R. A. FESSENDEN.
WIRELESS TELEGRAPHY.
APPLICATION FILED JAN. 14, 1907.

974,762. Patented Nov. 1, 1910.

Fig. 1.

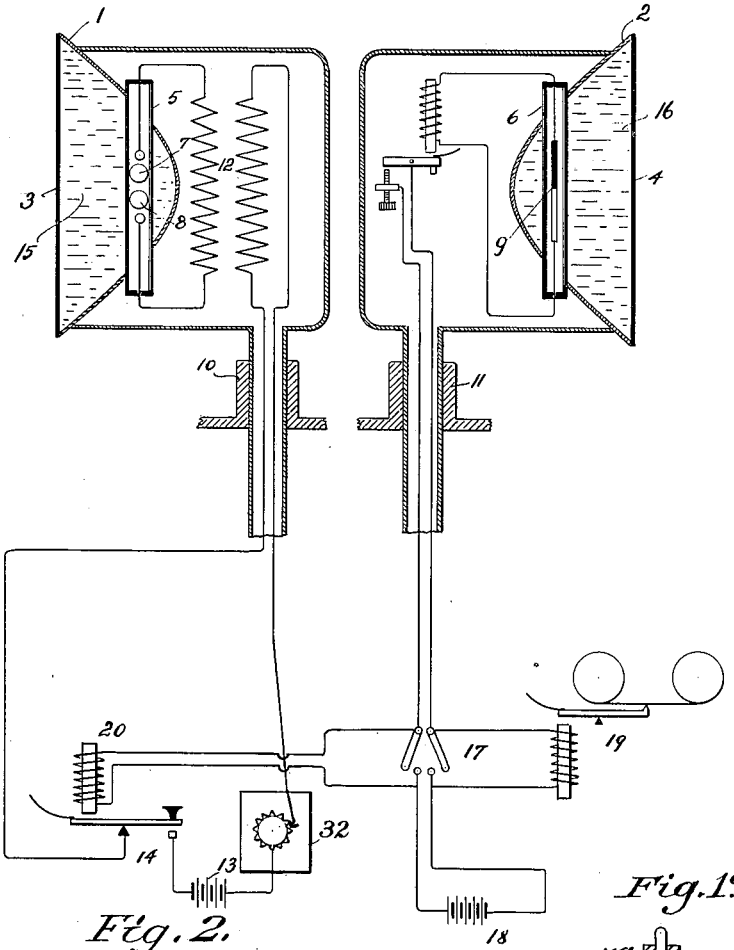
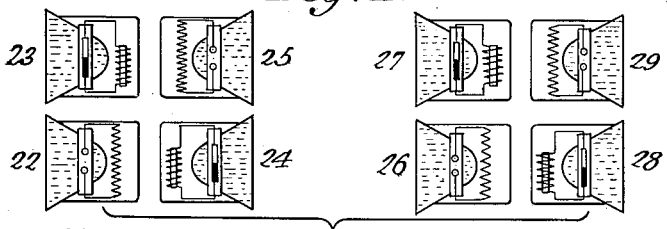


Fig. 1a

Fig. 2.



WITNESSES:
Jessie E. Bent
Fritz P. Hambendorf.

INVENTOR.
Reginald A. Fessenden

UNITED STATES PATENT OFFICE.

REGINALD A. FESSENDEN, OF WASHINGTON, DISTRICT OF COLUMBIA.

WIRELESS TELEGRAPHY.

974,762. Specification of Letters Patent. Patented Nov. 1, 1910.

Application filed January 14, 1907. Serial No. 352,212.

To all whom it may concern:

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

My invention relates to methods of relaying wireless telegraph messages, and more particularly to projectors for transmitting wireless messages in one direction.

In the accompanying drawings forming a part of this specification Figure 1 shows apparatus for carrying out my invention. Fig. 1ª shows the construction of a part. Fig. 2 shows the method of arranging the apparatus at different stations.

The object of the present invention is to permit of the relaying of wireless messages and for the operation by wireless telegraphy of a series of interconnecting stations such as is used on railway lines.

In Fig. 1, 1 and 2 are projectors preferably filled with a liquid of high specific inductive capacity 15, 16 such as water. 3 and 4 are hard rubber disks for retaining the water. Means for controlling the expansion of the water, etc., are not shown being obvious mechanical expedients. 5 and 6 are hard rubber tubes, 5 containing radiating conductors, including a discharge gap, 7 and 8, and 6 containing a receiver such as thermo-electric couple 9. 10 and 11 are swiveling supports for enabling the projectors to be turned in any direction. 12 is a transformer or induction coil. 13 is a source of voltage, 14 is a key. On depressing the key 14 sparks pass between the radiating conductors at 7 and 8 and electromagnetic waves issue from the projector. The presence of the medium 15, 16 causes a very intense emission of waves and also causes long waves to be transmitted in a straight line, as the wave length increases on passing out of the medium.

Any suitable means of generating the electromagnetic waves may be used as I do not confine myself to the method here shown. The insulating tube 5 may be filled with any desired gas and the composition of the discharge terminals suitably varied. For example with nitrogen gas I have found magnesium or alloys of magnesium and aluminum suitable for the terminals. Also alloys of aluminum or magnesium or zinc with metallic calcium or as the wick for a wick electrode as at 7ª in Fig. 1ª. Pure iridium may be used for one electrode with advantage preferably in the form of a thin water cooled sheet. A calcium alloy may be used for the other electrode. These alloys are also efficient with other gases besides nitrogen. The receiver may also be used in a compressed gas. A wave chute may be applied to the edge of the projector.

17 is a switch, 18 a source of current as a local battery, 19 a recorder and 20 a relay magnet. On the receipt of waves by the receiver 9, the recorder operates, and the relay magnet 20 depresses the key 14 and causes the message to be retransmitted by the sending conductors 7 and 8. The projectors are made of metal, and as they face in opposite directions and the receiving and transmitting apparatus are inclosed in a metal sheath, they do not affect each other except through the relay magnet. Fig. 2 shows two stations equipped in this manner.

22, 25, 26, 29 show sending projectors and 23, 24, 27, 28 show receiving projectors. A message received on the receiver 23 is relayed and transmitted by the sending projector 25. It is again received by the receiving projector 27 and retransmitted by the sending projector 29 and so on.

What I claim is:

1. In wireless signaling the combination of a receiving apparatus and a transmitting apparatus, means for shielding the receiving apparatus from the action of the sending apparatus during the simultaneous operation of the sending and receiving apparatus, said means comprising a focusing device for receiving the waves and a focusing device for emitting the waves, both focusing devices being filled with a medium having a higher dielectric constant than air, so that the waves as emitted and received are of much shorter wave length than when traversing the space between the stations.

2. In wireless signaling, the combination of a receiving apparatus and sending apparatus and a relay for retransmission from one to the other, of shields protecting one apparatus from the action of the other during simultaneous operation of the two, said protecting means being adapted to change the wave length when in the immediate neighborhood of the receiver and sender.

3. In wireless signaling, the combination

of a receiver and a generator of electromagnetic waves, and automatic means to retransmit effects from one to the other, and a shield for protecting each of said apparatuses from the other, and means to shorten the wave length in the immediate vicinity of the receiver and generator.

Signed at Brant Rock in the county of Plymouth and State of Massachusetts this 12th day of January A. D. 1907.

REGINALD A. FESSENDEN.

Witnesses:

JESSIE E. BENT,

ADELEINE WOLCOTT.