Have you seen it? Did you read it?

MODERN ELECTRICS

"That wonderful Electrical Magazine for Everybody." ¶ "Nothing like it in the World," "Marvelous," "Worth ten times the price"—that's what enthusiastic MODERN ELECTRICS readers say every day. Twelve thousand *paid* subscribers in 6 months, "There's a reason for it." Here it is: MODERN ELECTRICS has the "Goods" and *gets them first*. A splendid monthly for the experimenter and the amateur. The "How to Make It" Magazine. Hundreds of illustrations on all topics of electricity—but ONLY ELECTRICS nothing else.

MODERN ELECTRICS during the first 6 months published more articles on Wireless than all other electrical magazines *combined*. Are you surprised that it leads?

Edited by H. Gernsback, the inventor, who knows what *you* want and what *you* need.

MODERN ELECTRICS has its own European correspondents and always gets the Electrical news first, which others copy months later.

The Magazine is issued the first of each month, 12 times a year. The following well known writers contribute regularly: A. Frederick Collins, Wm. Maver, Jr., John L. Hogan, Jr., H. Gernsback, A. C. Austin, Jr., Etc.

Wireless Telegraph and Laboratory Contest each month. Best photos get 3 Dollars. The "Oracle" answers all your questions free. Wireless Department, "Knick-Knacks," etc. etc.

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MODERN ELECTRICS PUBLICATION, 84 West Broadway, New York City

THE BARE POINT "ELECTRO"-LYTIC DETECTOR.

(Patents Pending.)

No. 9002 (With Hard Rubber Posts.)

There is no doubt but that the Bare Point Electrolytic is the most sensitive responder invented. Comparative tests by the foremost men in the wireless field have proven beyond doubt that the Electrolytic Detector is fully 25% to 33 1-3% more sensitive than carborundum, silicon, etc., etc. That this is so is best proven by calling attention to the fact that nearly all up-to-date wireless stations — commercial and government—throughout the world now use the Electrolytic type, as its range is far greater than any other detector in existence.

If anyone doubts this statement, we refer to all standard electrical publications and text-books, in which are found statements that the Electrolytic Detector is the most sensitive of all.

For this reason we manufacture this type only, as our customers know that we furnish the best *of all*, at the *lowest prices*.

While our No. 5001 "Electro"-Lytic Detector was a success—proven by the fact that in two years over 4,000 were sold—we found out that our customers wanted a more accurate and easier-to-handle instrument, as our old type had several disadvantages.

We therefore experimented for over six months, and the result is our present No. 9002 Detector, which is, despite its low price, unquestionably the BEST AND MOST EFFICIENT TYPE on the market. Mind you, we do not except ANY. You may safely buy any other type Electrolytic Detector AT ANY PRICE, but you cannot buy a better one. We know this is a big claim, but we are willing to substantiate it.

Furthermore our new instrument is not an amateurish makeshift, but has been designed for hard commercial work. That the instrument is up-to-date is best proved by the fact that the largest wireless company of the United States has already adopted our Detector.

DESCRIPTION.

Instead of the carbon—to hold the acid—we use now a graphite-carbon cup, which we absolutely guarantee will never leak. The reason is that this cup is non-porous, it being "formed" under a pressure of 300 tons, and afterwards treated in the furnace to close up any microscopic holes. The acid will positively never soak into the cup. Ordinary carbon or graphite—as anybody can readily convince himself by a trial—will absorb the acid in less than ten minutes. This is true even of the best and hardest imported carbons.

We have furthermore reduced the size of the cup considerably now, and also decreased the size of the hole (to take the acid). Two reasons prompted us in doing so. First, a small body of liquid will adhere to the container better than a large one. Shocks and unsteady position (on ships) will therefore hardly effect our instrument. Secondly, the smaller the surface of the liquid, the slower the evaporation.

There could be scarcely a better method of establishing contact with the graphite-carbon cup than the one we have adopted. The cup is forced into a brass cap under hydraulic pressure, so that three-quarters of the cup is actually in contact with the brass cap. This is a "forced fit," and once in place the graphite-carbon cup can never be removed from the brass cap, except by breaking it in pieces.

The most important part of an Electrolytic Detector, however, is found in the mechanism used to raise and lower the fine Wollaston wire.

Our old instrument—like so many antiquated ones still in use—had the wire *directly* connected to a thumb-screw, which by being screwed up and down, lowered and raised the wire. Our experience taught us that this method was wrong, as the wire always swung around in a circle, sometimes touching the acid and more often not at all. Or else, touching the inside walls of the cup, short-circuited the Detector.

The ideal way, of course, is to move the wire up and down strictly vertical, so that one can dip it more or less in the electrolyte (acid). This method has been adopted in our new instrument. It is unquestionably an ingenious movement.

Pin P, holding the fine wire, has at the upper end a flat guiding rest, under which a spring is located which tends to press P upward. This is counteracted by the adjusting thumb-screw, which, by pressing on the flat part on P, raises or lowers same at will. It is impossible for the pin P to turn, as the flat guiding rest can only move up or down (it being square) in the guiding angle G. The large hard-rubber thumb-screw prevents current leakage through body; it allows extremely fine adjustments, and gives the instrument a distinctive appearance. The screw itself is molded in the hard-rubber, and therefore never becomes loose. The screw, furthermore, having a very fine pitch, makes it possible to raise or lower the fine wire less than 1-1000 inch at a time. This allows very fine adjustments.

The bracket B is of generous proportions and unusually heavy in order to stand rough and continuous handling.

The Wollaston wire W used is the very thinnest platinum wire obtainable. Its diameter is 0.0001 inch. All Wollaston wire comes heavily silver-plated. The acid soon dissolves the silver, leaving only the minute platinum wire of 1-10,000 inch diameter.

The best part, however, is that it is unnecessary to solder this fine wire, which method, not alone inconvenient to many, is too troublesome and takes too much time.

Pin P at the lower part has a fine hole ½ inch long, into which the wire is inserted, then the small thumb-screw H is tightened and the wire is secure.

We also furnish (with the instrument only) a novel wrinkle how to handle and insert the fine wire in the hole, without the screw H damaging the fine wire in the least, even if screwed up quite tight. With this method it is possible to use the last ½ inch piece of wire, which heretofore was impossible. One inch of wire therefore will last a long while.

The base (size 3½" x 3½") is ¼" thick, and molded of hard rubber. Impossible to shrink or warp. It gives the Detector a business-like appearance, and is, of course, acid proof; it is a far better insulator than the best wood. Local leakage, therefore, is an impossibility.

Two binding posts are provided.

ALL METAL PARTS ARE HEAVILY SILVER-PLATED, as only this will prevent the electrolyte from tarnishing the metal. The brilliant white metal parts give the instrument a very distinctive and unique appearance, which will enrichen any instrument-table.

We cannot send the acid through the mails or by express. We furnish rubber-stoppered bottle, which bears formula how to prepare the electrolyte. It can be obtained at ANY drug store. *Formula is only given with order.*

AS THE DETECTOR ITSELF IS A PRIMARY BATTERY (Grove cell.—Platinum—acid—carbon), NO EXTRA BATTERY IS REALLY NECESSARY. However some operators prefer to use one, and we illustrate same in our plan, but, as stated, it is not absolutely necessary.

The "Electro" Potentiometer No. 9250 should always be used when a battery is in circuit, else the strong current will soon dissolve the minute platinum wire of the Detector.

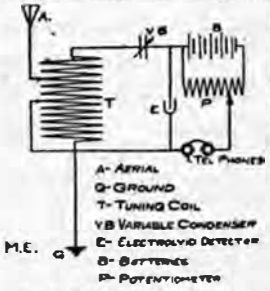
The Potentiometer further eliminates all humming noises sometimes experienced in the telephone receiver.

HOW TO OPERATE THE "ELECTRO"-LYTIC DETECTOR.

The cup should be filled by using the pipette which we furnish. When detector is not in use, draw off acid with pipette. It should never stand over night, as the solution spoils. When kept in well-stoppered bottle, it can be used over and over.

If a battery is used, its carbon, or positive pole, must invariably be connected with binding post marked + If all electrical connections are complete as plainly indicated in plan, screw down the thumb-screw far enough to let the Wollaston wire JUST TOUCH the solution. With little experimenting the right immersion into the acid will be found, and the best regulation is reached when the telephone receiver emits a faint hissing sound or click. The telegraphic signals come through the telephone receiver in short and long clicks or buzzes, respectively.

We do not recommend our Detector to work without ground or aerial, as only with these, perfect results can be had.



The only wire that can be used in our Detector is the No. 1313, or better, No. 1314 Wollaston wire (Page 93). As this wire is silver-plated, it will not work until the silver coating has dissolved. This is done by immersing the wire in the acid for about ten minutes and using a fairly strong current (2 dry cells). After this the coating dissolves as the wire is used.

PLAN TO CONNECT.

E—Detector.
A—Aerial.
G—Ground.
T—Tuning Coil.
V.B.—Variable Condenser.
B—4 Dry Cells.
P—Potentiometer.

