F. G. SARGENT.

WIRELESS TELEGRAPHY.

APPLICATION FILED AUG. 26, 1905.

976,500. Patented Nov. 22, 1910.

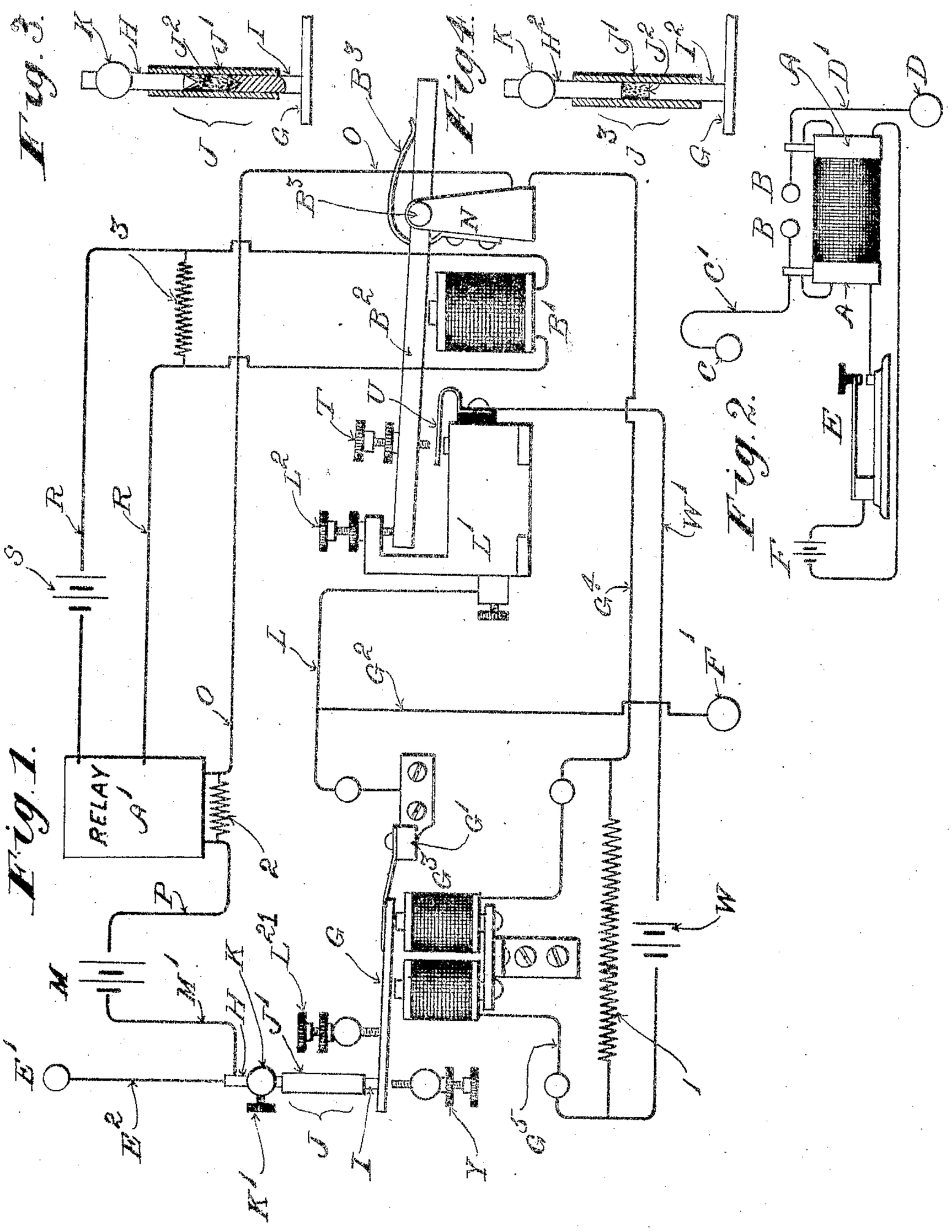

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

WITNESSES.

Edith J. Anderson.

