

J. P. FREEMAN.
ELECTRIC TELEPHONE.

No. 262,285.

Patented Aug. 8, 1882.

Fig. 1.

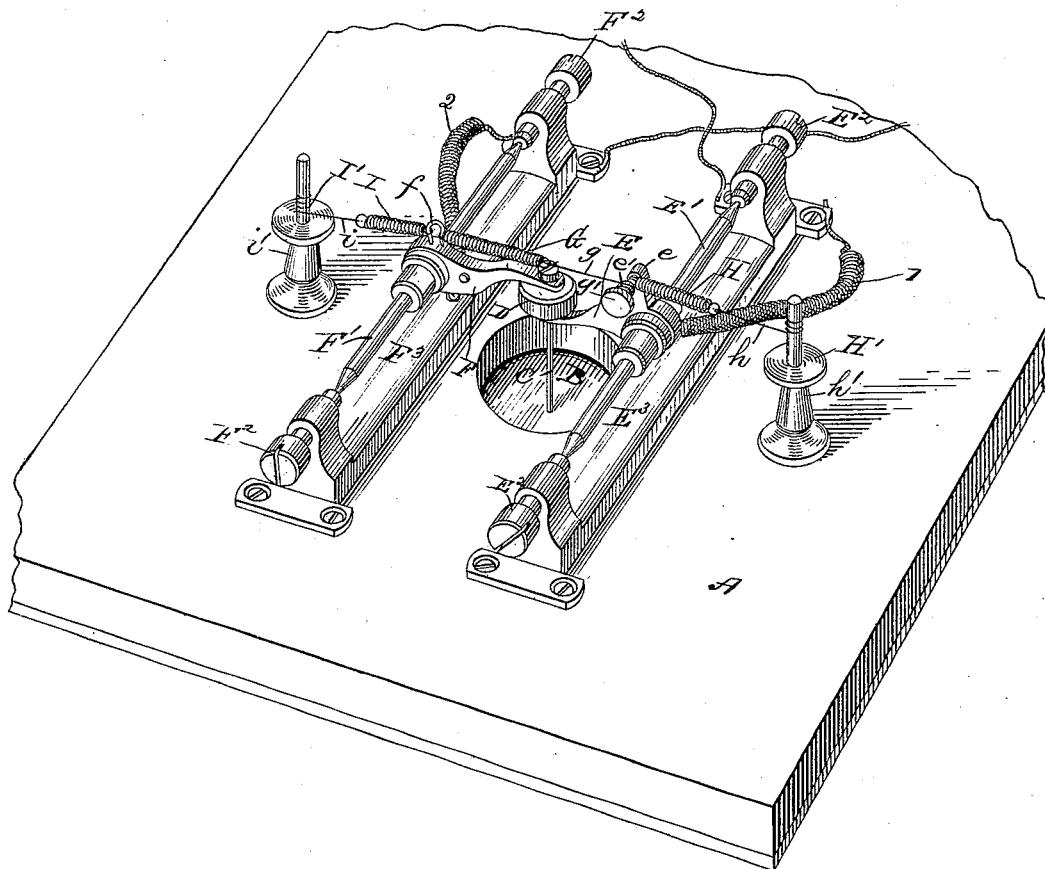
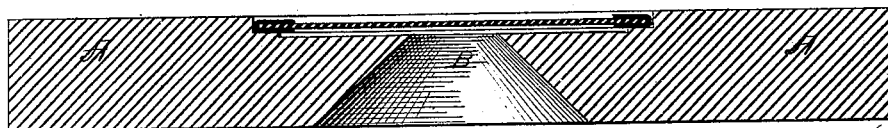


Fig. 4.



Witnesses:

