusted the syntonizer will so indicate by the passage of a spark across a minute spark gap. A loosely coupled tuning coil is really a transformer. Although the circuits of a double slide tuner may be carefully adjusted, oscillations having a different period from that which is natural to the circuits may be forced upon them. But by using a secondary coil which is acted upon inductively by the first coil the forced oscillations in the former are rendered almost negligible.

2.—Will the Telimco meter of the E. I. Co. work as the galvanometer used in the Ceraunograph?

A. 2.—Yes.

LOOSE COUPLER.

(524.) CHAS. JESSUP, New York, writes:

1.—Kindly state in the next issue of MODERN ELECTRICS what size enamel wire should be used on the primary and secondary of a loose coupler.

A. 1.—No.'s 22 and 28 B. S. gauge.

2.—How far can I receive with the following loose coupler rotary variable condenser having 20 stationary and 19 movable plates, E. I. Co.'s fixed condenser, potentiometer, mineral detector and a 75-ohm phone, aerial 35 to 40 feet high, 35 feet long, 4 strands, 18 inches apart, using water pipe for ground?

A. 2.—250 to 300 miles.

WIRE SIZES.

(525.) EDWARD MCGUIRE, Cal., writes:

1.—What are the sizes of the enclosed wires which I have designated as Nos. 1, 2, 3, 0, 4, 5 and 6.

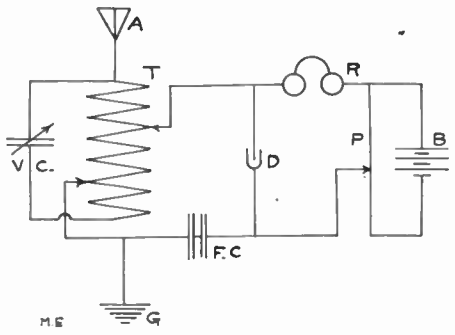
A. 1.—No. 1, 22 B. S. gauge; No. 2, 26 B. S. gauge; No. 3, 27 B. S. gauge; No. 0, 32 B. S. gauge; No. 4, 30 B. S. gauge; No. 5, 25 B. S. gauge; No. 6, 12 B. S. gauge.

WIRELESS QUERIES.

(526.) FREDERICK P. JONES, Maine, writes:

1.—Give diagram how to connect the following instruments: Double-slide tuning coil, loose coupling tuning coil, variable condenser (17 stationary and 16 rotary brass plates), electrolytic detector, potentiometer, double head receivers, 2,000 ohms.

A. 1.—Diagram given below.
2.—What is my receiving distance with



an aerial 100 feet long and 50 feet high in shape of letter V, with three strands of wire; aerial and station situated about one mile from river and six miles from the sea?

A. 2.—350 to 500 miles.

3.—Will the E. I. Co.'s rheostat give good results as a potentiometer?

A. 3.—It may be used as such, but since it is not intended for this use it will not operate as well as the "Electro" potentiometer.

INDUCTION COIL.

(527.) LAYTON CLARK, New York, writes:

1.—Kindly answer following questions in "Oracle:" Dimensions for 3-inch spark coil.

A. 1.—Core, 8 inches long and 1 inch in diameter. Primary composed of 2 layers of No. 12 B. S. magnet wire. Secondary 4 pounds of No. 34 B. S. single silk.

2.—How far can I receive with a double-slide tuner, tuning transformer, variable condenser, fixed condenser, 150-ohm receiver, auto coherer, carborundum and silicon detector with a 50-foot aerial?

A. 2.—Auto coherer 75 miles; carborundum detector 250 to 400 miles; silicon detector 350 to 500 miles.

WIRELESS QUERIES.

