No. 756,219. PATENTED APR. 5, 1904.

E. DUCRETET.

WIRELESS TELEGRAPH RECEIVING SYSTEM.

APPLICATION FILED AUG. 14, 1903.

NO MODEL.

Fig. 1.

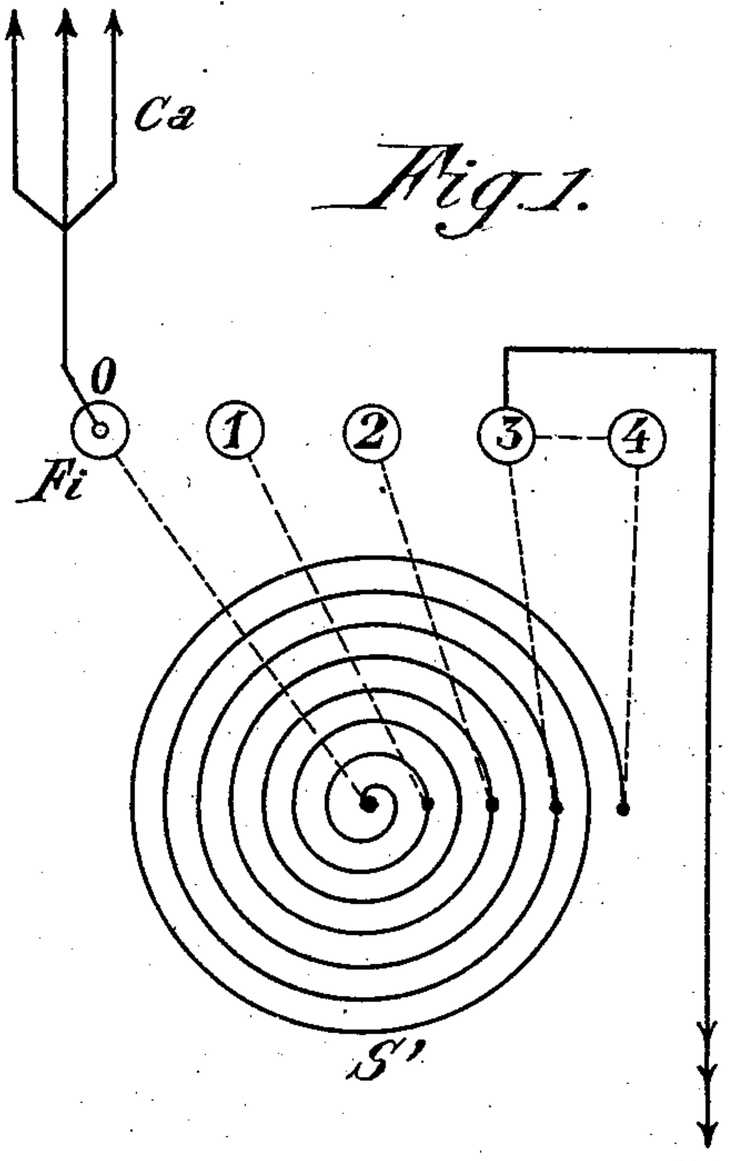
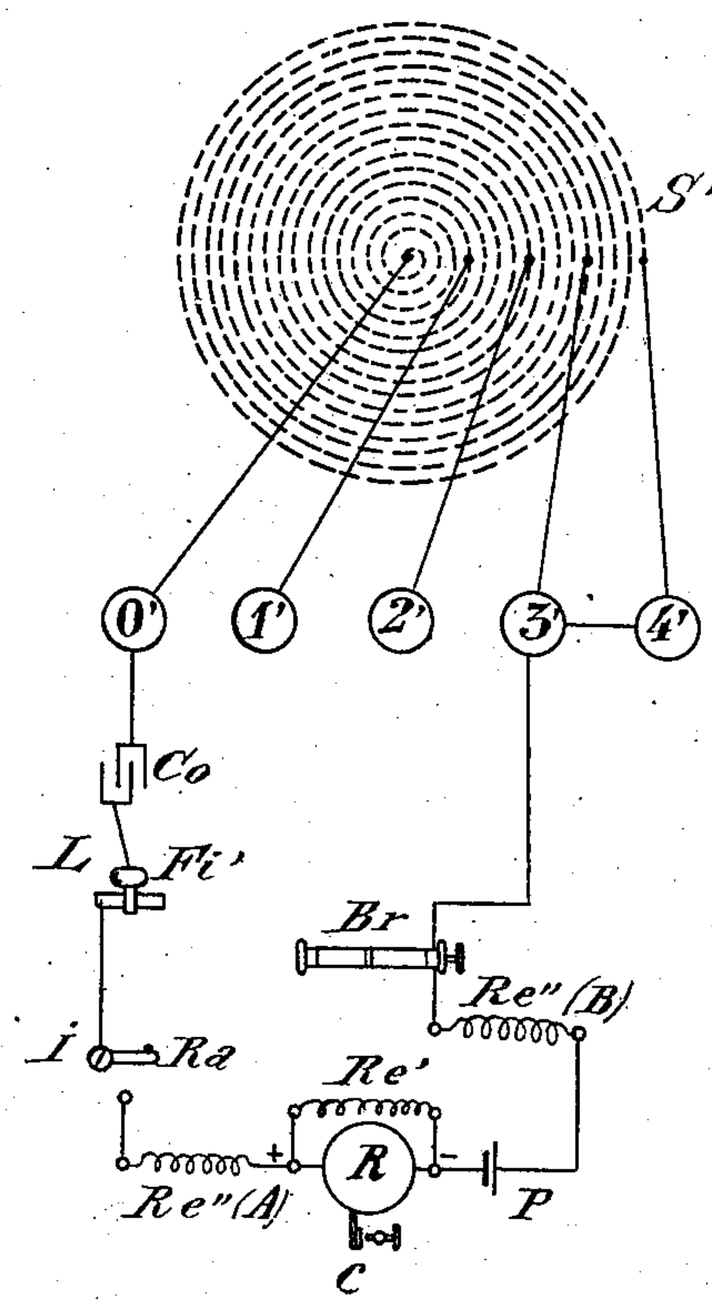


