No. 627,650. Patented June 27, 1899.

G. MARCONI.

APPARATUS EMPLOYED IN WIRELESS TELEGRAPHY.

(Application filed Jan. 5, 1899.)

(No Model.)

Fig. 1.

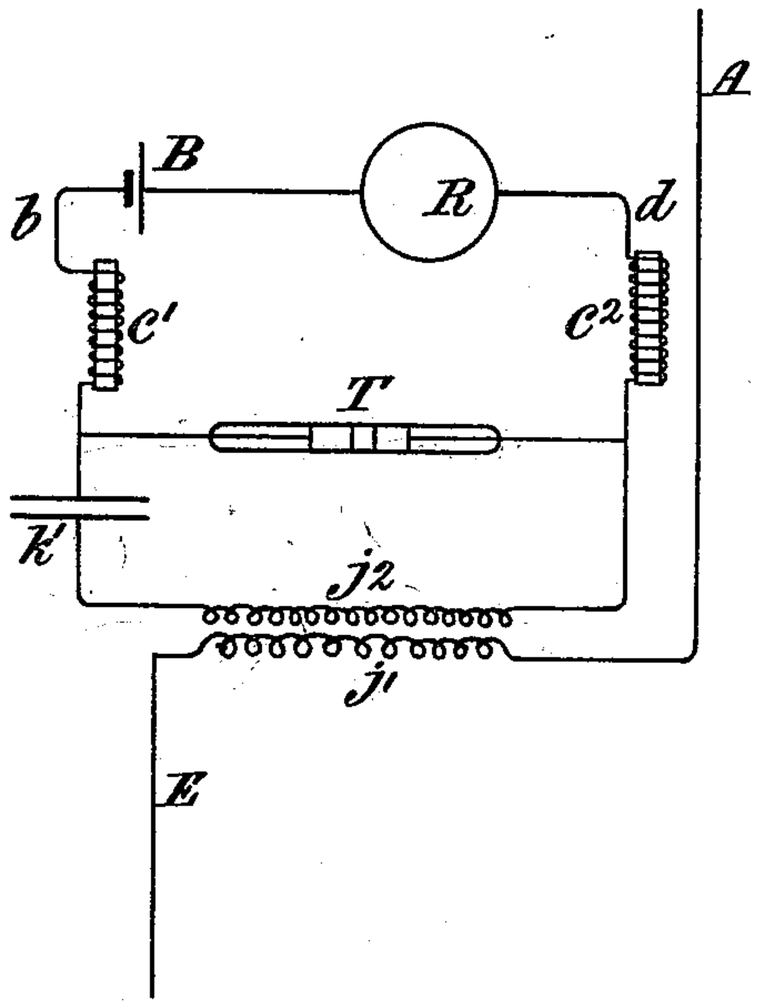
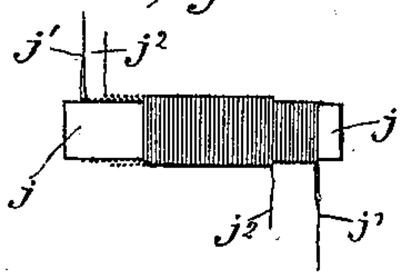


Fig. 2.

Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

GUGLIELMO MARCONI, OF LONDON, ENGLAND, ASSIGNOR TO THE WIRELESS TELEGRAPH AND SIGNAL COMPANY, LIMITED, OF SAME PLACE.

APPARATUS EMPLOYED IN WIRELESS TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 627,650, dated June 27, 1899.

Application filed January 5, 1899. Serial No. 701,251. (No model.)

To all whom it may concern:

Be it known that I, GUGLIELMO MARCONI, electrician, a subject of the King of Italy, residing at 28 Mark Lane, in the city of London, England, have invented certain new and useful Improvements in Apparatus Employed in Wireless Telegraphy, of which the following is a specification.

In the specification of a former patent granted to me, No. 586,193, I described a receiver in which the ends of an imperfect contact in a local circuit were connected one to earth and the other to an insulated conductor.

According to this invention the conductor is no longer insulated, but is connected to a capacity, which may be the earth, through the primary of an induction-coil, while the ends of the imperfect contact are connected to the ends of the secondary one of the connections, being through a condenser.

The induction-coil preferably consists of a few turns of insulated wire. Over or under this first winding, which constitutes the primary, is wound a secondary winding, which constitutes the secondary.

In order to obtain the best effects, it is essential that the induction-coil should be of very thin wire. It is desirable that the primary and secondary windings of the coil should be close to each other and that the windings of each should be in a single layer. It is desirable that the induction-coil should be in tune or syntony with the electrical oscillation transmitted, the most appropriate number of turns and most appropriate thickness of wire varying with the length of wave of the oscillation transmitted.

