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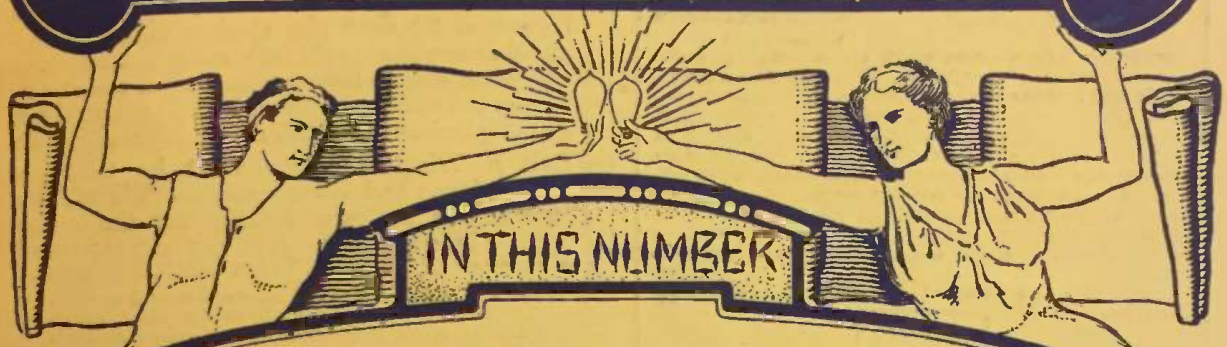

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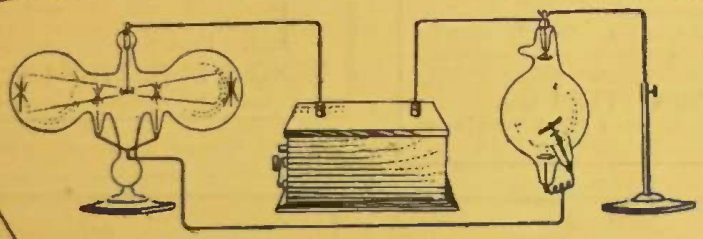
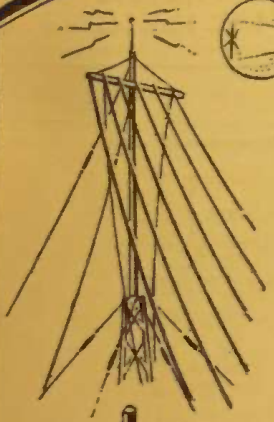
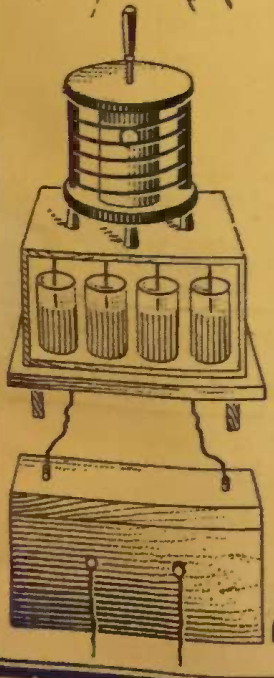
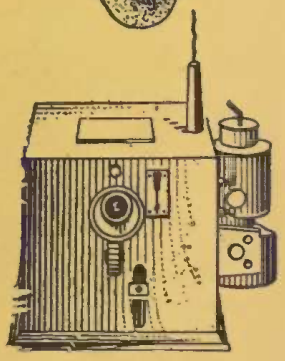
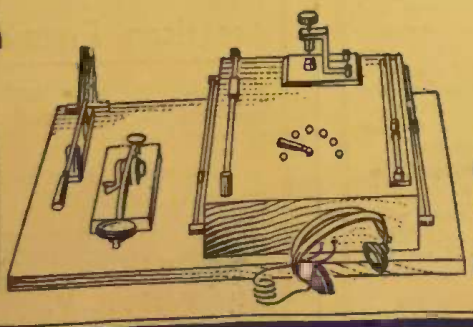
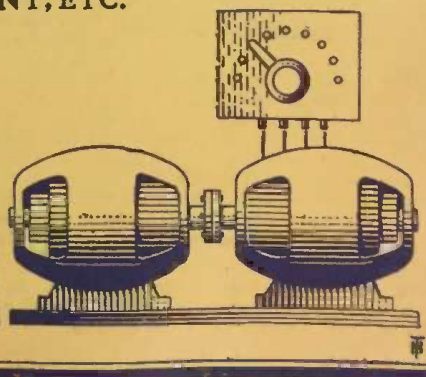












"THE ELECTRICAL MAGAZINE FOR EVERYBODY."

N. S. E.

MODERN ELECTRICS

Vol. II. JANUARY, 1910. No. 10

The Mastery of Inertia

A Review of Progress in a Difficult Field.

By Clarence B. Fowler.

"Something more subtile is needed—a medium devoid of all mechanical inertia," declared a noted electrical authority, after reviewing certain attempts to solve the problem of the telephone relay. Though spoken many years ago, these words still hold true. Inventors still find, as then, that their every step towards the solution of not only this, but many other alluring problems, is hindered by the old enemy—Inertia.

Inertia has been aptly defined as that repugnance to change of state which is characteristic of all matter. Thus a body at rest or in motion tends to so continue, and a much greater expenditure of energy is required to change it from one to the other condition, than to maintain it in motion. But most important of all, it takes time to accumulate this additional energy of transition.

In dealing with matter and mass the laws of inertia are as inexorable as those of gravitation, and we can as well hope to overcome one as the other. Yet many go on in apparent disregard of such facts, as evidenced by the recent invention of an apparatus for electrical vision employing the old scheme of minute image subdivision in conjunction with the phenomena of vision persistence, when it has long ago been demonstrated that the successful transmission of a very small view along these lines necessitates the use of about a million electrical impulses per second; a rate far too rapid for the mechanical inertia of any known receptive device, or the capacity or electrical inertia of the shortest line of wire. We can at best avoid inertia or resort to methods of reducing it, and much good work has been done in both directions.

Transatlantic telegraphy was more or less a failure until Lord Kelvin invented the mirror galvanometer, which successfully indicated the minute currents in the cables. Its success was due to the use of a weightless beam of light as the indicating and magnifying lever, whose movements over a scale indicated the dots and dashes of the Morse code. Our most sensitive current measurers, the oscillograph and Korn's telephotograph receiver, are but refinements of the mirror-galvanometer. Kelvin's siphon-recorder, now used for cable telegraphy, is an even more ingenious triumph over inertia. This instrument writes the signals on a moving strip of paper by the following means: The cable communicates with a delicately suspended coil of wire that hangs between the poles of a permanent magnet. To the suspended coil is attached a fine silk suspended siphon of glass, one end of which dips into an ink reservoir. The ink marks the signals on the paper in a wavy line. Starting and stopping inertia is practically eliminated by giving the siphon a continual minute vibration.

When the discovery of radium and the other members of the radio-active group was announced, scientists despaired of ever accurately measuring the apparently inertialess emanations. But the Curies, leading workers in this field, met the problem with a simple inertialess apparatus, "thousands of times more sensitive than spectrum analysis, and millions of times more sensitive than chemical analysis." This was a gold leaf electroscope, perfectly insulated from outside influences, and having micrometer, microscope, and chronometer attachments. In operation, the leaves were first deflected to a definite extent by an appropriate electrical charge. Then the substance to be tested was placed inside the instrument, near the electroscope. The radiant matter made the air conducting, and the electroscope was gradually discharged, the time required being a measure of the degree of radio-activity.

Through the agency of the cathode ray, a form of this wonderful weightless matter, Drs. Glage and Dieckmann have ar-

rived at what is probably the first experimental solution of the great problem of Tele-Vision. Their apparatus has enabled them to reproduce an image 1 1/4 inches square at their receiving station simultaneously with its insertion into the transmitter. The image was first cut from sheet metal, laid on an insulating block 1 1/4 inches square, and its underside connected to one line wire. A tiny metal brush connected to a battery and the other line wire, was caused to continuously cover this area with parallel and equidistant lines, in exactly one-tenth of a second. When the brush touched the metal an electric current passed through the line wires to the receiver. At the receiving station was located a Braun tube which was kept excited by a high tension current, causing a tiny beam of invisible cathode rays to be projected in a straight line from the cathode and at right angles thereto, onto a screen of fluorescent material, producing a bright phosphorescent spot Cathode rays because electrically charged and of infinitesimal inertia, are instantly deflected by any magnetic field in their vicinity. Advantage was taken of this fact to cause the spot of light to travel over an area on the screen 1 1/4 inches square, in synchronism with the transmitter brush. Also, the two line wires were connected to electro-magnets situated nearer to the cathode than those used to produce the motion of the spot of light; and when the brush touched the metal, sending a current through them, the cathode ray was deflected beyond the influence of this latter field. Thus a person watching the screen would normally see a luminous patch 1 1/4 inches square, and when the brush traversed the metal pattern, its image would appear simultaneously in shadow on the screen, due to the retentivity of vision. Only small patterns such as could be cut from metal and would show well in shadow could be transmitted by this method. However, these experiments must be regarded as a signal victory over inertia, the old enemy of every worker in this line of research.

As if akin to the cathode ray, Mr. Cooper-Hewitt claims that the resistance of the mercury vapor arcs of his invention responds instantly to changes in a neighboring magnetic field, and proposes a telephone relay or repeater along these lines. Although mercury vapor appears to satisfy the requirement of a medium devoid of all mechanical inertia, it is doubtful whether the normal resistance of these arcs can be made constant enough to be entrusted with the handling of delicate telephonic currents. The ultimate solution of this fascinating problem may some day be achieved by this or a kindred principle.

In some measuring instruments it is desirable to record the movements of an indicating lever from time to time on a moving band of paper, but the periodic marking of the paper has been found to interfere with the accuracy of the record; because of friction when the lever is heavy, and vibration when light. Therefore an induction coil is sometimes employed instead of a mechanical marker, one secondary terminal being connected to the lever and the other to a metal plate beneath, over which the paper passes. A spark is made to periodically jump from lever to plate, puncturing the paper. Thus the electric spark directly serves as an inertialess punch or stencil.

Besides mechanical and electrical inertia there is retentivity or magnetic inertia, about which little is heard because our mastery of it is sufficient for all practical purposes. We meet retentivity in many degrees, from the almost infinitesimal amount in the laminated pure iron cores of chronoscope electro-magnets, to the enduring sort of the compass and other steel magnets; and by observing well established laws may produce magnetism practically to order. This has been only of late, however, for in the early days of the telephone great difficulty was experienced in producing—first electro-magnets of sufficiently low retentivity; and then, permanent magnets of a reasonable constancy.

Chemical actions and reactions, dealing as they do with infinitesimal masses of matter, seem unhampered by inertia, as proven by the fact that photography has never been too rapid to prevent them. When this country was once threatened with a monopoly of the telephone patents based on electro-magnets, Edison promptly came forward with the chalk telephone, reproducing speech electro-chemically, without magnets. To inertialess chemical receiving devices are also due our most rapid telegraph systems, viz., those of Wheatstone and Delaney, receiving up to three thousand words per minute.

The mysterious lagging of the selenium cell is the most curious of all forms

of inertia. As is well known, selenium possesses the remarkable property of altering its electrical resistance in exact proportion to the intensity of the light falling upon it. The selenium cell forms the basis of many interesting inventions, such as the photophone, the photophonograph, and nearly all telephotographic or picture telegraph systems. Nearly all of these, too, owe their failure to the insurmountable inertia of the selenium cell, viz., that its changes in resistance are gradual, not instantaneous. Certain rules have been evolved for reducing the inertia to a minimum, such as special design and treatment during manufacture, or working high and low inertia cells in opposition. This last has been the most successful, and is used in the Korn telephotograph system between London and Paris.

The existence of inertia cannot be regarded as an unalloyed evil, for it is indispensable in its proper sphere. Thus it has been ingeniously harnessed in the seismograph or earthquake recorder of the Weather Bureau at Washington. This instrument consists of a heavy horizontal pendulum, having a fine pen attached to the bob. It is automatically kept swinging to and fro in unison with a band of paper under the pen, the band also being slowly unrolled at right angles to the oscillation. The pendulum is so suspended as to be very sensitive to any earth vibrations. When such occur, the pendulum remains more or less stationary, because of its inertia. The paper then receives a record. Inertia it is, also, that makes the flywheel invaluable, and gives every missile, axe, and hammer, its power of construction and destruction.

ELECTRIC SHOCKS REVIVIFY A RABBIT.

In the presence of medical men, scientists, electrical experts, and officials of the New York Edison Company, a demonstration was given recently of how an animal can apparently be killed by electricity and then be brought back to life by an application of an electric current so gauged that the heart and lungs are compelled to take up again their interrupted functions.

The demonstration was given by Dr. Louise G. Robinovitch, a young Russian woman who came here from France a few years ago and created a stir in the medical world by announcing that she could restore life to animals apparently dead.

The officials of the Edison Company learned of the demonstrations which had been given in this country and abroad by Dr. Robinovitch, and became interested. Every year many workmen are accidentally killed by electricity in the big power plants of the company. It was suggested that if animals which have been shocked to death can be restored to life, why not human beings?

J. W. Leib, Jr., third vice-president of the Edison Company, communicated with Dr. Rovinovitch through Dr. John A. Wyeth, president of the Academy of Medicine. Dr. Rovinovitch agreed to demonstrate before the officials of the company if they would promise to keep out all reporters and pledge themselves not to allow a report of the demonstration to get into the newspapers. Dr. Robinovitch is extremely shy of reporters. She does not object to lecturing before scientific bodies, but doesn't like notoriety. She is a scientist and holds many degrees from scientific institutions in Europe, where she is better known than here.

The Edison officials promised and arrangements were made for the demonstration in the large council room of the Edison Building, in Duane street. Most of the company's vice presidents and directors were on hand at the appointed hour.

Dr. Robinovitch had sent her apparatus ahead and it was installed in the council room. An operating table was there, also a small electrical appliance which she uses in resuscitating animals after life has apparently fled.

Although neither Dr. Robinovitch nor any of the Edison officials would discuss what took place at the demonstration, the news leaked out that a rabbit was put to death with electric shocks by Dr. Robinovitch, and that after the little animal had ceased to breathe and its heart had ceased to beat perceptibly, an electrode was applied to its back just over the shoulders and another at the base of the spinal column. While the company's officials and the scientists stood around her, Dr. Robinovitch began to operate a small switch which regulated the current of electricity as it passed through the animal's body.

"Rhythmic excitation" is the name applied by Dr. Robinovitch to this intermit-

(Continued on Page 466)

Dr. Korn's Apparatus

By A. C. MARLOWE,
Paris Correspondent MODERN ELECTRICS.

The writer recently had occasion to examine the new apparatus devised by Dr. Korn, of Munich, for the transmission of photographs over a line. The apparatus was constructed at Paris and there is a post installed in the offices of one of the leading illustrated weeklies, the "Illustration." It connects with a similar post located at Berlin, and the views which are transmitted over the line are very clear. About ten minutes is required for sending a portrait, for instance. A positive film is used at the sending post, and at the other end the impression is received on a sensitive film, which is then developed. Synchronous motors are used to operate both the sending and receiving apparatus, so as to produce the corresponding effects.

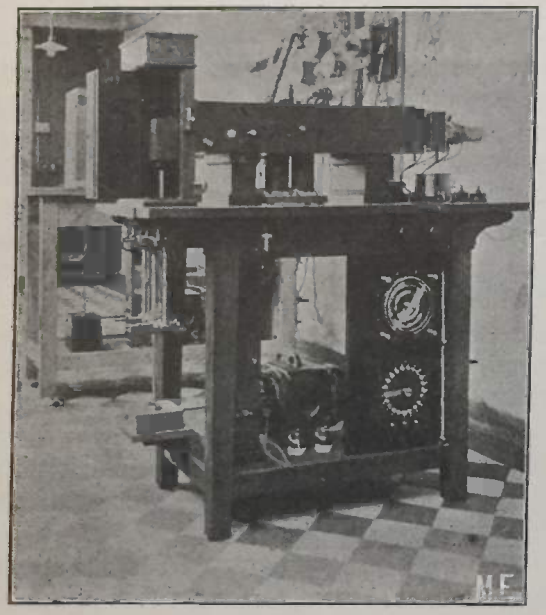


Fig. 1.

Dr. Korn's apparatus is shown in Fig. 1 in its complete form, with the transmitter and receiver mounted together upon a large table. Underneath is placed the synchronous motor which seems to drive the mechanism for both the transmitter and receiver by means of a horizontal shaft and the vertical shaft and gearing which is seen on the left. The diagrams show the working parts of the transmitter and receiver. The transmitter occupies one-half of the long box noticed above the table, ending in an upright case. At N is a sliding tube containing a Nernst lamp N with the lens L and in this way a strong beam of light is sent to the left-hand part of the apparatus. Here is placed the lens A which is mounted in a sliding tube having a small diaphragm B. This latter comes close upon the glass cylinder C. Around the cylinder is wrapped a positive film representing the photograph which is to be transmitted. The light passing through a certain point of the film is received by a total reflection prism D and is sent from thence to the top and falls on the surface of the selenium cell E.

As the cylinder is mounted on the rotating shaft F which operates in the same way as in a phonograph, it is revolved and at the same time rises, so that all the points of the image are brought in succession past the beam of light at B. Thus an opaque point in the film will cut off all the light and there will be none received on the selenium cell, while a transparent part gives the full light on the cell. The selenium thus receives different amounts of light corresponding to each point in the image. As it is connected together with a battery upon the outgoing line, the distant receiving station will receive a variable current, these variations following each other in rapid succession. The receiver then acts to reproduce the image according to these currents.

The receiver is mounted alongside the transmitter in each station. It contains

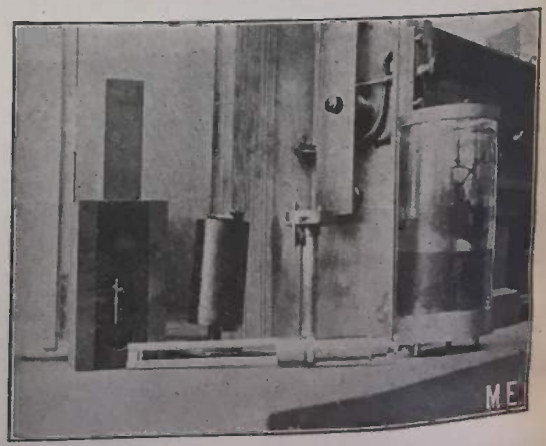
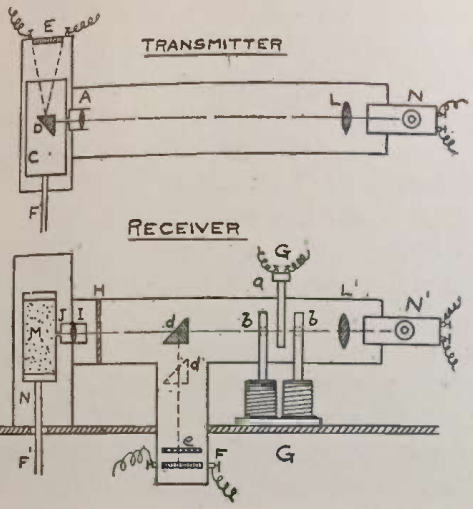


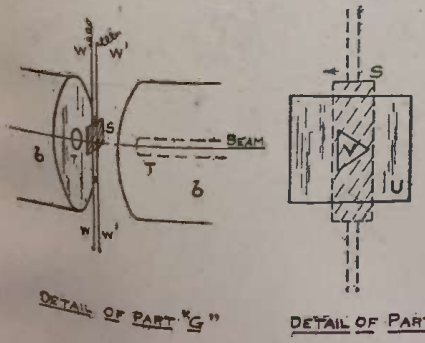
Fig. 1 A.

the Nernst lamp N' and the lens L' which sent a beam to the left. This beam passes through the apparatus G, which acts as a galvanometer shutter. It receives the in-

coming current and serves to cut off more or less of the beam according to the strength of the current at any instant. The current is received in the upper part *a* which carries the shutter and is mounted between the poles of a strong electro-



magnet bb. The detail view shows the action of the shutter, and it consists of a small square of aluminum foil mounted on the double suspension wires ww', these being stretched parallel. On either side are the poles bb' of the magnet and these are perforated at TT so as to allow the light beam to pass through. When a current passes in the wires ww', it causes these latter to give a deflection to one side, according to the principle of this type of galvanometer, and the aluminum foil uncovers the opening more or less, depending on the strength of the current. When there is no current coming on the line, the metal foil covers the opening completely and there is no light sent to the left. The full current, corresponding to the highest action of the selenium, that is, to the greatest amount of light, gives the full swing of the shutter to one side and uncovers all of the beam, and this allows



the light to act on the part which lies to the left. Passing by the part R, which is not used at present, the beam goes through the screen H, carrying a diaphragm, and then passes through the lens I and small hole J, falling upon a photographic film M. This is wrapped about the metal cylinder N, which is rotated at the same speed as is used for the transmitter, by means of a synchronous motor. The point of light at J thus acts on the film as it revolves, and as the value of the light corresponds to the white or dark parts of the original film, all the points of the latter are reproduced in succession on the sensitive film, so that finally we have the whole of the image. It only remains to remove the film and develop it. In practice the cylinder works inside a removable box with a sliding shutter on the principle of a film holder, so that it can be easily taken out for developing.

