R. A. FESSENDEN.

WIRELESS TELEGRAPHY.

APPLICATION FILED JULY 19, 1907.

1,147,010.

Patented July 20, 1915.

2 SHEETS—SHEET 1.

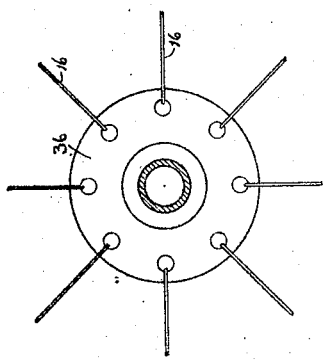

Fig 3.

Fig. 1.

Fig 2.

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2 SHEETS—SHEET 2.

Fig. 4.

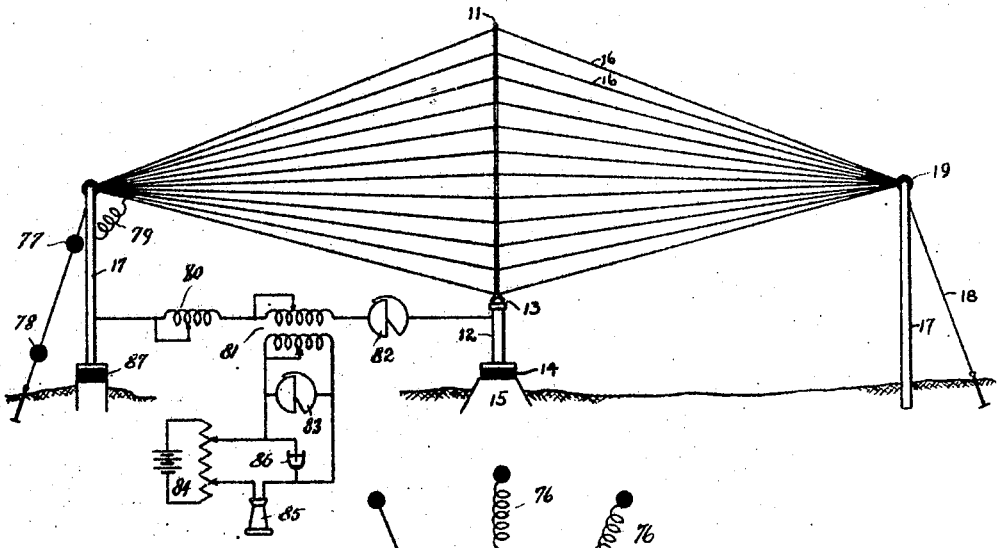
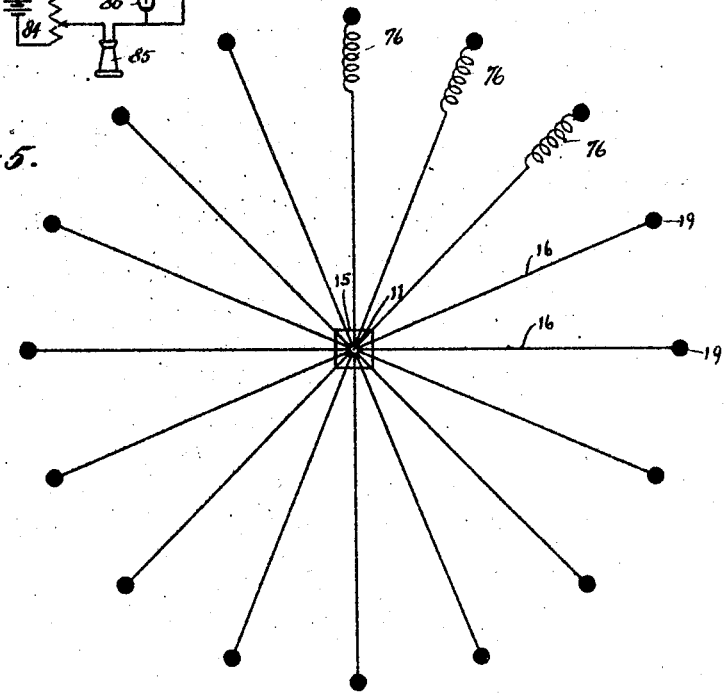


Fig 5.



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UNITED STATES PATENT OFFICE.

