(No Model.)

T. A. EDISON.

TELEPHONE.

No. 266,021. Patented Oct. 17, 1882.

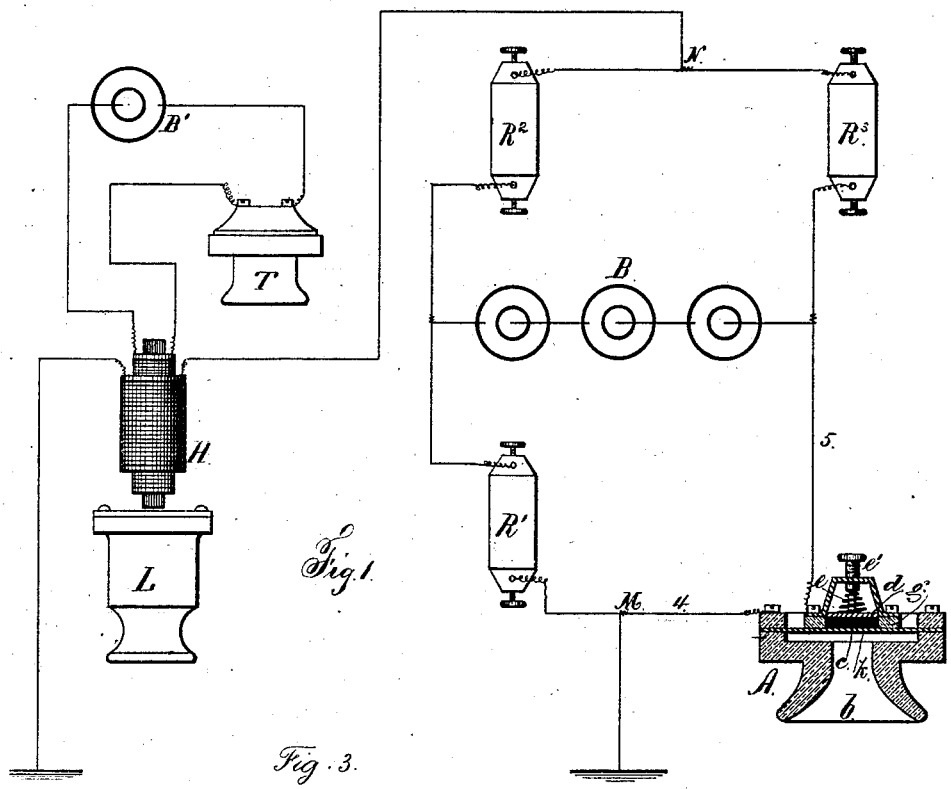
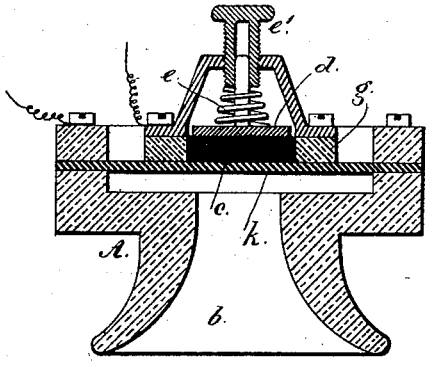


Fig. 1.

Fig. 3.



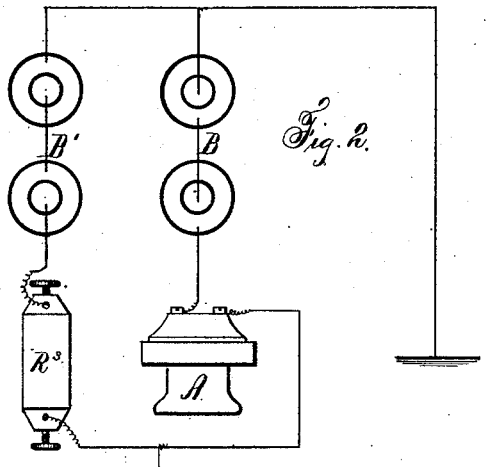


Fig. 2.

Case No. 158 A.

Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 266,021, dated October 17, 1882.

Application filed October 17, 1881. (No model.) Patented in England June 15, 1878, No. 2,396.

To all whom it may concern:

Be it known that I, THOMAS ALVA EDISON, of Menlo Park, in the State of New Jersey, have invented an Improvement in Telephones, (Case No. 158A,) of which the following is a specification.

This application is a division of my application No. 158, filed November 11, 1878; and the said division is made for the purpose of separating from said original application matters that are not in interference, and for separating the different features of invention into two additional applications. The present I term "Case No. 158A." Letters Patent in Great Britain, No. 2,396, show the present device. The same was applied for June 15, 1878; but the specification was not filed until December 13, 1878.

The object of this invention is to transmit oral communications over electric circuits; and said invention consists in devices for transmitting positive and negative currents by varying the resistance in the telephonic transmitter, in combination with a Wheatstone balance.