To have the beam of the receiver correspond exactly to the current values on the line, the swing of the shutter should be in proportion to the current so as to

Fig. 2

give the proper amount of stopping off of the beam. However, the galvanometer cannot be made to give a swing which is proportional to the current, and we need to use a correcting device for this purpose. This is shown in the detail view representing the part H which lies before the lens. At U is a screen carrying a triangular diaphragm V, which is quite covered by the shadow of the aluminum shutter S when no current is passing. When the shadow moves off the hole, the amount of light which is admitted to the

lens is varied in a different way from the ordinary, owing to the particular shape of the diaphragm, so that we now have

Fig. 3

an amount of light which is about proportional to the current in the line. It is found that the triangular shape answers the purpose.

Dr. Korn finds that he can overcome the inertia of the selenium cell to a great extent by the use of a device known as "compensator." While an ordinary cell fails to respond quickly enough to the action of the light, we can make this action much more rapid by the use of a second cell which is mounted in connection with the first one. The second or compensating cell is a selenium cell in which the selenium has been treated so as to have different physical properties from the first one. Thus the first cell may have a large inertia and a low electrical resistance, while the second cell has a small inertia but a high resistance. He couples the two cells on the differential principle, somewhat as in a Wheatstone bridge, and the resulting current is sent into the line. This current is a smaller one than we would have with a single cell, but it is enough to work the shutter galvanometer, which is very sensitive. The current now follows the rapid variations of light almost exactly, so that there is no trouble from this point, and all the shades of the photograph are reproduced in the receiver, giving the details of the image in a very satisfactory way.

It is found best to have the compensating cell lighted not from the same beam which lights the main cell, but from a galvanometer shutter working on the current of the latter, thus giving the same light variations, but from an independent source. As we have the galvanometer of the receiver, which is not used when sending an image, it can be used for this purpose. In the receiver we use the total reflection prism *d* which is now moved into the path of the beam (it is normally at d') and it sends the beam down the vertical column to the diffusing screen *e* and the compensating cell *f*. This cell is connected with the main cell E as stated above and the combined current is sent on the line.

Fig. 2 shows a picture which was transmitted from Berlin to Paris by means of Dr. Korn's apparatus. The duration of transmission is about 5 to 8 minutes.

Fig. 3 shows an excellent picture transmitted over the same distance. As will be seen the lines are more closely spaced

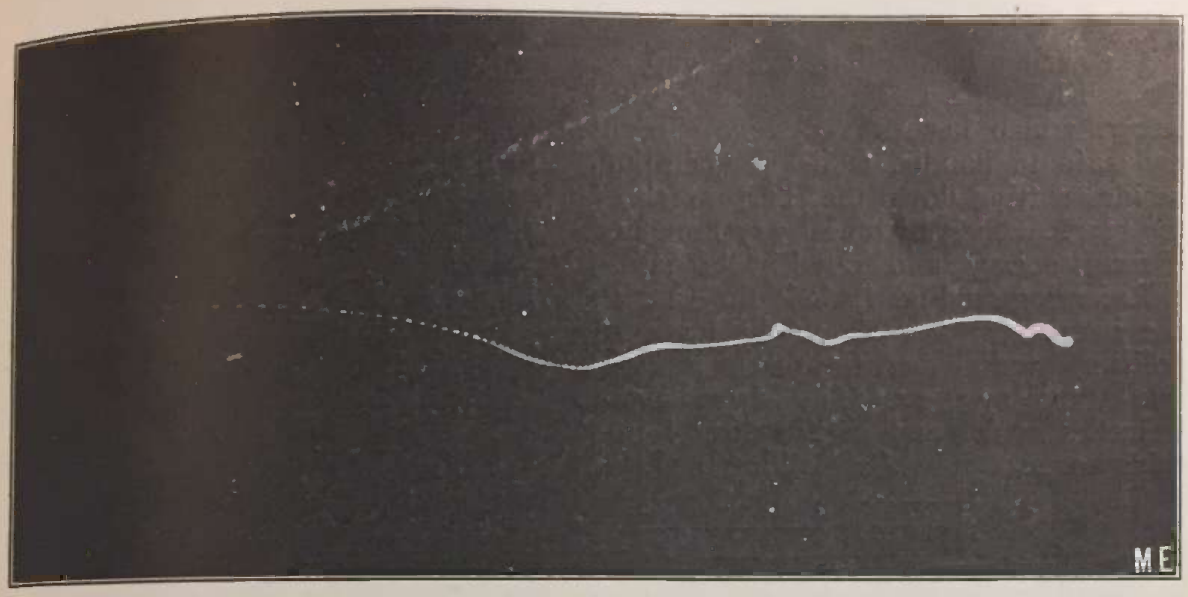
Fig. 4

than in the previous picture, which takes away the fence-like effect, present in photographs of the older pictures.

(Continued on Page 468.)

Bead Lightning

By Our Berlin Co respondent.



A. Schmauss publishes in a German periodical* a remarkable photograph taken by a Mr. Mack in Schweinfurt September 24, of this year.

During a terrific thunderstorm on that evening Mr. Mack who had observed several strange shaped forms of lightning, ventured in the open with his camera. Although hail and rain poured down in great profusion, Mr. Mack, when placing his camera in a westerly direction, was able to obtain the accompanying remarkable photograph, the like of which has seldom been seen.

*Phys. Zeit.

A HERO OF THE TELEGRAPH KEY.

By A. W. Rolker.

Three years ago as the Overland Limited dashed through the night in the bad lands, forty-five miles west of Cheyenne, Wyo., a rail broke in two and came up through the bottom of the baggage car. In an instant the train of nine cars was piled thirty feet high, while about and beneath the wreckage were more than one hundred and fifty dead or injured human beings. A frightful sleet storm with biting cold was raging, and to this the hurt and dying lay exposed, says A. W. Rolker in *Everybody's Magazine*.

The locomotive was wrecked so that it was impossible to cut loose and race ahead to the nearest settlement with word of the disaster, and it seemed as if nothing could be done to save the sufferers except to flag the next train, due in five hours, when, from under the wreck, on hands and knee stumps, came an apparition leaving a red trail behind. It proved to be Frank Shaley, a telegraph lineman who had been sent up the road to locate a wire trouble and who, with his satchel of instruments strapped across a shoulder, had been in the baggage car when the crash came. Clutching the precious satchel, he dragged himself forward, but his legs had been smashed off at the knees and he was bleeding frightfully. "The telegraph! Cut in on the telegraph!" he shouted, but not a man there knew which one of the score of wires to cut, and Shaley himself could not tell without testing. They threw a rope across an arm of one of the poles, passed a sling about the dying man and hoisted him up. Then he cut and grounded the wire and connected his telegraph key. Tenderly propped bv anxious hands, he began to send the call for the Cheyenne operator, meanwhile gazing stoically at the pool where his life blood ebbed away. At that unusual hour of the night he found trouble in raising his man, and he pounded his key for ten minutes before he got an answering click.

"No. 17 terribly wrecked forty miles west of Cheyenne! Send hospital train!" he said. Then they pillowed his head on the satchel and an armful of waste, while forty miles away a whistle shrieked through the night and brought engineer, firemen, and two hundred Japanese who

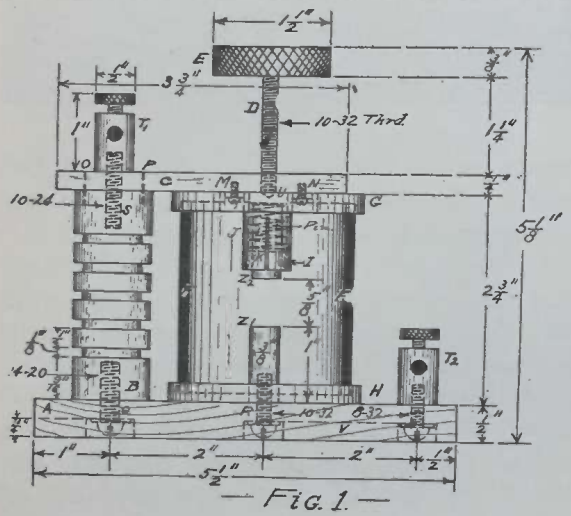
(Continued on Page 469)

A Muffled Spark Gap

By H. W. Secor.

The writer has built a spark gap, of the muffled type, as shown and described below, which has proved very efficient and safe to handle, while in operation, besides cutting down the sharp crack of the spark, which becomes very annoying if much energy is liberated in the gap.

Referring to Fig. 1, A is the base of the instrument and should be made of polished hard rubber, to prevent leakage, due to moisture, etc. The base is about 4 inches wide, and of the length and thickness shown. After drilling the holes



— Fig. 1. —

for the standard and other parts, in the base, and having mounted them thereon, the bottom of the screw holes, on the under side of the base should be filled in with beeswax or some other good insulation.

A standard, B, is made of a piece of 1-inch round hard rubber rod, polished, and having 5 grooves cut around its surface, to reduce leakage to a minimum. The standard is secured to the base, A, by means of the 14-20 machine screw, Q, and has the top piece, C, of brass 1 inch wide, clamped on to it by the 10-24 stud, S, threaded into the standard and into the binding post, T. To make the piece, C, more rigid, two pins, O and P, are inserted, as in Fig. 1, either side of the stud, S.

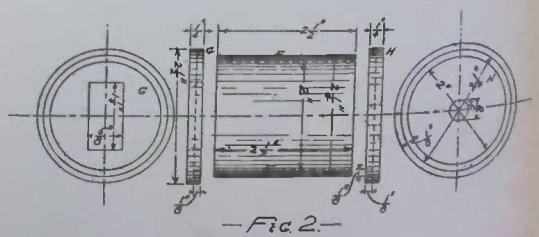
A hard rubber handle, E, is fitted to the upper end of the adjusting screw, D, which is threaded through C; the pointed lower end of D bearing on the coned out upper face of the electrode, Z2.

In Fig. 3 is shown the various parts of the upper electrode and its adjustment features, with the exception of the spiral spring, L, Fig. 1, which tends to push the upper electrode, Z2, upward. Returning to Fig. 3, g is a piece of 1/2-inch brass pipe cut with two projecting lugs on it, M and N, which are drilled and bent up to form supporting feet as shown.

Two 6-32 machine screws pass through these feet into the piece, C, thereby securing J in its place. See Fig 1.

Both electrodes, Z and Z2, are made of zinc. The faces are 3/8 inch diameter in the design given here, and are capable of handling 1 K.W. of energy. The size of faces for greater energy will be given at the end of this article.

The electrode Z is a straight cylindrical piece, and has its lower end tapped out for a 10-32 machine screw, which holds it in position on the base. The upper electrode, Z2, has a shoulder, U, turned upon its upper end, underneath which the spring L exerts pressure upward. The lower bearing for the spring is formed by the piece of 3/8-inch brass pipe, T, Fig. 3, which is tightly fitted into the lower end of the chamber J. A small pin or key on the side of the electrode, Z2, engages the slot or keyway, K, in the side of the brass cylinder, J. This prevents the movable or upper electrode from turning and causes it to advance or recede evenly and squarely, which is essential to the satisfactory operation of any spark gap.



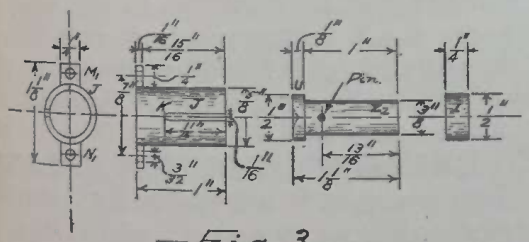
— Fig. 2. —

Fig. 2 shows the details of the muffler. The ends, G and H, are both made of hard rubber, and have annular grooves 1/8 inch deep, turned in their faces, into which set the ends of the glass cylinder, F. The end, G, has an aperture of the size given, cut out of its centre, enabling it to pass over the brass cylinder, J, and fit tight up against the piece, C.

The lower end, H, has a 3/8-inch hole in the centre of it, through which the electrode, Z, protrudes. The glass cylinder and its rubber ends are held in place between the top piece, C, and the base, A. The glass cylinder for the muffler may be obtained from an oil cup, such as commonly used on engines, etc.

The construction of this spark gap admits of its being made in most any size desired, without departing from the salient features it embodies, viz.: high insulation, efficiency, precision and ease of adjustment. For larger sizes than shown in this description, and for very high voltages, the spark chamber should be surrounded by a mica cylinder instead of a glass one.

In the design given here the capacity may be greatly enlarged by making the electrodes Z and Z2 with shoulders 1/8 inch long, and of the diameter desired, turned upon their spark faces. If this is done, the shoulder, U, in the electrode Z2 will have to be made separate from it, and fastened thereon by means of a flat head screw, threaded into the electrode Z2. This is necessary in order that the collar, T, may be put in place.



—Fig. 3.—

The following size electrode faces are suitable for the loads placed after them:

3/8 inch diameter up to 1 K.W.
9/16 inch diameter up to 2 K.W
11/16 inch diameter up to 3 K.W.
13/16 inch diameter up to 4 K.W.
7/8 inch diameter up to 5 K.W.

DR. KORN'S APPARATUS.

(Continued from Page 460)

Fig. 4 shows a curious effect of what will happen when a telegram is sent on a parallel wire to the one used to transmit pictures.

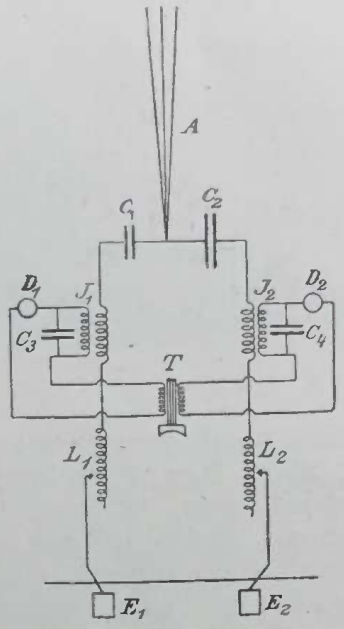
The inductive effect is quite marked, and a trained telegrapher has but little trouble to make out part of the telegram, incorporated in the young lady's face. However, by using suitable condenser arrangements this drawback is overcome easily.

NEW TUNING ARRANGEMENT.

J. A. Fleming has devised a new arrangement to utilize partial waves in the receiving circuit.

The arrangement is as follows:

The antenna A is connected to the two receiving circuits which work independent of each other. The condenser C2 is



connected to the oscillation transformer J2; this in turn connects to a tuner L2 and ground E2. Condenser C4 is shown connected across the secondary of the oscillation transformer. Detector D2 is in series with the telephone winding at T.

As will be seen this telephone has two windings, the one coming from D2, the other from D1.

It is therefore obvious that the telephone receiver responds to different wave-lengths. This feature makes it very convenient for a busy operator, as he does not need to switch from one to another circuit. Adjusting of one of the tuning coils is all that is required.

CORRECTION.

Please make note in regard to mistake in my article, "How to Convert a D. C. Dynamo or Motor into an A. C. One," in the December issue. The mistake is in the 9th line from the bottom of the right-hand side of page, No. 407, viz.: Instead of "The frequency of any pole machine will be, cycles per second = R. P. S. × 1/2 No. field poles," it states, "cycles per second = R. P. M. × 1/2 No. of field poles," which would give the cycles per minute.

HARRY W. SECOR.

Metropolitan Tower Radiophone

For the last month amateurs and experimenters about New York have been greatly puzzled when listening to the powerful signals, flashed off and on, the pitch of them being quite out of the ordinary. It will come as a revelation to many to know that they are sent out from Dr. De Forest's new station on top of the new Metropolitan tower.

The accompanying engraving shows the operating room of the new Radio wireless station in the Metropolitan Life Tower. This station is now in constant communication with Philadelphia and Albany, and frequently picks up messages from the company's station at Chicago.

The pictures show the multiplex receiving apparatus over which three different messages are now received at the same time. Next to the French Government Station in the Eiffel Tower, this is the highest wireless station in the world. It employs what is known as the high note system, which is a modification of the sparkless system announced last February. The closest tuning is possible and the signals are much more readily understood than is the case with the usual spark gap apparatus.

INTERMOUNTAIN WIRELESS ASSOCIATION.

The Intermountain Wireless Association was organized October 22, by Messrs. Adams and Ritchie at the home of the former in Salt Lake City. The object of the association is to further the arts of wireless telegraphy and telephony in the intermountain region. A constitution and by-laws have been adopted, and the following officers elected: President, M. E. L. Bourne, of the National Guard Signal Corps; secretary, M. D. McNichol, formerly of the Postal Telegraph; treasurer, Mr. J. G. McCullom. All persons residing in the Intermountain States are cordially invited to join, and may do so by communicating with Mr. D. R. Adams, 219 5th East street, Salt Lake City. DAMON ADAMS.

GOVERNMENT CHANGES CALLS

The Government has changed all of its wireless calls on board all of its ships and at all its land stations. They went into effect November 20, 1909. They have all been changed into three letter calls, i. e., Mare Island was TG, now NPH. The reason for this is the Government wanted a certain letter to distinguish their calls from others. The letter N was selected and now the Government's hundreds of stations have been changed.

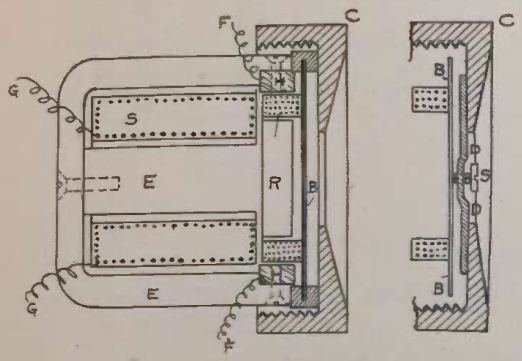
CORRECTION.

In "Bi-Polar Selective Switch," (page 411, December issue) M, Fig. 2, is a bow spring, serving also as an electrical connection between B and J. The M referred to in description was a thin metal strip (omitted in Fig. 2), practically a continuation of the bow spring, and running around end of switch-lever at J to insure good connection with H. This last is not a vital part, but the bow spring is. T is an upholstering tack, not a binding post.

Paris Letter

SENSITIVE TELEPHONE.

A telephone receiver which is claimed to be especially sensitive has been invented by P. Oliver. On the diaphragm B is fixed the circular coil A which is of light construction, and lies behind the mouthpiece. The electromagnet E has concentric poles, and is either in a three-branched or a bell form, carrying the coil S. A pole-piece R fastened on the end of the electromagnet lies inside the bobbin A, while the outer poles of the magnet carry an iron ring H which more or less surrounds the bobbin A. The electromagnet S is connected by the wires G G with a local battery, and the bobbin A is coupled to the line by the wires F F. Using this device the inventer claims to have a much stronger vibration of the diaphragm than usual, and can obtain an increased effect which makes the receiver more sensitive than the ordinary forms. This effect is still further increased by the use of the pressure screw S, noticed in the second diagram. The screw is held in a supporting piece D fastened to the back of the mouthpiece, and it bears against the centre of the diaphragm. He thus cuts down the outside vibrations of the plate which give disturbances, so that the sounds are better received. The same instrument can be used as a transmitter.



