

R. A. FESSENDEN.
WIRELESS TELEGRAPHY.
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1,045,782.

Patented Nov. 26, 1912.

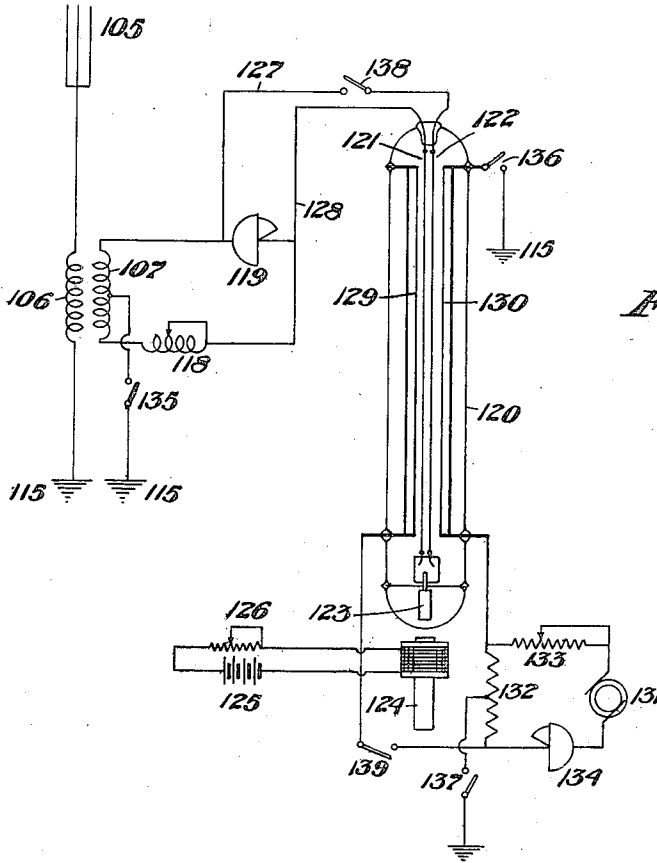


Fig. 1.

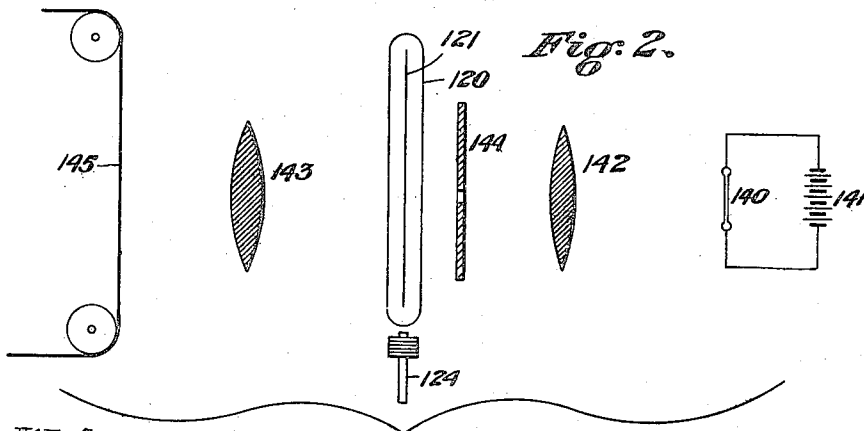


Fig. 2.

Witness:
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UNITED STATES PATENT OFFICE.

REGINALD A. FESSENDEN, OF BRANT ROCK, MASSACHUSETTS, ASSIGNOR TO NATIONAL ELECTRIC SIGNALING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

WIRELESS TELEGRAPHY.

1,045,782.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Original application filed June 16, 1908, Serial No. 438,725. Divided and this application filed January 29, 1910. Serial No. 540,735.

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 certain new and useful Improvements in Wireless Telegraphy, of which the following is a specification.

My invention relates to the art of signaling by electromagnetic waves, and its primary objects are to increase the sensitiveness and efficiency of receiving devices for signaling thereby.

More especially it is designed to make use of electrostatic effects in the construction of receivers.

In the accompanying drawing Figure 1 is a diagram of a receiver operating by an electrostatically charged wire, and Fig. 2 is a diagram showing a receiver with means for recording a message.