(528.) HAROLD M. TOWNE, Mass., writes:

1.—I am the first experimenter in Pittsfield on this subject. This town is 1,000 feet above sea level and is centrally located between low mountain ranges. There is a grove of large trees, about 400 yards from my aerial. My aerial is of the T style. It is composed of four No. 4 B. & S. gauge bare copper wires spaced 18 inches apart. All wires end dead at both ends. It is 57 feet from ground on one end and 38 feet on the other end. The length is 90 feet. All connections on aerial are soldered. My instruments consist of E. I. Co.'s double-slide tuner, variable condenser, fixed condenser, potentiometer, carborundum detector, and double receivers, 2,000 ohms per set, 1 dry cell. My ground is made by winding No. 14 bare copper wire on water pipe for a space of 5 inches. The nearest commercial station is Albany, N. Y., 50 miles, and Bridgeport, Conn., 110 miles. I have given my set a fairly good tryout, and haven't heard anything as yet. Do you

think I should hear Bridgeport? Albany?

A. 1.—Yes, you should hear both of these stations. Your receiving range should be 300 to 500 miles.

2.—If not, what instruments would be necessary to hear both of these stations, using same aerial?

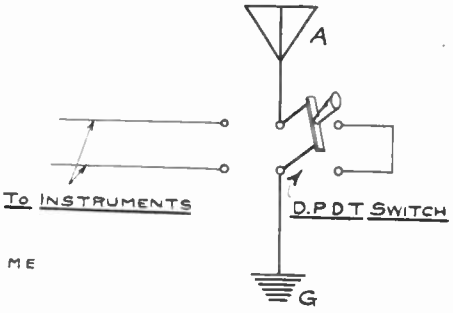
A. 2.—Your outfit is good enough as it is. We think that your instruments are not properly connected, or else poorly adjusted. Have some amateur friend in your vicinity examine them and see if he can remedy the trouble.

CONNECTIONS.

(529.) I. MAHAN, New Jersey, asks:

1.—Please give diagram for connecting the same with a D. P. D. T. switch and lightning protection.

A. 1.—Diagram given below.



INDUCTION COIL.

(530.) ROY WILMARTH, Missouri, asks:

1.—How to make a ¼-inch spark coil?

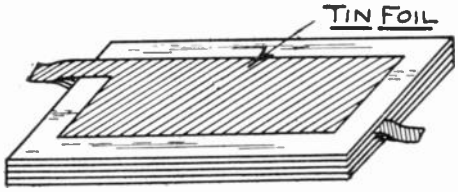
A. 1.—Core, 4 inches long and ½ inch in diameter. Primary, two layers of No. 18 B. S. gauge. Secondary, 6 ounces of No. 36 B. S. gauge.

2.—Will a pound of E. I. Co.'s core wire make a core 6½ by 1½ inches?

A. 2.—No. About two pounds will be required.

3.—How to make a condenser for a 1-inch coil?

A. 3.—40 sheets of tinfoil 6 by 4 inches, interposed between paraffined paper sheets 9 by 5 inches. Connect every alternate sheet together by means of a little strip of foil as below.



RECEIVING RADIUS.

(531.) WALTER A. LANG, N. J., writes:

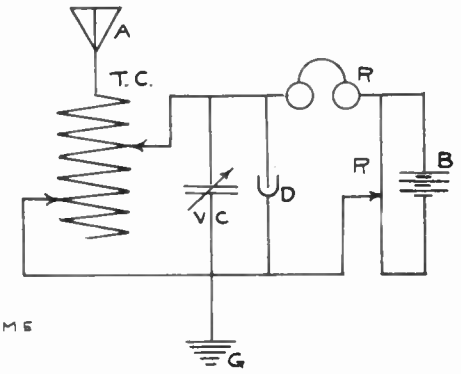
1.—How far can I receive with the following instruments: 60 foot aerial, composed of 4 No. 14 aluminum wires, placed 2 feet apart, 50 feet high at one end and 35 feet at the other, tuning coil made of 500 feet of No. 20 copper wire, S. C. C. 75-ohm receiver and perikon and silicon detectors, respectively?

A. 1.—Your receiving range with peri-

kon detector will be about 100 to 125 miles; with silicon detector, 80 to 100 miles.

2.—I find it very hard to tune out uninvited stations; what can I do to facilitate this?

A. 2.—You should use a variable condenser, shunted across your tuning coil, which will probably remedy the trouble. See diagram given below.



3.—What is it that counts, the height that the aerial is above the ground, or above sea level?