REGINALD A. FESSENDEN, OF BRANT ROCK, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SAMUEL M. KINTNER, OF PITTSBURGH, PENNSYLVANIA, AND HALSEY M. BARRETT, OF BLOOMFIELD, NEW JERSEY, RECEIVERS.

WIRELESS TELEGRAPHY.

1,147,010. Specification of Letters Patent. Patented July 20, 1915.

Application filed July 19, 1907. Serial No. 384,628.

To all whom it may concern:

Be it known that I, REGINALD A. FESSENDEN, a citizen of the United States, residing at Brant Rock, in the State of Massachusetts, have invented or discovered certain new and useful Improvements in Wireless Telegraphy, of which the following is a specification.

My invention relates to means for transmitting and receiving signals, and more particularly to sending and receiving conductors.

In the accompanying drawings forming a part of this specification Figure 1 shows a side view of elevated conductors suitable for carrying out my invention and also diagrammatic illustrations of suitable circuits. Figs. 2 and 3 show details of construction. Fig. 4 shows in elevation a modification and Fig. 5 shows a plan view of the elevated conductor shown in elevation in Fig. 4.

Heretofore the construction of sending and receiving conductors for wireless telegraphy has been of a very expensive type and it has been very difficult to get the desired capacity and height and to get a type of construction suitable for various classes of work.

The object of the invention herein disclosed is to overcome the above-mentioned difficulties and to afford a means whereby antennæ of great height and large capacity, and adapted for use in various ways, may be cheaply constructed, while at the same time being safe mechanically and costing little to keep in repair.

In Figs. 1 and 4, 11 is a vertical mast, preferably of metal. In a mast 400 feet high this may consist of sections of 2½ inch iron pipe screwed or bolted together, each section being 8 feet long.

The lower portion 12 of the mast may be constructed of thicker pipe and in a 400-foot mast may consist of 3 sections of 8-inch pipe, each section 16 feet long.

13 is a rocking joint, 14 is an insulating base and 15 a foundation.

16 16 are wires of phosphor bronze or galvanized steel, about No. 12 B. & S. gage. These are attached to insulators 19 placed at the top of poles 17. The poles 17 are supported by guys 18 which are preferably metallic and may be split into insulated sections as by insulators 77 78 in Fig. 4.

The poles 17 may be made of wood or of metal, and if made of metal may be insulated by the insulating base 87 (at the left of Fig. 4).

The whole construction may be made more flexible so as to be less strained by the wind by the insertion of springs in the guys for the posts as shown at 75, Fig. 1, or by the insertion of individual springs 76 in the individual wires 16 as shown in Fig. 5. For a 400-foot mast these springs are about 3 inches in diameter and about 2 feet long and made of galvanized steel about 3/8 inch thick.

The height of the pole 17 may be either approximately that of the section 12 as shown in Fig. 1, or higher, as shown in Fig. 4.

Fig. 5 shows a plan view of the construction shown in both Figs. 1 and 4, the same numerals being used for corresponding parts.

In Fig. 2 is shown a method of attaching the wires 16 to the mast 11. Here the wire 16 is attached to a ring at the point 38, which ring may be insulated as shown at 37 or conducting as shown at 36. 33 and 34 are two sections of the pipe which form the mast 11, and 35 is a metal collar or union. The wire 16 is connected to the mast 11, either directly or through an inductance 39 as shown at the left by 39 and a switch 90 is used to connect it. In this type of antennæ the guys themselves act as the crown wire to give a large capacity, and at the same time these can be made of very fine wire. This form of construction permits the use of very short sections to the mast, *i. e.*, only 8 feet instead of 100 feet as in the usual type, and the use of very small wires and a very small section of the mast.

As an illustration of the advantages to be gained by this type of construction a 400-foot antenna of this type consists of iron pipes only 2-1/2 inches diameter and the guys of wires No. 12 B. & S. gage and the cost of the whole mast is less than $2500., whereas, with the previously used type of construction steel tubes must be used 3 feet in diameter and steel guys 1 inch

in diameter, and the cost of this type of construction is more than $30,000. In addition to this the capacity of this new type of construction is four or five times as great as that of the previously used type.

In addition the breakage of a single guy in the previously used types is sufficient to entail the destruction of the tower while in the new type containing 300 or 400 guys a considerable number of wires might break without passing the safety limit. These towers may be used for operating by the electrical component of the electrical waves, for example, as shown in U. S. Patent 793,652, or by the applicant's method of utilizing the electromagnetic component of the electromagnetic waves, referred to in U. S. Patent 754,058 and in a number of pending applications.