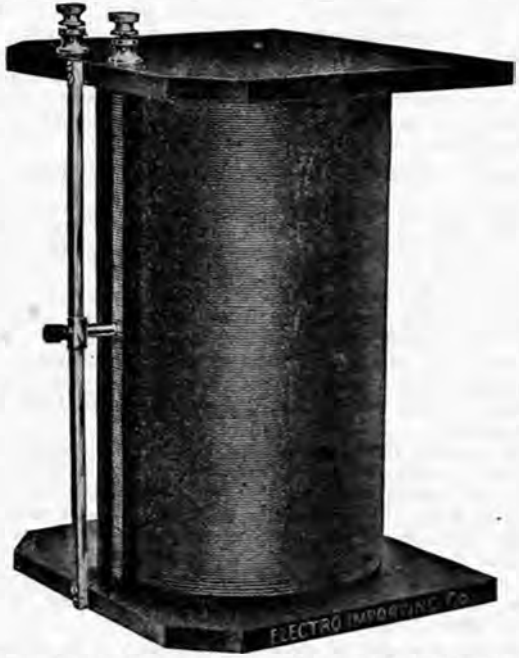
9002 BARE POINT "ELECTRO"-LYTIC Detector (Patents Pending), as described, with pipette, bottle for acid, packed in handsome box, complete..... **$1.50**

By mail, extra..... **$0.12** Registered mail, add **$0.08**

THE "ELECTRO-TUNER"

No. 8486

(Patent Pending)



DESCRIPTION AND DIRECTION FOR USE

"THE ELECTRO TUNER"

For several years past we have had inquiries for a good tuning coil, and since we placed upon the market our Elec tro Lytic Detector, it was only natural that the demand should increase.

In fact, we have received so many requests for a good tuning coil, that we at last resolved to place one upon the market.

The "ELECTRO TUNER" is the outcome of one year's experimentation, and we feel satisfied that nothing better can be procured for twice the amount of money.

In fact, we admit that the "ELECTRO TUNER" is one of the neatest and best-constructed apparatus ever constructed by us. Our patrons, who are now using our numerous goods with entire satisfaction, will surely welcome our new addition, and we are more than certain, too, that it will be only a short time before the greater number of wireless amateur stations shall be equipped with the "ELECTRO TUNER."

WHAT TUNING IS AND WHAT IT MEANS.

Everybody has seen a tuning fork, used for tuning pianos, etc. If we take two tuning forks of exactly the same dimensions, having both the same pitch and if we sound one, the other, too, will be brought to sound—*even if it is at the other end of the room.* This is termed sympathetic tuning forks, or in other words, the forks are in tune with each other. If we sound one, the other, too, must sound.

If, however, one tuning fork of different dimension and pitch is substituted it will be totally unaffected, even if placed quite close to the other fork. In other words, both forks are out of tune.

Now, exactly the same is true of electrical tuning.

If, for instance, we have a wireless station in N. Y. having say, 500 meters wave length, and if we wish to receive from that station (to get in tune with it) we must have also 500 meter wave length, at the receiving end. If not, we can not receive or "pick up" the N. Y. station.

To compute the wave length we quote below an editorial from the July issue of *Modern Electrics,* published by Modern Electrics Publication, New York:

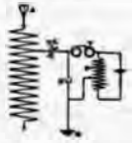
"The wave length in wireless telegraphy is dependent on the length of the aerial. Multiply the total length of your antenna by 4 and you have the wave length.

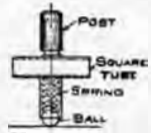
"For instance: Height of aerial 50 feet. Therefore 50x4=200 feet wave length.

"Now, the meter has been adopted almost universally to express the wave length; as one meter measures approximately 39 inches; it is an easy matter to transpose feet into meters.

"Referring to above case 200 feet are equivalent to 2,400 inches. Therefore 2,400÷39=61 meters.

"The wave length of an aerial 50 feet long is consequently 61 meters.





Tuning, therefore, is nothing else but having the same length of your aerial as the one you wish to receive from.

For instance, suppose you have an aerial 100 feet high and you wish to receive from a station having an aerial 200 feet high, it is clear that you would have to add 100 feet to your antenna before you can receive from the other station.

Now then, it would hardly be practicable to erect a higher aerial in order to get into tune with that particular station, because you might wish to receive from other stations having even higher or possibly shorter aerials.

For this reason the tuning coil was invented, which is nothing else but a certain amount of wire, wound on a drum or spool and a slider, to cut out or add more or less wire, which when added or taken from the fixed antenna, tunes the receiving station.

There are various methods to connect up tuning coils, the simplest and possibly best one is shown in Fig. 1.

"A" is one binding post, "B" the other post of the "ELECTRO TUNER." To "A" the antenna is attached, while "B" is the Slider. "D" represents the Detector, which may be our regular coherer and decoherer, our auto coherer, the Electrolytic Detector, or a carborundum or silicon Detector. "T" are the telephone receivers. G is the ground, C a small condenser which, however, is not absolutely necessary; in some instances the condenser may even cut down the strength of the signals. We do not hesitate to make the broad statement, that the "Electro Tuner" not alone will do as good and accurate tuning as coils listing at $25.00 and $30.00, but we vouch that it will do more. Besides it has several points of superiority not found in other coils costing six times as much.

The price at which we sell this coil is truly revolutionary. Who ever heard of a tuning coil having over 600 meters wave length, and costing only $4.00? Naturally our profit is little, but we are manufacturing these coils in such large quantities that it will pay us to market them. Besides, anybody who buys this coil, will come back to us with more orders, because he will experience that we charge little, but that our goods are A-1 in every respect.

The coil is built of well seasoned hardwood, finished beautifully with three coats of black heavy varnish. The novel part of the tuner, however, is found in the wire. It is ENAMELED wire, which takes up 20 per cent. less room than single silk covered, and exactly 100 per cent. less room than double cotton covered wire. Besides, the Enamel is a much better insulator than even rubber, and as it takes up almost no room at all, the size of our coil is wonderfully compact, considering its very great capacity

In the small space of 11 inches we wind 310 turns of No. 20 copper enameled wire. As each turn of wire is exactly ½ meter, the capacity of the coil is 155 meters. This gives a wave length of 620 meters. You can tune as fine as ½ of a meter.

The sliding rod is a square, solid bar of hard drawn brass, nickel plated and highly polished. The Slider has a square brass tube which fits the rod snugly ensuring always positive contact. A hard rubber handle is provided to carry the slider back and forward. Ground through your body, impossible. Two large binding posts are attached to one of the coil heads to make connections.

A very ingenious method is used to make contact on the bared wire. We found that a spring rubbing against the wire, played havoc with same, and we therefore use a highly polished steel ball, which is gently pressed against the wire by means of a spiral spring. (See separate sketch.) (PATENT APPLIED FOR.) The spring and ball are contained in a round tube fastened to the square slider tube. The ball always ROLLS and touches only one wire at a time. Does not damage the wire in the least. Slider works marvelously easy and light.

A great advantage of this coil is that it can be used either standing up (as shown in our cut) or laying down horizontally. Ours is the first coil thus constructed.

Sizes are as follows: Height, 13 inches; width, 9 inches, height, 10 inches. Net weight, 6 pounds. Weight boxed, 8 pounds.

By using the "Electro Tuner" the radius of a station can be increased over 500 per cent. By moving the slider a few inches either up or down (as the case may be) different stations can be heard; those one does not want are simply "tuned out."

By means of the "Electro Tuner," our Electro Lytic Detector and our 1000 Ohm Telephone receivers, and an antenna 50-65 feet high, commercial stations 700 to 900 miles away can be heard plainly. Incoming steamers have been clearly heard by us 600 miles away with above outfit.

An outfit to work up to 150-200 miles comprises: The Electro Tuner, our Auto coherer, and a 75 ohm telephone receiver. Price of this outfit is only $5.40. Just think of it: $5.40 for a wireless outfit, which receives clear messages 200 miles away!

No end of instruction is had by means of this coil. You learn telegraphy absolutely free. High priced operators of the government and commercial land and sea stations will send you ABSOLUTELY FREE all the messages you want. You can learn the codes to perfection in less than one month. No Teacher or School could teach you better than the expert wireless operator

THE "ELECTRO TUNER" as described, boxed, $4.

NOTE.—Parts of the "Electro Tuner" can not be supplied at any price only to users of the coil for repairs, etc.

No. 9486A With double slide..... **$4 50**

THE "ELECTRO" VARIABLE CONDENSER—Continued.

We would go too far to show diagrams of how to connect variable condensers, potentiometers, tuning coils, etc.

There are so many connections that we would have to fill up a book, besides every experimenter has his own ideas which he wishes to work out, and a very little experimenting will quickly show best connections.

Those not well informed on the subject we refer to the Wireless Magazine, "MODERN ELECTRICS." Several splendid articles, containing many diagrams on variable condensers and potentiometers were published in these issues: June, '08, page 90; July, '08, page 130; August, '08, page 163, 171; September, '08, page 204; October, '08, pages 221, 232, 239, 240, also several articles November, '08.

In wireless telephony it is absolutely imposaible to work without a variable condenser. Also in a good many other branches of electricity it is often required.

The "Electro" Variable condenser is of the slide-plate type. Our illustration shows the instrument fairly well, although its beauty can only be appreciated by seeing the article itself.

The case is made of solid one-half inch best seasoned oak, finely polished. We use heavy stock to minimize warping. There are 5 stationary and 4 movable plates. The plates slide in grooves ¼ inch deep and move with surprising ease.