A. 3.—Neither. It is the distance above the instruments which is considered.

WAVE LENGTH.

(532.) R. POLING, N. J., asks:

1.—My wireless station is about 250 miles from the Marconi Cape Cod station. Nearly every night, from 10 o'clock to 12, I hear them sending press to ships. My aerial is only 30 feet high and my tuning coil contains but 1 pound of wire, yet I can read the messages plainly, notwithstanding the fact that the Marconi station has a wave length of 1500 meters. Why is this?

A. 1.—You are so close to the high powered station that you receive by what are known as forced oscillations.

RECEIVING.

(533.) EDMOND RITCHIE, N. Y., writes:

1.—How far will I be able to receive with aerial 70 feet high, 45 feet long, composed of 4 strands No. 14 aluminum wire, inductive and double slide tuners, 1,000-ohm phones, fixed and variable condensers, silicon detector? How far with electrolytic detector and potentiometer?

A. 1.—With silicon detector, 200 to 300 miles; with electrolytic, 300 to 500 miles.

2.—What will be the sending range of a 2-inch spark coil, 16 dry cells, condenser, helix, zinc spark gap, and key?

A. 2.—8 to 10 miles.

3.—Would a 6-volt, 60-ampere hour storage battery run my coil better than dry cells?

A. 3.—Yes. It would considerably increase your transmitting efficiency.

CANNOT RECEIVE.

(534.) W. MCNALLY, N. Y., inquires:

1.—I have a receiving outfit, composed of a 2-wire aerial, spread 2 feet apart, 65 feet long and 38 feet high; water and gas pipe ground, electro loose coupler, silicon detector, 1,000-ohm receiver; the aerial runs down side of house and enters basement. Although I have the instruments connected right, I cannot hear anything.

A. 1.—We would advise that you look over your aerial and leading-in wire carefully, and see if it is not grounded at some point, before reaching instruments. Also test out your circuits to see that you have no open circuits, which often happens to be the trouble.

RANK OF DETECTORS.

(535.) SALVADOR M. FERRER, Brooklyn, N. Y., writes:

1.—What is the comparative sensitiveness of the following detectors: Perikon, ferron, silicon, carborundum and molybdenite?

A. 1.—Their sensitiveness is in the order named below: Perikon, silicon, ferron, molybdenite and carborundum.

2.—Where can I purchase a perikon detector?

A. 2.—We refer you to our advertising columns.

3.—What will be my receiving radius, with most sensitive of above detectors, 1,500-meter tuning coil, single slide, 3,000-ohm head receivers, tubular condenser and an aerial 250 feet long and 38 feet high? By day? By night?

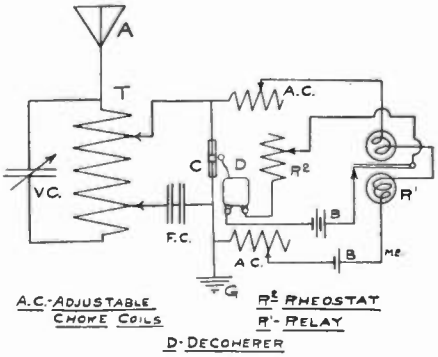
A. 3.—You could possibly receive 150 to 200 miles by day and 200 to 300 miles by night.

COHERER SYSTEM.

(536.) CARL V. CRUPP, Illinois, inquires:

1.—Please give diagram for wiring of following instruments: Double slide tuning coil, adjustable choke coils, 75-ohm relay, battery, rheostat, variable condenser, coherer and decoherer.

A. 1.—Diagram given below.



2.—Should I be able to hear the U. W. Telegraph Co.'s 5 K.W. Chicago station, which is 15 miles from here?

A. 2.—Possibly; but we would suggest that you use a polarized relay, of much higher resistance.

QUARTER-INCH COIL.

(539.) HAROLD B. WOOD, Neb., asks:

1.—How far would a ¼-inch coil send with an aerial composed of two wires, each 30 feet long?

A. 1.—One-fourth to one-half mile.

2.—With 1 pound No. 36 S. C. C. magnet wire, for secondary, how much primary and core should be used?