In Fig. 1 is shown one arrangement for operation in practice. In this 20 is a conductor attached to one or more of the wires 16, 24 is a variable inductance, 25 a variable capacity, 26 a liquid barretter, 31 the telephone receiver, 32 a potentiometer, 22 and 29 inductances, 23 and 30 variable capacities and 21, 27 and 28 switches for connecting the circuits to the mast 11, or to ground.

In Fig. 4 the supporting post 17 at the left forms a part of the receiving circuit and one or more of the wires 16 is connected to the post by the connection 79. 80 is a variable inductance, 81 a variable transformer, 82 and 83 are variable condensers, 86 a receiver, 85 a telephone and 84 a potentiometer.

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. An antenna for wireless telegraphy comprising a conducting structure supported by conducting guys, and said guys adapted to act as part of the antenna and effect a receiver in circuit.

2. An antenna for sending and receiving electro-magnetic waves, consisting of a mast and a series of conducting guys, forming part of the antenna and attached at varying vertical positions to the mast and insulated from the ground, each guy having a resilient element therein.

3. An antenna for wireless signaling comprising a mast and a series of conducting guys therefor, attached at varying elevations and their outer ends insulated from the ground and forming part of the antenna.

4. An antenna comprising a conducting mast and a series of conducting guys therefor with means for connecting some of them to the mast and for insulating their outer ends from the ground, whereby the guys form part of the antenna.

5. An antenna consisting of an insulated mast with conducting guys attached at varying vertical positions thereto and insulated from the ground, so as to add to the capacity of the mast.

6. An antenna for wireless telegraphy comprising an upright mast, and a series of resilient guys forming part of the antenna and attached at short distances apart along the length of the mast, so as to hold it in alinement, substantially as described.

7. A guy-supported antenna for wireless signaling having a capacity element as part of the antenna in the form of a series of conducting guys attached thereto.

8. Apparatus for wireless telegraphy comprising a conducting mast, a conducting guy attached to the mast and anchored at a distance therefrom, and a return circuit from the anchorage to the mast including a receiver adapted to be actuated by the magnetic component of the electro-magnetic waves in the guys.

9. Apparatus for wireless telegraphy comprising an insulated conducting mast, conducting guys attached thereto, an insulated anchorage post supporting the outer end of the guys, an electric circuit returning from the post to the mast and containing a receiver, whereby said receiver is actuated by the electro-magnetic component of the waves in part received by the guys.

10. An antenna for wireless signaling, comprising a conducting mast, and a plurality of conducting guys connected to the mast and insulated from the ground, said guys forming part of the antenna, and some of them at least being connected to the mast through separate inductances.

11. An antenna for wireless signaling comprising a conducting mast, having a rocking support on its base, and a plurality of radiating resilient conducting guys forming a part of the antenna, and insulated from the ground at their points of anchorage.

12. An antenna for wireless signaling, comprising a conducting mast having a rocking support at its base, and a plurality of radiating conducting guys forming a part of the antenna, each of said guys having a resilient element therein.

13. An aerial conductor system for wireless telegraphy, consisting of a central electrically conducting support insulated from the ground and a tent shaped group of wires running obliquely toward the ground, said wires being at one end electrically connected with said support and at the other end fixed to several distant points on the ground and insulated therefrom, substantially as described.

14. An aerial conductor system of wireless telegraphy, consisting of a central electrically conducting support insulated from the ground and a cone-shaped group of

wires running obliquely toward the ground, said wires being at one end electrically connected to said support and at the other end fixed to several distant points on the ground and insulated therefrom, substantially as described.

15. An aerial for wireless telegraphy comprising a central electrically conducting support insulated from the ground and a radially arranged group of wires electrically connected to said support near the top and at the outer ends fixed to several distant points on the ground and insulated therefrom.

16. An aerial conductor system for wireless telegraphy, consisting of a central electrically conducting support insulated f om the ground and a group of wires running obliquely toward the ground, said wires being at one end electrically connected with said support and at the other end fixed to several distant points on the ground and insulated therefrom, substantially as described.

In testimony whereof I have hereunder signed my name in the presence of the subscribed witnesses.

REGINALD A. FESSENDEN.

Witnesses:
ADELINE WOLEVER,
KATHARINE J. GILLIS.