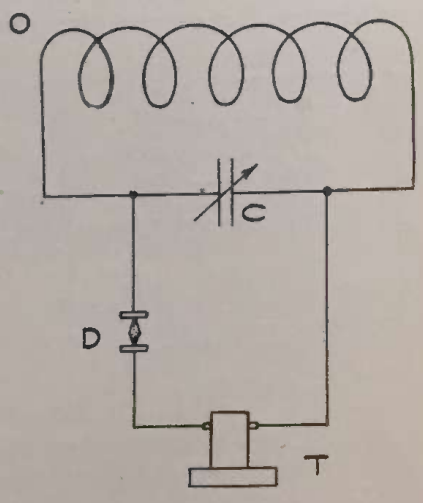
M.E. -FIG. 1-

MARCONI WAVE METER.

Mr. Marconi has lately devised a form of portable wave-meter which is in a very compact shape and also of light weight, not over 6 pounds. It has several advantages in the way of measuring wave-lengths. As will be noticed in Fig. 2 it consists of an oscillating receiver circuit for the waves, formed by the fixed coil O and a variable condenser C. A detector circuit is mounted above the condenser, and he uses the carborundum detector D, this being connected in series with the telephone receiver T. To measure the waves, we bring the coil O near the circuit in question and by varying the condenser we find the point which gives the loudest effect in the telephone. The length of the wave is then found by observing the corresponding regulated point on the condenser, using a set of curves or tables in this connection. Owing to the arrangement of the fixed oscillating circuit with a new type of condenser specially designed for the purpose, we obtain a very close result in the measurements, and any variations in the condenser have but little effect. The detector is not placed in the oscillating circuit, but in a parallel circuit, so that it works under better conditions, and the use of the carborundum detector gives a great sensitiveness. He is able to measure waves of 180 to 750 meters length with this instrument.

NEW RECTIFIER.

A new form of vibrating current rectifier for obtaining direct current from alternating current has been brought out in France, and it is claimed to do away with the disadvantage of this class of instrument. At the same time, both cycles of the current are used. There are used two vibrating strips, 1 and 2 (Fig. 3), which

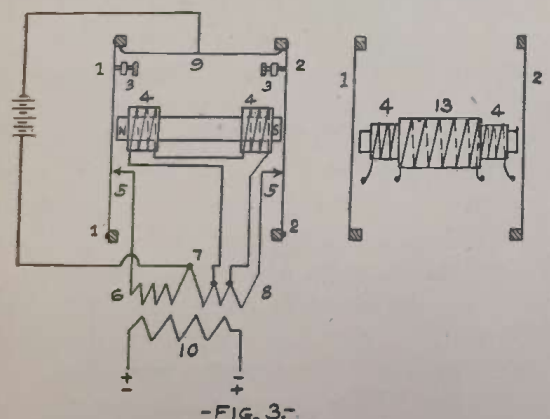


M.E. -FIG. 2-

are stretched between two fixed points and lie in front of a magnet. Each strip carries near the middle a contact plate which can touch the fixed and insulated pieces, 5. The electromagnet is polarized and consists of the permanent magnet N S, each of whose poles carries a bobbin 4, which is supplied by the alternating current. A vibration is thus given to the strips which is in synchronism with the period of the alternating current. The screws, 3, serve to adjust the strip with reference to the contact pieces and vary the duration of the contact. The two waves of the alternating current are utilized by connecting the contacts 5 to the ends 6, 8, of a transformer secondary, and the primary, 10, is connected to the alternating current mains. Each strip works in tune with one of the poles and we collect one or the other wave in turn. The apparatus for using the direct current, such as a storage battery to be charged, is connected at the neutral point 7 of the transformer and to the cross-connection of the two strips at 9, so that the current comes off from 7 and 9 always in the same sense. Instead of a permanent magnet, an electromagnet can be used which is excited by the coil 13 and carries the two end coils 4 as before. In this case the apparatus excites itself like a dynamo.

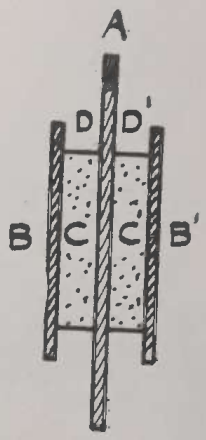
NEW CONDENSER FOR HIGH TENSION.

The Gaiffe Company of Paris uses a new device for condensers which is here



-FIG. 3.-

represented, especially for high tension work. A liquid or gaseous dielectric is placed between the edges of the metallic electrodes and the solid dielectric so as to prevent the breaking down of the latter. This can be used as here shown for flat condensers, but it can also be applied to Leyden jars. The metal electrodes *BB* are separated from the glass, etc., A, by the pieces CC of smaller size and of insulating material or metal and the pieces may form part of the electrodes B or the glass part A. The space D at the ends is filled with a liquid dielectric such as oil, or gases such as hydrogen can be used.



-FIG. 4-

M.E.

WIRELESS ST. PETERSBURG-VLADIVOSTOCK.

There seems no doubt that the project for connecting St. Petersburg with Vladivostock by wireless is to be realized soon. Connection will be made by installing a series of wireless posts situated at intervals of 1,000 or 1,200 miles, and the line of posts is to pass by Kharbine. The Russian government is engaged in making experiments with this end in view, with a type of wireless post laid out on a new model, and it gives connection at present at 1,200 miles distance. Signals have already been sent between the Baltic and the Black Seas by this apparatus.

ELECTRIC SHOCKS REVIVIFY A RABBIT.

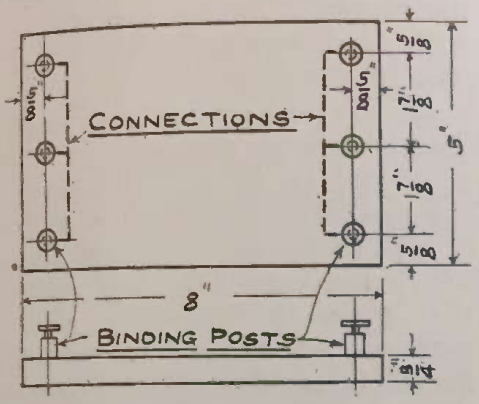
(Continued from page 457.)

tent current of electricity which is shot into the animal's body. Very slowly each excitation was given in imitation of the beating of the pulse and the natural breathing of the lungs. After some twenty of these rhythmic excitations the rabbit is said to have resumed its interrupted breathing. It was hopping about the room a little while after the demonstration.

The Construction of a Hot Wire Ammeter

A hot wire ammeter is usually not found in the wireless "fiend's" station owing to their expense. The writer will describe one he made, and was pleased with the results.

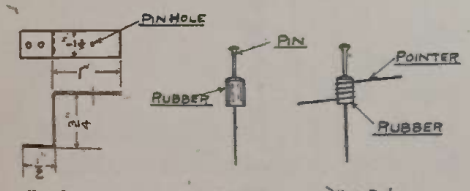
Make a base of some well seasoned



M.E. -FIG. 1-

wood, such as oak, 8x5x¾ inches and mount six binding posts on it as shown in fig. 1, and connect them as indicated by the dotted lines.

Make a little standard of some stiff brass. The dimensions are given on fig. 2. Punch little holes as shown in 2 a.

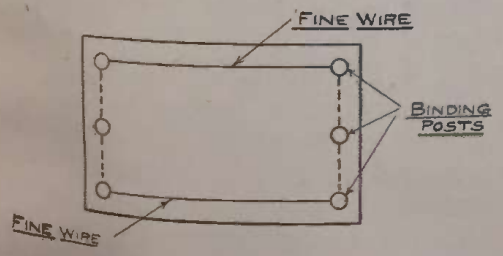


-FIG. 2- -FIG. 2b- -FIG. 2d-

M.E.

The little hole at a in fig. 2 should admit a pin through, but not the head. On a pin place a rubber from a pencil as shown in 2b, first slipping the pin through the hole a.

Make a pointer from a piece of aluminum wire and twist it around the rub-



M.E. -FIG. 3-

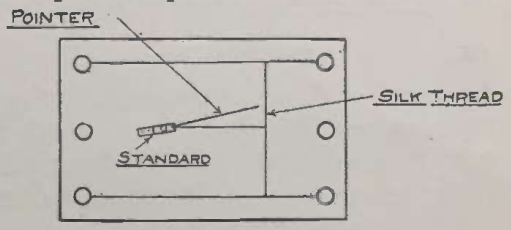
ber and leave a piece projecting on the other end as shown in 2d.

Take a piece of white paper and make a scale by marking 1, 2, 3, etc., on it.

We have most of the parts now, and we must assemble them. Take a piece of No. 40 or 38 copper wire, which is to be used up to ¼ K. W. and put it in the binding posts near the edge of the base, as shown in fig. 3.

Mount the standard five inches from one end, and punch a hole in the base where the pin rests so as to make a bearing. Three inches from one end, that is, two inches from the standard, to the right of it, tie a silk thread to the wires, taking care not to break them. Diagram given below.

Tie a piece of silk thread around the rubber on the pin two or three times, and splice it to the other silk thread, so that the pointer points to 0 on the scale.

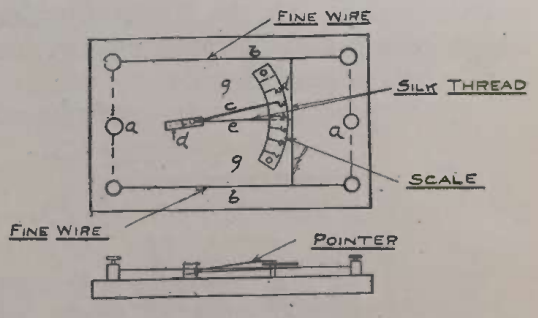


-FIG. 4-

M.E.

The ammeter complete is shown in fig. 5.

a—posts to which aerial is attached.
b—fine wires.
c—pointer.
d—standard.
e—silk thread.



M.E. -FIG. 5-

f—silk thread.
g—pins to keep pointer on scale.

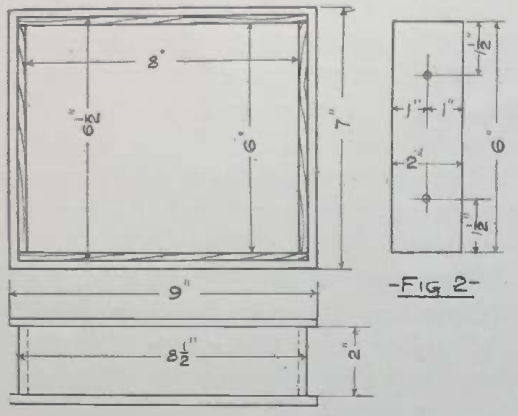
The working of it is as follows: The alternating current p enters the posts a and expands the wires b which moves the silk thread in b, which in turn loosens the silk thread e which holds the pointer on zero, causing the pointer to come down.

It should be in a vertical position, and meter should be connected in series with the aerial through the posts in the center of the base.

The Construction of a Sending Condenser

By Frederick Re Qua.

Some time ago I had trouble with my wireless sending set. I found that this was mostly due to my Leyden jar condensers, and so constructed the glass plate set; which gave such good results that I decided to give a description of it to the readers of Modern Electrics.



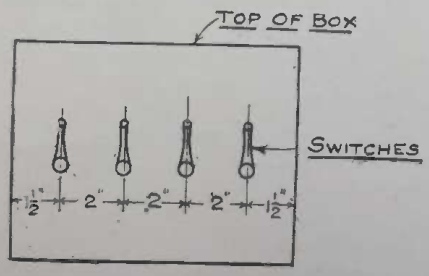
M.E. -Fig. 1-

-Fig. 2-

First make the box; this is of oak or other hard wood with inside dimensions of 2x6x8 inches. To add to its looks it is well to make the top and bottom project over a quarter inch on all sides. The dimensions of the box are: Top and bottom 7x9x¼ inches; two sides 2x8½x¼ inches, and two ends 2x6x¼ inches (Fig. 1).

The holes for the binding posts are bored in one of the ends equidistant from the top and bottom and 1½ inches from each edge (Fig. 2).

Four one-point switches are placed on the top; as these vary somewhat in the length of the arm, no special dimensions can be given, but they had better be placed in the center of the space; the two end switches being 1½ inches from the edges and the two remaining ones two inches apart and two inches from the end ones as seen in Fig. 3.

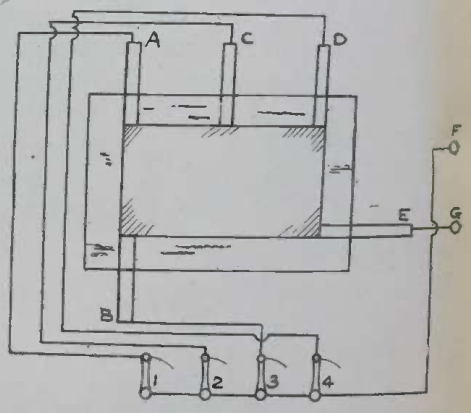


M.E. -Fig. 3-

The box is now ready to be assembled; this may be done with small brads or glue as it suits the convenience of the maker. The top had best be put on with small screws to facilitate examination of the interior.

We are now ready for the glass plates. These may be procured of almost any photographer for a small sum (13 plates are needed). They should be thoroughly washed in hot water until all traces of dirt, chemicals, etc., are removed and the glass is perfectly clear; then get enough thick heavy tinfoil to make eleven pieces 4½x2½ inches, one piece 2x3 inches and twelve pieces 1x5 inches for lugs.

With a little shellac fasten a piece of tinfoil in the center and on one side only of each of the twelve plates, being careful not to get any of the shellac on the upper side of the tinfoil. We are now ready to assemble the condenser itself. First lay a plate, with one of the larger pieces of tinfoil on it, on a flat surface and at E Fig. 4 bring out a lug. Plate 2 has a lug at D; plate 3 at E; plate 4, the one with the 2x3-inch piece of tinfoil, has its lug at D; 5 at E; 6 at D; 7 at E; 8 at C; 9 at E; 10 at B; 11 at E and 12 at A. Connect all E lugs together. After putting the plates in the box, just as they are assembled, put the empty one, with no tinfoil, on top. Connect the wire from lug E to binding post G. Lead wires up from post F and lugs A, B, C, D, then fill the box with melted paraffine. With a knife or stamp, number the switches 1-2-2-5 respectively, connecting the levers of all of them



M.E. -Fig. 4-

(Continued on Page 503)

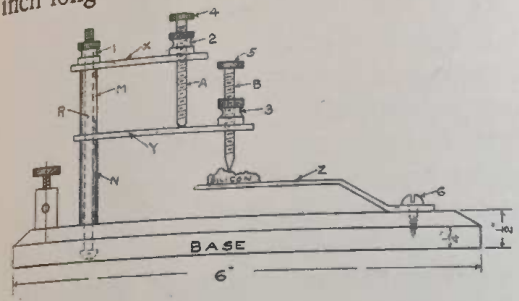
How to Make An Improved Silicon Detector

By CHARLES W. GALE.

Materials.

One 8-32 screw, five inches long.

Two pieces of brass tubing, 1 x 3/4 inch long and of 1/8 inch inner diameter.



-FIG. 1-

Seven and one-half inches of sheet spring brass 1/2 inch wide and 1/16 inch or 1/32 inch thick.

Three battery binding post caps.

One small screw.

Two 8-32 nuts.

Wood base 3 1/2 x 6 x 1/2 inches.

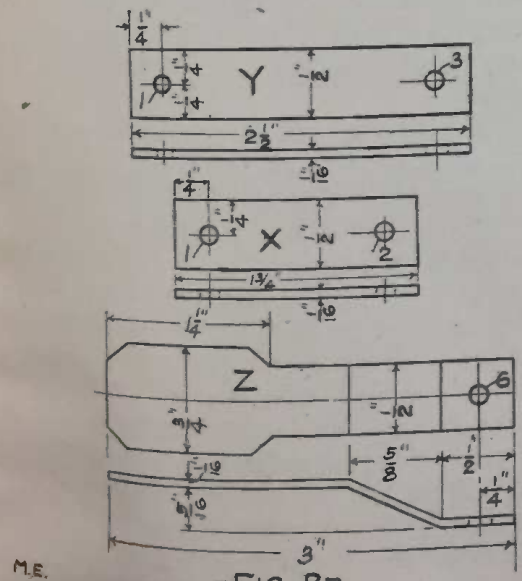
Two (any style) binding posts.

Eight inches No. 18 copper wire.

One small piece of fused sillicon.

Instructions, Etc.

Cut the five-inch screw into three pieces, 2 1/2 inches, 1 1/4 inches, and 1 1/4 inches, respectively. Cut the spring sheet brass into 3 pieces of 3 inches, 2 1/2 inches, and 1 3/4 inches, respectively, and neatly bend the 3-inch

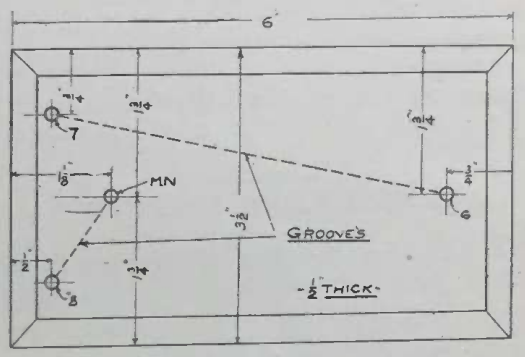


-FIG. 2-

piece as shown in part I of diagram. Next make a wooden base 5x3 1/2x1/2 inches and bevel it, then drill holes 6, 7, 8 and M-N (Fig. III.), each hole being a trifle less than 1/8 inch diameter. Now, taking the two 1 1/4-inch lengths of the 5-inch screw, file one round (A, Fig. I) and the other to a fairly sharp point (B, Fig. I). Then screw nuts 4 and 5 on screws A and B, respectively and solder neatly.

In the 3 pieces of sheet brass drill the holes as shown in X, Y and Z and Fig. II, each hole being 1/8 inch in diameter.

After arranging a countersink at M-N, force R through as shown in Fig. I, then drop on the 1-inch length of brass tubing N. Immediately above No. 2 and 3 of X and Y, respectively, solder binding post caps 2 and 3 of Fig. I. Now place



-FIG. 3-

piece Y on R, resting it on N, and slip on the 3/4-inch piece of brass tubing M. Place X as shown in Fig. 1 and screw cap 1 down very tightly. Next screw Z to hole No. 6 on base and after screwing in binding posts 7 and 8, Fig. 3, wire as shown in Fig. 3. Now insert your screws A and B and place a piece of silicon with a smooth surface toward Z, as shown in Fig. I.

Operation.

The detector is now complete. To operate screw B down until it comes within about 1/32 inch of the silicon, then do all further adjusting by A, i. e., by turning nut 4 until the sound in the telephone receivers is quite clear. It is easily seen this detector may be adjusted to the 1/10,000 part of an inch and is thereby capable of doing delicate work without it being delicate itself.

A HERO OF THE TELEGRAPH KEY.

(Continued from Page 461)

tumbled on to the wrecking train, followed by the hospital train with doctors and nurses. But Shaley was gone when they came.

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Vol. II. JANUARY, 1910 No. 10

EDITORIALS.

The long threatened wireless bill has made its appearance at last.

The resolution, as introduced by Representative Roberts of Massachusetts, is reprinted in detail on the following page and should be carefully read by every one who has wireless progress at heart. Personally, the Editor believes that there is no need of a wireless telegraph board.

It is of no practical value whatsoever, un-American, and will keep down the progress of a young and useful art, which in time may develop into an as yet undreamed-of asset of the nations' power.

Wireless telegraphy and telephony, in a country of such vast distances as America is a very valuable means for cheap transmission of intelligence, and it is the duty of the Government to encourage it, and not to pass a resolution to throttle it like England and Germany have done, in which two countries the art is almost unknown.