We had to build a special machine to cut these grooves, as they are only 1-16 inch apart.

It is understood, of course, the nearer the plates come together, the greater the capacity will be. We could have separated the plates ⅛ inch—which would cost us three times less in labor—but we want the user of our condenser to get as good results from the instrument as if he had bought a $25.00 one, and we will cheerfully exchange any one not giving absolute satisfaction.

The instrument is built with such precision that short circuiting the plates is an absolute impossibility.

The 5 stationary plates are soldered together, while the 4 movable ones are securely bolted together by a new method, ensuring the best contact imaginable. Contact with the movable plates is made by an ingenious method, which must be seen to be appreciated.

Two binding posts are provided on top for connections.

To vary capacity, simply slide out movable plates by grasping the hard rubber handles between thumb and forefinger. The movable plates can be pulled out to clear the stationary ones. The capacity is then zero.

The "Electro" Variable Condenser is now in use in several commercial stations, and its range is wide enough for even the finest regulation for stations 1,200 miles apart.

The plates are all heavy brass No. 22, B. & S., all trimmings are well finished. Base has holes to screw down condenser.

The instrument makes a necessary as well as a well appearing addition to any wireless station. We guarantee that it will increase the sound fully 50 per cent.

Sizes: 10½ inches long, 6½ inches high, 2 inches wide.

Weight, 3 lbs. Boxed, 3½ lbs.

No. 9340 "Electro" Variable Condenser, as described **$3.00**

NOTE.—Please do not compare our instrument with "condensers" (?) consisting of one stationary and one movable piece of sheet iron and selling for $1 to $1.50, having, of course, no capacity. We sell condensers intended to WORK, not junk to SELL.

The "Electro" Potentiometer.

NON-INDUCTIVE.

(Patent Pending.)

No doubt many experimenters have noticed that nearly all forms of detector employing a local battery require very fine regulation of the E. M. F. in order to secure their most efficient, and satisfactory operation. Several methods for obtaining the necessary variations are now in use, the two principal ones being by means of a finely adjustable rheostat or a potentiometer. The latter, however, is capable of such exceedingly fine adjustment that it is the one most frequently employed in all of the larger wireless stations. The potentiometer differs considerably from the rheostat in the fact that it varies the applied potential (E.M.F) directly, while the latter only causes a reduction of the current by introducing additional resistance into the circuit.

9250

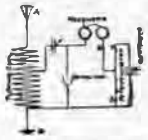
Diagrams for connecting up the potentiometer have been published in "MODERN ELECTRICS" as explained in the foregoing pages under "Variable Condenser," but we show herewith one of the most common connections:

In short, the Potentiometer serves the purpose to vary and regulate the battery current exactly and gradually.

We have been considering the manufacture of a Potentiometer for over two years and the instrument we now offer is the outcome of experiments with over a dozen different styles.

We are willing to prove that our instrument is superior to any other make manufactured now, no matter what its price.

Our potentiometer is the only one on the market which is NON-INDUCTIVE. Those who have made a study of wireless telegraphy know how desirable this is for fine work.



Considering the high resistance of the "Electro" Potentiometer, it is truly marvelous that we can crowd up to 1,000,000 Ohms in a thin graphite rod 7½ inches long. The special high resistance graphite rods are extremely hard and only about ⅛ of an inch thick. We have a new process of making these rods and can make them quite cheaply in this size up to 1,000,000 Ohms. We absolutely guarantee the resistance of our rods and will send anybody an instrument free of charge if they can prove that the resistance is lower than stated.

Two resistance rods are furnished with each potentiometer, one having 300 Ohms and one 500 Ohms. For ordinary use only about 100 Ohms or 1-3 of the 300 Ohms rod is used.

The rod fits in a special half-round groove in the base of the instrument, and two spring clips hold the rod at each end securely, besides serving the purpose of making contact.

While the rods are very hard, they would not last long if we were to use a common spring for a slider. Therefore we use our Rolling Ball contact (the same as used on the "Electro Tuner"); this not alone makes absolute contact at all times, but it cannot possibly wear down the rod.

We call special attention to this point. Furthermore this slider works incredibly easy—not in jerks—but absolutely uniform, thus producing a very fine and accurate regulation of the current.

THE "ELECTRO" POTENTIOMETER—Continued.

The resistance rod can be removed with ease in less than 10 seconds simply by lifting up the spring clips. Another rod is replaced in a few seconds.

Our potentiometer is the only one made having exchangeable resistances.

To connect up, we refer to illustration. Posts 1 and 3 lead to battery. Post 3 also is connected with one side of the Detector. Post 2 goes to one side of the telephone receiver, while the other side of the telephone connects with the free post of the Detector to complete the circuit.

Sizes: 10 inches long; 2 inches high; 2 inches wide.

Weight: ¾ lb. All metal parts finely nickeled.

No. 9250 The "Electro" Potentiometer (patent pending), as described **$1.50**
By mail extra ..... **.15**
Extra Resistance Rods, each ..... **.50**

NOTE.—Rods can be furnished only to users of the Potentiometer. Other parts are not sold.

The "Electro" ¼ K. W. Transformer.

Closed Core Type.

Commercial as well as experimental stations all over the world are now using exclusively transformers for wireless work, same being cheaper and much more efficient than spark coils for long distances — and even for comparatively short distances of 25 miles, etc.

9280

A transformer is nothing but a spark coil, only constructed differently. The principle, though, is the same in both.

No vibrator is used in a transformer, and only alternating current of ANY frequency can be used. A short but very fat and loud spark about ¼ inch long is produced at the secondary terminals.

No resistance of any kind is used. The A. C. supply of 110-125 volts is connected directly to the transformer, in series of course, with a regular telegraph key such as our No. 1116—1117 or No. 9212.

Our transformer uses about 2½ Amperes under full load, which is less than our 1-inch coil takes. The efficiency is very great and in output our transformer equals a 10-inch coil, which lists at $125. We guarantee that the "Electro" ¼ K. W. Transformer will transmit up to 50 miles by using a sensitive detector for receiving. The cost of operation is ridiculously low, about 2 cents per hour for constant working.

Our transformer is built so well that it can be worked for hours at a stretch and it will positively not heat up in the least. We build these transformers to be used up to 250 volts A. C. current, the price remaining the same for this voltage, but orders must state explicitly that the transformer is to be used on a higher voltage than 125.

THE "ELECTRO" ¼ K. W. TRANSFORMER—Continued.

If only direct current is available we furnish a motor generator. This is nothing but a small D. C. Motor coupled to an A. C. small dynamo, which it drives. The dynamo gives about 120 volts 3 amperes A. C. current. This current is used on the transformer. The price of the Motor Generator alone is $96.00 and is to be used on either 110 or 220 volts direct current.

Sizes of Transformer: 10 inches long; 5 inches wide; 6 inches high. Weight, boxed, 20 lbs.

9280 "Electro" ¼ Kilowatt Transformer, as described **$26.00**

PARTS NOT SOLD.

The "Electro" Zinc Spark Gap.

9220

We have placed on the market a good many articles during the past, but we pride ourselves that our little "Electro" Zinc Spark Gap, for efficiency, neatness, simplicity and low price, stands unequaled.

While our No. 1111 set of "Electro" jump spark balls are best suited for short distances, for which purpose they are so far unmatched, the "Electro" Zinc Spark Gap is intended to do real hard work—even commercially for distances as great as 150 miles.

The peculiar properties of a small zinc spark gap make it particularly efficient for sending, especially when a sending condenser is used. While the spark balls—having a capacity themselves—do not need aerial and ground for short distances, the Zinc spark gap throws all the energy upon the antennae from which it radiates into space most powerfully.

Our new Zinc Spark Gap is used of course in the same manner as our spark balls. Any size coil up to 6 inches can be used successfully.

It has been found in the past that if zinc is used in the sending spark gap, same will transmit fully twice as far as brass or any other metal, hence, as usual, we use the best.

If a single small Leyden jar is shunted across the gap and if, for instance, a 1-inch coil is used, an intense blue mass of fire will crash across the gap with a deafening roar—exactly like you hear it in the large commercial and government stations. If you never saw our Zinc Gap in operation, you will hardly realize its power.

Besides, it may also be used as an

ANCHOR GAP

in the antennae, which serves as an automatic switch. (See article on 2-mile Wireless Station in the July, 1908, issue of "MODERN ELECTRICS.")

The "Electro" Zinc Spark Gap has two zinc rods 3-16 inch diameter, and 2½ inches long, having a hard rubber handle at one end, making it possible to adjust the gap while sending. Stands which are finely nickel plated are mounted on heavy oak base. Size of base 2x3½ inches.

No. **9220** "Electro" Zinc Spark Gap, as described **$0.60**
By mail, extra **0.03**

PARTS to this Gap are not sold, except for repairs.

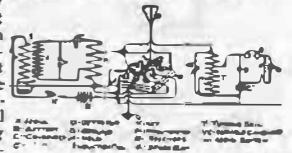
"ELECTRO" AJUSTABLE ZINC SPARK GAP.

