

(No Model.)

A. W. ROSE & C. A. CHEEVER.

ELECTRIC SPEAKING TELEPHONE.

No. 272,329.

Patented Feb. 13, 1883.

Fig. 1.

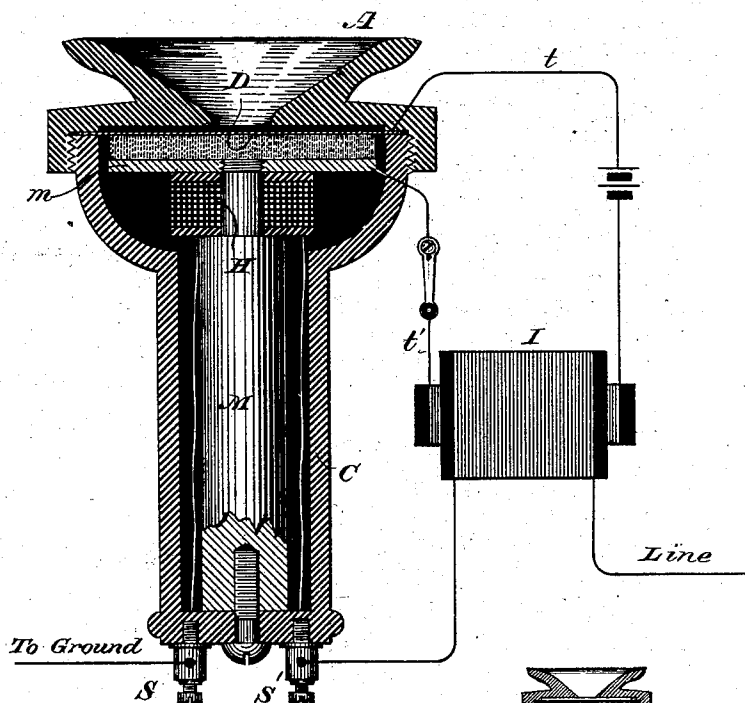
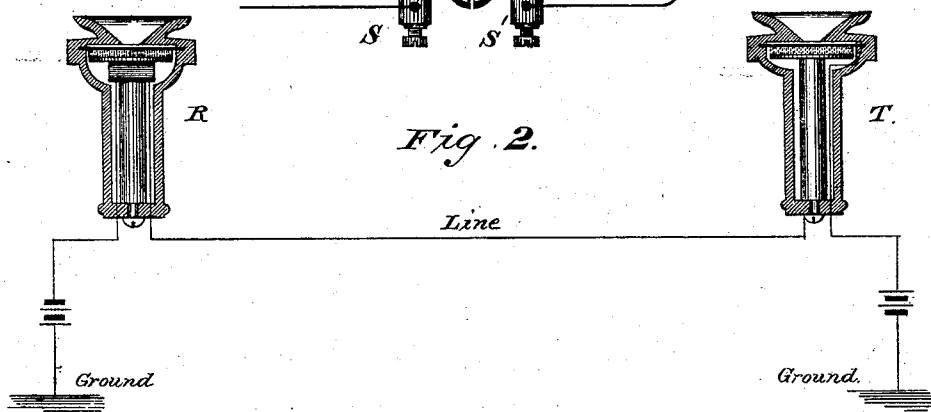


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALLEN W. ROSE AND CHARLES A. CHEEVER, OF NEW YORK, N. Y., ASSIGN-
ORS, BY DIRECT AND MESNE ASSIGNMENTS, TO SAID CHEEVER AS
TRUSTEE.

ELECTRIC SPEAKING-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 272,329, dated February 13, 1883.

Application filed October 26, 1880. (No model.)

To all whom it may concern :

Be it known that we, ALLEN W. ROSE, a citizen of the Dominion of Canada, residing in the city, county, and State of New York, and
5 CHARLES A. CHEEVER, a citizen of the United States, residing in New York city aforesaid, jointly have invented certain new and useful Improvements in Electric Speaking-Tele-
10 phones, of which the following is a specifica-
tion.

Our invention is based and constitutes an improvement upon certain new and useful im-
provements in electric telephony and trans-
15 mitting-telephones made by the aforesaid Rose, the distinguishing characteristic of which is the suspension of magnetic filings in the mag-
netic field of a speaking-telephone, through
which field a galvanic current passes.

The object of our invention is, more espe-
20 cially, to adapt such a telephone for operation both as a transmitter and as a receiver.

The subject-matter claimed is designated at the end of this specification.

The essential features of our improved tele-
25 phone are a magnet, a helix constituting part of a galvanic circuit and enveloping the core of the magnet or a portion of it, filings of met-
als susceptible to magnetic action, suspended
30 in the magnetic field of the magnet, but not necessarily in the circuit, and a diaphragm, preferably of non-magnetic material, between
which and the magnet the filings are inter-
posed. The diaphragm is thrown into action
35 as a receiver by the inductive action of the magnet upon the filings. The variations in the strength of the current produced in the
transmitter by sound-vibrations cause correla-
tive variations in such current in the magnet
40 of the receiver, which variations are reproduced through the intervention of the filings upon
the diaphragm, by the vibrations of which
sounds are reproduced.

