(No Model.)

W. C. & J. M. LOCKWOOD.

TELEPHONY.

No. 557,588. Patented Apr. 7, 1896.

Fig. 1.

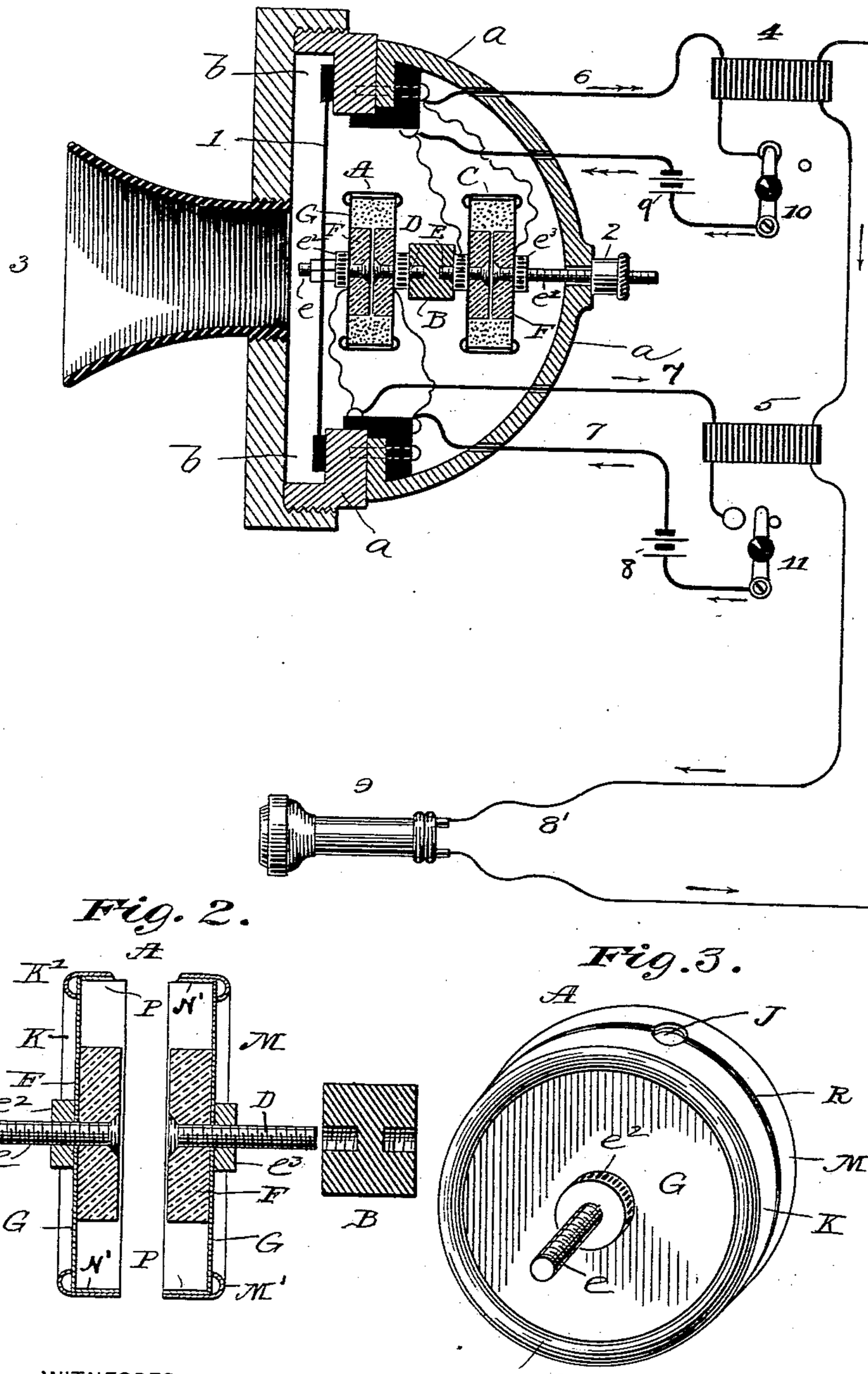

Fig. 2.

Fig. 3.

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TELEPHONY.

SPECIFICATION forming part of Letters Patent No. 557,588, dated April 7, 1896.

Application filed October 29, 1894. Serial No. 527,263. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. LOCKWOOD and JOHN M. LOCKWOOD, citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Telephony; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and numerals of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in telephone-transmitters; and it has for its objects to provide an extremely sensitive variable resistance for the same, and to so arrange a multiplicity of such resistances as to overcome a greater line resistance than heretofore in a telephonic installation, as more fully hereinafter set forth.

The first part of our invention consists of a variable resistance composed of two carbon disks or electrodes located between two flexible diaphragms and surrounded by a packing of loose or granular carbon, the whole being inclosed in a suitable casing, as more fully hereinafter explained; and the second part of our invention consists in the combination of a multiplicity of variable resistances with the transmitter-diaphragm, a multiplicity of electric generators and induction-coils, and mechanism for adjusting the parts of the variable resistances, as more fully hereinafter described.