This Spark Gap, ever since its introduction last year, has found much favor among wireless people. This Gap is a marvel of simplicity and must be seen in action to be appreciated. It has heavy zinc plugs, ¼ inch thick, which makes it possible to use the Gap on a ½ K.W. transformer, and with our ½ K. W. transformer coil. Size of base: 4½x2½ in. Finely polished hard rubber pillars, hard rubber binding posts and thumb screw (1 inch in diameter). Metal arch is of special hard aluminum, ¼ in. thick, finely lacquered. The adjustment is extremely accurate. Gap is to be adjusted while IN OPERATION.

No. 9220a. Zinc Spark Gap, patents pending, as described..... **$1.00**
By mail extra ..... 12c.

THE "ELECTRO" ANTENNA SWITCH.

This switch has been brought out in pursuance to a great many calls we have had in the past for such a switch. As illustration shows this is a three-pole, double throw switch. As will be seen the throw to change the switch over is only about 1 inch, making the throw almost instantly. The two end prongs are at an angle of 140 degrees and the construction of this switch is unlike any other. By referring to the diagram it will be seen that when the switch is thrown for receiving the primary of the coil is disconnected. If accidentally the sending key should be touched it will be impossible to damage the receiving instruments, as the coil can under no circumstances operate. The diagram shown is standard, but of course many other connections can be devised by the experimenter. All metal parts are pure copper.



No. 8100

Hard rubber handle is provided as switch handle. This switch will stand the discharge of a 4 inch coil without jumping across. It can be used in connection with a transformer up to 5 K. W. All copper parts are an eighth of an inch thick. Binding post is provided at each pole of the switch.

The switch can be screwed down on any table or on the wall. Size of base 7 x 7 inches, height over all 4 inches, when lever is down; when lever is up, height is 5 inches. Weight 1¼ pounds. This switch is built thoroughly all the way through, best material used and construction is right. There is at the present no quicker wireless throw switch on the market. We will refund your money if it is not absolutely satisfactory.

No. 8100. "Electro" Antenna Switch, as described, price..... **$2.00**
Cannot go by mail. Parts NOT sold.

THE GERNSBACK ELECTROLYTIC INTERRUPTER.

PATENTS PENDING.

No. 8000

is a radical departure in electrolytic interrupter manufacture. It was constructed with the view to stand great abuse, give marvelous results and to be ridiculously low in price. Heretofore such interrupters could not be had under $15 to $20 and most young experimenters who did not care to pay this sum had to go on using batteries, which only cause trouble and dissatisfaction.

The Gernsback interrupter is connected in series, with any ordinary spark coil and the 110 V. or 220 V., direct or alternating lighting current supply. No resistance or condenser is used, except a key or switch to break the current in the usual manner. The vibrator of the coil must be screwed up tight as it should not vibrate. The glass vessel is filled with the solution (formula furnished only with interrupter), and as soon as the key is depressed you will get the surprise of your life. You don't get a thin, meagre spark, as with batteries, but A HEAVY FLAME ¼ INCH THICK. That this is the ideal thing for Wireless is unnecessary to mention, The spark obtained of a 1-inch coil, connected to a big sending condenser and a zinc spark gap with zincs ½ INCH THICK will crash in the gap with such a tremendous noise that it will take your breath away AND THE SPARK FILLS THE GAP. These are PLAIN FACTS. Our usual guarantee backs them. By way of proving our statement look at the two photos taken by Mr. Gernsback. The first one shows the full spark of a 2-inch coil run by a 6 V. 60 A. H. storage battery. Exposure 1½ seconds. The second shows the FLAME of the same coil with a 110 V. current and the new interrupter. Exposure 1½ seconds. The flame shoots upward, as the great amount of heat raises the discharge. You cannot appreciate the work you are able to do with this wonderful interrupter till you see it in operation. Not alone do you get a better and a heavier spark, but it is also from 15% to 25% LONGER, all depending on the construction of the coil.

And that is not all. The output of the coil is increased at least 60%. That means that you can send at least 60% further with the Gernsback interrupter. This will be better understood by mentioning that two No. 14 copper wires, connected to a 1 inch coil and separated ¼ inch will fuse within 5 to 10 seconds.

The Gernsback interrupter starts with 50 volts. A metal rod of especial alloy goes through the cover down in the porcelain tube. This tube at its lower end has a peculiar aperture in which the point of the rod fits.

No. 1

The tube at the upper end has a screw top which screws in the cover. This tube is made of special material and will not crack even if the interrupter is worked steady. In operation the metal rod wears itself away to a point. The rod itself is fed down by gravity. This action is entirely controlled by the weight attached to the top of the rod (see cut). In fact, the entire success of this interrupter lies in the right weight of the metal weight. Too much weight gives no spark at all; too little gives an uneven and unsteady spark. Very little metal is used up; it takes about 60 hours' constant work to consume one inch of the rod. New rods are supplied at a trifling cost. The rod can be left constantly in the solution without harm.

No. 2

The hard rubber composition top has all metal parts IMBEDDED in it (Patented). No metal exposed whatsoever. Therefore NO CORROSION as is usually experienced in other interrupters. The binding posts are of hard rubber, therefore do not corrode, nor can they become short circuited accidentally, nor shock you.

The interrupter heats up very little even when working for hours. The path between the two electrodes is only ¼ inch and the amount of solution heated at a time therefore is necessarily very small.

This interrupter will find thousands of friends and is especially recommended for wireless and X-ray work. When used for the former it may be stated that it produces an extremely high sound in the distant receiver, which is much easier to read than the low sound produced with the old spring vibrator giving only from 150 to 200 interruptions per second, against 5,000 to 7,000 per second with the electrolytic interrupter.

The interrupter is to be used in connection with ordinary spark coils from ¼ inch up to 12 inch spark length.

Two coils (or more) may be connected in series and if the secondaries are connected in series too, the length of the resulting spark is as long as the spark of the two coils put together. Therefore, two 2-inch coils will give a 4-inch spark and so on. Ordinary vibrator coils can not of course be connected in series, as each vibrator working independently will oppose the other, the consequences being that the spark length is cut down.

With the electrolytic interrupter a plurality of coils work as one, as the pulsations from the interrupter flowing through all the primaries (connected in series) magnetize and demagnetize the primaries all at the same time. The result, therefore, is that each coil acting in unison with the other (or others) will add its output to the other (or others). The longer spark is the result. Another important feature is as follows: If we connect two Gernsback interrupters in series and then operate the coil, we find that the spark length of the coil is DOUBLED. Therefore, if anyone owns, for instance, a 2-inch coil he will obtain a 4-inch steady spark from same, when using 2 interrupters.

OPERATION.

First fill the glass jar with the solution (to be obtained from any druggist) so that it stands 4 inches high in the glass. Put the cover on jar and pass the rod through the cover down in the tube. Be sure that its point fits in the aperture at the bottom of tube. The weight is then attached to the rod as shown in cut.

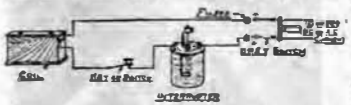
The thumb screw of the metal bridge on top of cover is left loose.

Now connect the interrupter as shown in diagram. If the current is direct the positive pole of the current must be connected with the post marked +. If the current is alternating it does not make any difference how the wires leading to interrupter are connected, since there is no positive nor negative pole.

The interrupter works on direct and alternating current.

The Gernsback interrupter consists really of two interrupters in one.

If we lift the rod up about ¼ or ½ inch so that the rod is no longer in the lower hole and clamp it tight by means of the thumb screw in the bridge of the cover, the interrupter will work, but the spark is much shorter; on the other hand, it is much heavier and more vigorous. The solution tends then to mount in the tube and will flow out from the overflow.



A switch block with fuses should always be used with the interrupter. It is much better to blow out a fuse than to damage the coil or interrupter if the current should get too strong, or if the tube in the interrupter should accidentally become fractured, which would short circuit the line.

Every instrument is fully guaranteed to be all we claim for it. Mr. Gernsback would not allow his name put to it if he had not implicit faith in it. It is a guarantee by itself.

THE GERNSBACK INTERRUPTER (patents pending) **No. 8000**, as described, size 10½x5 inches. Weight, without solution, 3 lbs. Boxed in strong wooden box, shipping weight, 5 lbs. ..... Price **$2.50**

No. 8000a.	Metal rods for Gernsback Interrupter ..... Each	**$0.15**
No. 8000b.	Extra tubes for Gernsback Interrupter ..... Each	**0.30**
No. 8001.	D. P. S. T. Switch block with two 10 A Edison fuses..	**0.45**
No. 8002.	Cotton covered double cond. lamp Cord, per foot.....	**0.01**
No. 8003.	Attachment plug, fits any lamp socket	**0.15**
No. 8004.	Extra Edison fuses	**0.05**

Note.—Parts to this Interrupter NOT SOLD, only to owners of the Interrupter for repairs, etc.

Note.—This Interrupter does NOT work our closed core transformer, but only open core transformers, such as our **No. 8050**.

The "Electro" Antenna Insulator

No. 10001.

For some time past we have been considering the manufacture of a high-grade antenna insulator having all the good, but none of the bad, qualities of aerial insulators. The problem has been a rather hard one to solve, we confess, but the insulator which we now offer is the outcome of four months' experimentation and our exhaustive tests have proven anew that the experts connected with our establishment can crack hard nuts, if occasion arises.