A. 2.—The core should be 7 inches by ¾ inch and primary of 2 layers No. 16 D. C. C. secondary to be wound in 2 sections.

3.—What would be the spark length?

A. 3.—It should give a ¾-inch spark.

RECEIVING RADIUS.

(538.) WALTER BLACKMAN, N. Y., inquires:

1.—What is the farthest receiving distance that can be covered by the following outfit: Aerial 6 aluminum wires, 2 feet apart, 125 feet high and 60 feet long, 3,000-ohm receivers, electrolytic detector, electro loose coupler, double-slide potentiometer, variable condenser and fixed condenser?

A. 1.—You should be able to receive messages from 1,000 to 1,500 miles away.

2.—With the same aerial, how far could I send with two ½ K. W. transformer coils in series, special sending helix, special large capacity glass plate condenser, wireless key, two Gernsback interrupters, adjustable spark gap?

A. 2.—You ought to be able to transmit fully 200 miles, with instruments properly tuned.

3.—Could I improve upon this outfit in any way?

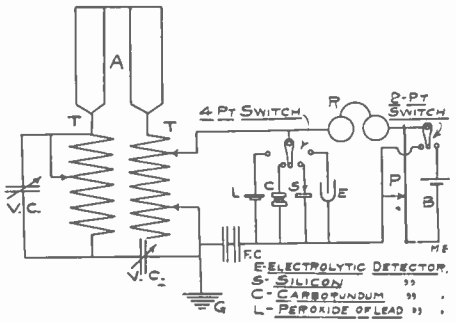
A. 3.—Your outfit is very good as it stands, but you might place a second variable condenser in the secondary circuit of the loose coupler, in place of the fixed condenser.

RECEIVING CONNECTIONS.

(539.) ALLEN J. KLEIN, Ohio, wishes to know:

1.—How to connect up the following instruments: 1 double-slide tuning coil, 1 single-slide tuning coil, 2 variable condensers, tubular type, 1 fixed condenser, 1 potentiometer, 1 electrolytic detector, bare point, 1 silicon, 1 carborundum, 1 peroxide of lead, and 4-point switch, pair 1,000-ohm receivers.

A. 1.—Diagram given below.



2.—How far can I receive messages with the above outfit, when used on aerial composed of 4 strands, 2 feet apart, 60 feet long and 45 feet high?

A. 2.—About 125 to 150 miles.

3.—Do I need a fixed condenser in the above set?

A. 3.—Yes; it increases the range of your station.

BURKE WIRELESS BILL.

(Continued from Page 19)

more than one year, or both, in the discretion of the trial court, for each and every offense.

IV.

The waves used by any station in signaling shall be so generated that the dampening of the wave train shall not exceed the amount prescribed from time to time by the Secretary of Commerce and Labor. The penalty for violation of this regulation shall be a fine of not more than one hundred dollars, or imprisonment for not more than one month, or both, in the discretion of the trial court, for each and every such offense.

V.

No station or person or corporation within the jurisdiction of the United States, including persons owning or engaged in operating shipboard stations on vessels of the United States, shall knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal or call, or a false or fraudulent signal, call, or message of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than two thousand five hundred dollars, or imprisonment for not more than five years, or both, in the discretion of the trial court, for each and every such offenese, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal, call, or message, shall be a fine of not more than one thousand dollars, or imprisonment for not more than two years, or both, in the discretion of the trial court, for each and every such offense.

VI.

For the purpose of the transaction of any and all business of the United States or any department or agency thereof, stations owned or operated by or on behalf of the United States shall have the exclusive use, and may at all times employ and use, in uttering, acknowledging, or transmitting any and all calls, signals, acknowledgments, or messages, such wave lengths as the Secretary of Commerce and Labor shall from time to time designate for that purpose. All other stations within the jurisdiction of the United States are hereby forbidden to use for any purpose whatsoever, except distress calls or acknowledgments thereof, wave lengths having a variation from the wave lengths so designated for the exclusive use of the United States, or its departments or agencies, less in amount than the said Secretary shall from time to time prescribe. The penalty for violation of this regulation shall be a fine of five hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the trial court, for each and every such offense.

