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PROVISIONAL SPECIFICATION.

Improvements in Apparatus for Wireless Telegraphy.

We, GUGLIELMO MARCONI, LL.D., D.Sc., and MARCONI'S WIRELESS TELEGRAPH COMPANY, LIMITED, both of 18, Finch Lane, in the City of London, do hereby declare the nature of this invention to be as follows:—

According to this invention, instead of the usual spark or arc in the oscillating circuit of a wireless telegraph transmitter the current is caused to discharge across a small gap at the periphery or near to the periphery of a suitable insulated disc or sphere caused to revolve at a very high rate of speed.

An arrangement which has been successfully employed is as follows:—

A metallic disc insulated from the ground is caused to revolve at a high rate of speed between two fixed balls, points or the like placed very close to its periphery. Or the fixed balls may be replaced by another rapidly rotating disc so arranged that the peripheries of the two discs at the point where the discharge passes travel in opposite directions.

The fixed balls or the pair of discs are placed in a circuit containing a condenser and an inductance of suitable values. Each plate of the condenser is also connected to the poles of a continuous current generator producing a sufficiently high electromotive force to cause the current to bridge the small air gap between the discs or between the balls and the disc.

In the connections between the condenser and the continuous current generator inductances or resistances, or both, of suitable values are inserted.

As it is necessary to rotate the above-mentioned spheres or discs at a considerable speed these should be constructed in such a manner and of such material as safely to allow of a high peripheral speed, such as is obtained in high speed turbine wheels.

If it be necessary to use a higher E.M.F. than that which is sufficient to cause a discharge across one or two small gaps a series of small gaps between discs travelling at high speeds may be advantageously employed.

An inductive or conductive connection is made between the circuit containing inductance and condenser and the transmitting or radiating conductor or antenna.

By means which are now well known the period of oscillation of the antenna should be brought into resonance with the period of the oscillating circuit.

The oscillations transmitted through space can be detected at a receiving station by means of the well known receivers or detectors employed for wireless telegraphy, it being especially desirable when using the waves generated in the manner described to utilise to the utmost the principle of resonance in the receivers. The receivers should preferably contain a responsive oscillation circuit with as little damping as possible.

In consequence of the fact that the oscillations emanating from the transmitter may be continuous it will in that case be desirable to arrange means, such as a short circuit or make and break, by which the detector only intermittently forms part of the receiving oscillation circuit.

[Price 6d.]

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In place of employing a continuous current dynamo or battery an alternator or transformer may be employed.

Dated this Tenth day of April 1907.

CARPMAEL & Co.,
Agents for Applicants,
24, Southampton Buildings, London, W.C.

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COMPLETE SPECIFICATION.

Improvements in Apparatus for Wireless Telegraphy.

We, GUGLIELMO MARCONI, LL.D., D.Sc., and MARCONI'S WIRELESS TELEGRAPH COMPANY, LIMITED, both late of 18 Finch Lane, in the City of London, but now of Watergate House, York Buildings, Adelphi, in the County of Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

According to this invention, instead of the usual spark or arc in the oscillating circuit of a wireless telegraph transmitter the current is caused to discharge across a small gap at the periphery or near to the periphery of a suitable insulated disc or sphere caused to revolve at a very high speed.

An arrangement which has been successfully employed is as follows:—

A metallic disc insulated from the ground is caused to revolve at a high speed between two fixed balls, points or the like placed very close to its periphery. Or the fixed balls may be replaced by another rapidly rotating disc so arranged that the peripheries of the two discs at the point where the discharge passes travel in opposite directions.

The fixed balls or the pair of discs are placed in a circuit containing a condenser and an inductance of suitable values. Each plate of the condenser is also connected to the poles of a continuous current generator or an alternator or transformer producing a sufficiently high electromotive force to cause the current to bridge the small air gap between the discs or between the balls and the disc.

An inductive or conductive connection is made between the circuit containing inductance and condenser and the transmitting or radiating conductor or antenna.

By means which are now well known the period of oscillation of the antenna should be brought into resonance with the period of the oscillating circuit.

The oscillations transmitted through space can be detected at a receiving station by means of the well known receivers or detectors employed for wireless telegraphy, it being especially desirable when using the waves generated in the manner described to utilise to the utmost the principle of resonance in the receivers. The receivers should preferably contain a responsive oscillation circuit with as little damping as possible.

In consequence of the fact that the oscillations emanating from the transmitter may be continuous it will in that case be desirable to arrange means, such as a short circuit or make and break, by which the detector only intermittently forms part of the receiving oscillation circuit.