The transmitting-instrument, containing carbon or similar material in the circuit, is also peculiarly constructed, and the diaphragm of the receiving-instrument is acted upon by an inductorium.

In the drawings, Figure 1 represents the transmitting-instrument sectionally, and also shows the circuit-connections by a diagram. Fig. 2 represents the circuit-connections in a slightly-modified form, and Fig. 3 is a section in larger size through the screw and circuit-regulator.

The transmitting-instrument A contains the mouth-piece *b* and a diaphragm, *k*, secured at its edges. The center of the diaphragm is platinized, and upon this rests a button, *c*, of finely-divided conducting material, such as metallized charcoal, lamp-black, or iodide of copper. The metallic plate *d* is kept in contact with the button by the spring *e*, and *e'* is an adjusting-screw to regulate the pressure of the spring against the plate *d* and button *c*. Said screw passes through the metallic support that is secured to the vulcanite ring *g* around the button *c*. The rod that is attached to the plate *d* passes freely into an axial hole in the screw *e'*, so as to be guided thereby, but allow the screw to be set up to regulate the spring without the screw acting directly on the plate *d*. The diaphragm is connected to the wire 4 and the plate *d* to the wire 5. The button, of carbon or other similar material, becomes a circuit-regulating device to control the electric condition of the line and cause the same to vary in a manner corresponding to the sound-waves that act upon the diaphragm, as set forth in applications heretofore made by me. The ring *g* and circuit-regulating devices are upon the diaphragm *k*, and hence move with it; but any atmospheric vibrations acting on the diaphragm *k* produce a variation in the resistance of the carbon or similar button, *c*, in the electric circuit, in consequence of the difference in pressure upon such carbon button, resulting from the tremulous movement of the parts and the inertia of the plate *d*. The carbon or similar material and the metallic surfaces in contact therewith become the electrodes of the electric circuit. The transmitter A is in one branch of the Wheatstone bridge, R^3 being a resistance equal to that of A when not subjected to sonorous vibrations. R' and R^2 form the other sides of the balance and have equal resistances. The bridge-wire from M to N is contained in the electric circuit that extends from N by the line-wire to the distant receiver H, thence to the earth, and returning to the earth-plate at the transmitting-station and to M. The battery B, of several cells, is between 5 and R' R^2. When the resistance of A R^2 is equal to that of R' R^3 no current circulates upon the line. When sonorous vibrations vary the resistance of the carbon button *c* in A the current will pass upon the line in one direction or the other. When the resistance of A is increased the current passes in one direction. When it is lessened the current passes in the other direction in consequence of the balance being disturbed. The induction-coil H has its secondary coil included in the line-circuit, and the primary coil is connected with a transmitting-instrument, T, constructed and operating in a similar manner to the transmitter A, the local battery B' being in the circuit through the carbon button and primary coil. The receiving-instrument L is provided with a diaphragm,

that is acted upon by the core of the induction-coil H, and hence the induction-coil is utilized, and serves for receiving or transmitting telephonically.

In Fig. 2 the balance of the similar batteries, B B′, with opposite poles to line, is obtained by the rheostat R^3, that is of a resistance equal to that of the instrument A when at rest, and when the resistance of the carbon button in A is increased or decreased by the sonorous vibrations the current will pass upon the line, either positive or negative, according to the resistance in A.

In my application No. 130 the diaphragm is in direct contact with a surface of plumbago or similar material, and in my application No. 151, patented April 30, 1878, No. 203,016, a carbon button and a diaphragm are employed, and there is a metallic plate intervening and in direct contact with both the carbon and the diaphragm. It is therefore to be understood that these features do not form the subject of the present invention.

I claim as my invention—

1. The combination, in a telephone, of an induction-coil having primary and secondary circuit-connections, with a diaphragm adjacent to and acted upon by such induction-coil and transmitting-instruments in such circuits, substantially as specified.

2. In combination with a battery or batteries, a system of balanced circuits, a telephonic transmitter constituting a variable resistance in one of the balanced circuits, and a telephonic receiver in the bridge-wire of the balance, substantially as set forth.

3. The combination, in a telephone, of carbon or similar material, forming a circuit-regulator, a diaphragm, and a holder upon and entirely supported by the diaphragm, and arranged to resist the movement of the diaphragm and circuit-regulator, substantially as set forth.

4. In a speaking-telephone, the combination, with the diaphragm, of carbon or equivalent material in the electric circuit, and a spring or yielding presser to apply an initial pressure to the carbon, and means for supporting both the carbon and presser upon the diaphragm, substantially as set forth.

5. In a speaking-telephone, the combination, with the diaphragm, of carbon or similar material, a spring pressing upon the carbon, and means for adjusting the pressure and supports therefor upon the diaphragm, substantially as set forth.

Signed by me this 7th day of September, A. D. 1881.

THOMAS A. EDISON.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.