Frank J. Blanchard
C. S. Hyer

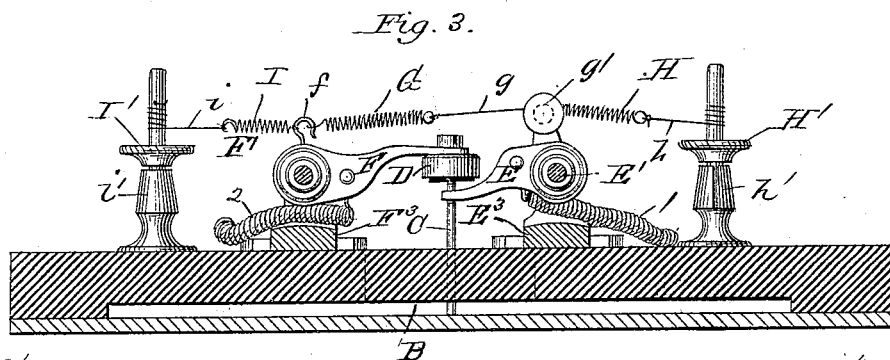
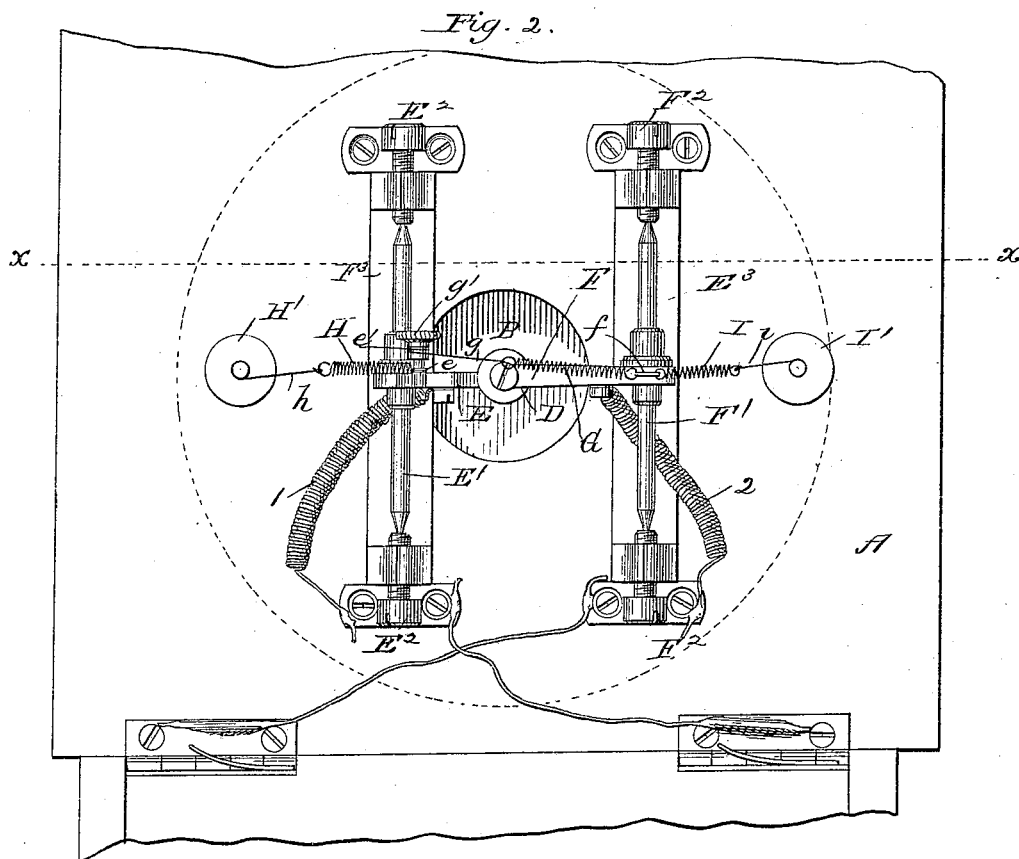
Inventor:

James P. Freeman
By his Attorney
R. F. Eick

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Francis S. Blanchard
and Hyer

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UNITED STATES PATENT OFFICE.

JAMES P. FREEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HOME TELEPHONE COMPANY, OF ILLINOIS.

ELECTRIC TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 262,285, dated August 8, 1882.

Application filed September 24, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES P. FREEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Telephones; and I do hereby 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 or figures of reference marked thereon, which form a part of this specification.

This invention relates to electric telephones adapted to the transmission and reproduction of articulate speech by means of electrical waves or impulses traversing a circuit.

My improvement concerns more particularly telephonic transmitters; and it consists principally of the combination of a mainspring for primarily holding the electrodes in contact with each other and one of them in contact with the diaphragm, and two compensating-springs for regulating the pressure with which the electrodes bear on each other and on the diaphragm. This combination of springs affords the means for ready and delicate adjustment of the electrodes with reference to each other and to the diaphragm, so that the instrument can be made exceedingly sensitive to sound-vibrations.