Fig. 2.



Witnesses:
C. Heymann.
L. Baldwin

Inventor:
Eugène Ducretet.
by F. B. Singer Attorney.

No. 756,219. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

EUGÈNE DUCRETET, OF PARIS, FRANCE.

WIRELESS-TELEGRAPH RECEIVING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 756,219, dated April 5, 1904.

Application filed August 14, 1903. Serial No. 169,522. (No model.)

To all whom it may concern:

Be it known that I, EUGÈNE DUCRETET, a citizen of the French Republic, and a resident of Paris, France, have invented certain new and useful Improvements in Wireless-Telegraph Receiving Systems, of which the following is a specification.

My invention relates to wireless-telegraph receiving systems, and more particularly to a novel oscillation-transformer to be used in connection therewith.

In 1890 Professor Branly proved that it was possible to actuate a tube containing metallic filings and commonly known as a "radio-conductor" or "coherer" by placing it in the secondary circuit of a small transformer the primary of which received the waves. The induction-coil used for this purpose comprises two circuits insulated from each other and wound concentrically upon a cylindrical core, the primary being movable inside the secondary. This experimental device was provided with a core of iron wires which was fixed or movable according to circumstances.

My invention relates to the construction of a more efficient transformer for use in a wireless-telegraph receiving system than those now in use.

My invention is illustrated in the drawings which accompany and form a part of this specification.

In the drawings, Figure 1 illustrates the primary of the oscillation-transformer connected to the aerial conductor, and Fig. 2 illustrates the secondary of the transformer connected to the local receiving-station.