The objects of our invention are attained by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of a transmitter complete, showing the electric generators, induction-coils, and their connections. Fig. 2 represents a detached sectional view showing the parts of one of the resistances, and Fig. 3 represents a perspective view of one of the resistances.

Referring to the drawings, the letters A and C indicate two variable resistances, and as they are identical in construction a description of one will answer. The said resistances are each composed of a metallic shell constructed in two parts, (indicated by the letters K M.) These parts are open at their outer ends and are formed with inturned edges K′ and M′, which form seats for the diaphragms G G, which consist of mica disks. The said disks are held to their seats by the paper shells N′, which insulate the carbon filling from the outer metallic shell and prevent the short-circuiting of the current through the said outer shell. The paper shells are glued or cemented in the parts K and M of the metallic shell, so as to hold the diaphragms G G securely to their seats. The letters F F indicate two carbon electrodes or disks which are secured to the diaphragms G G by means of the screws *e* and D passing through said diaphragms and clamped thereto by means of the nuts E^2 and E^3.

In assembling the parts in the construction of the resistance the diaphragms are first seated. The paper shells are then set in place and secured in the parts K and M, so as to hold the diaphragms to their seats, the outer edges of the paper shells N′ being flush with the adjoining edges of the parts K and M.

The parts K and M are placed together, as shown in Fig. 3 of the drawings, and are soldered at their joint, as indicated in said figure. The parts K and M are provided with registering recesses at their adjoining edges, which form an opening J when the parts are assembled. The paper shells are provided with similarly-registering recesses, which register with the opening J to permit the filling of the complete shell with loose or granulated carbon, the granules being of such size that they cannot under any circumstances work between the faces of the electrodes. The said carbon is inserted through said opening and packed in the space left for it by means of a suitable instrument, and the opening is then closed by means of electrically non-conductive cement—such as shellac, for instance—and the whole is then coated with a non-conductive varnish, completing the resistance.

Referring to Fig. 1 of the drawings, two of the variable resistances are represented arranged in a transmitter. These are arranged in a right line axially with each other and con-

nected by the screws D and E and the coupling-block B, which is constructed of some insulating material, such as vulcanite or the like. The rear resistance is held adjustably in the frame or casing *a* by means of a screw *e'* and a nut 2.

The screw *e* of the forward diaphragm G is connected to the center of the transmitter-diaphragm 1 by means of a suitable nut. The casing *a* at its front is provided with a ring *b*, having an annular recess in which the said transmitter-diaphragm is located, and the ring is provided with a screw-threaded cap, which carries at its center the speaking-tube 3, as usual.

The electrodes F F of the resistance A connect with the primary of an induction-coil 5 by means of conductors 7, which embrace in their circuit a generator 8 and a switch 11.

The electrodes F of the resistance C' connect with the primary of an induction-coil 4 and embrace in their circuit a generator 9 and a switch 10. The secondaries of the said coils are connected in series with the line and the receiving instruments, as shown in Fig. 1 of the drawings.

The operation of our invention will be readily understood in connection with the above description, and is as follows: When the transmitter-diaphragm is vibrated, corresponding vibrations are imparted to the variable resistances, and a variable current is set up in the primary of each induction-coil, and a corresponding induced current established in the secondaries and sent to line and to the receiving instrument.

By means of the switches one or more resistances may be employed at pleasure. While we have represented but two resistances, it is evident that any number of the same may be employed.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A variable resistance for telephone-transmitters, consisting of two flat flexible plates, as diaphragms, with flat electrodes lying thereon, in a suitable shell, a filling of loose conductive material packed in the shell around the said electrodes, mechanism whereby one electrode may be connected to the transmitter-diaphragm and the other electrode adjusted to a suitable support, and connections whereby the electrodes may be placed in circuit, substantially as specified.

2. The combination in a telephone-transmitter, of a multiplicity of variable resistances, each consisting of two electrodes located within a suitable shell, between two flexible diaphragms, and a filling of loose conductive material surrounding the peripheries of the electrodes, which are axially connected, the forward electrode being connected to the transmitter-diaphragm and the rear one to a suitable support, substantially as specified.

3. The combination in a telephone-transmitter, of a multiplicity of variable resistances, each consisting of two flat flexible plates, as diaphragms, with two flat electrodes confined between the said plates, in a suitable shell, a filling of loose conductive material packed in the shell around the electrodes, substantially as specified.

4. A variable resistance for a telephone-transmitter, consisting of two disconnected flat electrodes, located between suitable flat flexible plates, in a suitable shell, and a filling of loose conductive material packed in the shell around the electrodes substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

WM. C. LOCKWOOD.
JOHN M. LOCKWOOD.

Witnesses:
M. PARTINGTON,
C. FONTANNOZ.