VII.

Any messages received by a station other than the one to which they are directed shall not be divulged. The penalty for a violation of this regulation shall be a fine of five hundred dollars, or imprisonment for not to exceed one year, or both, in the discretion of the trial court.

VIII.

In time of war or public danger the President shall have authority to suspend the operation of any or all wireless stations within the jurisdiction of the United States.

CLASSIFIED ADVERTISEMENTS.

Advertisements in this column 2 cents a word, no display of any kind. Payable in advance, stamps not accepted. Count 7 words per line. Minimum, 2 lines. Heavy face type 4 cents a word. Minimum, 3 lines.

Advertisements under "Wireless" 5 cents a word. Minimum, 4 lines. Wireless books and blueprints not listed under "Wireless," 2 cents a word.

Advertisements for the May issue must be in our hands by April 25.

ELECTRICAL APPARATUS.

STUDY ELECTRICITY AT HOME. A complete electrical course at home, containing 30-page detail book, 220-page text-book, 200-page experiments and over 100 pieces of apparatus. Price, complete, only $5.60. Catalogue "M. E. S." explains this and other remarkable offers. Thomas M. St. John, 848 Ninth ave., New York.

LIMITED INVESTMENT OPPORTUNITY in a Telephone Manufacturing Plant, established, flourishing business. Particulars, Manufacturer, care Modern Electrics.

ELECTRICAL BOOKS, BLUEPRINTS, ETC.

WIRELESS CODES AND DIAGRAMS. Blueprint of Morse, Continental and Navy Codes, 10c. Twenty Standard Wireless Circuits 5c. A. C. AUSTIN Jr. Hasbrouck Heights, N. J.

METRIC SYSTEM in all its divisions, with English equivalents, 10c. All wireless calculations in this system. Exact wave-length calculated with formula as used by Massie System. Data on anything in Wireless. Crockford, Bristol, R. I.

WOULD YOU LIKE to make a thoroughly reliable storage battery at home? Only cheap materials needed. Complete plans for 25c. silver. Money cheerfully refunded if this does not prove to be the most efficient home-made battery you have met with. Chas. Johnson, 184 Ash st., Detroit, Mich.

SUMMER IS NEAR! Have you made a portable wireless outfit yet? If not, why not? The new book, "How to Make a Portable Wireless Telegraph Outfit," gives every detail. Profusely illustrated. Not an ad. Send for it to-day! Price 25c. Oak Ridge Wireless Specialty Co., Publishers, Room 30, 5310 Indiana ave., Chicago.

FLYING MACHINES, Demon Helicoptere, 25c., French Aeroplane, 85c; other models, spring and electric aero-motors, aero-building books, supplies, etc. Monarch Aero Co., Sta. A, Box 133-G, San Antonio, Tex.

COMPLETE FORMULAS for calculating condenser capacity, helix inductance, and exact wave length; with table of inductivities of dielectrics, 25c. No stamps. H. W. Secor, 14 Barbara street, Trenton, N. J.

IF WIRELESS OPERATORS of the Pacific States will send me their lists of calls I will revise them to date, making a minimum charge for the service. Estimates given. Wireless lists typewritten. Inclose return postage in all correspondence. T. W. H., Jr., 2629 Pacific ave., San Francisco, Cal.

MAKE A WIRELESS TELEPHONE.

No operating skill required. Any one can make and use them. Simple materials same as ordinary phones. Talks through solid walls. Uses dry cells. No special transmitter or high tension current required. Complete diagrams and instructions — 50 Cents.

Address—BOX 416, SUMTER, S. C.

FOR SALE.—Practically new set Cyclopedia of Applied Electricity in five volumes, well bound in half morocco leather. Treats of dynamos, motors, storage batteries, current measurements, wiring, telegraph, telephony, exchange, lighting, railways, power stations, alternating current, power transmission, etc. Cost $19.00—will sell for $8.00. Address, Henry Ward, 124 East 52nd street, Chicago, Ill.

HOW TO RENEW EXHAUSTED DRY BATTERIES at cost of one cent each. Formula and complete directions, 25 cents (stamps). Acme Publishing Co., Newburgh, N. Y. A.P.

