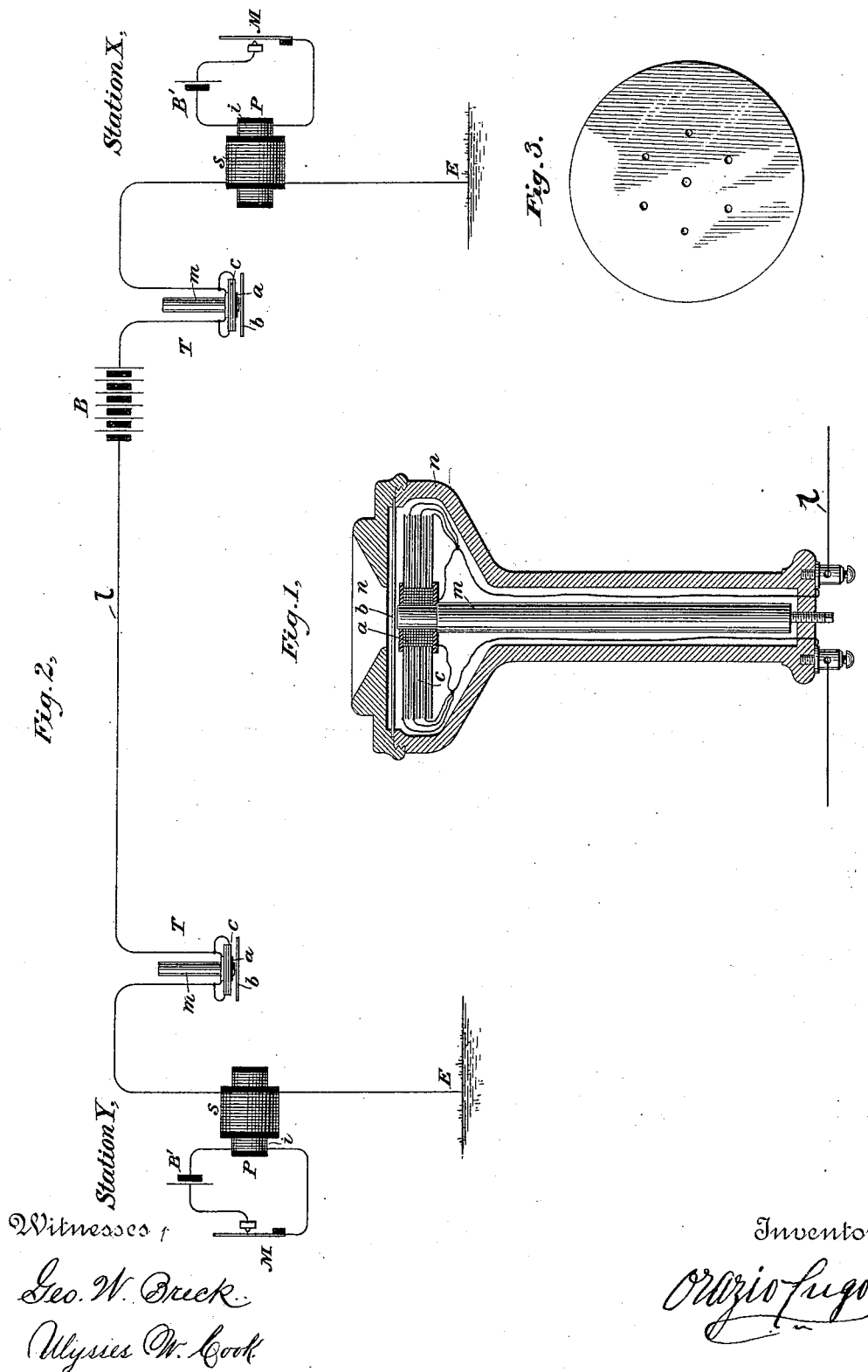


(Model.)

O. LUGO.  
RECEIVING TELEPHONE.

No. 348,134.

Patented Aug. 24, 1886.



# UNITED STATES PATENT OFFICE.

ORAZIO LUGO, OF NEW YORK, N. Y.

## RECEIVING-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 348,134, dated August 24, 1886.

Application filed August 15, 1885. Serial No. 174,494. (Model.)

*To all whom it may concern:*

Be it known that I, ORAZIO LUGO, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Speaking Receiving-Telephones, of which the following is a specification.

Figure 1 represents a cross-section of my new speaking receiving-telephone. Fig. 2 represents two stations, X and Y, with transmitting microphonic devices, receiving-telephones, line-wire connecting the stations, and a galvanic battery inserted in the line; and Fig. 3 represents the diaphragm provided with a few holes or perforations.

