

No. 770,668.

PATENTED SEPT. 20, 1904.

A. ARTOM.

WIRELESS TELEGRAPHY OR TRANSMISSION THROUGH SPACE.

APPLICATION FILED JAN. 3, 1903.

NO MODEL.

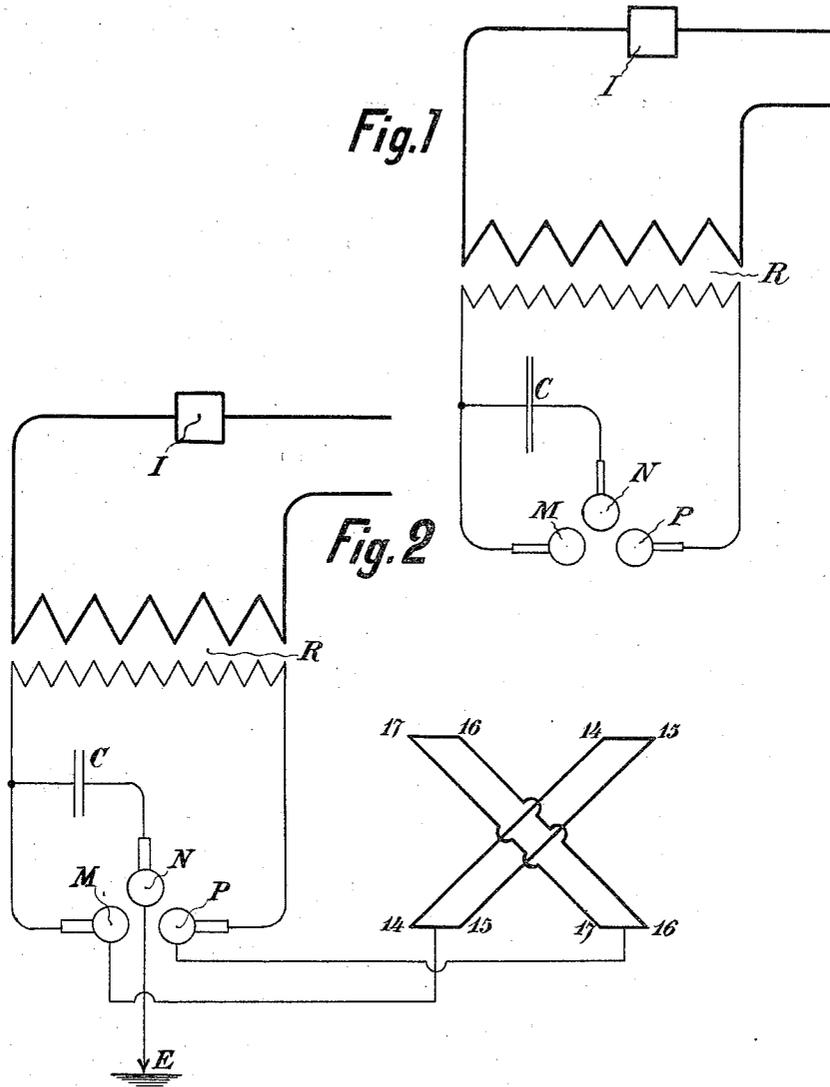


Fig. 1

Fig. 2

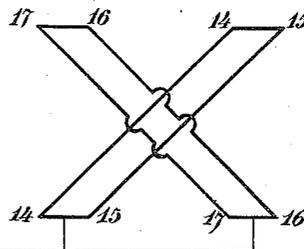
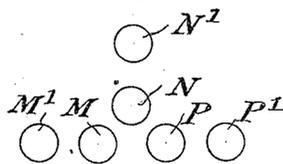


Fig. 3



Witnesses:
Arthur
W. Sommers

Inventor:
Alessandro Artom
by Henry Orthoff
Att'y.

UNITED STATES PATENT OFFICE.

ALESSANDRO ARTOM, OF TURIN, ITALY.