WIRELESS

WIRELESS FIENDS!

Phosphor Bronze Aerial Wire as used by Government, the best yet. Just imported 25,000 feet. 1½ ct. per foot. Bornite and Zincite, the most sensitive combination, 50 cts per set. Zincite and Copper Pyrites, 50 cts. per set. Silver plated brass cup for mounting crystals. 10 cts. each. Sliders (for square rod ¼-in. x ¼-in.) with ball and spring. 15 cts complete. Black Asphaltum, Black and White Shellac, liquid ready to use, large bottle, 25 cts. Electrolyctic Detector, 1909 style, 75 cts. each. Spool containing 1000 Ohms No. 50 Copper Wire, 60 cts. Silicon or Molybdenite, large piece 15 cts. Send postage stamp for 128 page Catalog.

Electro Importing Co., 86-2 West B'way, New York.

SPECIAL PRICES.—1,000-ohm wireless receiver, double pole, special thin diaphragm, hard rubber case, wound with copper wire, $1.75. Leather covered headband, double, $1; single, $.60. "National" receiving condenser, $.30. Waterhouse Bros., Bourne, Mass.

WIRELESS RECEIVERS, from $3.25 to $18.00 per set. Send for specifications without fail. This is of interest. C. Brandes, 111 Broadway, New York.

THREE-SECTION TWENTY-FOUR FOOT iron aerial mast, complete with reducers and socket for base. Upper sections drilled for guy wires; with cap on top to prevent grounding caused by water collecting in pipes. Pulley attachment for raising or lowering antenna. Bottom section 2 inch, upper, 1 inch. Threaded, ready to put up. Just the thing for amateurs. Price, complete, $4.50. Pittsburgh Wireless Mfg. Co., 1522 Center avenue, Pittsburgh, Pa.

FOR SALE.

FOR SALE, Wireless Outfit. Address, M. Lewry, 573 Washington ave., Brooklyn, N. Y.

WILL EXCHANGE, $150 complete wireless outfit, including 1¼ K. W. transformer, for motorcycle. Willing to pay difference in cash on first-class machine. Or will sell transformer, condensers, and impedence coil, all in highly finished oak cases for $50. A snap for somebody. Geo. Wood, 2109 12th st., Walbrook, Baltimore, Md.

BARGAIN, ½ Kilowatt transformer, only $20. Popper, 763 Beck street, Bronx, New York City.

FOR SALE—6-in. "Electro" Static Machine, 12-in. plates. Call at F. Ehlert, 882 Bergen street, Brooklyn, N. Y.

COMPLETE SENDING AND RECEIVING OUTFIT, with 500 feet of aerial wire, for sale. Sending radius 5 miles, receives Holtzer-Cabot 2,000 ohm. Price, express prepaid, $12. C. K. Little, 200 N. Upper st., Lexington, Ky.

WANTED.—1-inch spark coil; 1 1,000-ohm telephone receiver. W. H. Mueller, 1312 Benton st., St. Louis, Mo.

FOR SALE. A complete receiving and sending outfit, consisting of inch coil, condenser, helix, spark-gap, key, switch, tuner, detector, 1,000-ohm receiver, and head band, fixed condenser and 1-4 pound aluminum wire. Price, $10. Also complete chemical outfit, consisting of complete line of chemicals, glassware, and apparatus. Price, $10. Edgar Boydston, Downers Grove, Ill.

FOR SALE.—Fine portable receiving outfit, consisting of perikon and electrolytic detectors, fixed condenser, tuning coil, potentiometer, battery and switches, all mounted in a mahogany cabinet with cover. A RARE CHANCE. Only $15 to the first who applies. Julius Kaufmann, c|o M. E.

TWO HALF-INCH SPARK COILS, silk wound, $4.00; others, $3.00. Leon Ryker, Oneida, N. Y.

NEW ELECTRO IMPORTING CO. goods, have never been connected: 2,000-ohm receivers and headband, $5.00; variable condenser, $2.00; potentiometer and detector combined, $1.50; bare point detector, $.75; fixed condenser, $.75; 620 meter tuner, $3.00. Address, Harry Eby, 1716 Eye street, Fresno, Calif.