A form of static telephone receiver described by Dolbear in his United States Patent No. 350299, of 1882, has been used in experimenting in receiving wireless signals in various forms in which the diaphragms were made of sheet metal either plain or covered with an electrified dielectric, and also with a dielectric having a metallic coating on the side next to the fixed plate, these receivers, however, have been insensitive and have not come into practical use. I have discovered that static receivers can be made extremely sensitive by use of certain constructions and methods of operation, some of which are disclosed in my co-pending application No. 438725 of June 16th, 1908, of which this application is a division. I herein show a form in which I use electrostatically charged wires or filaments, which by change of position due to change of the charge, produce a signal, which may be recorded.

In Fig. 1, I show an antenna 105 grounded at 115 and having in circuit the primary 106 of a transformer whose secondary is 107. In circuit with the secondary is an adjustable inductance 118, and an adjustable condenser 119. The leads 128 and 127 are connected to two extremely fine wires of filaments 121, 122, which are mounted in a glass vessel 120 in any convenient way. They are preferably made of aluminum or else of quartz with a silver coating. Their tension may be adjusted by means of an

armature 123 which is pulled down by the effect of the electromagnet 124 excited by battery 125, whose current may be adjusted by the resistance 126. In proximity to the wires 121, 122, I place parallel larger conductors 129 and 130, adjusting their distances from the wires very carefully, since I have found that there is a certain critical distance at which the apparatus is very sensitive, while the sensitiveness falls off if these larger conductors are either closer or farther away than the critical distance. These conductors 129, 130, may be connected to a local exciting circuit containing a high frequency dynamo 131. Resistances 132, 133, form an adjustable potentiometer for regulating the voltage to which conductors 129, 130, are raised, while a variable condenser 134 is used to also modify the intensity and at the same time alter the phase. I provide switches 138, 139, to operate the device and it will be understood that when electromagnetic waves pass through the primary 106 they will generate oscillations in the secondary circuit 107, 118, 119, and the wires 121, 122, will by the electrostatic effects be caused to change their relative position. Such change of position may be either observed or recorded in any convenient or obvious way. It will also be noted that if the wires 121, 122 are continuously given a certain rate of electrostatic charge in the neighborhood of the periodicity of excitation of the wires 129 and 130, beats will be produced of audible or otherwise recordable frequency, according to my well known "heterodyne" method. This static charging with neighboring frequency to produce beats, may be called heterostatic charging. By use of the switches 135, 136, and 137, the circuits may be grounded as indicated, while by switches 138 and 139 one or more of the sides of the circuits may be opened. I have found that by suitable use of these switches the effect of atmospheric electricity may be cut out.

In Fig. 2, I show a convenient form of recording apparatus for making a permanent record of the signals received as above described. The diagram represents a Nernst glower at 140 excited by a source 141 and by means of lenses 142 and 143 projecting a ray of light on a moving strip of photographic film 145, this ray of light passes

through a perforated diaphragm 144 and casts an image of the wires 120 and 121 of Fig. 1, so that the signal is recorded by relative change of position of these wires as above described. For example, if the received oscillations formed beats with the oscillations locally produced by the heterodyne circuit of Fig. 1, such beats will be of low enough periodicity to easily record on the photographic film.

Having thus described my invention and illustrated its use, I claim the following:

1. An electrical indicator comprising a fixed conducting surface and a flexible conducting wire mounted in proximity thereto and means to charge the said surface and wire heterostatically to produce a varying field of force and cause the wire to move.

2. In wireless telegraphy apparatus, the combination with a fixed conducting surface and means at the receiving station to produce a continuous train of high frequency oscillations thereon, a movably mounted fine wire supported in proximity to the said surface and means to continuously excite it by high frequency oscillations,

whereby the wire and surface are electrostatically attracted, and means to produce an indication by the influence of the combined excitations of said surface and said wire.

3. A receiver for wireless telegraphy comprising a fixed conducting surface and means to excite it with locally produced high frequency oscillations, a fine wire supported in proximity to said surface and means to charge it by received oscillations periodically at oscillation frequencies neighboring the frequency of locally produced oscillations, whereby to vary the electrostatic attraction between the surface and the wire, and means to photograph the resulting movements of the wire, substantially as described.

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

REGINALD A. FESSENDEN.

Witnesses:

JESSIE ETTA BENT,
FLORENCE MAY LYON.