WIRELESS TELEGRAPHY OR TRANSMISSION THROUGH SPACE.

SPECIFICATION forming part of Letters Patent No. 770,668, dated September 20, 1904.

Application filed January 3, 1903. Serial No. 137,692. (No model.)

To all whom it may concern:

Be it known that I, ALESSANDRO ARTOM, a subject of the King of Italy, and a resident of Turin, Italy, have invented certain new and useful Improvements in Wireless Telegraphy or Transmissions Through Space, of which the following is a specification.

This invention relates to wireless telegraphy or, more generally, to the electrical transmissions across space.

As is well known, in wireless telegraphy hitherto an oscillatory discharge has been commonly employed to produce ordinary electromagnetic waves, and I am well aware that circularly or elliptically polarized waves can be obtained by forcing the said ordinary electromagnetic waves to pass through prisms of wood (so refracting them) or through metallic grids, (so reflecting them;) but it is impossible to use practically said waves obtained by these means on account of the too great loss of energy which is absorbed by such means in passing through them.

My present invention has for its object the production and composition of two or more oscillatory discharges of different phase and of different direction (which operation has never been hitherto obtained directly) in order to directly produce elliptically or circularly polarized electric radiations without a great loss of energy, said radiations being therefore capable of transmitting signals through space.

This invention consists in the method of producing and composing two or more oscillatory discharges of different phase and of different direction for the purpose above set forth, thereby producing a compact cone of rays.

The accompanying drawings show the apparatus carrying into effect this invention, which will be hereinafter fully described.

Figure 1 is a diagrammatic view illustrating a form of the apparatus for the sending-station. Fig. 2 is a modified form of the same. Fig. 3 is a detailed view.

In the form of apparatus shown in Fig. 1 the secondary terminals of an induction-coil (inductorium) R, the primary of which is provided with an interrupter I, preferably of the

Wehnelt type, are connected with two discharge-balls M P or other suitable conductors. A third suitable discharge-conductor N is connected through a suitable self-induction coil or preferably a suitable small condenser C to be conveniently calculated with one of the secondary terminals of the induction-coil. The three discharge-conductors are disposed as the vertices of a right isosceles triangle.

In Fig. 2 is shown the connection of the discharge-conductors with the aerial conductors whose object it is to reinforce the circular or elliptical polarization of the magnetic waves already produced by the discharge-conductors and to transmit said waves across space in order to produce signals at a greater distance than by not employing such aerial conductors and using only the discharge-conductors. In accordance with the theory developed in my note delivered before the Royal Academy of the Lincei at Rome on the 15th of March, 1903, I have illustrated in Fig. 2 four aerial conductors electrically coupled in pairs and the pairs disposed at right angles to each other. The aerial 14 15 is electrically connected with the discharge-conductor M, and the aerial 16 17 is connected with the discharge-conductor P, while the third discharge-conductor may be connected to earth at E. The aerial conductors are arranged in or about a vertical plane.

The substantial feature of my present invention is that elliptically or circularly polarized electromagnetic waves are directly produced and transmitted in a predetermined direction and that greater energy is transmitted in this direction. Rotatory effects round this direction are easily observable upon little solids of revolution of dielectric materials or other suitable composition, as a rotating electrostatic and magnetic field is produced in said direction by my present arrangement, and it is possible to increase these mechanical effects by applying my present invention. In fact, I can dispose one or several other similar systems of three or more discharge-conductors M' N' P' all round the same predetermined direction, Fig. 3, said discharge-conductors being connected in each system in the same manner as described for the first one. Each

of these discharge-conductor systems may be fed by its own independent induction-coil or the induction-coils of said several systems can be electrically connected with each other.

5 By the described improvements the aerial conductors of wireless telegraphy may be considerably diminished in height and the construction of syntonized apparatus is rendered easier.