FOR SALE. 35 Kilowatt, 15,000 volt transformer. Secondary in sections. In oak case, with spark gap. Best of reasons for selling. Worth $40.00; make offer. Also transformer to reduce 110 V. A. C. from 5 to 20 volts. Cash Taggart, 421 Lecta ave., Fort Smith, Ark.

FOR SALE.—25,000 volt ½ K. W. 60 Cycle Transformer, with Tesla Coil and Condenser. Big bargain at $35. L. Work, 214 N. 22nd st., Philadelphia.

HOW TO MAKE ELECTRIC LAMP COOKING AND HEATING APPARATUS.

(Continued from Page 17)

the increased pressure in the water storage chamber.

At the left in illustration, Fig. 1 and drawing, Fig. 2, there is another arrangement of the electric cooker steamer, which retains the principle features of a thin film of water, an insulating air, steam or vapor shell chamber, and an outer storage chamber, the latter three being formed by a removable double cylinder, being pressed down into the water

Fig. 0

and forcing same into the space between the cylinders and into the steaming water layer. An electric coffee pot is shown in illustration, Fig. 1, and drawing, Fig. 3, connected along the same lines, the lamp heating the thin film of water, which rises through the coffee in the perforated receptacle at the top, and circulates, passing down along the outside wall of the coffee pot.

A small amount of water being required for poaching eggs, a novel combination egg poacher and plate warmer has been developed. Without using any wa-

(Continued on Page 53)

(Continued from Page 51)

ter, such dry heat is supplied as necessary for warming the plates, while a thin layer of water only is utilized for a few minutes in the former case for poaching eggs. Some of these cooking and heating devices are provided with resistance heat-regulating sockets, mounted between the supporting receptacle and the heating lamp, when found desirable, and another construction utilizes a thermostat plug between the porcelain receptacle, and a tubular heating lamp for controlling the temperature as desired.

The electric shaving cup and incandescent lamp curling-iron heater noted in Figs. 5, 6, and 7, may be considered the simplest application of lamp heated device, the curling irons passing through holes at the top, and being in contact with the black heat absorbing surface. The curling irons are located between the lamp and the heat absorbing outer shell, which last is in turn supported by a white reflecting support of porcelain fastened to the heating lamp receptacle as a base. It can be connected with any electric lighting current by attachment plug and an ordinary flexible cord approved by the National Board of Fire Underwriters for heating devices.

Spring

The accompanying cut (actual size) shows our new hard rubber ball-bearing slider (Patented Feb. 1, 1910). It is the acme of perfection and surpasses in efficiency, quality, accuracy, any slider ever placed on the market.

As it is non-metallic, it slides over the rod with astonishing ease. **NO MICROPHONE CONTACTS** possible with this slider, no jars in the telephone. The ball is pressed evenly on the tuning coil wire, while the spring (which makes contact with the rod) presses firmly on the ball ensuring perfect contact at all times.

The construction of the slider is so perfect, that it can never stick, but responds at once and quickly, with astonishing ease. **ALL OUR INSTRUMENTS ARE EQUIPPED WITH OUR NEW PATENT SLIDER,** beginning March 10th, **WITHOUT EXTRA CHARGE.**

NOVEL FEATURE:. While our standard slider is black hard rubber, we have devised the same slider in **BRIGHT RED** composition, for the Aerial slide and therefore equip all our double slide tuners, couplers, etc., with one black and one red slider. This original feature, is a distinctive departure. We lead as usual.

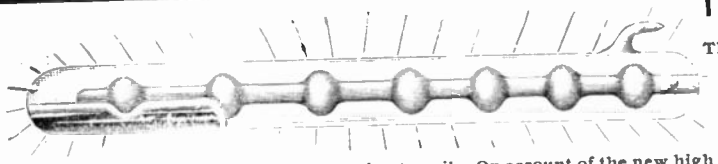
Our new slider fits any ¼-inch rod.