Aaron F. Randall

INVENTOR

Frederick G. Sargent

By Chas. F. Randall

ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK G. SARGENT, OF GRANITEVILLE, MASSACHUSETTS.

WIRELESS TELEGRAPHY.

976,500. Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed August 26, 1905. Serial No. 275,377.

To all whom it may concern:

Be it known that I, FREDERICK G. SARGENT, a citizen of the United States, residing at Graniteville, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Wireless Telegraphy, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in an improved coherer; in an improved method and improved means of producing de-coherence in a coherer; and in a novel method and novel means of facilitating the de-coherence.

An apparatus comprising one embodiment of the invention is illustrated in Figures 1 and 2 of the drawings, Fig. 1 being a diagram of the receiving station, and Fig. 2 a diagram of the sending station. Fig. 3 is a detail view in section of a coherer constructed in conformity with the invention. Fig. 4 is a similar view showing a modification of the coherer.

Referring to Fig. 2, F is a battery, and E is a sending or transmitting instrument, which herein is represented by an ordinary Morse key serving to close the circuit through the primary of the Ruhmkorff coil A, A. The knobs of an oscillator are shown at B, B, the said knobs being connected, respectively, to the respective terminals of the secondary circuit of the said coil. In practice a mechanical vibrator (not shown) is employed to make and break the current through the primary of the coil. At C C′ is an aerial or antenna which is in connection with one terminal of the said secondary circuit, and at D is a ground which is in connection by means of a wire D′ with the other terminal of the latter.

Referring to Fig. 1, at E′ E^2 is represented the aerial or antenna of the receiving station, J being the coherer with one end of which the wire E^2 is connected. M is the battery of the local circuit, the said battery being connected by a wire M′ with the coherer. A′ is the relay which is embraced in the local circuit, P being a wire which extends from the battery M to the relay, and O is a wire also pertaining to the local circuit, and extending from the relay to a post N pertaining to the receiving or signaling instrument. L′ is a sounder-post pertaining to the latter instrument, and L a wire connecting the said sounder-post with a post G′, to which last is applied a vibrator G that is in connection with the end of coherer J opposite to that end of the latter to which the wire E^2 is connected. F′ is the ground of the local circuit, the said ground being connected by means of wire G^2 with the wire L aforesaid. R is a conducting wire pertaining to the relay circuit, S the battery in the said relay circuit, and B′ a coil or electro-magnet included in such circuit and pertaining to the receiving or signaling instrument. The said instrument is shown as a sounder, the vibrator B^2 thereof being pivoted at B^3 to the post N, and L^2 is the adjusting-screw in connection with the sounder-post L′, and with which the vibrator makes contact. At B^3 is indicated a spring, attached at one end thereof to the post N and bearing by the other upon the tail of the vibrator, and operating with a tendency to separate the vibrator from the core-piece of coil B′ and hold the vibrator against the end of the adjusting-screw L^2.

The coherer J comprises a tube J′, Figs. 1 and 3, having fitted into one end thereof a portion of the length of a metallic or other conducting rod H, and into the other end thereof a portion of the length of a like rod I. Preferably the rods H and I are composed of steel. The rod H is secured to a post K, with capacity for longitudinal adjustment, by means of a binding-screw K′, and the wires E^2, M′, are in electrical connection with such rod. Rod I is fastened to the vibrator G. The space within the tube J, intervening between the proximate inner ends of the rods H and I is occupied by material J^2, which latter, while normally constituting an imperfect conductor, will be rendered more perfectly conductive, or as it commonly is termed, will be cohered, by the action of the Hertz waves. In Fig. 3 the inner end of rod H is conical and the inner end of rod I is correspondingly concaved. In the case of the coherer J^3 shown in Fig. 4, the inner ends of the two rods H^2, I^2, are squared off. Preferably, I employ steel-filings or particles for the cohering material J^2. Tube J′, preferably, is made of rubber and is of an elastic nature, its opposite ends being fastened to the respective rods H, I. The elasticity of the rubber tube enables the latter to accommodate itself to varying positions of rods H, I, with relation to each other, and to movement of rod I toward and from rod H in the working of the apparatus. In place of a rubber tube, I may in

some cases use a tube of some other non-conducting material, fastening one end of the same to either of the rods H and I and leaving the other end of the tube and the other rod free to work longitudinally upon each other. In practice, the parts of the coherer first are adjusted so that the current from battery M passes through the coherer, and then the ends of the rods of the coherer are adjusted apart from each other, by means of the adjusting-screw L^{21} in connection with the vibrator G, sufficiently to break or reduce the current from the said battery. The coherer then is in a condition suitable to be operated on by the Hertz waves.