Our improvements may readily be adapted
to most of the various forms of transmitting-
45 telephones shown in sundry applications for Letters Patent of the United States filed by
the said Rose simultaneously herewith. We do
not therefore claim anything shown in said
applications, but limit ourselves to the im-
50 provements thereon herein set forth.

Our improved receiver can be operated in connection with any of the well-known bat-
tery-telephone transmitters.

The magnetic filings may be of any mag-
netic materials, such as iron, steel, aluminum, 55
cobalt, or nickel; but the latter is preferred, as being less liable to oxidation from moisture.
The filings may be employed in the form of a
coarse powder; but we prefer slivers or filings
60 of a length three or four times greater than
their width or thickness, as they interlace
more perfectly, and consequently respond to
slighter vibrations. A mixture of filings of
different magnetic metals, or of powder and
65 filings of homogeneous magnetic metals, or of
dissimilar magnetic metals, may be used with
good effect.

In the accompanying drawings, Figure 1
represents a central longitudinal section
70 through our improved telephone organized for
operation both as a receiver and as a trans-
mitter, with an induction-coil included in the cir-
cuit. Fig. 2 shows a Rose transmitter ar-
ranged on circuit with our improved receiver,
75 the line being organized for transmission in
one direction only.

The drawings show a permanent magnet,
M, provided with an enlarged head or plate,
m, constituting one of its poles, and properly
80 secured in the case or handle C. An ordinary
coil or helix, H, surrounds this core near the
enlarged pole. The wires of the helix termi-
nate in binding-screws S S', in the usual way.
A diaphragm, D, of some non-magnetic ma-
85 terial, is secured in the case in the usual way,
so as to leave a space between the enlarged
pole of the permanent magnet and the dia-
phragm, which space or magnetic field is sup-
plied with magnetic filings such as herein re-
ferred to. 90

The apparatus thus described (and also par-
ticularly shown in Fig. 2) is adapted for oper-
ation as a receiver, R, only, and may be placed
upon the line in combination with a transmitter,
95 T, such as those described in the Rose applica-
tion above mentioned, or any other suitable
transmitter.

The diaphragm D, when used as a trans-
mitter, must be of some conducting material, not
necessarily magnetic. One terminal of the 100

transmitting-wire, *t*, is connected with this diaphragm, and the other, *t'*, with the enlarged pole of the magnet, and said transmitting-wires are connected with a battery, B, and the primary wire of the induction-coil I in usual well-known ways for this class of instruments, the current passing through the filings. The helix H is connected with the secondary wire of the induction-coil and with the line in usual well-known ways. Using this instrument as a transmitter, it operates precisely like the Rose transmitter above referred to. The diaphragm D is thrown into vibration by sound-waves. These vibrations of the diaphragm produce corresponding variations in the condition of the magnetic filings through which the transmitting-current passes, thus causing correlated variations in the strength of the current, which are reproduced upon any suitable receiver in any well-known way. When used as a receiver the vibrations transmitted through the line act on the helix of the magnet, thereby causing the magnet to act inductively upon the filings, producing vibrations therein corresponding with those received through the helix. The vibrations of the filings impart correlative vibrations to the diaphragm, thus producing sound-waves. The vibrations of the diaphragm are produced mechanically by direct action of the vibrating filings.

Fig. 2 is a diagram showing a transmitter and receiver as arranged on circuit and adapted for transmission in one direction only. With the line equipped with two instruments such as above described, messages could be sent either way.

Our improvements may be applied to various forms of transmitters shown in the applications of Rose above mentioned, which involve the use of a diaphragm or plunger, it being only necessary, to adapt them for use as receivers as well as transmitters, to put a helix around the pole of the magnet, so as to act inductively on the filings in a manner similar to that described in Fig. 1.

A diaphragm of non-inductive or even of non-conductive material—such as mica—may be used as a receiver. The transmitting-dia-

phragm, as before remarked, need not be of magnetic metal.

We claim as of our own joint invention—

1. The combination, substantially as herein set forth, of the magnet, the inducing-coil connected in circuit, the diaphragm, and the magnetic filings interposed in a loose condition in the magnetic field between said diaphragm and pole of the magnet, and acted upon by induction to reproduce sound-vibrations transmitted through the circuit.

2. The combination, substantially as herein set forth, in a galvanic circuit, of a transmitter having the capacity of varying the strength of the current by changes in the condition of the metallic filings included in the circuit, and a receiver consisting of a magnet acting inductively upon magnetic filings interposed between said magnet and the diaphragm, and thus varying the intensity of the magnetic field in which they are included.

3. The transmitting and receiving telephone hereinbefore described, consisting of the combination of the magnet, the helix, its circuit-connections, the diaphragm, the magnetic filings interposed in the magnetic field between the magnet and diaphragm, and the transmitting circuit-connections, one wire of which is connected with the diaphragm and the other with the magnet, the transmitting-current passing through the filings, upon which the receiving-current acts inductively.

4. The combination, substantially as herein set forth, of the magnet, the helix and its circuit-connections, including the secondary helix of an induction-coil constituting part of the line-wire, the diaphragm, the magnetic filings interposed in the magnetic field between the magnet and diaphragm, and the transmitting circuit-connections, (one of which is connected with the diaphragm and the other with the magnet,) including the primary helix of said induction-coil.

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Witnesses:

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