It would be deplorable indeed to see Representative Roberts' resolution passed. The farmer, who three years hence will be in a position to own his wireless telephone to call up his next neighbor fifty miles distant from him, will much rather install his private wireless 'phone, than be forced to subscribe to an exorbitant rent of an instrument owned and controlled by the United Wireless Company or some other wireless trust, to which trusts such a resolution would give full swing to extort high rates.

At first sight Representative Roberts' resolution appears very tame and gentle, but men acquainted with modern methods at Washington know full well what the "recommendations (!) to Congress" mean, with the big wireless interests dictating the "recommendations."

Despite the present telephone interests the farmer is allowed to put up his personal telephone line from his house to that of his neighbor's. If the national wireless board comes into power, the same farmer would undoubtedly not be allowed to operate a private wireless telephone between his and his neighbor's house.

As far as wireless telegraphy is concerned, it is ridiculous to maintain now that the amateur can interfere with the business of commercial stations.

With the present efficient weeding out tuners, loose couplers, variable condensers, etc., the amateur can no more interfere with the commercial or government stations than the transatlantic liners—equipped with powerful apparatus—can interfere with the messages flashed from coast to coast.

The trouble is, that the majority of commercial and government stations have antiquated instruments, and do not care to acquire new ones. Their operators are almost entirely wire telegraph men who have not the slightest idea of wireless, nor are they interested in it. The Editor, who is personally acquainted with over twentyfive such operators was amazed to find that not four of them could draw a diagram how their instruments were connected up.

All their shortcomings are blamed on the innocent amateur, whose weak spark cannot be heard half a mile, as a rule, and the manager of the station of course takes the word of the operator every time.

There are to-day over sixty thousand experimental and amateur wireless stations in the United States alone.

That means that over sixty thousand young aspiring men stay at home evenings, enjoying an innocent sport, instead of dissipating outside in a questionable pastime.

We have as yet to find the father who objects to his son's "wireless." He knows it keeps the boy at home, away from mischief.

The Editor sounds a general call, and asks everyone to whom wireless is at heart, to send him at once a letter of protest against the wireless resolution. State in your letter, before all, the UTILITY of your wireless. These letters, in mass, will be presented in Washington, to the proper officials.

All letters must be received not later than January 25th. Act at once!

National Wireless Telegraph Board Proposed.

Representative Roberts, of Massachusetts, has introduced a resolution in the House at Washington providing for the creation of a wireless telegraph board. Mr. Roberts said that there is the greatest need for such control, as he has information from the Navy Department, the revenue cutter service and the commercial wireless companies that the effect of the activities of amateur operators has been such as not only to make necessary a change from "C Q D" as the distress signal, but to interfere seriously with the operations of all Governmental and private services. As a result of these reports, Mr. Roberts, who is a member of the House Committee on Naval Affairs, considers it high time to take cognizance of the situation.

The perfection of wireless apparatus has reached such a stage, he said, that if the service is to be permitted to grow unchecked it is absolutely essential that the Government take steps in the matter. The simplest solution of the matter lies in the passage of the resolution presented, or a measure of similar character, placing in the hands of a wireless board the control of wireless plants afloat and ashore. It has been brought to his attention in an official way that the wireless service of the navy has been rendered practically useless at times by amateur operators, who send meaningless and oftentimes vile and unmentionable language through the air from their instruments.

Mr. Roberts' resolution authorizes the appointment of a board of seven members, "one expert each from the War, Navy and Treasury departments, three experts representing the commercial wireless-telegraph and wireless-telephone interests, and one scientist well versed in the art of electric wave telegraphy and telephony."

The duties of the board, according to the resolution, shall be "to prepare a comprehensive system of regulations to govern the operation of all wireless plants afloat and ashore which come under the cognizance of the United States, with due regard alike for Government and commercial interests."

It is provided that within 30 days of the organization of the board it shall submit its report and recommendations to Congress. To defray the expenses of the board $2,000 is appropriated.

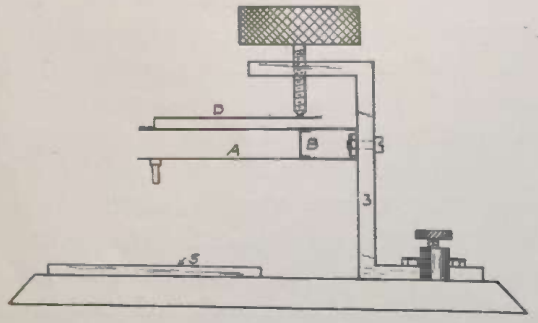
W. A. O. A.

The Wireless Association of America was founded solely to advance wireless. IT IS NOT A MONEY MAKING ORGANIZATION. Congress threatens to pass a law to license all wireless stations. The W. A. O. A. already has over 3,000 members—the largest wireless organization in the world. When the time for action arrives, the thousands of members will exert a powerful pressure to oppose the "wireless license" bill. This is *one* of the purposes of the W. A. O. A. There are more.

How to Make A Universal Detector

By E. R. WILLARD.

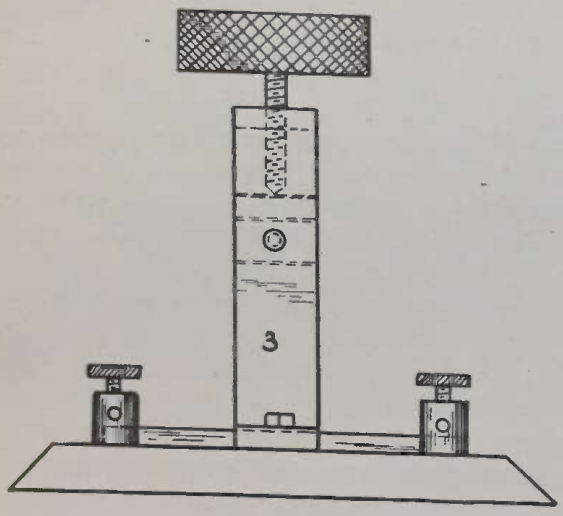
Most experimenters wish to make their own detectors but are at a loss as to what



-FIG. 1-

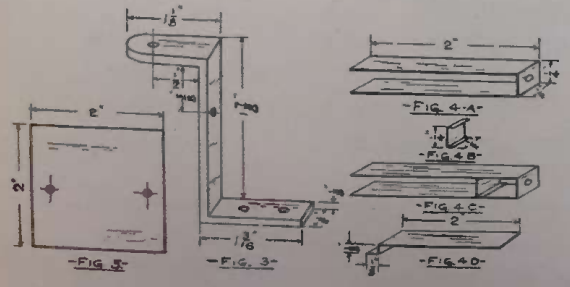
kind they should make and the proper size of the various parts.

I shall try to explain to those of the unknowing class a simple way in which one can make a universal detector.

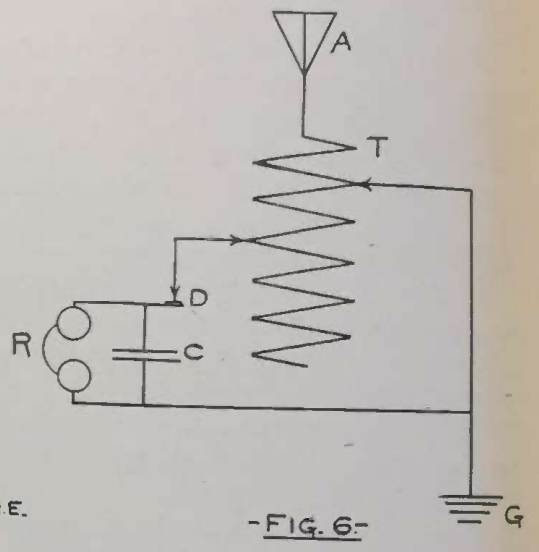


-FIG. 2-

Figs. 1 and 2 show the side and end views of the finished detector. Fig. 3 shows the upright support, which may be made in two ways: either by taking a piece of strip brass 4 x 1/2 x 1/32

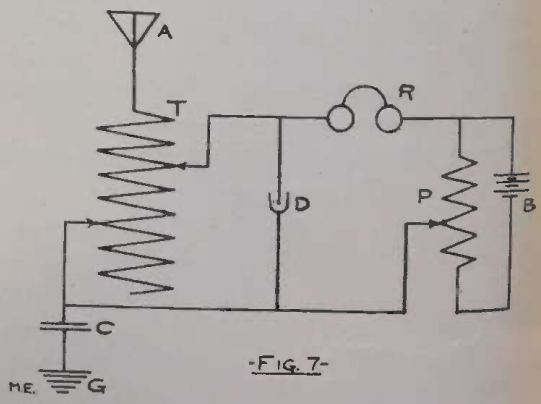


inches and bending it as shown in Fig. 3, or by first making a wooden model, then by use of the model make a plaster of Paris and asbestos mould; and casting it of aluminum. The latter way I consider the best, for it gives a neater appearance After the stand has been shaped, drill the four holes as shown and thread the one in the top for an 8-32 brass screw.



-FIG. 6-

Now procure a piece of spring brass, gauge No. 22, 1/2 x 7 inches long. Cut off a piece 4 1/4 inches long, bend and drill as shown in Fig. 4A; also cut a piece 5/8 inch long and bend as shown in Fig. 4B; solder this last piece to the other as shown in Fig. 4C. Bend the piece that is left as shown in Fig. 4D, and solder to



-FIG. 7-

the other piece as shown in Fig. 1; a small pin chuck is soldered to the spring just under the joint where the last piece was soldered.

Now cut and drill a piece of sheet copper as shown in Fig. 5.

The thumb screw can be made from an old typewriter roller knob with a screw imbedded in it having threads to fit the hole bored in the top of the stand.

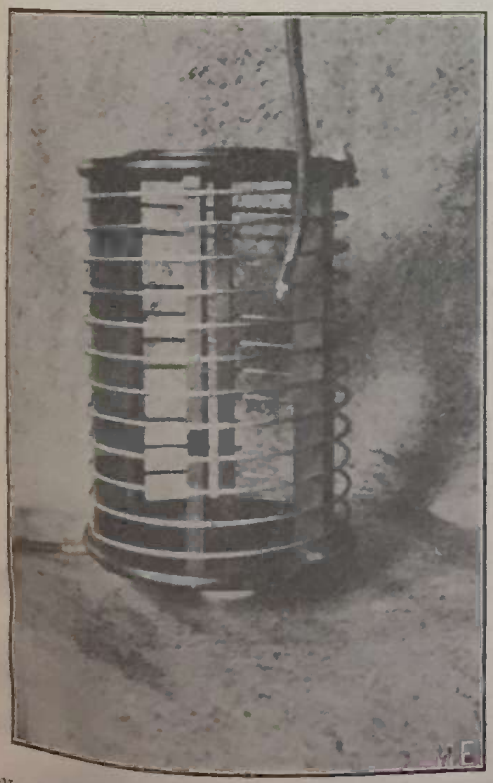
A base may be made according to the experimenter's wishes, but if made of hard rubber as shown in Figs. 1 and 2 the looks as well as the practicability of the instrument will be greatly improved. Figs. 1 and 2 show clearly the way in which the detector should be put together, therefore there is no explanation needed except that one of the binding posts should be connected to the stand and the other to the copper plate which is either screwed or bolted to the base.

This instrument may be used for either a mineral or an electrolytic detector; the latter by placing a non-porous carbon cup upon the plate and inserting the platinum wire into the pin chuck instead of a pin which is used for minerals. If connected as shown in Figs. 6 and 7, very good results may be obtained.

A UNIQUE TRANSMITTING HELIX FOR WIRELESS SIGNALLING.

By FRANK C. PERKINS.

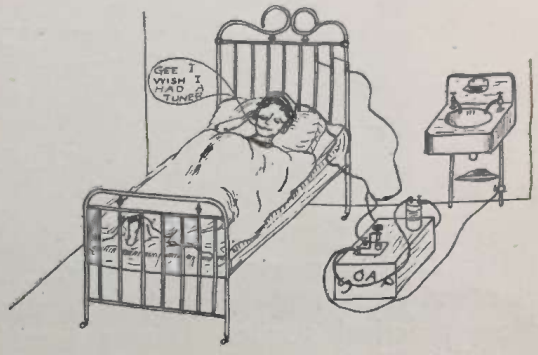
The accompanying illustration shows the simple construction of a transmitting helix for wireless telegraph and telephone service which can easily be made



by any student in wireless signaling. The woodwork is of highly finished hard wood which should be well seasoned and dried. The convolutions are of solid aluminum wire and all the metal parts may be readily nickeled and polished, making an instrument of handsome appearance. A transmitting helix of 1/2 kilowatt capacity should be wound with No. 10 wire, while the No. 6 wire should be utilized for an instrument of three kilowatts capacity. A dozen turns being employed as indicated in the illustration. The aluminum wire can be purchased read bent from firms handling aluminum wire.

BRASS BED AS AERIAL.

At first glance it seems ridiculous that a brass bed could be used to receive wireless messages, but nevetheless it is true.



A moment's reflection reveals that a brass (or any metal bed) has a large metallic surface, thereby giving quite a great capacity, necessary for any aerial.

The Editor convinced himself that, if the frame and steel bed spring are in good metallic connection, messages can be caught from large stations 20 to 30 miles away.

Especially good results were obtained when the bed was in the highest story of a 6-story house, thereby giving the "bed aerial" a good elevation.

A gas range and the metal frame of a piano were also used with good success, also a metal bathtub, but best results were obtained with a steam radiator —pipe system.

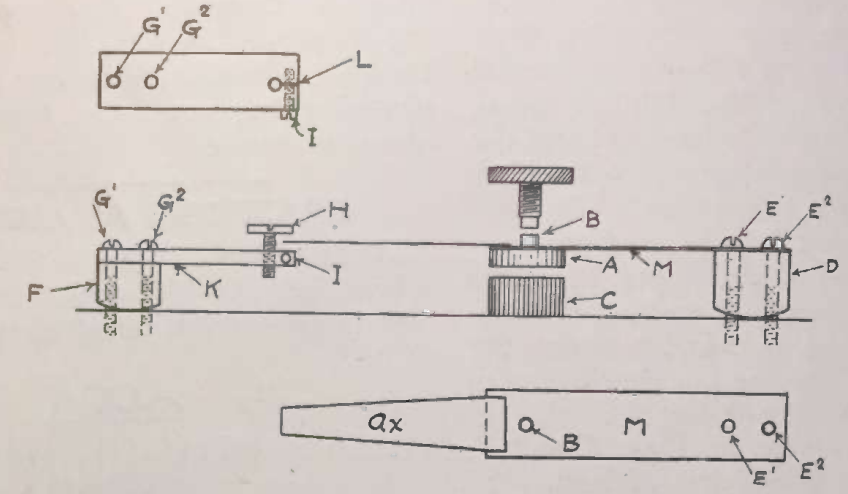
We are living in a curious world. Years ago our fathers scolded us when reading in bed. Now the young stay in bed and send and receive messages to and from their friends a few blocks away—and fall asleep with the phones on their ears!

HAVE YOU A NEW IDEA?

If so, have it published in next month's "Experimental Department" of Modern Electrics. It's going to be tremendously interesting. Try and be one of the first ones in it.

How To Build An Efficient Vibrator

By "A. S. N."

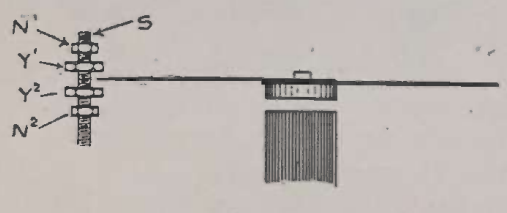


M.E.

-FIG. 1-

After experimenting on coil vibrators for several years, and giving the different devices practical service, I have found that coils will do more than is expected from them if a proper vibrator is used in conjunction with them.

The following description is of a vibrator which has proven to be the most satisfactory and rapid vibrator I have ever used or seen, and has been used by



ME

-FIG. 2-

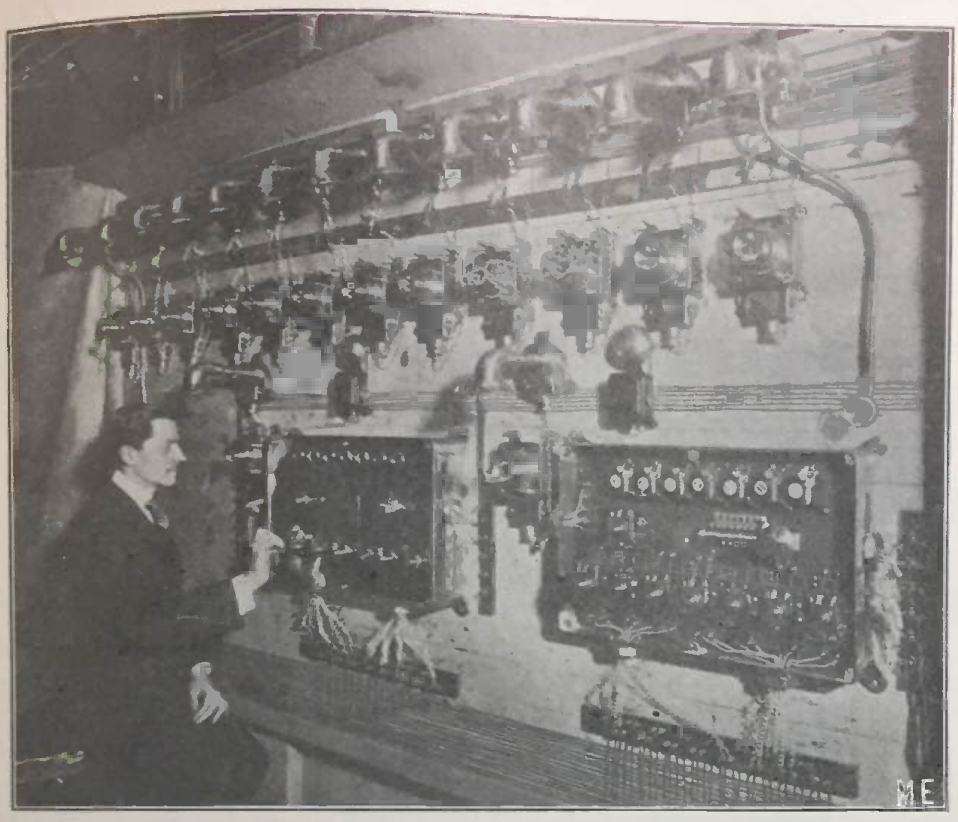
myself and a few of my friends on coils up to 4 inches with the same gratifying results. The object in this construction is to get a rapid hammer blow action both to and away from the contact points. This is done by relieving the main spring M in Fig. 1 of part of the weight of armature A by adding an extra spring Ax at end of spring M, and have means to limit its range which is done by placing the extreme end, between two adjustable, solid contacts shown at H and K. When K is so adjusted (at the block F to which it is fastened) by means of adjusting screws G1, G2, armature A is drawn slightly away from core at C. After main spring M has been adjusted the proper distance from C by means of block D (which is fastened solid to M) and adjusting screws E1 and E2, screw H should then be set so distance between under side of its head and K is slightly more than the thickness of the spring Ax. K should be slotted as shown by L and tapped out for a lock screw I to prevent screw H from working out of adjustment.

A simpler arrangement is shown in Fig. 2, and in which the results are about the same. Although it must be said it is harder and rather inconvenient for quick adjusting.

The springs of this arrangement are the same as in Fig. 1. S shows a screw or threaded brass rod set in head of the coil and on which are two nuts, Y1 and Y2, corresponding to H and K in Fig. 1. N1 and N2 are lock nuts for nuts Y1 and Y2. For above vibrators the electrical connections are the same as the ordinary vibrator. The additional parts being for mechanical action.

A little experimenting will soon enable one to quickly adjust the above vibrators without any trouble, which when properly done, will be found very adaptable for wireless work. Fig. 2 is to be adjusted in same manner as Fig. 1. As so much depends on the springs, especially spring Ax, which must be stiff and light, it would be useless to try to give further directions for adjusting.