10 The present invention may be applied to wireless telegraphy and other electrical transmissions across space very usefully. The great advantage in using such electric waves lies in sending out the radiations from the
15 transmitting-station in a compact cone in or about a single direction which is normal to the plane of the discharge-conductors and to the plane of the aerials, both of these planes being parallel to one another, instead of sending
20 the same amount of energy subdivided in an infinite number of radiations simultaneously in all the radial directions of a sphere whose center is the transmitting-station, thereby effecting a great saving in energy.
25 The cone of rays being directly produced without reflection or refraction and in the same direction as their generation there is no loss of energy, thereby enabling the receiving-station to clearly and distinctly receive
30 the signals, and every other station which is not in or about in a direct line between the two stations in question will either not be influenced at all, even if the waves have great force, or said stations will at most receive
35 confused and unintelligible signals.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The method of directly producing electric waves, which consists in arranging discharge-conductors to discharge in different directions and producing oscillatory discharges between the conductors, substantially as and for the purposes set forth.

45 2. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in producing disruptive discharges between a plurality of discharge-conductors arranged at the vertices of a triangle, the current supplied to the discharge-conductors differing in phase, and the disruptive discharges differing also in direction owing to the angular position of the discharge-conductors, substantially as described
50 and for the purposes set forth.

3. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in connecting discharge-terminals arranged at the vertices of
60 a triangle to a source of an induced current to produce disruptive discharges and inserting a capacity in the part of the circuit connected to one of the terminals to cause the current passing through said part of circuit
65 to differ in phase with the current passing

through the other part of the circuit, the disruptive discharges between the discharge-conductors differing also in direction owing to the angular position of the discharge-conductors, substantially as described and for the
70 purposes set out.

4. The method of directly producing circularly or elliptically polarized electromagnetic waves, which consists in arranging discharge-conductors at the vertices of a triangle, and
75 connecting them to a suitable electric circuit in the part of which connected to one of the discharge-conductors a self-induction is inserted, to cause the current passing through said part of circuit to differ in phase with the
80 current passing through the other part of circuit, the oscillatory discharges between the discharge-conductors differing also in direction owing to the angular position of these latter, substantially as described and for the
85 purposes set forth.

5. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in arranging oppositely-disposed discharge-conductors in a suitable
90 circuit of induced current and arranging at right angles to said discharge-conductors another conductor forming the discharge-terminal of a branch circuit in which a capacity is inserted to cause the current passing through
95 it to differ in phase with the current passing through the main circuit, the oscillatory discharges between the discharge-conductors differing also in direction owing to the angular position of these latter, substantially as described and for the purposes set forth.
100

6. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in arranging discharge-conductors in a triangle whose plane is normal to the direction in which the waves are
105 to be sent, and supplying suitable oscillatory currents to said conductors differing in phase, so that the oscillatory discharges between the discharge-conductors are simultaneously different in phase and direction, substantially as described and for the purposes set forth.
110

7. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in producing oscillatory discharges between discharge-conductors
115 arranged in a triangle by supplying suitable currents to the discharge-conductors differing in phase, and discharging the oscillations thus resulting simultaneously different in
120 phase and in direction at an elevation above the discharge-conductors, substantially as described and for the purposes set forth.

8. The method of directly producing circularly or elliptically polarized magneto-electric
125 waves, which consists in arranging oppositely-disposed discharge-conductors in a suitable circuit, arranging at right angle to said conductors another conductor forming the discharge-terminal of a branch circuit in which
130

its own current is displaced, in phase to the current in the main circuit, and discharging the circularly or elliptically polarized magneto-electric waves thus produced from aerials disposed similarly to the discharge-conductors and electrically connected respectively with two of these latter, substantially as described and for the purposes set forth.

9. The method of directly producing circularly or elliptically polarized magneto-electric waves, which consists in producing oscillatory discharges between discharge-conductors arranged in a triangle and supplying current

to the discharge-conductors differing in phase, the relative positions of the discharge-conductors causing the oscillatory discharge to differ in direction, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALESSANDRO ARTOM.

Witnesses:

HENRY O. FIZZUNI,
EUGENIO G. B. CAZETTA.