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 APPARATUS FOR WIRELESS TELEGRAPHY.  
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935,382.

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Fig. 1.

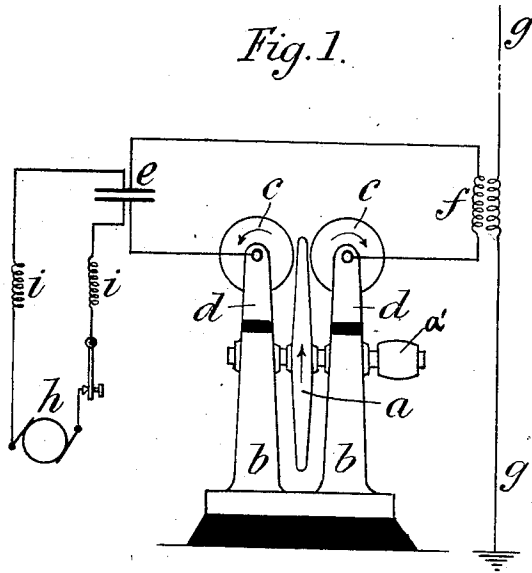
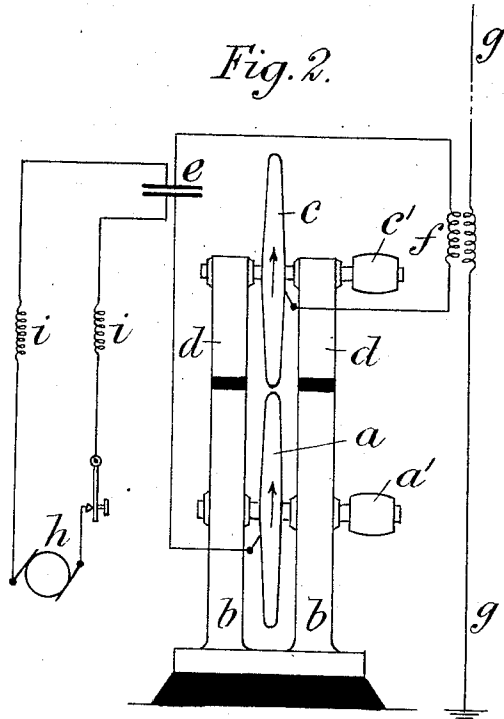


Fig. 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR WIRELESS TELEGRAPHY.

935,382.

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To all whom it may concern:

Be it known that I, GUGLIELMO MARCONI, LL. D., D. Sc., a subject of the King of Italy, residing at Watergate House, Adelphi, London, England, have invented new and useful Improvements in Apparatus for Wireless Telegraphy, of which the following is a specification.

According to this invention instead of the usual spark or arc in the oscillating circuit of a wireless telegraph transmitter, the discharge is caused to take place across a small gap between metal surfaces in relative motion at a very high speed. One of the surfaces may conveniently be a disk or similar rotatable device having a continuous surface and adapted to rotate so that its peripheral speed is one hundred meters per second or more while the other surface may likewise be a rapidly rotating disk or similar device in which case the actual speed of each disk need not be so great though the relative speed should preferably reach the value given. The disk may be entirely insulated and rotate between a pair of disks which are connected in an oscillatory circuit containing a condenser and an inductance, the condenser being connected to a source of electromotive force. Or there may be a pair of disks rotating in the same plane, in the same direction and in close proximity to one another, the two disks being included in the oscillatory circuit.

The drawings are diagrammatic representations of transmitters made in accordance with this invention.

In Figure 1 *a* is a metal disk 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 connected for instance to the belt pulley *a'*. *c c* are disks supported one on each side of and very close to the disk *a* by insulated uprights *d d*. These disks are connected to a condenser *e* and inductance *f*, this circuit being connected either 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 disks *c* may be rotated if desired and may be cooled by water circulation or otherwise.

In Fig. 2 the balls or disks are replaced by a disk *c* which can be driven by means of the pulley *c'* and may be similar to *a* which is now connected in the circuit of the condenser and inductance as shown.

In all cases the source of electromotive force *h* may be a continuous current dynamo, alternator, battery, or transformer.

By the arrangements of my invention as above set forth I am enabled to produce electrical oscillations in the sending or transmitting circuit without using a make-and-break interrupter or other similar device for producing intermittent currents or discharges through the spark gap. The spark gaps are short and therefore require comparatively little power to produce the disruptive discharges and the oscillations. The high relative peripheral speed of the disks forming the spark gap or gaps prevents arcs from forming and produce rapid oscillations. Such speed must be above a certain critical point, depending upon the size of said disks, and when the speed is above this critical point, oscillatory disrupting discharges are produced between the disks, without the formation of arcs and without the use of other circuit interrupting devices. No complete explanation of the phenomenon involved in the production of such discharges is at present apparent, but I have found that the apparatus is extremely efficient for producing the results attained, as well as being of unusually simple construction. There are no metallic contact breaking points to become worn or which may get out of adjustment.

If it be necessary to use a higher electromotive force than that which is sufficient to cause a discharge across one or two small gaps the number of sparks may be increased.

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 transmitters constructed in accordance with this invention to utilize to the utmost the principle of resonance in the receivers which should preferably contain a responsive oscillation circuit with as little damping as possible.

What I claim is:—

1. A transmitter for wireless telegraph apparatus comprising, a plurality of metallic bodies having continuous surfaces and located adjacent each other so as to form a

spark gap, means for causing a movement of said bodies so that said surfaces have a high relative velocity to produce disruptive discharges in the gap between said bodies.

5 2. A transmitter for wireless telegraph apparatus comprising, a plurality of metallic bodies having continuous peripheral surfaces and located adjacent each other so as to form relatively short spark gaps, means for causing  
10 a movement of said bodies so that the surfaces of a plurality thereof have a high relative velocity to the surface of another of said bodies, thereby producing disruptive discharges in the gaps between said bodies.

15 3. In a transmitting apparatus for wireless telegraphy, an oscillation generator comprising rotatable bodies having continuous surfaces separated by a relatively small spark gap, a condenser having its terminals  
20 connected with said bodies respectively, means for charging said condenser, and means for causing a movement of said bodies so that their surfaces have a high relative velocity.

25 4. In a transmitting apparatus for wireless telegraphy, an oscillation generator comprising a disk having a continuous rim, a disk situated to form a spark gap with the first named disk, means for causing a rela-  
30 tive movement of said disks, so that their surfaces have a high relative velocity, conductors leading from the source of current to said disks respectively, a condenser connected in shunt between said conductors, and

an aerial operatively connected with said 35 conductors.

5. In transmitting apparatus for wireless telegraphy, an oscillation generator comprising terminals consisting of two adjacent and rotatable disks, an intermediate disk sit- 40 uated so as to form spark gaps with said terminal disks, means for causing a relative movement of said disks so that their surfaces have a high relative velocity, conductors leading from the source of current to the 45 terminal disks, a condenser connected in shunt between said conductors, and a transformer in one of said conductors, connecting the same with the aerial.

6. In a transmitting apparatus for wire- 50 less telegraphy, an oscillation generator comprising disks of metal, a source of direct current, means for producing uniform polarity of high potential at the periphery of said disks, a conductor leading from one pole of 55 the source of current to one disk and operatively connected with an aerial, a second conductor leading from the other pole to the other disk, a condenser placed in shunt between the two conductors, an intermediate 60 disk between the first named disks, and means for rotating said intermediate disk at a high speed.

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Witnesses:

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