Hard Rubber Slider, complete with ball and spring, by mail

20 CENTS

Red composition slider, complete, same price.

The Astral Tube



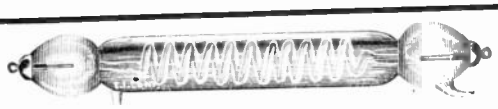
This tube lights up in the dark WITHOUT THE AID OF ELECTRICITY. Simply shake it. The mercury does the rest Lights up brightly near an aerial or coil WITHOUT ANY CONNECTIONS.

Can be used as a Geissler Tube by connecting to coil. On account of the new high duty imposed we are discontinuing this tube.

As long as supply lasts.

$1.00

Mail extra 15 cts.

Odd Size  Geissler Tubes

Through an error of the manufacturers an odd size lot of tubes were imported, not catalogued by us
It is the same quality tube as our famous tubes. Only odd length. Each tube guaranteed.

4 Inch Plain Tube.....$0 30; by mail extra, $0.07
3 Inch Liquid Tube (all colors)..... 0.40; by mail extra, 0.10

As long as limited supply lasts.

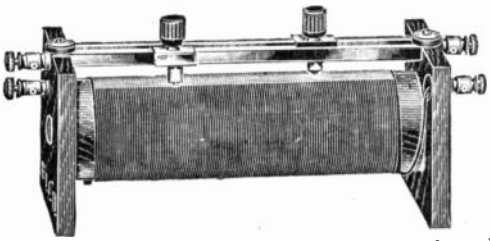
TUNGSTEN LAMPS

During this month only, our overflow stock of Tungsten Lamps must be reduced. We are offering these fine lamps almost at cost.

No. 4,000 Tungsten Lamps, 1½, 2, 3½, 5¼ Volts, each.....$0.28
No. 4,001 Tungsten Lamps, 5, 8 Volts, each..... 0.35

By mail extra, each, 3 cts.

TUNER JR.



Since introducing our new Junior Tuner, with solid hard rubber ends, we have left over a few of the old style ones, with wooden ends. As these are not regularly catalogued, and as we discontinued them, we offer them at cost. Anybody who wants a first-class GUARANTEED Tuning Coil should get this bargain. First come first served. We reserve right to return your money when these coils are all sold out.

Regular price, $2.00.

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Will You Give a Home Test to Johnson's Under-Lac at our Expense?

WE WANT you to know Johnson's Under-Lac by actual proof and real test. *One* trial will convince you how far superior it is to shellac or varnish.

How much simpler, more economical, easier and more satisfactory to apply.

Let us send you a bottle free and prepaid, and our illustrated booklet, Edition M. E. 2, "The Proper Treatment of Floors, Woodwork and Furniture," which answers every question on the care, preservation and beautifying of every wood surface—is full of valuable hints and helps on home decoration.

Johnson's Under-Lac

Imparts a beautiful, brilliant and lasting finish to floors, woodwork and furniture—over surfaces being dressed for the first time, over dye stains, filler or the bare wood; over an old finish of any kind.

You know the fault of varnish. It is thick, sticky—dries slowly in a mottled way.

Under-Lac dries evenly and quickly—but not too quickly, like shellac which laps and crawls and dries before it is well on. Under-Lac is thin, elastic—dries hard in half-an-hour. Use it for *any* purpose for which you would use shellac or varnish.

Johnson's Under-Lac produces a splendid *permanent* finish.

For Linoleum and Oil Cloth

It brings out the pattern to best advantage, giving a finish as glossy as new; protects from wear and makes cleaning easy.

The most economical because it goes farthest and lasts longest. Gallon cans, $2.50. Smaller cans down to half pints. Write to-day for the samples and our book of Home-Beautifying Suggestions. Edition M. E. 4. Clip coupon or take down address now.

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S. C. Johnson & Son, Racine, Wis.

I accept your offer of a sample of Johnson's Under-Lac, better than varnish or shellac; also Booklet, Edition M. E. 4. I agree to test the sample and report results to my paint dealer.

Name .....

Address .....

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S. C. Johnson & Son

Racine, Wis.

"The Wood Finishing Authorities"