The capacity of the condenser on the connection between the imperfect contact and the secondary of the coil should be varied (in order to obtain best effects) if the length of wave is varied.

It is desirable that the conductor connected should offer a large surface, and therefore the use of such materials as broad wire-netting in lieu of wire is desirable. It is also desirable to employ thick conductors or netting or its equivalents at the transmitting end. The introduction of the coil in the conductor not only improves the signals, but also prevents to a great extent any interference due to atmospheric influences, as any atmospheric electricity collected by the aerial conductor escapes to earth through the primary of the coil, thus preventing a charge from accumulating and discharging itself through the imperfect contact. Any stray interference can be further minimized by substituting a suitable capacity for the earth.

I have used a condenser of about one-fourth microfarad capacity for the above purpose.

Figure 1 is a diagram of the arrangement I prefer. Fig. 2 shows a modification. Fig. 3 shows the induction-coil.

In Fig. 1, A is a long conductor suspended in the air by insulators, and E is a connection to earth or other suitable capacity. B is a local battery, and R is a relay working a signaling or other instrument. j' is the primary of the induction-coil or transformer, which is inserted between A and E. k' is a condenser placed across the sensitive imperfect contact and the secondary winding of the induction-coil or transformer. c' c^2 are choking-coils, their object being to prevent the oscillations generated in the winding j^2 from running into the battery connections at b and d, which would weaken the effect of the oscillations on the sensitive imperfect contact T.

Fig. 2 shows a somewhat similar arrangement, which, however, does not give such good results as Fig. 1. In this case the condenser k' is omitted.

I have obtained good results by employing an induction-coil or transformer constructed as follows: The primary j' of the said induction-coil or transformer is wound on a glass tube j about .635 centimeter in diameter. The said primary winding consists of two parallel windings of two hundred turns each of copper wire .012 centimeter in diameter insulated by a single covering of silk. The resistance of these two windings in parallel is about 3.1 ohms. The secondary winding j^2 of the induction-coil or transformer consists of about eight hundred turns of a similar but thinner wire .005 centimeter in di-

ameter wound over or under the primary winding. The resistance of the secondary winding is about one hundred and forty ohms.

The condenser k', which I preferably use, is composed of six tin-foil or copper plates connected to each terminal, each plate being five centimeters by three centimeters, the plates being insulated by paraffined paper .017 centimeter thick.

When using the above-described induction-coil or transformer, I employ as insulated conductor at each station a conductor formed of seven strands of about one-millimeter-diameter copper wire one hundred and forty feet long, the top of the conductor being one hundred and twenty feet from the ground. In some cases I use in lieu of the above-described conductor a galvanized-iron netting about two feet broad and one hundred and thirty feet long, the top of the netting being about one hundred and ten feet above the ground. In the latter case I obtain good results when using an induction-coil or transformer constituted as follows: secondary winding of three hundred and seventy-five turns of copper wire .005 centimeter in diameter insulated with one covering of silk, and wound on a glass tube .777 centimeter in diameter. Over this is wound the primary winding of one hundred and seventy-five turns of a similar wire .012 centimeter in diameter. The resistance of the primary winding is about 7.1 ohms and that of the secondary about 79 ohms.

What I claim is—

1. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity, connections between the ends of the imperfect contact and the ends of the secondary of the coil and a condenser in one of the latter connections.

2. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, a local battery and relay included in the local circuit, choking-coils respectively included in said circuit between the terminals of the imperfect electrical contact and the battery and relay, an induction-coil, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity, connections between the ends of the imperfect contact and the ends of the secondary of the coil, and a condenser in one of the latter connections.

3. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which consist of a single layer only, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact and the ends of the secondary of the coil.

4. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which consist of a single layer only, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact, the ends of the secondary of the coil and a condenser in one of the latter connections.

5. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which consist of a single layer only, and in which the primary consists of a number of parallel wires connected at their ends, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact and the ends of the secondary of the coil.

6. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which consist of a single layer only, and in which the primary consists of a number of parallel wires connected at their ends, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact, the ends of the secondary of the coil and a condenser in one of the latter connections.

7. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which are both of wire not exceeding one-fiftieth of a centimeter in diameter, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact and the ends of the secondary of the coil.

8. In a receiver for electrical oscillations, the combination of an imperfect electrical contact, a local circuit through it, an induction-coil, the primary and secondary of which are both of wire not exceeding one-fiftieth of a centimeter in diameter, a capacity, a conductor connected to one end of the primary of the coil, a connection between the other end and the capacity and connections between the ends of the imperfect contact, the ends of the secondary of the coil and a condenser in one of the latter connections.

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Witnesses:
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