R. A. FESSENDEN.

WIRELESS TELEGRAPHY.

APPLICATION FILED DEC. 14, 1905.

1,059,665.

Patented Apr. 22, 1913.

FIG. 1.

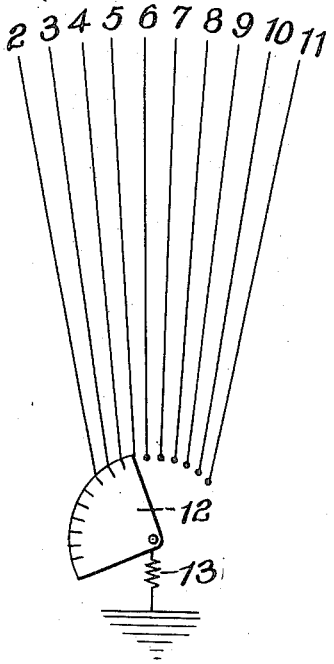
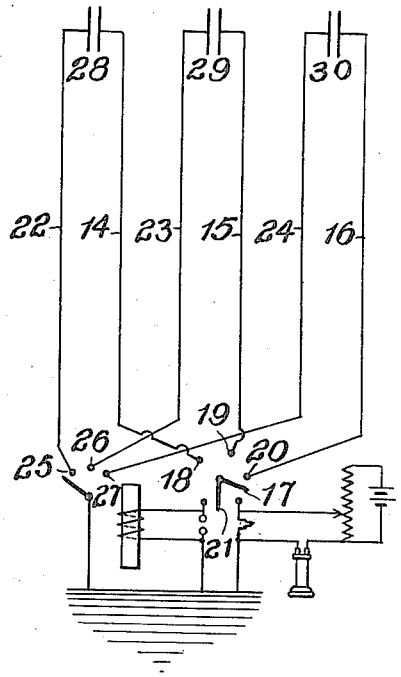


FIG. 2.



WITNESSES:

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by Dennis B. Dolcett Atty

UNITED STATES PATENT OFFICE.

REGINALD A. FESSENDEN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SAMUEL M. KINTNER, OF PITTSBURGH, PENNSYLVANIA, AND HALSEY M. BARRETT, OF BLOOMFIELD, NEW JERSEY, RECEIVERS.

WIRELESS TELEGRAPHY.

1,059,665. Specification of Letters Patent. Patented Apr. 22, 1913.

Original application filed July 27, 1903, Serial No. 167,242. Divided and this application filed December 14, 1905. Serial No. 291,736.

To all whom it may concern:

Be it known that I, REGINALD A. FESSENDEN, residing at Washington, in the District of Columbia, a citizen of the United States, have invented certain new and useful Improvements in Wireless Telegraphy, of which the following is a specification.

The invention described in this case, which is a division of application Serial No. 167242, filed July 27, 1903, patented Mar. 12, 1912, Number 1,020,032, relates to the tuning of antennæ by altering the capacity of the antennæ; it also relates to tuning by connecting one or more members of a multiple antenna in electrostatic inductive relation; it further relates to the utilization of one or more members of a multiple antenna for sending or receiving and altering an electrical characteristic of the sending or receiving members by one or more of the other members of the antenna.

The invention is hereinafter more fully described and claimed.

In the accompanying drawing forming part of this specification, Figures 1, and 2 show means for tuning the antennæ whether used for sending or receiving.

In Fig. 1, a method is shown of tuning the antennæ by changing the capacity of the antennæ, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.

12 is a device whereby more or less of the antenna can be connected at will, and 13 is a coil which may form either the primary of the transformer in which a receiver is placed, when it is desired to receive, or the secondary of a transformer whose primary is in a circuit for producing oscillation when it is desired to send.

Fig. 2, shows an alternative apparatus for accomplishing the same results, where 14, 15 and 16 are antennæ, any of which may be switched in as desired by the switch 17 passing over the contacts 18, 19 or 20 and being connected by the switch 21 so as to send or receive at will, while 22, 23 and 24 are wires which may be connected to the ground at will by the switch making contact with one of the contacts 25, 26, 27. 28, 29 and 30 are capacities of different values and it will be seen that on connecting the wire 22 to ground, the capacity of the vertical 14 will be largely increased and similarly with the other antennæ.

Since one or more members of the multiple antenna may be connected at will, or more capacity otherwise introduced and this changes an electrical characteristic of the antenna, the invention affords convenient means for changing the electrical characteristics of the antenna when alternately using it for receiving and sending. It will be understood that ordinarily an aerial should have less capacity and inductance when receiving than when sending. (*Elec. World Engineer*, vol. 37.) The advantages of tuning the antenna by altering the capacity between it and another conductor, will be recognized by those familiar with the art as useful for various other purposes.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. In apparatus for the transmission of energy by electromagnetic waves, the combination of an antenna and an operating instrument connected thereto, of several complementary conductors and means for altering the capacity of the antenna by employing the influence of different ones of said complementary conductors.

2. Apparatus for the transmission of energy by electromagnetic waves, comprising a multiple antenna, an operating instrument and means for connecting various portions of the antenna to the instrument.

3. Apparatus for wireless telegraphy, comprising a multiple antenna having some of its members connected to an operating instrument and some of its members connected to ground, and the grounded members being in electrostatic inductive relation to the active radiating or receiving members, substantially as described.

4. In wireless telegraphy apparatus, an antenna consisting of several conductors and means to alter the electrical characteristics of some of the members acting as radiators by connecting to others of the members, substantially as described.

5. A multiple antenna consisting of several separate conductors and means to alter

the capacity of some of them by the influence of others selected, substantially as described.

6. In wireless telegraphy, the combination of a multiple antenna, connected to operating instruments complementary conductors influencing the antenna, and means for altering the capacity of the antenna by cutting out some of the complementary conductors, substantially as described.

In testimony whereof, I have hereunto set my hand.

REGINALD A. FESSENDEN.

Witnesses:

GERTRUDE M. KELLEY,

JESSIE E. BENT.