(No Model.)

J. EMMNER, Jr.

TELEPHONE TRANSMITTER.

No. 385,664. Patented July 3, 1888.

Fig. 1.

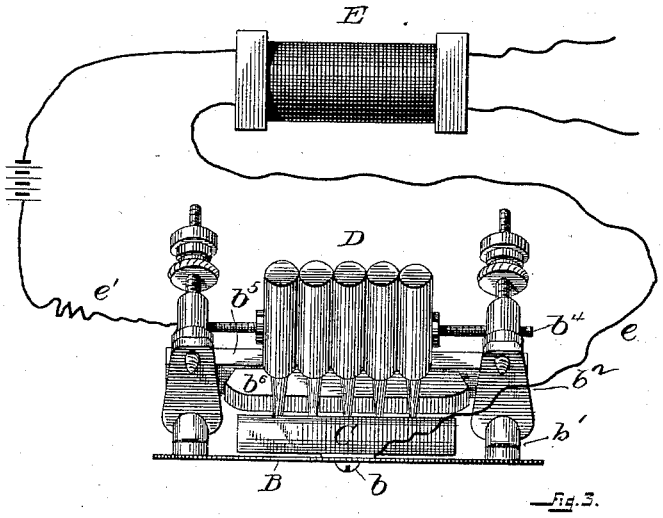
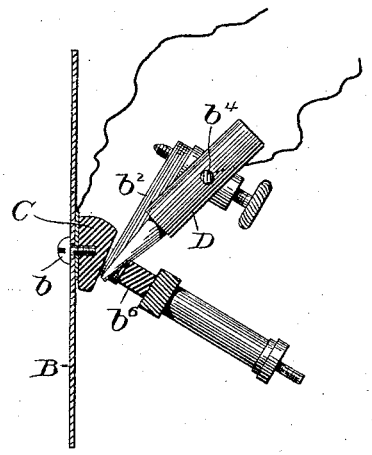
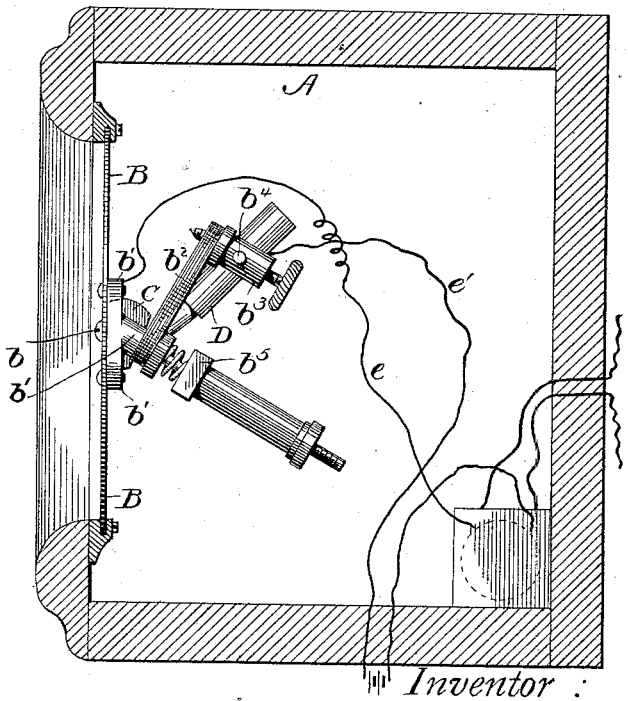


Fig. 3.

Fig. 2.





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UNITED STATES PATENT OFFICE.

JULIUS EMMNER, JR., OF WASHINGTON, DISTRICT OF COLUMBIA.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 385,664, dated July 3, 1888.

Application filed March 22, 1887. Serial No. 232,046. (No model.)

To all whom it may concern:

Be it known that I, JULIUS EMMNER, Jr., a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Telephone-Transmitters; 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.

This invention relates to telephone-transmitters.

In a patent granted to me November 24, 1885, No. 330,879, are embodied as main features of my invention an electrode parallel with and rigidly attached to the diaghragm at or near its center, which electrode I have termed the "diaphragm-electrode;" also, a second electrode substantially parallel with the diaphragm and mounted upon posts projecting from the diaphragm, but insulated therefrom or from the diaphragm-electrode, which second electrode I have termed a "post-electrode;" also, one or more intermediate electrodes loosely mounted substantially at right angles to the diaphragm in seats or recesses provided therefor in the opposing faces of the two first-mentioned electrodes, all of these electrodes being mounted upon the diaphragm, and provision being made for an adjustment of the post-electrode with relation to the diaphragm-electrode, thereby to secure adjustment of the contacts of the two ends of the intermediate electrodes.

