

No. 771,818.

PATENTED OCT. 11, 1904.

L. DE FOREST.  
WIRELESS SIGNALING APPARATUS.  
APPLICATION FILED MAY 28, 1904.

NO MODEL.

Fig. 1.

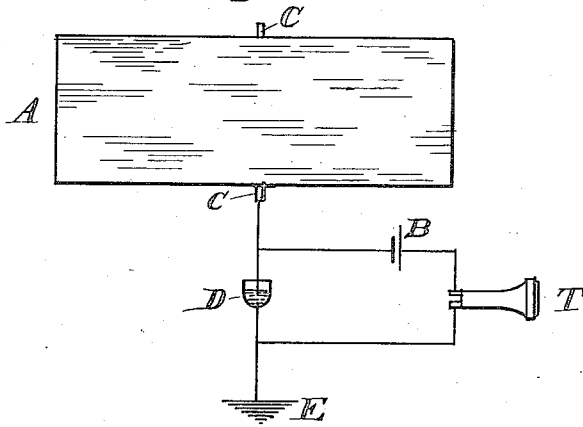
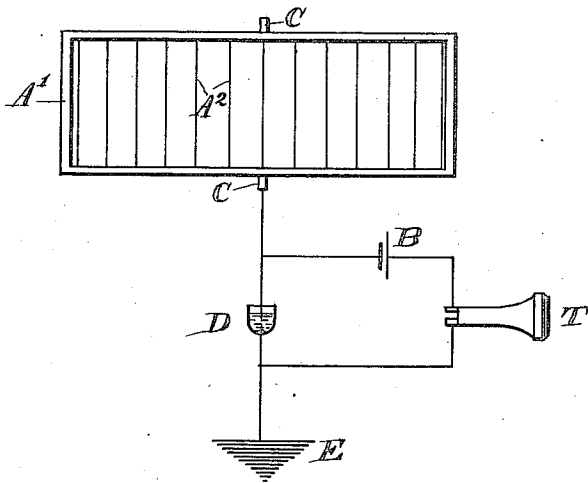


Fig. 2.



WITNESSES:

*H. Emmrich*  
*Philip Farnsworth*

INVENTOR

*Lee deForest.*

BY  
*Henry L. Reynolds*  
ATTORNEY

# UNITED STATES PATENT OFFICE.

LEE DE FOREST, OF NEW YORK, N. Y.

## WIRELESS SIGNALING APPARATUS.

**SPECIFICATION** forming part of Letters Patent No. 771,818, dated October 11, 1904.

Application filed May 28, 1904. Serial No. 210,154. (No model.)

*To all whom it may concern:*

Be it known that I, LEE DE FOREST, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Wireless Signaling Apparatus, of which the following is a specification.

My invention relates to devices for use in wireless signaling to localize or indicate the direction of a signal-transmitting station and will be defined in its scope by the claims.

The object of my invention is to simplify and improve such devices, and particularly to reduce them to practicable and convenient dimensions.

The drawings illustrate my invention in the simple forms now preferred by me.

Figures 1 and 2 each show a receiving device embodying the principles of my invention.

Attempts have been made—as, for instance, in the United States patents to Stone, Nos. 716,134 and 716,135—to determine the direction of travel of electric signaling-waves, and thus the direction of the transmitting-station.

In the patents referred to the apparatus is based upon the principle of the use of two antennæ separated by a half wave length, the two antennæ being associated with the wave sensitive member of an electric translating mechanism in such a manner as to affect the latter oppositely, whereby there is a maximum effect when the plane of the antennæ coincides with the direction of travel of the signal-waves and a minimum or zero effect when the plane of the antennæ is normal to the direction of flow of the said waves.

My invention differs from the above in ignoring the wave length in determining the proportions of the parts and also in employing one instead of two antennæ. While the collecting-conductor may consist of a plurality of wires, they are so associated, both with each other and with the translating mechanism, as to act substantially as one.

Fig. 1 shows my invention embodied in a simple form. This comprises a metal plate A, mounted to swing upon a vertical axis, as by pivots C C. This plate is connected with the earth or other capacity E and has associated therewith an electric translating mechanism

of which the wave-sensitive member D is in series between said plate and the earth or capacity E. The particular form of electric translating mechanism used is not material. I have shown a wave-sensitive member D of the electrolytic type, a local circuit containing a battery B, and a telephone-receiver T. These particular forms of devices are, however, only shown as illustrative of the manner of utilizing such devices in my invention and without any thought of limiting myself thereto.

In Fig. 2 I show a device essentially the same. Instead, however, of a metal plate I show a frame A', substantially equivalent in dimensions with those of the plate and provided with conductors, as wires A<sup>2</sup>, extending across it. The effect of these wires as collectors of received energy is approximately the same as that of the plate. This frame is likewise mounted on pivots C C, whereby it may be swung about a vertical axis.

The dimensions of the collecting-screen A A' are not determined by any reference to the wave length of the signal-waves, but solely by convenience of construction and like grounds. It is, however, recognized that a large screen will collect a larger amount of energy than a small one, and for this reason it is preferable. I also prefer to secure horizontal extent rather than height in the screen. When such a screen is broadside onto the waves—that is, normal to the direction of their travel—it will manifestly collect the largest possible amount of energy, while when it is edge on, or in a plane coinciding with the direction of travel of the waves, it will collect the smallest amount of energy. The electric translating mechanism should be of such character that the effect thereon of the received waves is more or less approximately proportional to the amount of energy received. I have found a telephone-receiver T to be admirably adapted for use as the indicating mechanism.

With a mechanism of this character having a collecting-screen six by fifteen feet in size I have been able to locate with certainty a transmitting-station seven miles distant within ten degrees; the transmitting-station being one designed for signal-transmitting purposes. Such a device may be employed in connection

with ordinary signal-transmitting stations or with special transmitting-stations, in which case it would not be necessary to use tall antennæ. In fact, it would preferably be best to use short antennæ and short lengths. The direction qualities of each localizer will then be better; but it is practically impossible to cover useful distances by wave lengths short enough to correspond with the period of any localizing device small enough to be installed and rotated on board a vessel.

What I claim, and desire to secure by Letters Patent, is—

1. A localizer of the source of wireless signaling-waves comprising a collecting-screen mounted to be turned about a vertical axis, a ground connection therefor and an electrical translating mechanism having its wave-sensitive member in series between said screen and its ground connection.

2. A localizer of the source of wireless signaling-waves comprising a collecting-screen mounted to be turned about a vertical axis and having dimensions independent of the wave length of the signaling-waves, a ground con-

nection for said screen and an electrical translating mechanism, having its wave-sensitive member in series between said screen and its ground connection.

3. A localizer of the source of wireless signaling-waves comprising a collecting-screen mounted to swing about a vertical axis and having dimensions independent of the wave length of the signaling-waves, and an electrical translating apparatus associated therewith.

4. A localizer of the source of wireless signaling-waves comprising a collecting-screen having a relatively large horizontal extent mounted to swing about a vertical pivot, a ground connection for said screen and an electrical translating mechanism having its wave-sensitive member in series between said screen and its ground connection.

In testimony whereof I have hereunto affixed my signature, this 25th day of May, 1904, in the presence of two witnesses.

LEE DE FOREST.

Witnesses:

HENRY L. REYNOLDS,  
ALPHONSO HOWE.