Heretofore telephonic communication has been partially accomplished by using a magneto speaking receiving-telephone, or by a speaking-condenser receiving-telephone; but when the magneto receiving-telephone is used alone the limited quantity of electric current that can be induced into the line-wire connecting the distant station it limits the force for the transmission of the message, and renders it very often uncertain in its operation. The same uncertainty of receiving the message transmitted from a distant station exists when a speaking-condenser receiving-telephone is used alone. The uncertainty of the operation of the speaking-condenser receiving-telephone depends mostly in not knowing how to keep the condenser-receiver at a constant static charge by a battery in the line-wire, the changes or variations of charge being due to electrical phenomena taking place on the line of transmission connecting the communicating stations.

The object of my invention is to make more certain the receiving of the transmitted articulate speech or message; and to this end my invention consists in increasing the receiving capacity of the telephone-receiver, thereby increasing the volume of articulate speech at the receiving-station, by combining in the same receiving hand-telephone box a magneto and a condenser speaking-telephone speaking in conjunction. I attain this object by the combination illustrated in the accompanying drawings.

In Fig. 1, *m* represents a permanent magnet. *c* represents a speaking-condenser, the metal-

lic plates of which are insulated from each other by paper or other dielectric. One side of each alternate plate of the condenser goes to line, and also connects with one terminal of the coil *a*. The opposite plates of the speaking-condenser *c* connect with the other terminal of the coil *a*, as well as with the line-wire. *a* is a coil or helix of insulated wire, preferably of high electrical resistance, wound around one pole of the permanent magnet *m*. *b* represents a metallic diaphragm, the whole incased in the box *n*, similar in material to that in common use. *B* represents a galvanic battery placed in the line-wire connecting the different stations. Said line-wire may be formed as a metallic circuit, or it may be connected as an earth-circuit.

In Fig. 2, X and Y represent two stations organized for the transmission and receiving of articulate speech. At station X, *T* represents the receiving-telephone, *S* the secondary wire of the induction-coil *i*, and *p* the primary wire of said induction-coil; *B'*, the local battery in the circuit of the primary wire of the induction-coil *i*, in which the microphonic transmitter *M* is also included. The line-wire *l* connects the two stations. The same letters of reference represent similar parts at station Y. In the line-wire *l* the battery *B'* charges statically the condensers *c*, and they are kept normally charged to the maximum potential of the battery *B'*. When speaking in the microphonic transmitter at the distant station, the current induced on the line by the action of the transmitter changes the normal static charge of the condensers *c*, incased in the telephone-box *n*, allowing the plates of the condensers to vibrate, and thus reproduce the transmitted speech or signal. The terminals of the coils *a* are connected with the opposite poles of the condensers *c*, as well as with the line-wire, and forming part of said line-wire. Thus the same current induced to line when speaking in the microphonic transmitter at the distant station reproduces articulate speech by or with the condenser, and also by or with the magneto-telephone. The result of this double action at the same instant and by the same current is an increase of volume in articulation of the receiver.

The great advantage of my invention con-

sists in being able to receive articulated speech from great distances with precision and certainty, for the reason that the speaking-condenser being kept charged with a sufficiently strong galvanic battery in the line-wire it will reproduce speech, besides reacting on the magneto-telephone. The reaction of the condenser upon the magnet being inverse to its charge, it increases or decreases the magnetic saturation of the permanent magnet to a greater or less extent than if the reaction due to the statically-charged condenser did not exist, inducing the latter to reproduce the same speech or signals which would otherwise most probably have remained silent. With this invention, therefore, telephony becomes as accurate and as positive in its transmission as telegraphy is at the present day.

The number of plates in the little condensers need not exceed forty to fifty.

The metallic diaphragm *b* may have a few holes or perforations, in order to better hear the condenser speak.

The number of cells of the battery B should be increased in proportion to the resistance of the line-wire.

Heretofore magneto receiving-telephones and speaking-condenser telephones have had to be used separately.

What I claim, broadly, as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a speaking-telephone, of a magneto-instrument with a condenser in a shunt about said instrument, operating in conjunction and actuated by the same microphonic transmitting devices at a distant station, substantially as set forth.

2. A speaking-condenser receiving-telephone the poles of which are connected with the terminals of the helix of a magneto receiving-telephone and with the line-wire and transmitting-station, substantially as herein set forth.

3. The combination, with a magneto receiving-telephone, of a speaking-condenser receiving-telephone placed in the same receiving-box in the same circuit, substantially as herein described, so that both receivers may be heard speaking at the same time.

4. The combination of the magneto-telephone and the speaking-condenser in a shunt about said magneto-telephone, substantially as described, with an electric generator in the line-wire connecting with the transmitting devices at a distant station, as herein set forth.

Orazio Lugo.

Witnesses:

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ALBERT A. WRAY.