New Loud Speaking Telephone



Set of 12 Loud Speakers on French Battleship

We illustrate the arrangement which has been adopted by the Ducretet firm of Paris for mounting its type of loud-speaking telephone on shipboard. In the present view we represent the central post installed on the battleship Vérité of

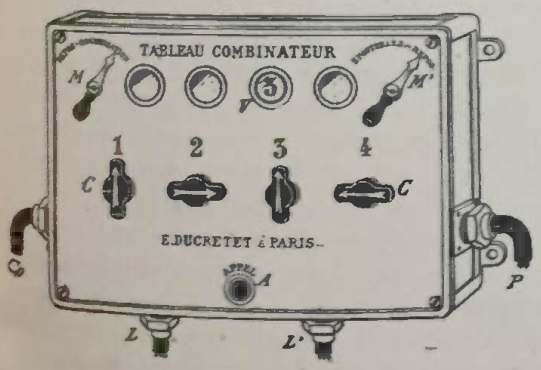


Fig. 1

the French fleet. Orders can be very well transmitted to the engine room, the artillery and different parts of the vessel without obliging the men to leave their post. The microphone transmitter can be used with six receivers at the same time and these may be located at different points in the vessel, so that the orders are transmitted to all these points at the same time. The central post on shipboard uses a special type of connecting board which suppresses the use of jacks and cords and all the apparatus is enclosed in a tight metal case so as not to be affected by moisture. The maneuver is very simple, and to bring any two posts into connection with each other, the operator has only to turn the handles of the switches C, Fig. 1, in the direction facing each other, or in other cases to use the indicators MM'. If the same order is to be sent to several posts from the officer's post, we turn all the handles to the left in the direction of the indicator M. Any of the posts can be used as a central post by first obtaining the proper connection, so that the officer can send orders from any point. A drop-shutter board and electric bell, seen on the right, serves to give the indications to the central post.

Fig. 3 shows a loud-speaking desk

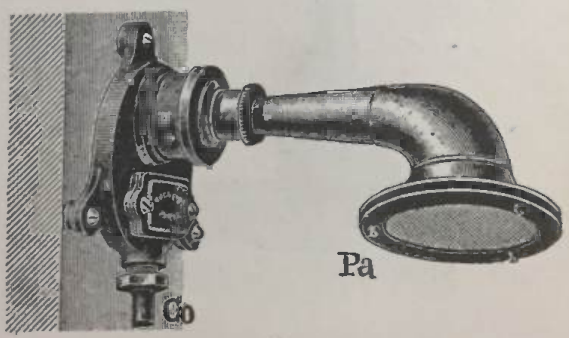


Fig. 5.

'phone for office and factory use. When speaking into transmitter the lever L is

depressed which puts transmitter M and loud-speaker Pa in circuit. At the other

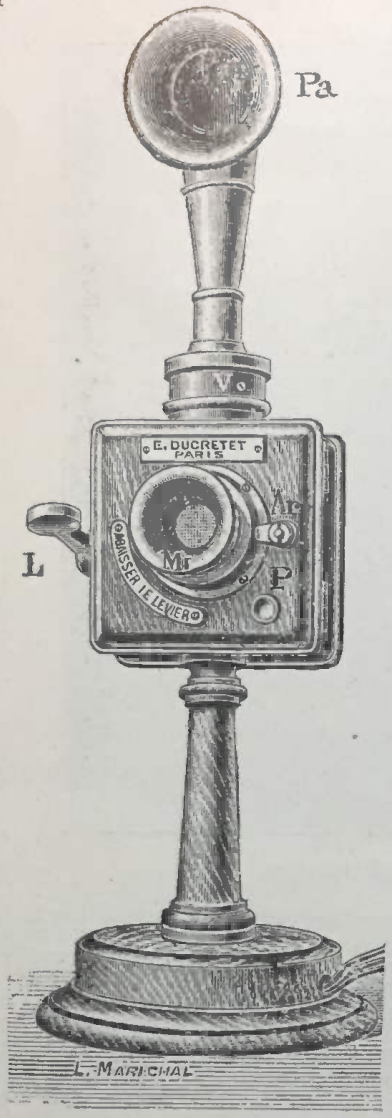


Fig. 3.

station a similar instrument is stationed. When speaking medium loud in transmitter M at station one, the voice is heard

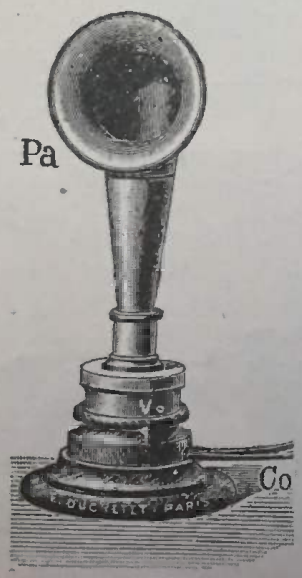


Fig 4.

clearly and distinctly through Pa over a radius of 50 feet. The articulation is perfect and the phonograph-like grating, so often heard in other loud-speakers, is entirely overcome in this instrument.

Fig. 4 shows the loud-speaker as installed in hotel kitchens, factories, ships, etc. It is used to give orders which are plainly heard in even large establishments.

Fig. 5 shows a waterproof loud-speaker used in mines, in the open and damp or wet places.

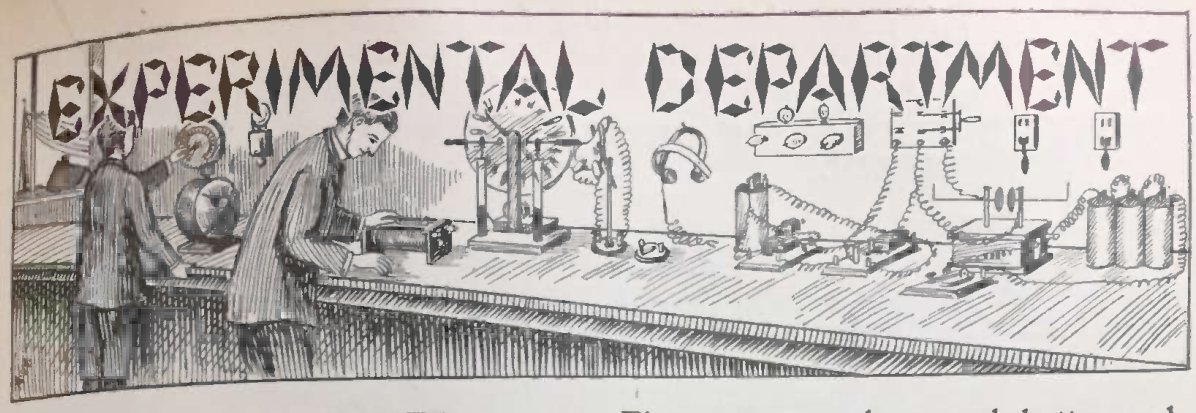
HEN WIRELESS EFFECTIVE.

Having been troubled for some time by his neighbor's chickens, which persisted in scratching up his garden, a Winstead, Conn., man adopted a new method of getting rid of his troubles. He bored holes through several kernels of corn and to each kernel tied a string with a tag bearing the words "Keep this chicken at home." The chickens swallowed the corn but the tags were too big to go down, and when they went home they carried the wireless message to their owner. The Winstead man says his wireless system of communication has been more successful than all the letters of warning his lawyer had written.—*"Aerogram."*

New Wireless Bill.

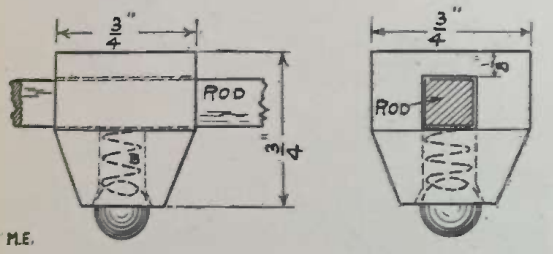
Mr. Peters introduced the following wireless bill on December 6th, prescribing penalties for interference with official wireless messages:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that it shall be a punishable offense (a) to originate or transmit a false wireless message purporting to be official; (b) to emit or radiate electro-magnetic waves of lengths between three hundred and seventy-five meters and four hundred and twenty-five meters in wireless telegraphy except when communicating with an official wireless station. Any person committing the first above-mentioned offense shall, for each offense, be punished by a fine not exceeding two thousand dollars or by imprisonment not exceeding one year, or both. Any person committing the second offense shall be punished for each offense by a fine not exceeding one hundred dollars, and for a willful commission the second offense shall be punished by a fine of not exceeding two thousand dollars or by imprisonment not exceeding one year, or both."



TUNING COIL SLIDER.

In the last number of your magazine you ask for easy ways to do hard things. I had always had trouble making slides for tuning coils until I thought of this way. I take a little block of soft wood about 3/4 of an inch square, and make a hole through it the size of the rod it is to slide upon near the top, as per illustration.



M.E.

I then drill another hole up through the block to meet the first hole (B). This second hole is large enough to permit a spiral spring to lie in it and is widened at the bottom to admit a ball of steel or iron. This ball makes connection with the rod through the spiral spring and is pushed against the wires by it. The block is tapered toward the bottom and sandpapered.

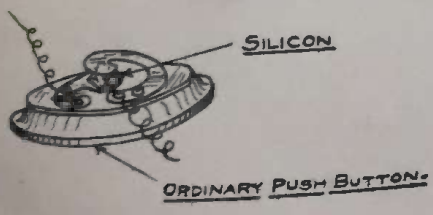
This makes an excellent slider, moving easily and the wood prevents grounding through the body.

Contributed by EDWARD N. HORR.

A SIMPLE DETECTOR.

By CLYDE SMITH.

This detector will be found very useful and inexpensive to the average amateur, as it will work from fifty to one hundred miles.



M.E.

First procure a cheap push button and unscrew the top, then adjust the contacts to fit the silicon or any other substance that you wish to use.

To adjust silicon move between contacts till the message can be heard loud and clear.

This detector is very useful and can be screwed down to your table with one or two wood screws and with your other receiving instruments connected up the message may be heard quite plain. If not, tune until it becomes plain enough to suit you.

A NOVEL DISCHARGE EFFECT.

While experimenting the other night,

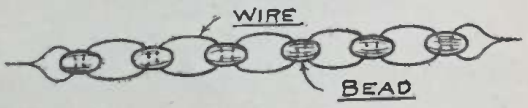


FIG. 1.

M.E.

I found the following a very pretty luminous effect:

First, obtain a number of small glass beads, all colors, with very fine holes in them, and connect them up as shown in figure No. 1.

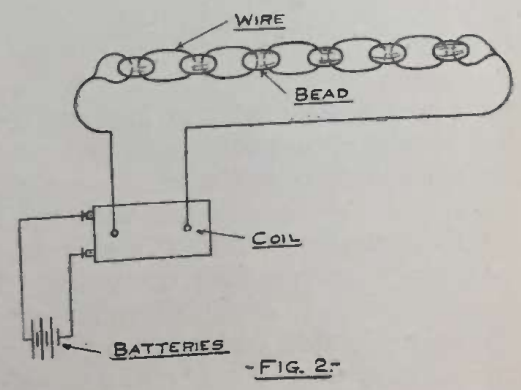


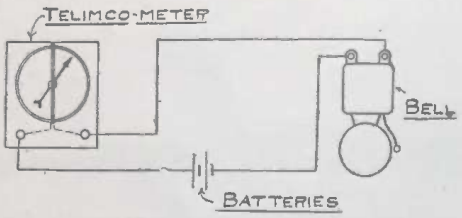
FIG. 2.

M.E.

Connect the beads as shown in Fig. 2, and start the coil. The spark will jump at every gap in the beads and will show

up very pretty at night. Of course the bigger the coil the longer can be the chain of beads. FRANK X. KEILING, JR.

REVOLVING GALVANOMETER NEEDLE.



M.E.

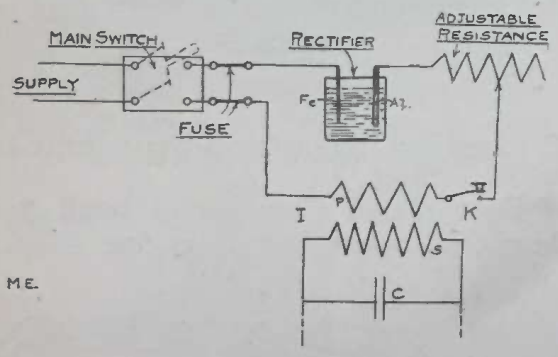
It is not long since I bought a "Telimcometer" (low resistance galvanometer).

I connected one pole of the batteries to one of the binding posts of the "Telimcometer" and the other binding post of the instrument to one of the binding posts of a bell. The other binding post of the bell I connected to the remaining pole of the batteries. By regulating the make and break contact screw of the bell, I made the needle of the "Telimcometer" rotate. The bell will make and break the current very regularly so that the needle rotates continuously.

Contributed by RALPH TARSHIS.

A SIMPLE RECTIFIER.

No doubt there are amateurs, like myself, who are not allowed to use the lighting mains at night, on account of putting



M.E.

too heavy an inductance load on them, thus almost extinguishing the lights in his house, as well as in that of his neighbor, if not making them flicker with the key.

To avoid this, I find it convenient to use a single cell rectifier, consisting of an aluminum rod, 1/2 inch diameter, and of convenient length, and an iron plate, convenient size, in a jar, containing sodium bicarbonate, one pound to the half-gallon, or even stronger, and a suitable resistance, preferably an adjustable choke coil; these in series with the transformer entirely eliminate the inductance trouble. It also gives a much better spark at gap. Coils may be worked with extreme satisfaction this way.

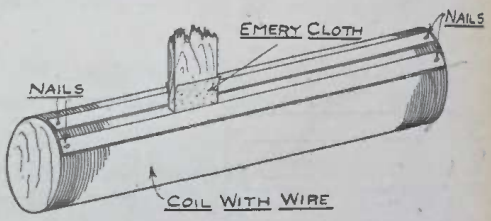
Contributed by K. EDGAR STARK.

Anderson's Bay, New Zealand, Australia.

TUNING COIL HINTS.

In making a tuning coil some time ago, a strip of bare wire 1/2 inch wide and 16 inches long was needed for contact with the slider. Instead of using a knife to scrape away the insulation I used the following plan:

First, two laths were nailed on one side of the coil so as to make the space between them 1/2 inch wide and 16 inches long. Then I used a block of wood 5 inches long, 3 inches wide, and 1/2 inch thick. I had glued some coarse emery paper on the side of the block 1/2 inch wide and 5 inches long; then this block

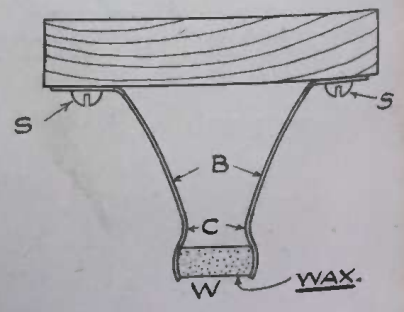


was rubbed up and down the groove made by the laths until the insulation had been scraped away by the emery paper. The laths were then removed and the result was very satisfactory.

Contributed by ARY ARMONA.

AN ELECTRIC FIRE ALARM.

The accompanying sketch shows how to make an electric fire alarm. Take a block of wood 2 inches long, 1 inch wide and 3/4 inch thick, fasten to this two strips of brass (B) 1/2 x 3 1/2 inches, bent as shown in sketch. These strips should be bent so they will press tightly against each other. The screw (S) can be used to connect the wires



M.E.

and also to hold the brass strips. A piece of tallow (W) or a piece of beeswax is now inserted between the two strips of brass to keep them apart to form the in-

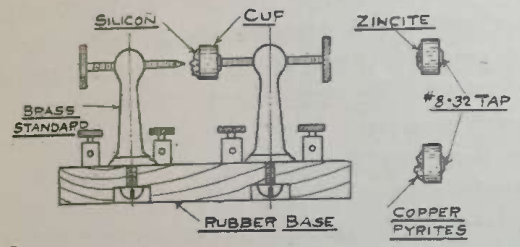
sulation. When the wax is melted by the heat of the fire it will close the circuit at (C). This can be placed on the wall or ceiling but never in an upright position, as when the wax melts it will fall on the contact (C), and take some time to form a circuit.

Contributed by

ANDREW G. THOME.

COMBINATION DETECTOR.

I wish to call your attention to a combination detector of which I have a working model. It gives excellent results. There is nothing new in the detector, only the way it is arranged. Below please find a drawing of it.



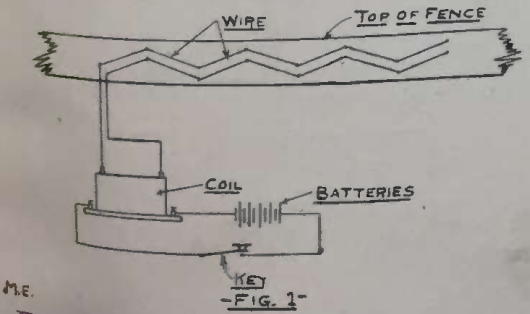
M.E.

It may be seen that either perikon, silicon, (with point) or carborundum, (with flat surface) detectors, may be used, changing from one to another in a few seconds by turning standard around which gives us flat surface.

Contributed by LEWIS C. YUMFORD,

THE "CAT TICKLER."

For some time I was greatly annoyed at night by the crying of cats on the back fence, but since I perfected my "Cat Tickler," as I call it, they have given my fence a wide berth. As the experiment also affords a great deal of amusement, for the cats do acrobatic stunts, I thought the readers of MODERN ELECTRICS would like to try it.

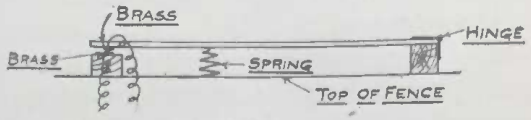


M.E. -FIG. 1-

First, wire any length of your fence as per diagram, with bare wire, tacking it at the corners with ordinary tacks, spacing the wires sufficiently to prevent the spark from jumping (fig. 1).

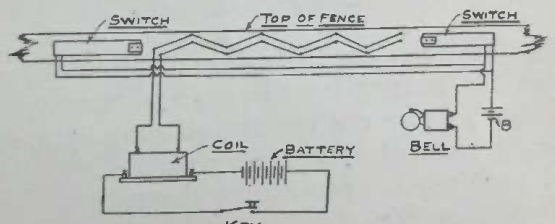
Run the ends of the wire to the secondary of your spark coil. Connect up the primary in the ordinary way, in series with battery and key. That is all. When you see a cat on the fence, press the key and the cat will do the rest. The shock is not sufficient to kill the animal on account of the poor insulation.

If any one has an impatient disposition, he may do away with his watch-



M.E. -FIG. 2-

ing, and construct a switch that will announce the arrival of his victim. Get two pieces of hard wood a foot long and two inches wide, four blocks of wood two inches long and an inch square, an old bed spring and some scraps of sheet brass (fig. 2). This is sufficient material for two switches, one for each end of the fence. As both are made in the same manner, I will describe one only. Nail the two blocks on the top of the fence 10 inches apart. Tack a piece of the sheet brass, two inches by three-quarters, on the top of



M.E. -FIG. 3-

one block. Cut the bed spring in half, and using one piece for each switch, nail it midway between the blocks. Now take the one foot length of board and fasten it, by means of a hinge, on the other block. Having made the other switch in like manner. Connect them in parallel, and connect up a bell and battery in series with them (fig. 3).

Now when the cat steps on the board, the brass pieces come in contact with each other and the bell rings. Then press the key, and the cat will be shocked.

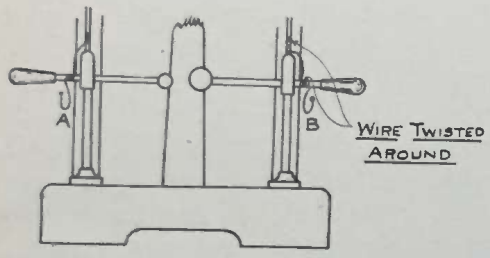
Contributed by Robert C. Skelly.

STATIC EXPERIMENTAL APPARATUS.

The following apparatus can be used with the static machine described in the July issue.