Our insulator will do the following: It holds the discharge of a 4-in. coil, WHEN WET, even if thoroughly moistened with a solution of sal ammoniac. (This represents a test near the sea in damp, salty air.) It withstands a strain of 350 pounds, and does not break easily. It is not affected by tropical and frigid climates, snow or moisture and stands ordinary temperatures from 0-100 degrees Fahrenheit surprisingly well. The insulator is made of a new compound and is warranted to be perfect in every respect. It has positively the highest insulating value and will not leak. Wrought-iron rings at both ends. Size over all, 3½x2½ ins.

No. 10001 "Electro" Antenna Insulator, as described, each...**60 20**
In dozen lots..... **3 25**
Cannot be mailed.

THE "ELECTRO" ½ K. W. TRANSFORMER-COIL.

(100 MILE WIRELESS COIL.)

is a radical departure from ordinary coil building. It possesses all the good points of a good coil, but none of its bad ones

The average experimenter when buying a coil nowadays buys a cat in a bag. The coil is sealed entirely and if it should break down it must go back to the factory. Neither does the owner know what is inside of the coil—he must take the maker's word for it.

Our new coil is **NOT SEALED IN**, and is still better insulated than a sealed in coil.

Our new Departure is centered in our **BLOCK SECONDARIES** (see cut). These secondaries are wound with **NO. 30 B. & S. ENAMELED WIRE**. This means, on account of getting 3 times as many ampere turns into a given space, that our secondaries are 3 times as efficient as other ones, and that they take up one-third as much room. Size of secondary, 3½x2¾x3½ inches.

No. 8050

You marvel that such a small coil could give such an enormous output. The enameled wire explains the mystery. After the secondary coils have been wound they are placed in a square box which is filled with molten paraffine. When cold, a square block-coil is obtained, which exposes no wire except the 2 end pieces.

We form our secondaries square so they can not roll. Each secondary weighs 2¾ lbs. and gives a 1-inch spark.

The primary is another marvel. We use again enameled wire, No. 14 B. & S., and consequently get just 3 times as much wire on the core, as if we used the common D. C. C. wire, used now almost entirely on inferior coils. The result is of course that our new primary is just 3 times as efficient as other ones.

We are willing to prove that our primary gives a 25 per cent longer spark on the secondary as with the old type.

A hard rubber insulating tube is slipped over the primary. Then the two block secondaries are slipped on, and the whole is placed in the coil box, which has been treated with an insulating compound.

All coils fit perfectly close and snug and the box is arranged in such a way that the secondaries can not move, but are always ¼ inch apart.

Connections are made and the cover is screwed down. Thus this marvel of simplicity is always ready to be inspected and to be taken apart, when occasion arises, for new experiments, etc., etc.

Four top rubber binding posts are provided, so that one secondary may be used at a time, both in series, both in parallel and for other important experiments.

As there is no vibrator nor condenser to this coil, it must of course be used with an electrolytic interrupter or independent vibrator, or running it from 110-220 Alternating current.

The spark obtained is from 1¾ to 2 inches long, but ¼ inch **THICK**. For wireless work it is the fat spark that counts, not the long, thin spark. You must radiate energy (amperage) from your antenna, not tension (voltage).

THE "ELECTRO" ½ K. W. TRANSFORMER-COIL.—Continued.

Our coil radiates energy—high amperage—and lots of it.

Compared with the ordinary coil, ours as far as wireless transmission is concerned, will send further than the 8-inch coil wound with No. 36 B. & S. wire. And an 8-inch coil costs $88.50!!

Size of box, 9x5½x4⅝ inches. Weight of complete coil 8¼ lbs.

No. 8050. Electro ½ K. W. Transformer-Coil, as described.....**$7.50**

No. 8060. Same coil as above, but with fine vibrator and condenser, to work on 6 to 10 volts (100 watts equal to 20 miles). Price **$10.00**

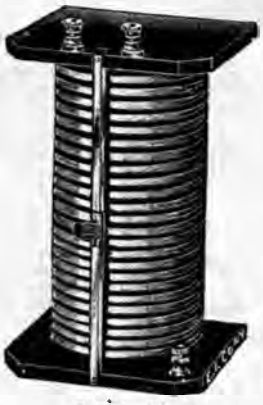
No. 8070. Block-Secondaries wound with No. 30 Enameled wire, as described. Price .....each **$2.75**

No. 8071. Primary, with Enameled wire (1½ in. diam.). Price each **$1.50**

No. 8072. Hard wood box. Price .....each **$0.50**

THE "ELECTRO" SPECIAL SENDING HELIX.

(Patent Pending.)



No. 9270a

While our now well known Sending Helix No. 9270 (see opposite page) has been used extensively in wireless work during the past year, we have had so many calls for a more powerful helix, that we decided to build one, to work on coils from 2 inch up to 12 inch spark length, or in connection with our No. 8050-8060 Transformer Coils, or up to ½ Kilowatt standard wireless transformers.

The Special Sending Helix does not take the place of the No. 9270. It is simply built to work in conjunction with larger coils, as the No. 9270 cannot be recommended to work with coils above 2 to 2½ inch spark length.

The inductive effect of our new helix is extremely high; in fact, is about 2½ times as great as that of a round wire coil, on account of the metal ribbon which we use. It has been proved time and again that when used with high tension alternating currents, a flat ribbon inductance acts far more powerful, as the inductive effect between edges is much greater than between round wires.

Our new Helix is wound with 24 turns brass ribbon ½ inch wide. Total length of ribbon is 26 feet. The ribbon is thick enough so as not to introduce objectionable resistance in the circuit.

Our patent ball bearing sliding contact is used which works with wonderful ease and does not wear out the ribbon. The contact ball is now made of hard copper to decrease resistance.

Three large binding posts are provided. For connections see diagrams pages 118-119-120.

Size of frame 7 x 7½ x 13 inches. Weight 4 lbs.

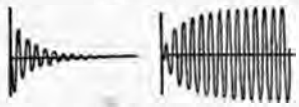
No. 9270a. "Electro" Special Sending Helix, as described.....**$5.00**

THE "ELECTRO" ADJUSTABLE CONDENSER—Continued.

A 2-inch coil, in connection with our Adjustable Condenser and our Sending Helix rivals a good many commercial stations, and can be used as such.

The "Electro" Adjustable Condenser is truly a marvel of simplicity and efficiency. No condenser was ever built in this manner and we have devoted all our energy to produce an excellent article in reach of everybody. Our Condenser is not alone used in Wireless, but in Tesla experiments; in fact, in all high tension work, to adjust capacities, etc.

A complete Condenser comprises the stand or frame and six best imported Leyden jar condensers in which only glass free of all traces of lead is used. Leakage absolutely impossible. The novel part, however, is that each jar has a spring clip at the top, and as the stand has at the top circular recesses, and at the bottom small round metal knobs, the jar is snapped into its position in less than a second. It snaps out simply by pulling or pushing the jar.

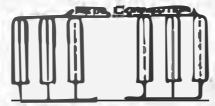


1 2

NO CONNECTING WIRES, NO SCREWS USED WITH JARS.

Good connections at ALL times. The jars cannot fall out, no matter in what position.

THE BEST PART, however, is that you do not have to buy a complete stand with 6 jars. You can start with the stand and 2 Leyden jars, and add more as you need them. If this is not furthering your interests we know of nothing that is. To change or vary the capacity of your circuit, simply snap in or out more or less jars, till best results are reached.



In the whole world you could not find a simpler arrangement.

The frame is made of well seasoned oak, the jars are beautifully finished and when connected (from 2 up) they are automatically placed in multiple as per sketch above. This, we found, is the best arrangement.

Sizes are: Height, 6 inches; width, 2½ inches; length, 9 inches.

Weight (with 6 jars, complete), 1 lb.

No. 9260 "Electro" Adjustable Condenser, as described, complete with Stand and 6 Leyden Jars **$2.50**

No. 9261 Stand only (complete to take jars) .... **.50**

No. 9262 Leyden Jar (with spring clip), each ..... **.35**

Leyden Jars.

9221

Our jars embody the best workmanship. The glass used is guaranteed to be the thinnest Bohemian hard glass, free of all harmful salts. We could turn out these jars at almost half the price listed, by using domestic glass, but such jars will leak badly and crack soon. Our jars may be subjected to a remarkably high potential and are very hard to puncture. The tinfoil is at least twice as heavy as that used in other jars and will not "blister."

Solid brass balls are used and the glass, not covered with tinfoil, inside and outside, is finished in bright red shellac, giving the jar a very beautiful appearance, besides preventing leakage.

All our jars can be charged with even our ½-inch coil and the discharging crash of even our 1-pint jar can be heard for blocks. It is powerful enough to kill a cat with a single discharge. Even our largest jars can quickly be charged with our static machine, No. 9000.

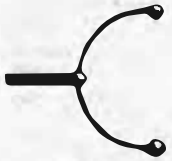
LEYDEN JARS—Continued.

Only the following sizes are made now:

No.		
9221	Leyden Jar, as described, 1 pint	**$ 0.75**
9222	Leyden Jar, as described, 1½ pint	**1.00**
9223	Leyden Jar, as described, 1 quart	**1.50**
9024	Leyden Jar, as described, 2 quarts	**2.00**

Cannot be sent by mail.

Discharger.