My transformer comprises, essentially, two superposed spirals S′ S″ and assures the regulation of the receiver according to the distances between the stations and the amount of energy transmitted by Hertzian waves. With this transformer I may use any known form of coherer in connection with a relay and usual Morse register or other equivalent means, or I may use the receiver invented by Alexander Popoff, which consists of a telephone-receiver connected without the interposition of a relay to the terminals of two carbon electrodes bridged by steel needles, as described by me in the *Comptes Rendus de l'Academie des Sciendes*, Tome CXXXI, December 15, 1900, page 1296. For the receiving system so constituted any known transmitter of sufficient power may be used.

In Figs. 1 and 2 I have shown by way of example one embodiment of my transformer S′ S″ applied to a coherer which actuates a relay. The primary S′ is connected to the aerial *Ca* by the plug F*i* and to the earth at *Ca′*. The secondary spiral is shown at S″, and its circuit includes the coherer B*r*. R is a relay, and P is a battery of proper voltage. The other parts of the system are not shown, but they are well known and have been described by me, for example, in a catalogue entitled *Guide Pratique de Telegraphie Hertzienne sans Fil aux Grandes Distances*, August, 1901. L F*i′* is a plug for cutting the coherer B*r* out of circuit. *i*R*a* is a switch for cutting the relay R out of circuit. R*e″* (A) and R*e″* (B) are resistances with self-induction placed in the circuit of the coherer B*r*. R*e′* is a shunt connected around the terminals of the relay R to reduce the effects of the inductance of the latter, and a similar shunt may be used across the terminals of the automatic tapper, which is operated by the contacts C of the relay R when such tapper, which is not herein illustrated, is used. The number of turns of the spirals S′ S″, which are brought into action, as well as the sizes of these spirals and the diameter of the conductors used, may vary according to the syntony to be obtained between the stations. As clearly shown in the drawings, the connections of the aerial and the earth to the spiral S′ can be made at different points, as at 0, 1, 2, 3, and 4, Fig. 1, and likewise the points at which the local circuit containing the coherer may be connected to the spiral S″ may be varied, as shown at 0′, 1′, 2′, 3′, and 4′, Fig. 2. It is to be understood that these spirals are fixed upon appropriate supports and that the distances separating them may be varied. In practice the spirals S′ S″ are superposed, and the distance separating one from the other is changed according to circumstances. In order to clearly illustrate the construction of these spirals, I have shown them separated quite

a distance from each other; but it will be understood that to get the best effects this separation is reduced to a minimum.

The apparatus set forth in my French patent, and the additions thereto, of April 21, 1899, No. 288,067, and in my English Patent No. 9,791, May 9, October 7, 1899, can be used with the spirals herein described. The condenser C*o*, which is shown in the patents above referred to, but which in these patents is not included in the circuit of the battery P and relay R, may in the system herein described be placed between the secondary spiral S″ and the coherer B*r*.

By employing the various points of connection 0 1 2, &c., and 0′ 1′ 2′, &c., several different arrangements may be obtained, and it is also possible to obtain a unipolar or auto-transformer system by connecting the spirals together and to the earth.

When the spirals are placed parallel to each other and in close proximity, there is a certain condenser action between the two, so that the energy of the electrical oscillations created in the primary may be transformed to the secondary by electrostatic induction as well as by electromagnetic induction.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a wireless-telegraph receiving system, an oscillation-transformer whose primary and secondary windings consist of flat spirals, superposed one on the other, and means for making electrical connection with various parts of each spiral whereby the number of effective turns is varied.

2. In a wireless-telegraph receiving system, an oscillation-transformer whose primary and secondary windings consist of parallel flat spirals.

3. In a wireless-telegraph receiving system, an aerial conductor, a flat spiral connected in series therewith, a second flat spiral inductively associated with the first-mentioned spiral and a receiver connected with the second spiral.

4. In a wireless-telegraph receiving system, an aerial conductor, a flat spiral connected in series therewith, a second flat spiral parallel to the first, and a receiver connected with the second spiral.

EUGÈNE DUCRETET.

In presence of—

AUGUSTUS E. INGRAM,
JOHN BAKER.