Fig. 1, A and B are hooks which are very handy for charging Leyden jars and holding other apparatus. They are pieces of wire (about No. 18) twisted two or three times around the rod which comes from the collectors and two or three times around the spark rods. The end should either have a ball on it or else be bent in a circle as shown. The hook should be about 1/4 inch across.

Fig. 2 shows a tube which gives a very pretty effect in the dark. It is made of a glass tube about 1/4 inch in diameter, and 6 inches long. Cut a piece of tinfoil 1/8 inch wide and long enough to go the full length of tube when wound in a spiral, each turn being 1 inch apart. Next give the tube a coat of medium thick shellac and wind the tinfoil on as shown. Let this dry twenty-four hours and then with a sharp knife cut the tinfoil into squares, being careful to cut way across the foil at each place. Next give the ends a coat of shellac for about an inch and wind a piece of tinfoil on each end. This tube should just fit the hooks on the static machine and when the machine is in action should light up with small blue sparks. The balls of the machine should be pulled as far apart as they will go.

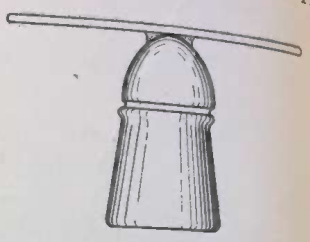


-FIG. 1-

M.E. -FIG. 2-

Test-tubes make very good Leyden jars. Fig. 3 shows a good method of making them. They should be given a coat of shellac on the inside and by means of a round stick about a foot long and 1/4 inch in diameter should be covered with tinfoil for about two-thirds of their length. The bottom can be covered with a round piece quite a little larger than the diameter of the tube. Next give the outside of the tube a coat of shellac and cover with tinfoil for the same height. Take a common stopple that will just fit the tube and cut it off about 1/16 inch above the tube. Give this and the outside of the tube above the tinfoil three or four coats of shellac. The connection to the inside coating is made by a rod of brass or copper about 2 inches longer than the tube and 1/16 inch diameter. At its top end solder a small brass ball 1/4 inch diameter, or bend the end in a circle. This rod should be passed through the stopple in the middle and pushed down until it touches the inside layer at the bottom. To charge the jar lay the rod in one of the hooks of the machine and connect the outside to the other hook with a wire. Two jars may be charged at once by laying the rod of one in one hook and the rod of the other in the other hook and then connecting the outside coatings together. If the spark balls of the machine are not too far apart a large spark will pass between them every time the jars get a sufficient charge. This spark will light gasoline or puncture paper.

-FIG. 3-



-FIG. 4-

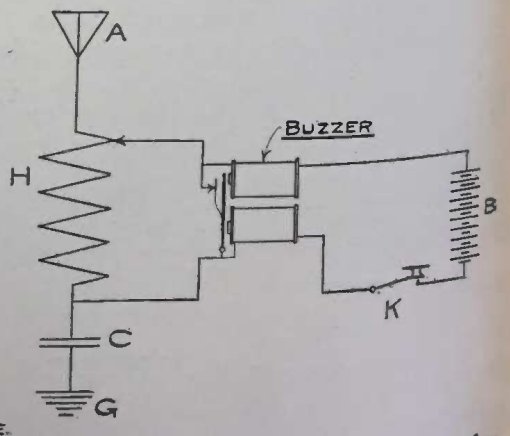
M.E.

Fig. 4 shows an insulating table made of a glass insulator and a piece of plate glass.

Contributed by L. W, DAVIS.

NOVEL WIRELESS.

The above sketch shows a wireless system with which I have transmitted successfully up to about one-half mile by using ten dry batteries on the buzzer. The helix must be adjusted well to get the right results. The condenser C must also be used in the ground.



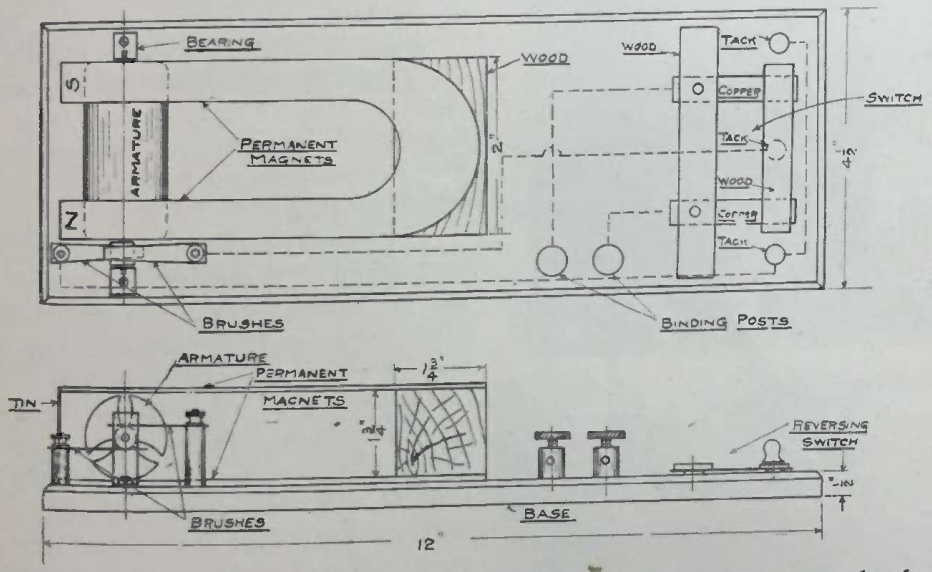
M.E.

Contributed by MAXWELL ALBON.

HOW TO MAKE A HOME-MADE REVERSIBLE MOTOR.

A very simple reversible motor can be made as shown in the illustrations. The things necessary for making the motor are: a piece of wood 12 inches by 4 1/2 inches by 1/2 inch, for the base; two 4-inch horseshoe magnets; a 1 1/2-inch armature (which can be taken from a small battery motor or can be bought for a few cents from any electrical supply house); two binding posts (from old dry batteries); two strips of copper 2 inches long by 1/2 inch wide, for the bearings; a block of wood 2 inches long by 1 3/4 inches wide by 1 3/4 inches thick; a small reverse switch, as shown in the illustration, and a pair of brushes which can be made out of copper.

For the bearings take two pieces of copper 2 inches long by 1/2 inch wide, about 1/2 inch from one end bend it into the shape as shown in the illustration; then about 3/4 inch on each side of the magnet nail the bearings. The hole in the bearing should be about 1/4 inch from the top and should be just big enough so as to let the armature revolve freely. The armature is next put in place, it is put between the bearings. If the top magnet touches the armature bend it up a little. For the brushes get two pieces of copper 2 inches long and 1/2 inch wide on one end and 1/4 inch wide on the other end; about 1/8 of an inch from one end make a small hole. For the brush holders get two small blocks of wood. On one side of the bearings nail a small block of wood about 1/2 inch high by 1/4 inch square; on top of this the brush is nailed.



The first thing we will start to make will be the base. For the base take a piece of wood 12 inches long by 4 1/2 inches wide by 1/2 inch thick; the base should be made of soft wood, to make a nice appearance the edges should be rounded and sand-papered. Next take one of the horseshoe magnets and fasten it near the center of the base with small nails. Then take the block of wood, which should be 2 inches long by 1 3/4 inches wide and 1 3/4 inches thick, and nail to it the horseshoe magnet so that the back end of the magnet will be even with it. Now find out which is the north pole of each of the magnets; the north pole on mostly all magnets is marked by N. Now take the other magnet and nail it on the block of wood so that the north pole of the bottom magnet is just below the north pole of the top magnet.

This brush should be on the bottom side of the commutator. For the other brush holder take a small block of wood about 1 inch high by 1/4 inch square; this should be nailed on the other side of the bearing, on this the other brush is nailed, which should be on top of the commutator. The motor is now complete with the exception of the reverse switch and the wiring. The reverse switch can be made as shown in the illustration. The wiring is shown by the dotted lines. If at first the motor will not run, take a piece of tin about 2 inches long by 1/2 inch wide and put it on the two north poles of the magnets. This motor will run very fast in either direction, if two or three batteries are connected in series and if properly made.

Contributed by WM. DETTMER and MICHAEL SCHLOSSER.

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.

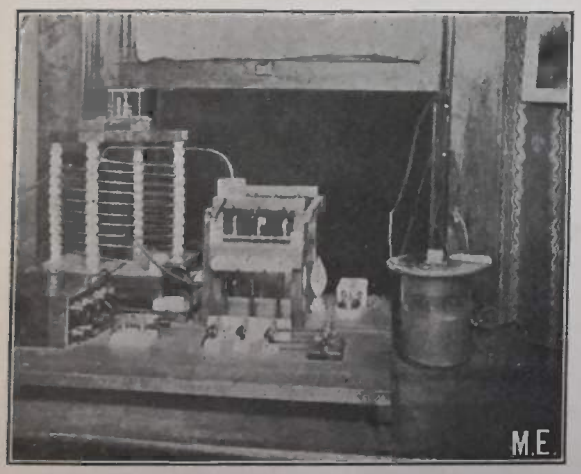
This competition is open freely to all who may desire to compete, without charge or consideration of any kind. Prospective contestants need not be subscribers for (the publication) in order to be entitled to compete for the prizes offered.

FIRST PRIZE. THREE DOLLARS

Herewith are photographs of my wireless station:

The sending side consists of two open core transformers, ¼ K. W., with

primaries and secondaries in series, at left, also my helix, which is of 24 feet, of No. 6 brass wire, supported on small porcelain insulators; spark gap is



mounted on top of helix, which is E. I. Co.'s; sending condenser is seen to right of helix, which consists of three photograph plates 8x10. Electrolytic interrupter to extreme right was made by myself, large battery jar, lead plate, and copper wire inside of a glass tube; the glass tube has a small hole in the bottom, allowing the solution to enter, and good results have been obtained with this simple interrupter. Key is not shown, being mounted to right of sending set.

Receiving side is of E. I. Co.'s product entirely, as can be seen, which is as follows: Large tuning coil, to right of this is variable condenser, in front will be seen a detector stand. The light shown in front of condenser shows that receiving set is in operation, and in front of tuning coil is a fixed condenser; potentiometer is in front of light.

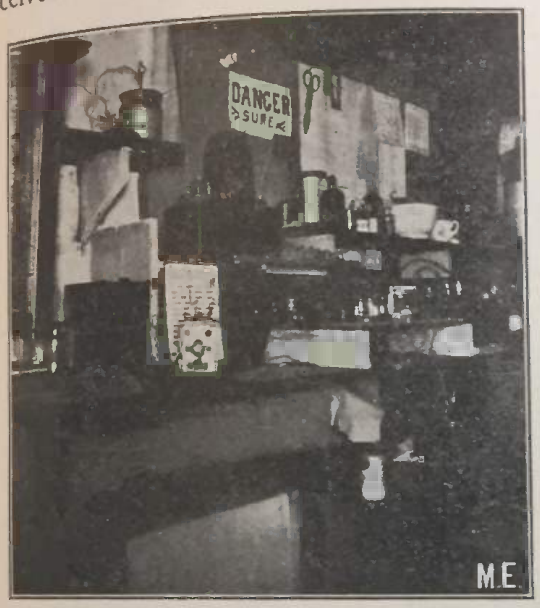
The antenna is as follows: 1400 feet from my station is located a city water tower, which is about 175 feet high, one end of the antenna is fastened to the top of this tower (which is of brick) and two wires separated 3 feet apart run from the tower to my station, as stated before, 1400 feet in length. I have two baby antennæ which start 200 feet from my station and run to main antenna, giving me approximately 3500 feet of number 14 aluminum wire up in the air; the building in which my station is located is but 50 feet high. This is the best station I believe within a radius of 300 miles, as far as the antenna is concerned, even better than Clark's or the United Wireless Telegraph Co. owing of course to the great amount of wire which is up in the air, giving me an immense receiving capacity.

Cleveland, O. C. C. HALL.

HONORABLE MENTION.

Enclosed find flashlight photos of my laboratory. Most of my experimenting is done with the wireless apparatus which was started about three years ago. The receiving is done with five detectors, three of which are shown mounted in the centre of the

picture. The coil is run on the 110 A. C. circuit in connection with the large resistance shown to the left of the picture. The tuning coil rectifier and etc., were made from directions received from MODERN ELECTRICS, as well



as diagrams the connection. I find the auto coherer the best for local work, the electrolytic detector being used only for long distance experimenting.

ANTON HENDERSON.
B. C., Canada. Victoria, B. C.

HONORABLE MENTION.

Enclosed find a photo of my wireless station. At the right may be seen my receiving apparatus; it was constructed by myself with the exception of the telephone receivers (I have a new pair of head receivers since this photo was taken). The receiving apparatus consists of two tuners, one double and one single slide, about 300 meters each, and are wooden cores, 2 3/4 inches by 13 inches, wound with No. 24 D. C. C. wire. Also 3

detectors, carborundum, silicon, and perikon, all made by myself. I have also a rheostat to regulate the battery current and a switch to cut in one, two or three batteries and also a switch to short circuit the detectors when I send and a double pole double throw switch to throw in or cut out the batteries.

My sending outfit consists of a 1-inch spark coil, with which I telegraph to a friend across the river without any trouble, a plate condenser which consists of six 8 x 10 photograph plates. I am constructing a 1/2 K. W. transformer and have just completed the primary windings. I have heard many ships on the ocean, also Atlantic City, A. X.; Manhattan Beach, D. F., and New York, W. A.; Brooklyn Navy Yard, P. T., and Wilmington, Del., D. U., without any trouble excepting the last named, as this one was faint.

I have got most of my helpful hints from MODERN ELECTRICS. I am a member of W. A. O. A. My receiving outfit is wired like the United Wireless system, and although I am within 50 feet of an arc lamp and trolley wire and alternating current wires pass the house, I cannot hear any of them. FRANK MERRITT.

——————— New Jersey.

HONORABLE MENTION.

I enclose herewith photo of my wireless station.

I have been experimenting for about two years with wireless. My outfit comprises the following:

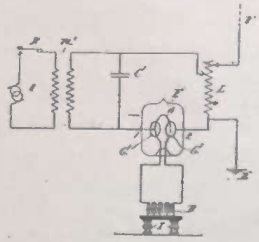
Six different detectors: two of silicon, one carborundum, one molybdenite, one electrolytic and one perikon. Two tuning coils, two thousand-ohm receivers, fixed condenser, make up my receiving. A two-inch coil, set of E. I. Co. adjustable condensers, a helix, and one E. I. Co. key. I have attained much of my success through your widely known magazine, MODERN ELECTRICS.

FRED DAHLEN,
Bronx, New York City.

Electrical Patents for the Month

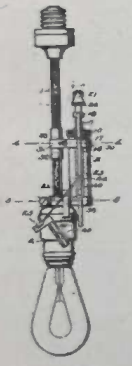
943,969. SPACE TELEGRAPHY. LEE DE FOREST, New York, N. Y., assignor, by mesne assignments, to De Forest Radio Telephone Co., a Corporation of New York. Filed Jan. 29, 1907. Serial No. 354,663.

1. The combination with a source of electrical energy and a circuit including an electrical capacity, of a discharger comprising an evacuated vessel, two electrodes sealed therein, and means maintaining a heated gas in said vessel.

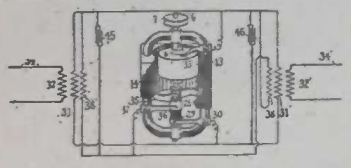


942,623. AUTOMATIC CUT-OFF. PAUL DIXON, Atlanta, Ga. Filed Dec. 20, 1907. Serial No. 407,284.

1. The combination with fluid-conducting means and a cut off therefor, of movable means connected to said cut off and normally stationary when initially set, and automatically controlled means continuously movable when set, said automatically controlled means being set by the movement of said movable means in one direction, and said movable means being operated at a predetermined time by the movement of said automatically controlled means in the opposite direction of movement, substantially as described.

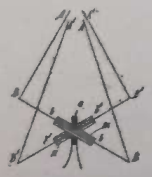


942,685. METHOD OF AND APPARATUS FOR REPEATING TELEPHONE-CURRENTS. PERCY A. CAMPBELL, Bloomfield, N. J. Filed July 20, 1909. Serial No. 508,633.



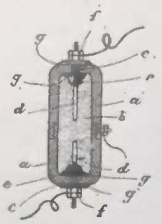
1. The method of repeating telephone currents, which consists in charging a series of condensers in turn from an incoming circuit, mechanically separating the plates of the charged condensers in turn, and discharging the condensers in turn in an outgoing circuit, substantially as described.

943,960. SYSTEM OF DIRECTED WIRELESS TELEGRAPHY. ETTORE BELLINI and ALESSANDRO TOSI, Paris, France. Filed Oct. 1, 1907. Serial No. 395,366.



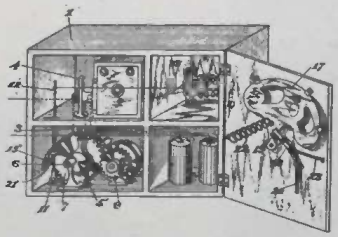
A system of directed transmission for wireless telegraphy stations, comprising for the aerial part of the transmitting station several dirigible aerials in a fixed position, combined with fixed windings inserted in the conducting part of the aerials, a wave generator and a rotary device which is connected to the wave generator and which excites the fixed windings, substantially as described and for the purpose set forth.

942,555. ELECTRIC RESISTANCE APPARATUS. MAX HANKIN, Brussels, Belgium. Filed Jan. 5, 1909. Serial No. 470,782.



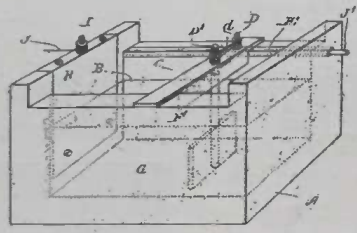
1. In a device for use as a resistance in an electric circuit, in combination, a closed conducting metal envelop, particles of a resisting material filling said envelop and two terminals extending through and insulated from opposite ends of the said envelop and embedded in the said particles.

943,232. COMBINED BURGLAR-ALARM AND AUTOMATIC CAMERA. JOSEPH C. ASHE, Montreal, Quebec, Canada. Filed Oct. 19, 1908. Serial No. 458,358



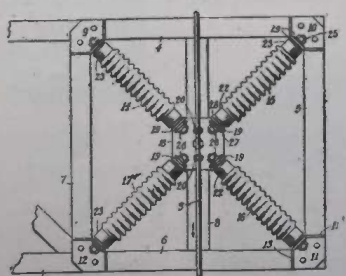
1. A machine of the character described comprising a normally open electric circuit, a camera adapted to use photographic plates, means for operating the shutter mechanism of said camera, an arc in the aforesaid electric circuit, fusible means adapted to hold said shutter operating mechanism in inoperative position and extending in the path of said arc, and means for closing said circuit to complete the arc therein.

944,060. RHEOSTAT. HERBERT L. TRUESDALE, Somerville, Mass. Filed Aug. 20, 1909. Serial No. 513,762.



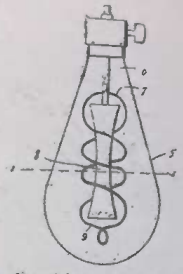
1. A fluid rheostat comprising a vessel, an electrically conductive and resistant fluid in said vessel, a pair of electrodes having their terminals submerged in said fluid, a slide movably mounted on said vessel, supporting one of said electrodes and adapted to move the same relatively to the other electrode, a bar of conductive material secured to said vessel and insulated from the last named electrode and from said fluid, and a contacting part carried by said slide, connected with the electrode carried by the slide and having a movable engagement with said bar.

942,335. INSULATING-SUPPORT FOR HIGH-TENSION CONDUCTORS. RALPH D. MERSHON, New York, N. Y. Filed Feb. 5, 1908. Serial No. 414,308.



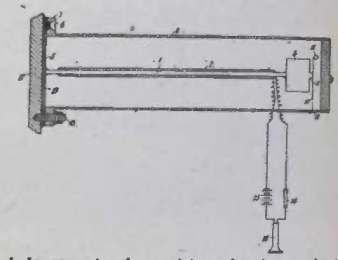
1. An insulating support for high tension conductors, comprising a framed structure having insulating structural members for resolving mechanical forces originating in the conductor into components and connected each to oppose forces substantially in one direction only, as set forth.