Oscillations originating at the sending or transmitting station of Fig. 2 in consequence of the closing of the instrument E, and propagated thence and reaching the receiving station of Fig. 1, will affect the coherer so as to cause the resistance within the same to become reduced, and thereby close the local circuit during the continuance of the oscillation and for a length of time corresponding thereto. By such closing the relay circuit excites the coil or electro-magnet B′ of the receiving or signaling instrument. In order to cause the material within the coherer to de-cohere upon the cessation of a particular oscillation which has closed the circuit and produced an action of the receiving or signaling instrument corresponding thereto, so as by such de-coherence to break circuit, I provide for causing relative movement of the rods of the coherer to widen the interval between the proximate ends of such rods. It is with this aim in view that the rod I in Figs. 1 and 3, and the rod I^2 in Fig. 4, is connected to the vibrator G. For the purpose of operating the vibrator G, I provide an electro-magnetic coil or coils G^3, the said vibrator serving as or carrying the armature for the said coil or coils. One end of the wire of said coil or coils is connected by a wire G^4 with the post N. The other end thereof is connected by a wire G^5 to a battery W, from which a wire W′ extends to a contact-device or circuit-closer U. The latter is insulated from sounder-post L′. The vibrator B^2 of the receiving or signaling instrument is provided with an adjusting screw T for action against the elastic or spring-portion of the said device U. Movement of the said vibrator occasioned by the coil or electro-magnet B′ will cause the said adjusting-screw T to produce contact between the said elastic portion or spring of the said contact-device or circuit-closer and the sounder-post, which will complete the circuit embracing the battery W and electro-magnet or electro-magnets G^3. The excitation of the said magnet or magnets will operate to move the vibrator G so as to draw the rod I apart from rod H and occasion the de-coherence as aforesaid. The adjusting-screw Y is provided to serve as a stop by which to prevent too great an extent of vibration of the vibrator G. It is easier to de-cohere the coherer when the circuit through the same from battery M is broken. Such break results when the vibrator B^2 is drawn away from the adjusting-screw L^2. However, it is not absolutely necessary that there should be a make and break in the said circuit for this reason, and I contemplate in some instances connecting the wire L directly to the post N or wire O.

At 1, 2 and 3 are resistance coils which are inserted in the lines for the prevention of sparking at the points at which the makes and breaks are made through the circuits to the batteries which have been described. Such sparking is detrimental to the operation of the coherer.

The capacity area C of the aerial at the sending or transmitting station is spherical, and so is the capacity area E′ of the aerial at the receiving station. The two capacity areas are of the same size or capacity. The ground D at the sending or transmitting station is spherical, and so is the ground F′ at the receiving station, the two grounds being both of the same size or capacity. The length of the wire connecting the capacity area E′ with the ground at the receiving station is the same as that of the wire connecting the capacity area C with the ground at the sending or transmitting station. Hence, the aerial or antenna, ground, and connecting wire at each station are of the same capacity as those at the other.

The features shown and described herein other than the coherer, the method of producing de-coherence therein, and the method and means of facilitating de-coherence, have been made the subject of claims in a divisional application filed December 18, 1906, Serial No. 348,380.

I claim as my invention:—

1. In a coherer, in combination, the tube composed of extensible material, the rods entering opposite ends of such tube and having said ends connected therewith, and the cohering material between the proximate ends of such rods.

2. In a coherer, in combination, the elastic non-conducting tube, and the electrodes fitted into the opposite ends of said tube.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK G. SARGENT.

Witnesses:

CHAS. G. SARGENT,

WM. F. SARGENT.