9225

There is only one way to discharge a Leyden Jar and that is by using a discharger. Ordinary wire cannot be used, as it is impossible to draw a spark with pointed wires or other objects. The points act like lightning arresters and draw out the charge silently. By using our discharger the bright blue, crashing spark will jump between the two balls as soon as one of the balls of the discharger touches the outside coating of jar, while the other is brought close to the brass ball of the Leyden Jar. Finished in brass. Hard rubber handle.

No. **9225**	Discharger, as described	**$0.35**
	By mail, extra	**0.06**

Carborundum.

Specially selected crystals for experimenting with the Carborundum Detector. Marvelously sensitive.

9308	Per ounce	**$0.25**
	By mail, extra	**0.03**

Silicon.

There are two kinds of this material: Silicon crystals and fused Silicon. The former, manufactured in this country, is absolutely unfit to use, the latter, imported by us, is the only kind that should be used. It comes in chunks and somewhat resembles graphite. It is very hard and extremely brittle.

9209	Per ounce	**$0.75**
	By mail, extra	**0.03**
	Small piece	**0.20**
	By mail, extra	**0.02**

Molybdenite.

This new substance is the only one discovered so far which does not get out of adjustment, when used in a sensitive Detector, and when placed near a sending gap. Most all substances suffer a great deal from strong sending currents, but it is impossible to damage the adjustment of the Molybdenite Detector; even a heavy discharge does not affect it.

Molybdenite proves incredibly sensitive when distant stations are to be picked up.

9210	Per ounce	**$0.15**
	By mail, extra	**0.02**

Selenium.

This peculiar substance is a conductor of electricity while exposed to light rays. An insulator in the dark. Used to make the well-known Selenium Cells (see article: "An Electric Sun Alarm," and "How to Make a Selenium Cell," May, 1908, issue "MODERN ELECTRICS"). Will close a relay when match is lighted near cell.

Selenium will solve many problems during this century.

The only kind fit to use in the electrical arts comes in form of sticks. This is the kind we import.

9211	Selenium Metal, in sticks, C. P., per ounce	**$1.50**
	By mail, extra	**0.04**
	One-quarter ounce (smallest quantity sold)	**0.50**
	By mail, extra	**0.02**

Platinum Wires.

(Prices Subject to Fluctuations.)

No.				
1278	Platinum Wire .001 in. diameter	**$0.60**	per	foot
1279	" " .002 in. "	**0.50**	"	"
1180	" " .004 in. "	**0.35**	"	"
1281	" " .006 in. "	**0.40**	"	"
1282	" " .008 in. "	**0.48**	"	"

By mail, extra, 2 cents.

In less than 1 foot, 15 per cent. extra. Not less than 6 inches sold.

Wireless Key.

9212

While our No. 1116-17 keys are well suited for coils up to 2-inch spark, a larger key must be used for the more powerful coils, from 3-12 inches, and especially if the coils are used on 110 volt currents.

We also greatly recommend this key for use with our No. 9280 transformer, with which it gives excellent results.

Our key has an auxiliary conductor for leading heavy currents to the lever, and will positively not heat up even if 30 Amperes are used for hours.

It is provided with large hardened platinum contact points, fitted in removable holders to facilitate renewal.

Handsomely finished in Gold Lacquer, heavy metal base, ½ inch thick.

We call especial attention to the large binding posts, which will take a No. 10 B. & S. wire.

Weight of key: 9 oz. Sizes: 5½ inches long, 2 inches wide.

9212	Wireless Key, as described	**$5.00**
	By mail, extra	**0.12**

THE PHONES WHICH

Saved the "Republic"

(or rather its 500 human beings)

Operator Binns the famous C. Q. D. man used our Phones.

HIGH RESISTANCE PRECISION HEAD RECEIVERS FOR WIRELESS TELEGRAPHY AND TELEPHONY

TRANSATLANTIC TYPE

Adopted by the U. S. Navy, United Wireless Co. Marconi Wireless Telegraph Co. etc.

WE GUARANTEE EACH RECEIVER FOR ONE YEAR

1305

These receivers embody the finest workmanship, and in connection with our various Detectors and other instruments are so marvelously sensitive that they will talk loud and distinct where others would not respond at all. A few years ago we sold these same receivers, (No. 1305) at $12.00 a set, but as we manufacture them now on a very large scale it has been possible to greatly reduce our price.

We make the broad and sweeping statement that our receivers are absolutely the most sensitive in the world now—without any exception and regardless of price.

The two largest commercial wireless companies in the world now use our receivers, which alone is proof of the superiority of our phones. We have hundreds of testimonials from enthusiastic owners of our headphones.

The weight is 50 per cent. less than other similiar receivers; operators do not tire with these even if carried hours at a stretch on head. The head band is adjustable to fit any size or any shape head; the stirrups holding the phones are made so ingeniously that the phones are pressed tight to the ear, excluding all external noises.

Each receiver is wound to 1000 OHMS with No. 50 single silk covered wire which explains the extraordinary sensitiveness. Some makers use No. 40 silk covered or enameled wire. This is absolutely unfit to use as we found through long experiments. No. 50 wire costs six times as much as No. 40, but we use it because *we increase* with its use the AMPERE TURNS and the receivers consequently become infinitely more sensitive. We guarantee each receiver to stand the following extraordinary test: Moisten or wet the metal receiver cord tips. When both are touched the receiver will respond! The voltage generated by the metal tips is less than 1/100,000, the amperage less than 1/1,000,000 (one millionth.) Bands and receivers finely nickel plated. Silk conductor cords, 6 feet long, etc.

1307

1305 Head Receivers (2) with head band (as cut) complete		**$7.00**
1306 One Head Receiver (1) with head band	"	**4.50**
1307 Receiver only with 8 foot cord	" "	**2.50**
1308 Head Band only	" "	**2.00**
1024a Receiver wound to 1000 Ohms, guaranteed.....		**1.50**
1309 Head Band to fit No. 1024 Receivers.....		**.55**
Postage on single telephone receivers, 7c		
4003 Telephone Cord 3 feet long with 4 metal tips.....		**.15**

Complete Wireless Outfits.

Although it had been our intention not to sell complete wireless outfits (we do not refer to our "Telimco" and "Telim" sets), as all the apparatus and supplies are listed separately in our catalogue, we have had considerable correspondence in the past few months with experimenters and parties desiring to use our instruments commercially, and we decided to list complete outfits.

As will be seen, the complete outfits sell at a lower figure than the separate apparatus. If, however, one or several of the listed pieces are left out from an outfit, THE FULL PRICE FOR EACH PIECE AS LISTED COMES IN FORCE. This does not refer to batteries, which, if left out, may be deducted AT THE PRICE OF 10 CENTS EACH, and not more, from the full price of the outfit.

Many people who desire a receiving outfit only will welcome the assortment of receiving outfits listed.

We have gone to considerable expense and trouble to test these outfits and we are, therefore, in a position to ABSOLUTELY GUARANTEE the range of all our outfits if put up as per our directions, and if worked intelligently. It will be seen that our outfits listed below are all of the modern type; that is, no calling apparatus are used. As will be known, all up-to-date wireless stations have discarded the call apparatus and most stations now work under prearranged time schedules.

To make this clear, suppose you arrange with a friend to communicate by wireless every evening at 8.30 o'clock. Both of you should have an alarm clock, which, ringing at 8.30, calls the attention of both, which makes forgetting or missing out of the question.

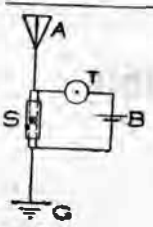
As stated, we guarantee the range of our apparatus. If we say that a particular outfit works five miles, it will really work six and even seven under favorable conditions. It must be borne in mind that all wireless outfits (no matter what make) work twice the distance over water than they will over land. During the night the range is 30-50 per cent greater than during the day.

Forests and mountains, especially those containing ores, cut down the efficiency of an outfit 10-15 per cent. With higher aerials this deficiency can, however, be easily overcome.

This catalogue is the first one ever issued by any concern to give complete diagrams showing how to connect wireless instruments. Some concerns who do not take so much interest in their customers as we do, sell diagrams—not half as clear as ours—for 10 to 25 cents each. We give you all information free, as we know that you will order enough goods from us to recompense us for our trouble.

The letters used in all the diagrams designate: A—Aerial; B—Battery; C—Coil; D T—Double Slide Tuner; E—"Electro"-Lytic Detector; F—Fixed Condenser; G—Ground; H—Sending Helix; K—Key; KW—Transformer; L—Leyden Jar Condensers; P—Potentiometer; R—Rheostat; S—Auto Coherer; S T—Single Slide Tuner; T—Telephone Receiver; V—Variable Condenser; Y—A. C. Supply, 110-220 Volts; Z—Zinc Spark Gap.

Receiving Outfits.



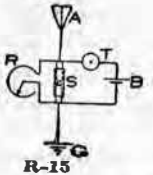
R-10

No. R-10.

Range 5-10 miles with aerial 20-25 feet high.

No. 1098	Auto-coherer	$0 90
No. 1024	Telephone receiver	38
No. 1001	Electro dry battery	16
No. 9219	¼ lb. aluminum wire	15
	Complete Outfit No. R-10	1 50

This outfit is not tunable.



R-15

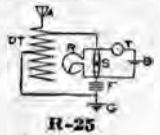
No. R-15.

Range 10-15 miles with aerial 20-25 feet high. Same as above, with one No. 5000 Rheostat Regulator, which allows to adjust the coherer more sensitively. This outfit is not tunable.