944,667. INCANDESCENT LAMP. CHARLES H. CRUTCHFIELD, New Boston, Tex., assignor of one-half to Andrew W. Desbong, New Boston, Tex. Filed Sept. 9, 1908. Serial No. 452,260.



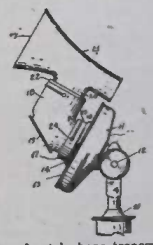
1. In an incandescent lamp, a hollow body comprising a series of transparent concaved sides and a concaved end, said sides and end being coated interiorly with a reflecting medium.

942,897. APPARATUS FOR RECEIVING SUBMARINE SOUNDS. THOMAS A. GARRETT, Reigate, and WILLIAM LUCAS, Crouch End, England. Filed Aug. 31, 1909. Serial No. 515,439.



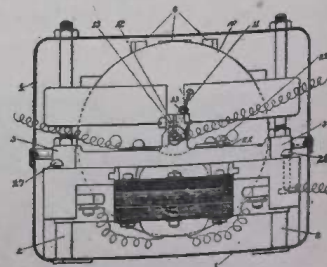
1. In apparatus for receiving submarine sounds, the combination of a magnetized rod, means for connecting one end of the rod to the side of a vessel, a mass fixed to the other end of the rod, and means for detecting variations in the magnetism of the rod.

943,149. MOUTHPIECE FOR TELEPHONE-TRANSMITTERS. JOHN A. JAMIESON of Harrison, N. J. Filed June 8, 1909. Serial No. 500,910.



1. A mouthpiece for telephone transmitters, comprising a trumpet member having a substantially straight tubular body portion open at both ends, and means intermediate of said ends for securing said body portion to a transmitter.

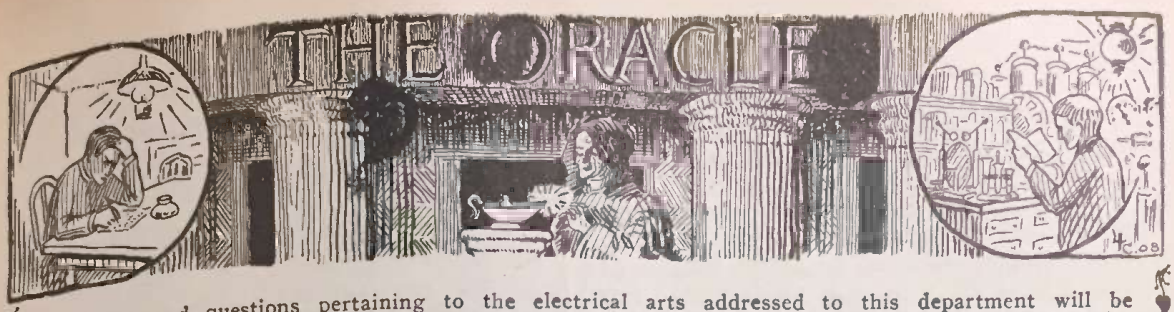
944,040. OVERLOAD AND REVERSE CURRENT RELAY. PIERRE O. KEILHOLTZ, Baltimore, and FORREST E. RICKETTS, Derwood, Md. Filed Aug. 5, 1908. Serial No. 447,082.



1. In an overload and reverse current relay, the combination of an unbalanced rotor, a system of electro-magnets and an electrical contact, means for producing a reaction between the rotor and the system of electro-magnets proportional to the resultant phase composition of the current and voltage elements of the circuit to be controlled, which current and voltage elements are in multiple relation to each other

Original Electrical Inventions for Which Letters Patent Have Been Granted for Month Ending December 28.

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.

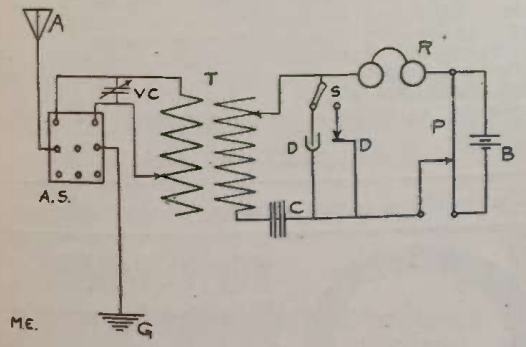
If you want anything electrical and don't know where to get it, THE ORACLE will give you such information free.

WIRELESS CIRCUITS.

(427.) JOSEPH TATE, Illinois, asks:

1.—Give diagram how to connect the following: Tuning transformer (single slide on each coil and 4 binding posts), 1 variable condenser, 2 fixed condensers, Ferron and also electrolytic detector, aerial switch, No. 8100, double head receivers. I have a potentiometer for Electrolytic detector.

A. 1.—Diagram given below.

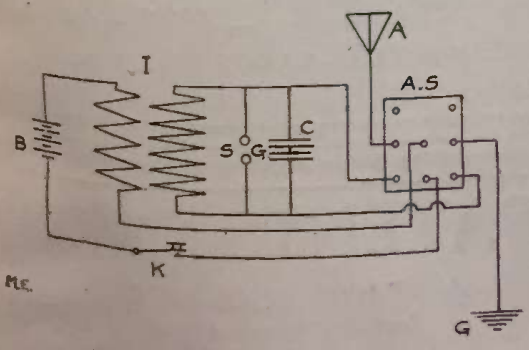


2.—Which is the primary on Clapp Eastham's tuning transformer?

A. 2.—The outside coil of the Clapp Eastham tuning transformer is the primary.

3.—Diagram how to connect 2-inch coil key, aerial switch 8100, adjustable condenser, zinc gap.

A. 3.—Diagram given below.



ONE-INCH SPARK COIL.

(428.) C. M. ENGLAND, Ohio, writes:

1.—Give dimensions of a 1-inch spark coil.

A. 1.—Core 6½ inches long by 1¼ inches diameter. Primary wound with 8 ounces No. 14 single cotton covered magnet wire. Secondary 4¾ by 2¾ inches in diameter wound in four sections with 1½ pounds of No. 36 single silk covered magnet wire. Condenser forty sheets tin foil 6 by 3 inches. Voltage 8, amperage 4.

2.—Can 110 volt, alt. current, be used to run the above coil?

A. 2.—Yes, provided that an electrolytic interrupter is used in series with the primary.

3.—Where can I buy "compressed fibre?"

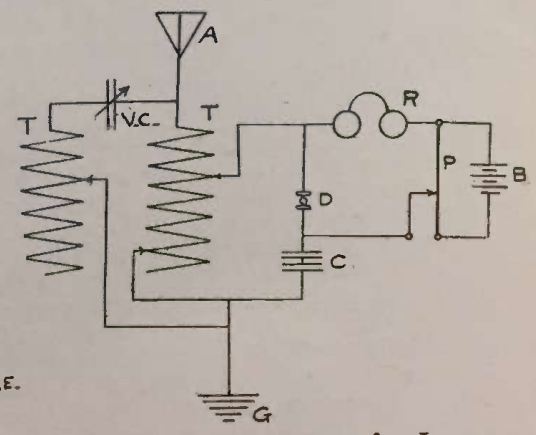
A. 3.—We suggest that you consult our advertising columns.

RECEIVING DIAGRAM.

(429.) WM. SPENGEMANN, California, writes:

1.—I have been experimenting with wireless telegraphy and have been trying to find a way to connect up the following instruments. Please give diagram: 1 2-slide tuning coil, same as No. 9950 in Electro I. Co., 1 3-post tuning coil, 1 variable condenser, 2 fixed condensers, 1 carborundum detector, 1 1,000-ohm receiver, 1 potentiometer.

A. 1.—Diagram given below.



2.—Please also tell me how far I may receive messages with these instruments.

A. 2.—As you do not give the height of

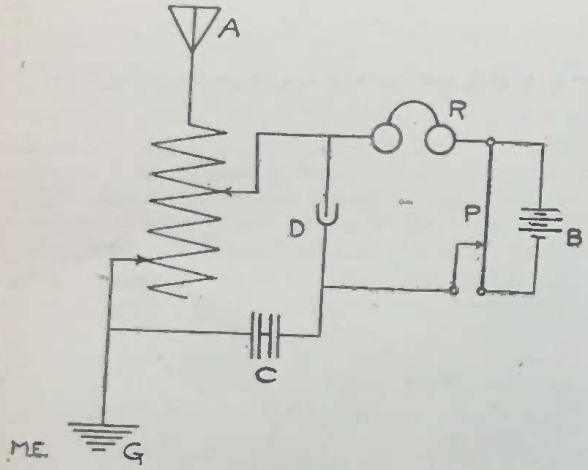
your aerial it is impossible for us to estimate the distance you will receive messages.

CUTTING OUT ARC LIGHT.

(430.) CHAS. HORN, Bronx, asks:

1.—Kindly tell me at what length of distance I can receive with the following outfit: 4-wire antenna, electrolytic detector, potentiometer, 75-ohm receiver and 7 dry cells. Also have a 3-point switch with hard rubber base. Do you think that it is all right as it is not insulated at the points? My antenna is at the height of 50 feet on one side and 20 feet on the other. I have an air-tight condenser from a 1-inch spark coil and I want to cut out the noise from an arc lamp. How can I do it? I have tried a few ways and seem unsuccessful.

A. 2.—We suggest that you try the connections as per diagram given below. It



is presumed that you have a double slide tuning coil on which you may use a slide direct to the ground.

TWO HUNDRED MILE SET.

(431.) M. V. WOODRUFF, California, asks:

1.—What apparatus would be necessary to transmit 200 miles?

A. 1.—You would require at least a 1 K. W. closed core transformer in connection with a suitable helix and high tension condenser. Your aerial wires are placed too close together; same should be spread at least three or four feet apart.

2.—Would you advise transformer or coil?

A. 2.—We refer you to answer to question one.

3.—What would be the approximate cost of set complete?

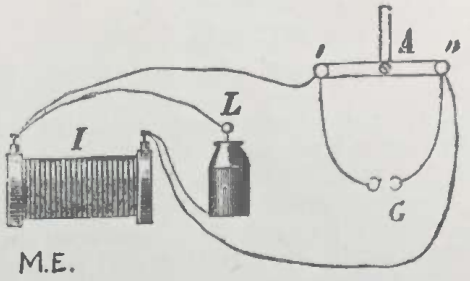
A. 3.—Approximately $225.00

LEYDEN JAR.

(432.) RAY MALCOLM, Missouri, writes:

1.—I have made a Leyden jar as follows: I got a quart fruit jar (clear glass) and lined the inside and outside with a double coat of tinfoil. With a piece of soft pine I turned out a cork that fitted the top of the can tight and melted beeswax and poured around the edge of the cork which made the jar air-tight. Through the top of the jar I inserted a copper wire with a lead ball fastened to the upper end. On the end that goes in the jar is a strip of tinfoil which makes contact with the innercoating. Is this jar made properly? If not, what does it lack? And how am I to charge it?

A. 1.—We consider that the Leyden jar is constructed fairly well for a home-made one. It may be charged with a static machine. We would suggest that you secure any good book on static electricity which will give you many points on the various experiments which may be performed with a Leyden jar. To charge with spark coil



see illustration. Between the balls, G a blue crashing spark will appear.

SENDING HELIX.

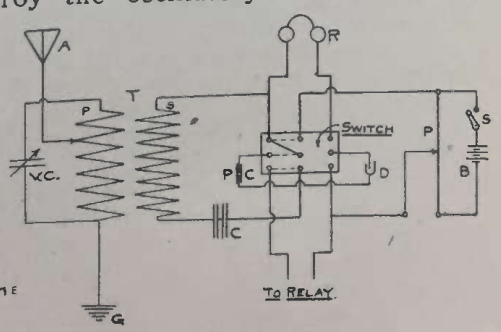
(433.) Earl G. Henderson, Pennsylvania, asks:

1.—Is the Electro Importing Co.'s double slide loose coupling receiving transformer better than the single slide, and wherein do they differ in working?

A. 1.—Yes, because finer adjustments may be made. However, there is practically no difference in the working qualities.

2.—Enclosed please find a diagram of a sending helix that I devised myself so that I would not have to bother with clips. It is composed of four brass rods each 30 inches long and one-quarter of an inch in diameter, as you will see there are three sliders. The first one connects the two middle rods and forms the helix proper, while the two outside ones practically act as clips in connection with the sliders. I would like to know whether this arrangement would work, for although I can send messages when using it, yet there seems to be no energy sent out through the aerial and ground as I can shunt my hand across the antenna switch while sending and not experience the least shock. If this would work as a sending helix, would you kindly tell me approximately what wave length it would add?

A. 2.—We do not think much of the design of the sending tuning coil. It cannot properly be called a helix as the word helix practically means circular, and it is the inductive effect of the helix which really adds length to the wave. We are of the opinion that the instrument described by you would instead of adding to the wave length destroy the oscillatory effect and conse-



quently there would be little or no radiation of energy from the antenna. Diagram

which you submitted is reproduced herewith.

3.—Would diagram No. 2 work, and can it be made any simpler? It is a diagram of connecting instruments in connection with a call station.

A. 3.—We are unable to suggest any change in the diagram which you show; same is reproduced herewith.

AERIAL.

(434.) CHANDLER BATES, New York, writes:

1.—I have a 1-inch spark coil and would like to know how many dry batteries (Columbia) I would need to spark it.

A. 1.—You must use three sets of eight dry batteries in each set connected in series multiple to operate this coil to any degree of satisfaction.

2.—I have an aerial of German silver wire 250 feet long with two strands, six feet apart, and 60 feet high. Would any other aerial be better?

A. 2.—German silver wire is practically of no use in the construction of an aerial. The resistance of this wire is quite high and offers an interference to the passage of the rather weak currents utilized in receiving wireless messages. Aluminum or copper wire is infinitely superior for use in construction of aerials.

RECEIVING RADIUS.

(435.) C. ROGERS, Massachusetts, writes:

1.—How far can I receive with the following instruments: 1 wire for aerial 275 feet long, being 37 feet from the ground, a 700-meter tuner, 100-ohm receiver, silicon detector and a paper condenser and a water pipe for a ground? Also with a 1000-ohm receiver and same instruments?

A. 1.—200 to 300 miles.

2.—What is a four-point spark coil?

A. 2.—We do not understand the term used. Please give sketch or illustration.

AERIAL SWITCH.

(436.) CARL E. SPITZ, Butte, Mont., writes:

1.—I made a loop aerial switch, described in one of the late issues of MODERN ELECTRICS, and when I try to send out a long wave the discharge jumps all around. I am using the Massie connections.

A. 1.—The switch which you have constructed is probably not large enough to take care of the power you are using. Raise the upper connecting contacts 1 to 2 inches.

TRANSFORMER.

(437.) HERBERT MEES., Montana, writes:

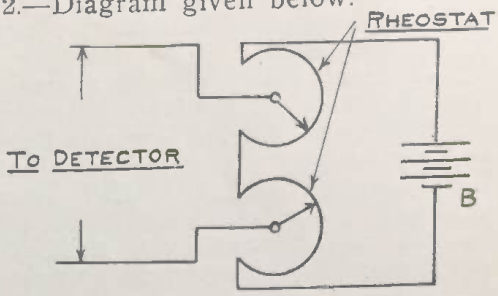
1.—I made a 500-Watt transformer coil of the following dimensions: Core 14 inches long by 1½ inches in diameter covered with three layers of No. 16 D. C. C. magnet wire, with 12 pounds No. 29 S. C. C. magnet wire wound in one section. I use 110 volt A. C., an electrolytic interrupter in series with the coil. I get a long, stringy spark with 1-quart Leyden jar and when I put more condenser on it cuts the spark short, and it has a frying sound, which is no good for wireless. I have tried nearly all the diagrams I have seen in MODERN ELECTRICS with no success. Please tell me what is wrong.

A. 1.—It would seem to us that your spark gap is too short, or, in other words,

you do not use enough capacity to cut the spark down to the proper length. Use a large condenser.

2.—Please give diagram of how to connect 2 rheostats, one 10-ohm and one 1-ohm, so they will work together on one detector.

A. 2.—Diagram given below.



M. E.

SPARK COIL.

(438.) EDGAR RAMSDEN, Massachusetts, asks:

1.—Will you kindly inform me how large a spark this coil will give: Core 8 inches long, ¾ inches in diameter, primary 4 layers No. 20 D. C. C., secondary 2 pounds of No. 30 S. C. C.; paper and shellac between each layer?

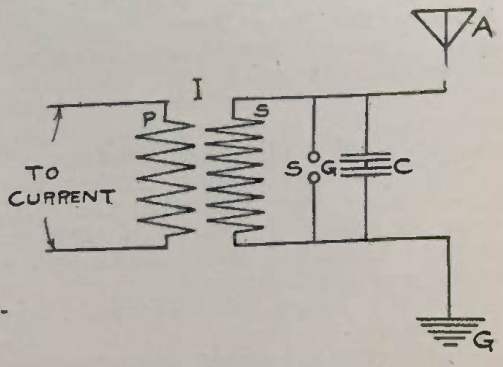
A. 1.—We think that the design of the coil is very poor. If you are able to obtain a ½ inch spark from same you will be doing very well. You should only have 2 layers on primary. The secondary is not sufficiently insulated. It should be boiled in paraffine.

2.—How many dry cells will be required to operate it?

A. 2.—Three sets of six dry cells connected in series multiple must be used to give any satisfaction whatsoever.

3.—Please give a diagram of how to connect a condenser to this coil so as to give the best results for wireless.

A. 3.—Diagram given below.



M. E.

SPARK COIL.

(439.) T. HUNTINGTON, Brooklyn, N. Y., asks:

1.—What would be the spark length of the following: Core 11 inches long, 1 inch in diameter, wound with 2 layers of No. 14 B. & S. as primary, secondary wound with 4 pounds of No. 34 B. & S.

A. 1.—3½ to 4 inches.

2.—Kindly tell me how many batteries I would need and how to connect them.

A. 2.—Probably about 10 to 12 volts and 4 amperes. It would be preferable to use a 12-volt 60 A. H. storage battery on this coil.

3.—What would be the transmitting dis-

tance of the coil mentioned above in connection with 6 pint Leyden jars, Morse key, sending helix, zinc spark gap, with an aerial 30 feet long, one end of which is 50 feet high, the other being 40 feet high; eight wires 12 inches apart.

A. 3.—25 to 30 miles.

LAMP TO WARM BED.

(440.) FRANK X. KEILING, Newark, N. J., writes:

1.—I would like to make a small heater for 110 volts A. C. from German silver wire. I would like to use this heater in a bed for keeping a sick person's feet warm. Kindly advise me how much German silver wire will be required, also size of wire—one that will not set fire to the bed clothes nor be too hot for the patient to endure.

A. 1.—We would suggest that instead of trying to make the heater which you described from German silver wire, you use a tubular 110-volt lamp wrapped in asbestos and thoroughly protected. This makes a very good form of heater.

2.—Could I use a zinc plate ½ inch thick in the Ideal battery described on page 152 of MODERN ELECTRICS Aug., 1908, issue, instead of sheet zinc?

A. 2.—Most assuredly.

3.—How many Daniel batteries would be required to operate a ½-inch induction coil to the fullest extent, Daniel cells giving a voltage of 1.079. Size of cell is the ordinary salamoniac battery's glass jar. I intend to use a porous pot in the batteries.

A. 3.—You would have to use at least 18 Daniel cells connected in series multiple 3 sets of six.

ELECTRICAL ENGINEER.

(441.) VICK AZBE, Missouri writes:

1.—How could I become a good electrical engineer? I have not sufficient funds to go to the college and how long will it take? I know the principles of electricity, but this is all.

A. 1.—We would suggest that you write to the New York Electrical Trade School, or to either of the Correspondence Schools advertised in our columns. They will give you more information on the subject than it is possible for us to give you.

STATIC MACHINE.