Figure 1 of the accompanying drawings is a diagrammatic representation of a transmitter in accordance with this invention.

a is a metal disc which is carried on a stand *b* insulated from the ground and is capable of being rotated at a very high speed from an electric motor, turbine or other convenient machine. It is found that a peripheral speed of

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300 or more feet per second works well and the disc should of course be so made as to stand such a speed. *c c* are balls supported one on each side of and very close to the disc *a* by insulated uprights *d d*. These balls are connected to a condenser *e* and inductance *f*, this circuit being connected either
 5 inductively as shown or else conductively to an aerial conductor or antenna *g* which is connected to earth or to a capacity in the usual way. Each plate of the condenser *e* is connected to a generator *h*, suitable inductances or resistances *i* being included in the connections.

The balls may be replaced by revolving discs.

10 Or in place of the balls or discs on either side of the disc *a* another disc *k* may be employed as shown in Figure 2 carried on insulated uprights and rotated in close proximity to and in the same direction as the disc *a* which is now connected in the circuit of the condenser and inductance.

If it be necessary to use a higher electro-motive force than that which is
 15 sufficient to cause a discharge across one or two small gaps a series of small gaps between discs travelling at high speeds may be advantageously employed.

It is found that with a sufficiently high speed such as is indicated above no arc can be established at the spark gap but the condenser discharge can pass freely.

20 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that we are aware that it has before been proposed to set up a discharge between a point and a surface moving at a high speed and we wish it to be understood that we make no claim to such an arrangement but that what we claim is:—

25 1. A transmitter for wireless telegraphy in which the discharge takes place across a small gap between continuous metal surfaces in relative motion at a very high speed substantially as described.

2. In a transmitter for wireless telegraphy the combination of a pair of balls or discs in circuit with a condenser and an inductance, a generator connected
 30 to the condenser and an insulated metal disc rotating at a high speed between the balls or discs substantially as described.

3. A transmitter for wireless telegraphy in which the discharge takes place across a small gap between a pair of rapidly revolving discs or the like in circuit with a condenser and an inductance, substantially as described.

35 4. Transmitters for wireless telegraphy substantially as described with reference to the drawings.

Dated this 13th day of September 1907.

CARPMAEL & Co.,

Agents for Applicants,

24, Southampton Buildings, London, W.C.

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(3rd Edition)

Fig. 1.

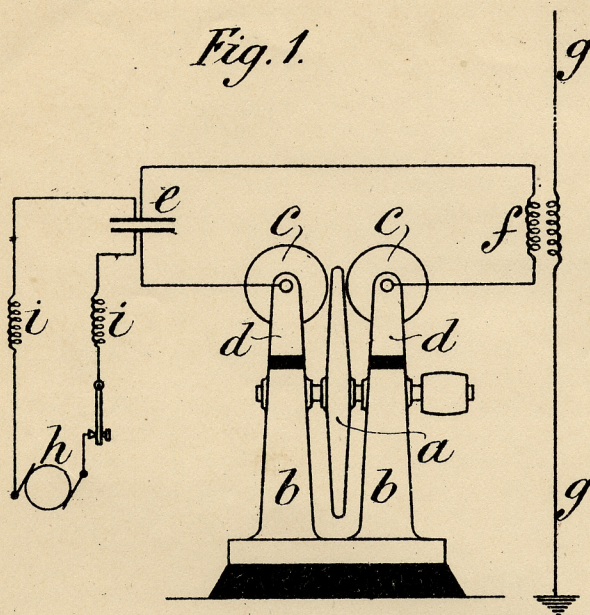
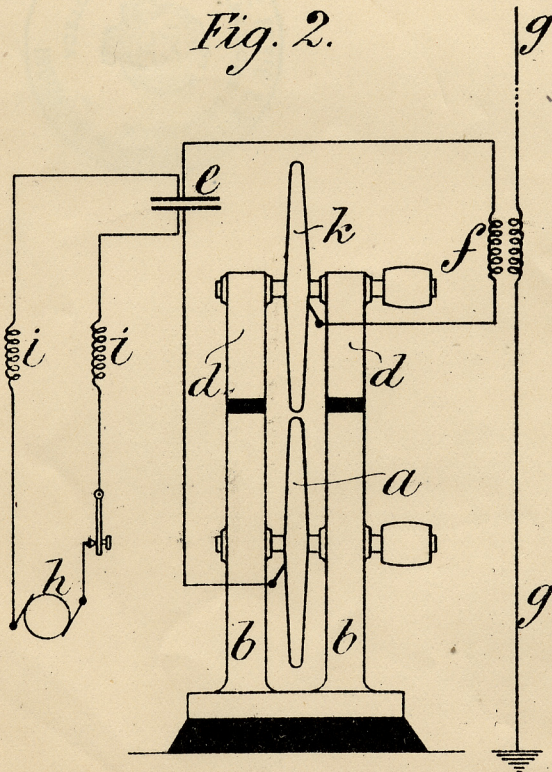


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]