In order that my invention may be clearly understood, I have illustrated in the annexed drawings and will proceed to describe the best form thereof at present known to me, and which I practically tested and found very effective.

In the annexed drawings, Figure 1 is a perspective view of so much of the telephonic transmitter as will illustrate my invention. Fig. 2 is a plan view. Fig. 3 is a cross-section on line *xx* of Fig. 2. Fig. 4 is a sectional view of the well-known form of metallic diaphragm, which may be used in lieu of the wooden diaphragm seen more particularly in Fig. 3.

The same letters of reference indicate like parts in all the figures.

The various mechanical devices used in the construction of my invention are mounted on

the door or front A of an ordinary box of a telephonic transmitter, said door being provided with a central opening covered by a diaphragm, B, which may be simply a flat wooden board of suitable wood, and suitably prepared to prevent it from warping, and applied as shown in Fig. 3, or the ordinary metallic diaphragm applied in the ordinary way, as shown in Fig. 4. The vibrations of this diaphragm are transmitted by the electrode C, in contact therewith, to the electrode D, the ordinary carbon button acting in a well-known manner. The electrode C, preferably a stem of platinum, is secured to the free end of an arm, E, on the shaft E', which is pivoted between center screws E² E² on a base-plate, E³, secured to the inside of the door A. The electrode D is fixed to the free end of an arm, F, of a shaft, F', pivoted between center screws F² F² on a base-plate, F³, secured to the inside of the door. The shafts E' and F' are in this instance arranged parallel with each other on opposite sides of the center opening in the door, and their position with reference to the diaphragm and to each other is such that the electrode C may touch with one end the center of the diaphragm and the center of the carbon button with the other end.

The arms E and F may be of unequal length, as shown. The arm F is provided with a hook, *f*, (on about the radial line of the shaft F',) to which one end of the spiral mainspring G is hooked. The other end of this mainspring is connected by a thread, *g*, to the stem of a button, *e*', frictionally secured in the eye of a projection, *e*, formed on arm E. Thus the mainspring G tends to turn the arms E and F so as to force the electrode C against the diaphragm and the electrode D against the electrode C. The tension of the mainspring should be properly adjusted above the point giving the required approximate pressure to be exerted by the electrodes on each other and on the diaphragm. This approximate primary adjustment of the mainspring can be readily effected by winding or unwinding the thread *g* by the turning of the button *g*'.

In order to adjust the pressure with which the electrode C touches the diaphragm in con-

sequence of the action of the mainspring *g*, a spiral compensating-spring, *H*, is used, hooked with one end around the stem of the button *e'*, and connected by a thread, *h*, to the stem of the button *H'*, frictionally secured in the socket *h'*, fixed on the door *A*. By properly adjusting this compensating-spring *H* the pressure of the touch of the electrode *C* on the diaphragm may be very delicately adjusted without affecting the tension of the mainspring to any perceptible degree. For adjusting the pressure of the electrode *D* on the electrode *C* a similar spiral compensating-spring, *I*, is attached to the hook *f*, and connected by a thread, *i*, to the stem of a button, *I'*, frictionally secured in a socket, *i'*, fixed to the inside of the door *A*. The action of the compensating-springs is necessarily opposed to that of the mainspring, and in such a way that their tension is relaxed every time the diaphragm moves inwardly, so that the pressure of the electrodes upon each other is increased not only by the stretching of the mainspring, but also in consequence of the decreased opposing action of the compensating-springs.

The arm *E* is electrically connected by wire 1 and other metallic conductors to one pole of the battery, while the arm *F* is connected by

wire 2 and other metallic conductors with one end of the primary wire of an induction-coil, the other end of which primary wire is connected with the other pole of the battery in the ordinary manner.

Having thus described my invention, what I claim is—

1. The combination, substantially as before set forth, of the diaphragm, the two electrodes, the mainspring for forcing one electrode against the other and the latter against the diaphragm, and the compensating-springs for modifying the action of the mainspring.

2. The combination, substantially as before set forth, of the diaphragm, the electrodes, two pivoted arms supporting the electrodes, the mainspring acting on both said arms for forcing one electrode against the other and the latter against the diaphragm, and a compensating-spring for each arm for modifying the action of the mainspring.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES P. FREEMAN.

Witnesses:

CHAS. S. HYER,
C. A. NEALE.