(442.) J. W. HARRISON, Alabama, writes:

1.—I have just completed the static machine described in the July, 1909, issue of MODERN ELECTRICS and it fails to generate under any weather conditions. I have followed the instructions carefully, except I have made the sectors a little wider than the dimensions given and used a wood washer between the plates instead of a hard rubber one. Every part is made carefully and neatly, and I do not see why it does not generate. I purchased the shellac varnish from a paint store. Can you suggest anything? Is it possible that it needs to be charged? If so, how can I do so without another machine?

A. 1.—In all probability the varnish which you used contains some mineral salt. It is also possible that the neutralizing brushes are placed at the wrong angle; try adjusting same in different ways.

2.—Should the brushes on the neutralizing rods touch the next sector before it gets entirely off the first one?

A. 2.—If the neutralizing brushes touch two sectors on one side at the same time it will destroy the generative effect of the machine. Each brush should touch one sector on the opposite side of the plate to produce the right results.

3.—What purpose are the neutralizing rods and brushes for? Do they generate electricity by the friction on the sectors, or are they merely to connect the two sectors on the opposite edges of the plates?

A. 3.—The neutralizing brushes serve the purpose of collecting the static electricity from the sectors.

WAVE LENGTHS.

(443.) RAY P. WILSON, New Jersey, asks:

1.—If one's wave-length was 100 metres without the tuning coil, and he was expecting some one to call him, would he not have to have the slider at the point where no wire was added to the aerial?

A. 1.—Yes.

2.—Suppose I wanted to call up some one with a wave-length of 150 m., how do I know where to place the clips on the helix?

A. 2.—This may only be determined by the use of an instrument known as a wave meter, or else continuous adjusting.

3.—Is the instrument called the "tuning transformer," on page 438 of March, 1909, issue the same as the "loose coupler?"

A. 3.—Yes.

SENDING HELIX.

(444.) RALPH TERRY, Wisconsin, asks:

1.—Which would you consider best for a 1-kilowatt sending station, an oscillation transformer or simply a common sending helix?

A. 1.—We prefer the sending helix.

2.—What size wire should be used on the above helix or transformer? Number of turns on primary and secondary of transformer (if you think transformer best) and number of turns on helix and diameter of helix (if you think that best).

A. 2.—Ten turns of No. 0 aluminum wire made into a helix 14 inches in diameter.

3.—About how many square feet or square inches of tinfoil should be used in the secondary circuit of a 1-kilowatt open core transformer for a capacity?

A. 3.—You should use about twelve glass plates 14 by 17 connected in series multiple with tinfoil 10 by 13.

WIRELESS QUERIES.

(445.) CHARLES A. HISS, Maryland, writes:

1.—How far can I receive with a 40-foot aerial composed of two 65-foot strands of No. 16 bare copper wire, double slide tuner, fixed condenser, silicon detector, and pr. of 1200-ohm receiver?

A. 1.—200 to 300 miles.

2.—What would be the receiving radius with aerial 40 feet high, loop antenna of two wires 135 feet long, variable condenser, tuning transformer, silicon detector, fixed condenser, and pair of 1200-ohm phones?

A. 2.—250 to 400 miles.

3.—If I should move my instruments down into the cellar from where I have it on the third floor would my receiving radius be much greater?

A. 3.—We think possibly that there might be a gain of about 10 per cent., but this may only be determined correctly by your own experiments.

ALUMINUM HELIX.

(446.) CLARENCE K. APPLEBY, Providence, R. I., writes:

1.—Which is the better wire to use for a sending helix, aluminum or brass, and why?

A. 1.—We prefer aluminum wire, as it is lighter, does not corrode and is much neater in appearance than the brass wire. It is also considerably cheaper.

2.—Where can I buy ¼-inch aluminum wire?

A. 2.—Electro Importing Co., No. 86 West Broadway, New York City.

3.—How many feet of aluminum wire of this size are there in a pound?

A. 3.—Of No. 0 aluminum wire there are about eleven feet to the pound.

LICENSE FOR WIRELESS.

(447.) NOTCH HILL, B. C., writes:

1.—Using "Electro"-Loose coupler, potentiometer, variable condenser and electrolytic detector, with 1000-ohm amateur receiver. What is the nature of the noise (signals) heard in the receiver? Is it just clicks, or can one kind of hear the spark at transmitting station? If it is a click, is there a return click as on a sounder?

A. 1.—Sound heard in the receivers is very much like the sound of the spark at the sending end, only a great deal weaker, of course. There are no clicks similar to the sounder.

2.—With the above outfit, what is the furthest I can get signals with aerial of 4 No. 14 aluminum wires on spreaders, 4 inches apart, hung from window of house, down two stories, outside to operating room (about 30 feet), insulated well from the house, of course.

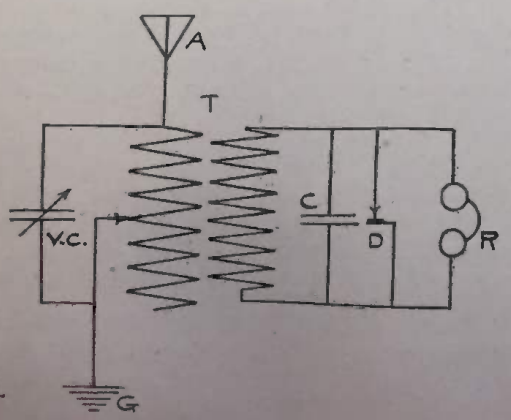
A. 2.—Your aerial wires are placed too close together. We would suggest that you spread same at least two feet apart. After doing so you would probably be able to receive messages over a distance of 300 to 400 miles.

3.—Is it necessary to have a license for a receiving station only, in England?

A. 3.—England and all its colonies have the same law regarding wireless, viz., a license must be obtained by writing the postmaster. It is usually granted.

INDUCTIVE TUNER.

(448.) KARING M. HEWUN, Florida, writes:



1.—Please inform me what size wire to use on the primary and what size on the secondary of an inductive tuner.

A. 1.—You should use No. 22 wire on the primary and No. 28 wire on the secondary.

2.—Please give me connections for inductive tuner, variable condensers, silicon detector, head phones and fixed condenser, using straightened antenna.

A. 2.—Diagram given below.

3.—Please give me the United Wireless Tel. Co.'s connection for double slide tuning coil detector, phones and looped antenna.

A. 3.—As far as we know the United Wireless does not use what is known as the double slide tuner.

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 Feb. issue must be in our hands by Jan. 25.

ELECTRICAL APPARATUS.

STUDY ELECTRICITY AT HOME—A complete electrical course at home, containing 30-page detail book, 220-page text-book, 200 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, 843 Ninth Ave., New York.

When writing please mention "Modern Electrics."

YOU WITHOUT THE WIRES! Increase the efficiency of your station by using one of our Independent Interrupters on your coil. You will never be bothered by sticking of contacts or any other irregularities in the transmission of your messages. Middle West Wireless Specialty Co., 505 Norton ave., Kansas City, Missouri.

When writing please mention "Modern Electrics."

FASCINATING ELECTRIC STORE WINDOW Display, Magic Optical Illusion Box. Makes articles appear and disappear continuously. To Agent $6 net. Description, how made, 10 stamps. Buffalo Mechanical and Electrical Laboratory, 157 Erie Co. Bank, Buffalo, N. Y.

ELECTRICAL BOOKS, BLUEPRINTS, ETC.

WIRELESS CODES. Send 10c. for blue print showing Morse, Continental and Navy Codes. A. C. Austin, Jr., Hasbrouck Heights, N. J.

When writing please mention "Modern Electrics."

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.

When writing please mention "Modern Electrics."

64-PAGE BOOK, how to make static machine, telephone, electrotypes, etc., 200 illustrations, 10c. prepaid. B. E. Bunch, Marshall, Mo.

When writing please mention "Modern Electrics."

LEARN WIRELESS RIGHT! Complete working drawings and circuit for constructing a 800-mile receiving station at home, 50c. G. Young, Pasadena, Cal.

When writing please mention "Modern Electrics."

FLYING MACHINE Demon, 25c. French monoplane self-propeller, 75c. Aeroplane, exact model famous aviator, own power, $1.25. Write us. Box 133, Station A, San Antonio, Tex.

When writing please mention "Modern Electrics."

WIRELESS

ARE YOU BUILDING A COIL? We have just imported a stock of THE BEST NORWEGIAN CORE WIRE, No. 22. FINELY ANNEALED. The wire is cut in straight lengths from 6 in. to 24 in. NOT IN COILS. Price per pound 20 cents. ORDER AT ONCE AS SUPPLY IS LIMITED. ELECTRO IMPORTING CO., 86z West Broadway, N. Y.

When writing please mention "Modern Electrics."

SPECIAL! Enameled Resistance Wire; 800 ohms, 25 cents. Enameled copper, 300 feet number 28 or 125 feet number 24, 25 cents. Number 40, 50 cents per 1,000 ohms. Cardboard tubes, 5 inch, 25 cents foot; 4 and 3 1-2, 15 cents foot. Middlesex Wireless Supply Company, 94 Antrim street, Cambridge, Mass.

When writing please mention "Modern Electrics."

YOU BET

we have all up to date wireless supplies. We carry more wireless goods for the amateur than any other house on the Coast. Why pay express and freight, when you can get the goods right here at right prices? Detectors, Tuners, Condensers, Spark Coils from 1-2 to 4 inch spark, oscillators, coherers, lamps, Static machines, in fact, anything electrical you want. Call or write. It will pay you. PAUL SEILER ELECTRIC WORKS, Market st, San Francisco, Cal.

When writing please mention "Modern Electrics."

IN my advertisement which appeared in "Modern Electrics," November issue, wherein I offered to sell the perikon and silicon detectors, I find that I have inadvertently infringed the patents owned by the Wireless Specialty Apparatus Company, and I hereby inform any intended purchasers that I cannot supply the articles I advertised. Allen E. Dudley, Milford, Mass.

When writing please mention "Modern Electrics."

TO WIRELESS EXPERIMENTERS EVERYWHERE, FREE DETECTORS. I have discovered a new crystal detector and claim it is superior to any other. I have a great quantity on hand and will be glad to furnish large crystals FREE to all who apply, as I want your opinion. I would like wireless experimenters everywhere to try this detector at my expense. Apply at once by mail to William Dubilier, 54 and 56 Clinton st., Newark, N. J.

When writing please mention "Modern Electrics."

SPECIAL PRICES.—1,000-ohm wireless receiver, double pole, solid hard rubber case, wound with copper wire, $1.75. "National" receivng condenser, 30c. Waterhouse Bros., Bourne, Mass.

When writing please mention "Modern Electrics."

WIRELESS BARGAINS. Zincite and Copper Pyrites, 50c per set. Brass Cups silver plated for mounting crystals with solder, 10c each. No. 36 S. S. C. IRON wire for Marconi Magnetic Detector, 50c per ounce. No. 50 (1 1-2 mil.) S. S. covered copper wire for high resistance phones, 60c for spool containing exactly 1000 ohms. Wollaston wire, .0005, 15c. .0001, 25c; silicon fused, large piece 15c. Molybdenite, more sensitive than silicon 10c large piece. Graphite carbon cup for electrolytic detector, 20c. Selenium metal in sticks for selenium cells, large piece, 25c. Stamp for 128 page catalog. Electro Importing Co. 86-Z West Broadway, N. Y. City.

When writing please mention "Modern Electrics."

FOR SALE.

WANTED. Complete sending and receiving set, or good receiver set only. Write quick to B. Lazarus, 536 1-2 Main st., Winnipeg, Canada.

When writing please mention "Modern Electrics."

FOR SALE.—Tesla Coil, $25.00; Transmitting Helix, $10.00; Condenser, $25.00; Double Slide Tuner, $10.00; also other apparatus described in articles in previous issues. Write A. C. Austin, Jr., Hasbrouck Heights, N. J.

When writing please mention "Modern Electrics."

FOR SALE. One K. W. transformer, $15.00. Wireless automatic tape-recorder, $10.00. 1 1-2 h. p. water motor, $5.00. 14 pounds of new No. 36 silk covered wire, $18.00. 6,000-ohm H. C. wireless head receivers, $8.00. G. Wilson, 20 St. Stephen st., Boston, Mass.

When writing please mention "Modern Electrics."

FOR SALE.—Wireless outfit, sending and receiving, for $10.00. Also electrical apparatus. Sidney Allen, 630 Graymont, Birmingham, Ala.

When writing please mention "Modern Electrics."

1-2 K. W. Transformer Coil, $10. Electrolytic interrupter, 6,000 i p. s. guaranteed, $3. Lester E. Wahl & Co., East Brady, Pa.

When writing please mention "Modern Electrics."

FOR SALE.—One 12-in. Western-Scheidel induction coil; also one American X-Ray Co.'s Tesla coil. No reasonable offer refused. A genuine bargain. E. Gruendel, 2130 Osgood st., Chicago, Ill.

When writing please mention "Modern Electrics."

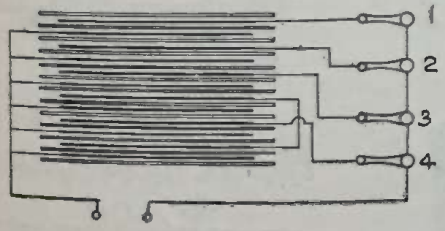
We wish to buy a number of back issues from April, 1908, to September, 1908, inclusive. We shall pay a good price for these issues, if in good condition. We would like to hear at once from readers who desire to dispose of above copies.

THE CONSTRUCTION OF A SENDING CONDENSER.

(Continued from Page 468)

to binding post F. Lugs D go to switch 5; B goes to a switch marked 2, while C goes to the other one of the same number and A goes to the remaining switch 1.

Now, a word as to the operation of this set. By referring to Fig. 5, it will be seen that switch No. 1 has only one condenser, switch No. 2 has two, as its condenser plate is between two others, the same is true of the second switch



M.E. -FIG. 5-

marked 2. The switch numbered 5 has two whole and one half plate (2x3 ins.) making 5 condensers. Thus the box contains 10 condensers, any number of which may be used; for instance if desired 7 condensers thrown across the binding posts in Fig. 5, we throw on switches 5 and 2; 3 condensers and we close the contacts at switches 1 and 2, and so on.

For wireless use shunt a spark gap across the terminals of the coil and place the condensers in series with the helix. Vary the contacts of the latter and the switches on the condenser until the receiving station gets messages the loudest; then the two stations will be in tune.

Selections

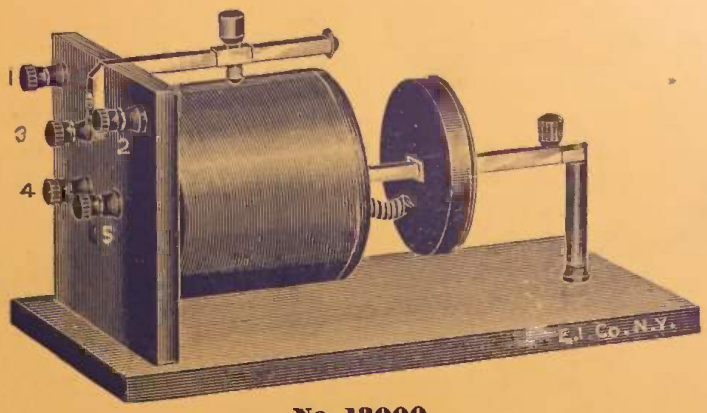
THE "ELECTRO" LOOSE COUPLER (Receiving Tuning Transformer)

(Patent Applied For)

is the latest word in wireless.

While an ordinary tuning coil is admirably suited for ordinary work it is not a success where exceedingly fine tuning is required. In fact even the best tuner cannot tune within 10% accuracy. Furthermore, now when so very many stations are working simultaneously, we must have an instrument which is capable of tuning to an exceedingly fine degree—within 1% accuracy—and furthermore be able to ABSOLUTELY tune out ANY unwanted station.

The loose coupler does this in an astonishingly perfect way and in addition will bring in distant stations 3-5 times as clear and loud.



No. 12000

The new instrument is nothing but a transformer which serves to increase the intensity of wireless signals At the same time it is the most accurate tuner as yet devised. For this reason the large commercial stations and government stations are using it exclusively now, as it enables them to work "through" other stations.

The loose coupler is not a new invention. It has been known for years, in fact has been used by European governments for two years.

However, the experimenter has been deprived of its use as the cheapest on the market sell at an exceedingly high price making it prohibitive for the average experimenter to procure this useful instrument.

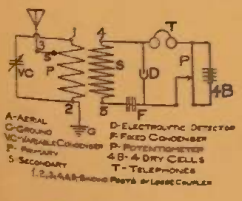
We have been experimenting for long months to produce a loose coupler within the reach of everybody and as usual succeeded. Not alone did we succeed but we improved the old type to such an extent that it has a far greater selectivity than any similar instrument on the market NO MATTER WHAT ITS PRICE.

By means of our new secondary it is possible to "feel off" comparatively few turns of the primary and as each layer (of the secondary) assists the other one, it will be easily understood why we obtain such marvelous results with our instrument, never duplicated before.

Certain far off stations come in quite loudly even if the secondary is pulled clear out as far as it will go, that is the air distance between primary and secondary is fully 6 inches.

If the iustrument was well "in tune", we frequently heard a 2 K. W. station 30 miles distant so loud that the signals even when the phones were one foot from the ear, were plainly audible.

We found the connections as per diagram to give best results. The variable condenser is especially recommended and will be of considerable value. Any detector can be used of course. Personally we prefer the "Electro-" Lytic Detector as the signals come in very much louder.



The construction of the "Electro" Loose Coupler is of the highest perfection.

All wood parts are of quartered oak, metal parts nickel plated. The wire on both primary and secondary is warranted to be the best black enameled wire. 5 hard rubber binding posts are provided as shown. If the variable condenser is not used, post No. 1 remains unconnected.

The secondary is machine wound as it would be quite impossible to wind the very fine wire otherwise. It is of course highly important that no wire of one layer should cover any other, in other words the winding must be done with highest precision only made possible with a special winding machine.

The secondary, projecting from the right has a square tube which slides on the square guiding rod with greatest ease. At the far end a hard rubber knob is provided which serves as a handle to move the secondary back and forth.

We use no sliding contacts to make connections with the secondary, a flexible cord passing through the center of the primary connects with posts 4 and 5. No loose contacts possible.

On the primary a single sliding contact is provided with our well known slider used on our other instruments. A stop is provided so that the slider cannot be moved beyond a certain point. The secondary can be moved back and forth with the greatest possible ease and will not stick, or require two hands to move as is the case with even expensive makes. Our loose coupler is built to pick up wave lengths up to 800 meters and as the majority of commercial and government stations have only a wave length up to 600 meters, our instrument will be found to respond in practically all cases.

Adjustment: When connections are made and detector is adjusted, move secondary up to the centre of primary, then adjust slider till signals come in loud; then move secondary back and forth till position is found where signals are loudest. Now the variable condenser is adjusted. Dimensions: length of base 12 inches, width 6 inches, height over all 6½ inches, weight 2¼ lbs. No. 12000, the "Electro" Loose Coupler, (Patent applied for) as described,

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No. 12001 "Electro" Loose Coupler with two slides **$4.00**

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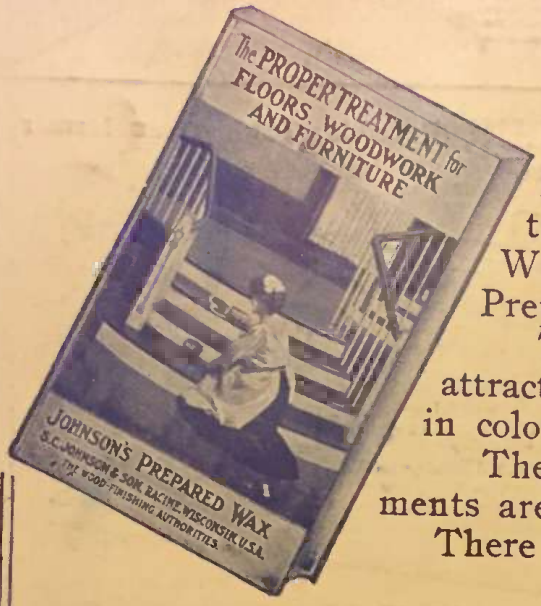

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