Complete Outfit No. R-15 ..... $2 00

No. R-25.

Range 20-25 miles with aerial 25-30 feet high.



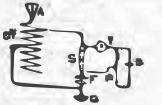
R-25

No. 1098	Auto-coherer	$0 90
No. 1024	Telephone receiver	38
No. 9950	Tuning coil	2 25
No. 10000	Fixed condenser	1 00
No. 5000	Rheostat regulator	50
No. 1001	Electro dry battery	16
No. 9219	¼ lb. aluminum wire	15
	Complete Outfit No. R-25	5 00

This outfit can be tuned.

No. R-25a.

Range 20-25 miles with aerial 25-30 feet high.



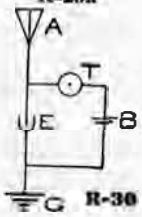
R-25a

Same as No. R-25 with addition of Potentiometer No. 9250, which makes the regulation considerably more perfect. The sensitivity is also greater, the signals coming in clearer and stronger.

Complete Outfit No. R-25a $6 50

This outfit can be tuned perfectly.

No. R-30.



R-30

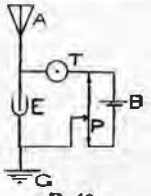
Range 25-30 miles with aerial 25-35 feet high.

No. 9002	"Electro-Lytic" bare point detector	$1 50
No. 1024	Telephone receiver	38
No. 1001	Electro dry battery	16
No. 9219	¼ lb aluminum wire	15
	Complete Outfit No. R-30	2 70

This outfit is not tunable.

RECEIVING OUTFITS.—Continued.

No. R-40.



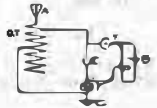
R-40

Range 35-40 miles with aerial 25-35 feet high. Same as No. R-30, but with potentiometer No. 9250, which increases the sensitiveness of the ouft considerably.

Complete Outfit No. R-40 ..... $3 50

This outfit is not tunable.

No. R-40a.



R-40a

Range 35-40 miles with aerial 25-35 feet high. This outfit is the same as No. 40, but with the addition of tuning coil No. 9950 and fixed condenser No. 10000. This makes the outfit tunable and free from most interference.

Complete Outfit No. R-40a $6 00

No. R-60.

Range 50-60 miles with aerials 30-35 feet high. Same as No. R-40, but with one No. 1307 1,000-ohm receiver, with which we furnish a fine 3-foot cord. With the 1,000-ohm receiver the signals come in twice as strong than with the No. 1024 75-ohm receiver. Connection the same as for No. R-40.

Complete Outfit No. R-60 ..... $5 40

This outfit is not tunable.

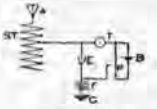
No. R-75.

Range 65-75 miles with aerials 30-35 feet high. Same as No. R-60, but with addition of tuning coil No. 9950. This is a very good outfit and we recommend it strongly. It is tunable and practically free from interference. Connections are the same as No. R-40a.

Complete Outfit No. R-75 ..... $7 50

No. R-100.

Range 80-100 miles with aerial 40-50 feet high.



R-100

No. 9002	"Electro-Lytic" bare point detector	$1 50
No. 1024	Telephone Receiver	38
No. 9250	Potentiometer	1 50
No. 8480	Tuner	4 00
No. 10000	Fixed condenser	1 00
No. 1001	2 Electro dry batteries	32
No. 9219	½ lb. aluminum wire	30
	Complete Outfit No. R-100	$8 50

This outfit can be tuned very satisfactory.

No. R-150.

Range 125-150 miles with aerials 40-50 feet high. Same as No. R-100, but with No. 1307 1,000-ohm receiver instead of No. 1024. This outfit, which can be tuned very successfully, is used a great deal by schools and people who desire a high-grade outfit. Connections same as No. R-100.

Complete Outfit No. R-150 ..... $10 50

RECEIVING OUTFITS.—Continued.

No. R-300.

Range 250-300 miles with aerials 50-75 feet high.

R-300

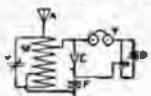
No.	9002	"Electro-Lytic" bare point detector	$1 50
No.	1307	1,000-ohm receiver with 3-foot cord	2 50
No.	9250	Potentiometer	1 50
No.	8486	Tuner	4 00
No.	9240	Variable condenser	3 00
No.	10000	Fixed condenser	1 00
No.	1001	3 dry cells	48
No.	9219	1 lb. aluminum wire	60

This outfit is tunable in the highest degree. All interference can be overcome with the variable and fixed condenser. Static electricity will neither have much effect on this outfit.

Complete Outfit No. R-300 ..... **$13 75**

No. R-1000.

Range 1,000-1,500 miles with aerial 100-125 feet high.



R-1000

This is our best receiving outfit. It is impossible to furnish anything better for the money. The outfit is used for commercial work and is absolutely non-interferable. Signals even from 1,000 miles away are heard very plainly. We only claim a range of 1,000 miles for this outfit, but we have quite frequently received clear messages from 1,500 miles away. When conditions are very favorable (during night—over water) 2,000 miles and even more can be covered. Instead of No. 8486 coil we give No. 8486a with this outfit. No. 1205 receivers—2,000 ohms—are also used instead of No. 1307.

Complete Outfit No. R-1000 ..... **$18 50**

Sending and Receiving Outfits.

While it is comparatively cheap to construct wireless outfits to receive messages from great distances, outfits to send even over short ranges are more expensive, as powerful coils or transformers are needed to create sufficiently powerful oscillations to bridge certain distances.

What has been said under "Receiving Outfits" holds true for sending outfits. All our outfits are UNDERRATED. When we claim that an outfit will work ten miles under most all conditions you can rest assured that it will cover twelve miles quite easily. As we ABSOLUTELY GUARANTEE all our outfits, we consequently underrate them to be on the safe side; our customers, therefore, never run the risk of buying outfits that do not transmit over a specified range.

We even go further. We shall unhesitatingly take back any of our outfits, with all the apparatus and aerials we recommend, which we sell to work over a specified distance, if it can be proven to us that with ordinary care and attention the outfit does not cover the range. We are willing to exchange the outfit in such a case or give credit for the entire amount of purchase, if apparatus are returned in A-1 condition.

SENDING AND RECEIVING OUTFITS.—Continued.

Other so-called "manufacturers" who "manufacture" in an attic may sell you outfits cheaper, but take our word for it that the outfits are invariably OVERRATED; their outfits rated to work ten miles will work five miles—if that much.

We do not ask you to take our word for it. Write them and get a WRITTEN GUARANTEE if they will guarantee their outfit to work the full range or take it back and REFUND THE MONEY.

Our six years' reputation is back of US. THE E. I. CO. ALWAYS MAKES GOOD—and everybody knows it. Ask your friends; they know us and will tell you.

When two complete intercommunicating outfits (two sending and two receiving) are ordered at **the same time** we furnish free of charge two D. P. D. T. switches No. **1313** (see plan, page 82).

With outfits Nos. S-¼, S-½, S-1, S-2, we do NOT furnish switches free of charge. If wanted they must be purchased separately.

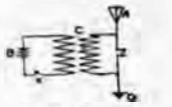
As will be seen we have listed with the sending outfits various receiving outfits. These we have found most suitable. Of course, our customers are at liberty to substitute other receiving sets. However, in that case we cannot guarantee the range of the entire outfit.

No. S-¼.

Range ¼ mile with aerial 20-25 feet high.

No. 4360	¼-in. spark coil	$2 50
No. 9220	Zinc spark gap	60
No. 1119	"Cinch" strap key	20
No. 1001	3 Electro dry cells	48
No. 9219	½ lb. aluminum wire	30
Complete Sending Outfit, No. S-¼		3 85
Complete with No. R-10 Receiving Outfit		5 50

This outfit is not tunable.



S-¼

No. S-½.

Range ½ mile with aerial 20-25 feet high. This outfit is the same as No. S-¼, except that Coil No. 1087 instead of No. 4360 is used. Connections are the same as for No. S-¼.

Complete Sending Outfit No. S-½ **$4 50**
Complete with No. R-10 Receiving Outfit **6 00**
This outfit is not tunable.

No. S-1.

Range 1 mile with aerial 20-25 feet high. This outfit is the same as No. S-½, except that receiving outfit No. R-15 is used in connection with it. As same is more sensitive than No. R-10 the range consequently is greater. The connections are the same as No. S-¼. Diagram of receiving the same as for R-10.

Complete Outfit No. S-1 with Receiving Outfit No. R-15 ..... **$8 50**

No. S-2.

Range 2 miles with aerial 25-30 feet high.

No. 1088	1-in. spark coil	$5 00
No. 9220	Zinc spark gap	60
No. 1119	Cinch strap key	20
No. 1001	5 "Electro" dry cells	80
No. 9219	½ lb. aluminum wire	30
Complete Sending Outfit No. S-2		6 50
Complete Sending Outfit No. S-2 and Receiving Outfit No. R-10		8 00

This outfit is not tunable. Same connections as S-¼.

No. S-5.

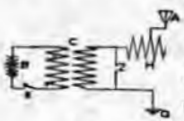
Range 5 miles with aerial 30-35 feet high. This outfit is the same as No. S-2, except that at the receiving end the receiving outfit No. R-30 is used. Connections the same as No. S-¼.

Complete Sending Outfit No. S-2 and Receiving Outfit No. R-30 ..$8 50

This outfit is not tunable.

No. S-5a.

Range 5 miles with aerial 30-35 feet high. This outfit is tunable; tuning can be done quite sharply. An excellent outfit in every respect. Can be used for regular and commercial work. Will stand much abuse.

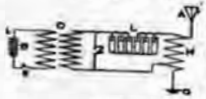


S-5a

No. 1088	1-in. spark coil	$5 00
No. 9220	Zinc spark gap	60
No. 1119	"Cinch" strap key	20
No. 1001	6 electro dry cells	96
No. 9219	1 lb. aluminum wire	60
No. 9270	Sending helix	2 00
Complete Sending Outfit No. S-5a		**8 90**
Complete Sending Outfit No. S-5a and Receiving Outfit No. R-40a		**$15 50**

No. S-8.

Range 8 miles with aerial 35-40 feet high.



S-8

This outfit has the same sending and receiving apparatus as No. S-5a. The sending outfit, however, has in addition the No. 9260 adjustable condenser. This instrument greatly increases the range (see page 109).

Complete Sending Outfit No. S-8 ..$11 00

Complete Sending Outfit No. S-8 and Receiving Outfit No. R-40a ..$17 50

No. S-8a.

Range 8 miles with aerial 35-40 feet high. This outfit has the same range as No. S-8. The sending instruments are the same. With this outfit the receiving outfit No. R-75 is used. This outfit is absolutely non-interferable. It can be tuned sharply and can be worked well, even if large stations are near. Sending Diagram same as No. S-8. Receiving Diagram same as No. R-40a.

Complete Outfit No. S-8 and Receiving Outfit No. R-75 ..$18 50

No. S-10.

Range 10 miles with aerials 40-50 feet high.

No. 4306	1½-in. spark coil	$7 00
No. 9220	Zinc gap	60
No. 1119	"Cinch" strap key	20
No. 1001	8 "Electro" dry cells	1 28
No. 9219	1 lb. aluminum wire	60
Complete Sending Outfit No. S-10		**9 20**
Complete Sending Outfit No. S-10 with Receiving Outfit No. R-30		**$11 25**

Same connection as No. S-¼. This outfit is not tunable.

No. S-10a.

Range 10 miles with aerial 40-50 feet high.

This outfit is the same as No. S-10, but is tunable, as one No. 9270 Sending Helix is added.

Complete Sending Outfit No. S-10a ..$11 00

Complete Sending Outfit No. S-10a with Receiving Outfit No. R-40a ..$17 50

Same connections as S-5a.

SENDING AND RECEIVING OUTFITS. Continued.

No. S-15.

Range 15 miles with aerial 40-50 feet high.

This outfit can be tuned very sharply and is non-interferable. An excellent outfit. It is the same as No. S-10a, except that instead of the 1½-in. coil No. 1089 2-in. coil is used, and with addition of No. 9260 adjustable condenser. Same connections as No. S-8.

Complete Sending Outfit No. S-15 ..$16 25

Complete Sending Outfit No. S-15 with Receiving Outfit No. R-300 ..$30 00

No. S-20.

Range 20 miles with 4-wire aerial each 50-60 feet high.

This outfit is perfectly tunable and free from all interference. It is an excellent outfit and cannot be recommended too highly. Connections same as No. S-8.

No. 1089a	2½-in. spark coil	$13 50
No. 9220	Zinc spark gap	60
No. 9270	Sending helix	2 00
No. 9260	Adjustable condenser	2 50
No. 1117	Steel lever key	1 05
No. 1001	12 "Electro" dry cells (in multiple)	1 80
No. 9219	1½ lbs. aluminum wire	90
Complete Sending Outfit No. S-20		**$21 20**
Complete Sending Outfit No. S-20 with Receiving Outfit No. R-1000		**$39 50**

NOTE.—If 4-type R-E storage cells are substituted with the dry cells the price of the S-20 Sending Outfit will be $26.00.

No. S-30.

Range 30 miles with 4-wire aerial 75 feet high. This outfit, tunable, free from all interference, has the same instruments as No. S-20, except that instead of the No. 1089a coil No. 1091 4-in. spark coil is used. Instead of the No. 1001 dry cells 6 R-E storage cells are used. Connections same as No. S-8.

Complete Sending Outfit No. S-30 ..$47 50

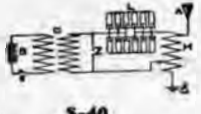
Complete Sending Outfit No. S-30 with Receiving Outfit No. R-1000 ..$66 00

No. S-40.

Range 40 miles with 4-wire aerial 75-90 feet high.

This outfit is tunable the same as No. S-30. It is also free from interference.

An especially powerful 6 V.-60 A. H. battery is furnished with this outfit. This battery, not listed in the catalogue, is encased in vulcanite, has non-corrosive connections and is unspillable.



S-40

No. 1093	6-in. coil	$72 50
No. 9220	Zinc spark gap	60
No. 9270	Sending helix	2 00
No. 9260	2 sets adjustable condensers	5 00
No. 9212	Wireless key	5 00
No. B-3	6 V.-60 A. H. battery	15 00
No. 9219	3 lbs. aluminum wire	1 80
Complete Sending Outfit No. S-40		**96 75**
Complete Sending Outfit No. S-40 with Receiving Outfit No. R-1000		**115 00**

SENDING AND RECEIVING OUTFITS.—Continued.

No. S-50.

Range 50 miles with 4-wire aerial 85-100 feet high.

This outfit, on account of the transformer, can only be used where 110 or 220-volt alternating current is to be had. The outfit is perfectly tunable and extremely well suited for regular work and business purposes. This outfit is very popular and can absolutely be depended upon.

S-50

No. 9280	¼-K. W. transformer	$26 00
No. 9220a	Special zinc spark gaps	1 20
No. 9270a	Special sending helix	5 00
No. 9223	4 2-qt. Leyden jars	8 00
No. 9212	Wireless key	5 00
No. 9219	3 lbs. aluminum wire	1 80
	Complete Sending Outfit No. S-50	44 65
	Complete Sending Outfit No. S-50 with Receiving Outfit No. R-1000	63 00

No. S-100.

Range 100 miles with 6-wire aerial 100-125 feet high. This is our best outfit. It works practically under all conditions, is tunable and free from interference. Especially suitable for commercial work. Diagram same as S-50.

No. 9281	½-K. W. transformer	$60 00
No. 9220a	Special zinc spark gap	1 20
No. 9270b	Special sending helix	10 00
No. 9223	8 2-qt. Leyden jars	16 00
No. 9212	Wireless key	5 00
No. 9219	5 lbs. aluminum wire	3 00
	Complete No. S-100 Sending Outfit	90 00
	Complete Sending Outfit No. S-100 with Receiving Outfit No. R-1000	108 50

Wollaston Wire.

This extraordinary thin platinum wire is used in all wireless stations in connection with electrolytic coherers. It is of such minute diameter that it can hardly be seen with the naked eye; this is especially the case with the smaller size.

No. 1313	Wollaston Wire 0.0005 inch diameter, price per inch	25c
" 1314	" " 0.0001 " " " " " "	2½
	By mail, extra 2c	Discount in feet lengths.

COMMERCIAL WIRELESS INSULATORS.

10002

These insulators are used on large aerials and are built very substantially in order to stand the enormous strains sometimes experienced in heavy storms. These insulators are now used by the UNITED STATES GOVERNMENT and are made of moulded "Electrose." They will stand discharges of 80,000 volts. Deep corrugations are provided to reduce surface leakage. Powerful wrought-iron rings are imbedded at each end.

Size, 10½ ins. long, 1½ ins. diameter.

No. 10002	Commercial Wireless Insulator, as described, each	$0 50
	In dozen lots	5 75

Cannot go by mail.

THE "ELECTRO RHEOSTAT-REGULATOR".—Continued.

Some of its uses:

In connection with small motors it will regulate the speed more accurately and more gradually than could be done by any other means. This feature makes it very desirable for Dentists, Doctors, and all those who need an effective regulator. In connection with cautery work it is indispensable, as any degree of heat can be obtained,—due to the very fine regulation.

To dim down incandescent lamps from 2-110 volts. The light can be reduced so gradually as hardly to be perceptible at all. Other rheostats cut down the light by step only.

To act as inductance in wireless telegraph work where a gradual increase or decrease of resistance is most essential, especially in tuning. In connection with coherers to regulate the battery current, as for instance with electrolytic coherers or our auto coherer.

5000

For electro-plating work it will be found indispensable. A gradual increase of current, as is well known, is necessary especially for fine work.

The wire used in this regulator is the finest imported high resistance wire. It will positively not rust, break nor bend even under a constant load of 2 amperes. This we guarantee in every instance. The groove which holds the spiral is ( ) shaped (patent applied for), which makes it impossible for the coil to fall out or become dislocated once wound in place.

Resistance is 10 Ohms.

Maximum capacity: 2 amperes continually; size: 4" diameter; thickness of base, 9/16"; weight complete: 3 ounces.

No. 5000 Rheostat-Regulator, in neat cardboard box, price $0 50

Ask for discounts in quantities.

To Our Agents:—Write at once for a very interesting proposition on this article.