My present invention is intended as an improvement upon that forming the subject of the patent referred to, and the objects are to simplify the construction, obviate the difficulties arising from the easy breakage of the described intermediate electrodes, present greater facility for delicacy of adjustment, insure greater certainty of action of the apparatus, and at once increase its efficiency.

With these objects in view my invention consists in the combination, with a diaphragm-electrode of carbon, iron, platinum, or aluminium, arranged substantially as in my former patent, of movable or balanced electrodes hung upon a rod or bar of metal mounted upon the diaphragm and insulated therefrom, whereby I dispense with the post-electrode and my balanced electrodes take the place of the intermediate electrodes.

Furthermore, the invention consists in the combination, with a diaphragm-electrode, of balanced electrodes hung upon a rod or bar of metal and a piece of soft rubber, serving at once as an insulator and being adjustable as means for regulating the distance of the lower ends of the balanced electrodes from the diaphragm-eletrodes, while presenting a cushion to lessen the danger of breakage of the balanced electrodes in their adjustment and in their action; and, finally, the invention consists in various novel details of construction, all as hereinafter more fully set forth, and shown in the drawings.

In the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts, I have illustrated one form of embodiment of my invention.

Figure 1 is a view from above, the diaphragm being in a vertical position, showing the diaphragm with its electrode, the movable electrodes upon their rod or bar with means of moving them laterally and of keeping them together or allowing them to be separated, means for adjusting the extent of movement of the movable electrodes and the cushion for the ends of the movable electrodes, the relations of an induction-coil and a battery with which the electrodes are coupled being also shown. Fig. 2 is a central vertical section taken through the diaphragm, the movable electrodes, and the adjustable cushion, showing the attachment of the diaphragm-electrode to the diaphragm and the relations between the movable electrodes and the diaphragm-electrode and the adjustable cushion. Fig. 3 is a vertical section of a transmitter-box, disclosing the transmitter in side elevation and showing means of mounting the movable electrodes upon the diaphragm and the means of adjusting the rubber cushion, as well as the general relations of the transmitter in its box.

In the drawings, A designates a transmitter-box, which may be of any preferred construction and within which is suitably secured a diaphragm, B, which may be an ordinary disk-diaphragm. At or near the center of

this diaphragm is rigidly secured an electrode, C, parallel with the diaphragm and in electric contact therewith, which electrode I term the "diaphragm-electrode," and which may be made of carbon, platinum, iron, or aluminium, one side of which electrode is of greater thickness than its opposite side, thus giving it an oblique upper face. This electrode is connected to the diaphragm by a screw, *b*.

At opposite sides of the diaphragm and secured thereto by screws or other means of fastening are provided posts *b'*, the upper reduced portions of which are threaded and extend outward from the diaphragm at an angle thereto.

Resting upon a shoulder upon each of the posts *b'*, and extending outward perpendicular to the post, is placed a projection or arm, b^2, composed of hard rubber or other non-conducting material, upon the end of which arm is mounted a binding-post, b^3, between which and the post upon the opposite side of the diaphragm, similarly mounted, is connected a rod or bar, b^4, of metal, screw-threaded at one or both ends, and upon which is mounted a series of movable or balanced electrodes, D, their lower ends reduced and pointed, and the points being held directly above the upper inclined face of the diaphragm-electrode. These electrodes are perforated at or near their centers, through which perforations the supporting rod or bar upon which they hang passes. The rod is also provided with a nut or screw near one end at one side of the balanced electrodes, and near its other end and upon the opposite side of the electrodes has a similar nut or screw, or, if preferable, a stationary button or washer to prevent lateral movement in this direction. The movable or balanced electrodes are thus rendered laterally adjustable, the nut or screw tending to crowd them together or permitting them to be separated, as desired.

Upon the reduced portion of the screw-post *b'*, and resting against the insulating arm or projection b^2, is mounted a washer, against which abuts a small coiled spring, also mounted upon the post *b'*, upon the other end of which rests a hard-rubber or other non-conducting bar, b^5, the opposite end of which bar rests upon a corresponding spring similarly mounted upon the post at the opposite side of the diaphragm. This bar b^5 has secured to its inner face a strip of soft rubber, b^6, against which the lower pointed ends of the balanced electrodes rest, and which strip of soft rubber acts as a cushion to lessen the danger of breakage of the balanced electrodes, and also as an insulating medium between the diaphragm and the balanced electrodes in that direction.

Upon the outer ends of the posts *b'* and in contact with the bar b^5 are mounted small sleeves, held in place by set-screws upon the ends of the posts, by means of which, in connection with the spiral springs at the opposite side, the bar and cushion are adjusted upon the rods, thereby bringing the balanced electrodes into close relation to or removing them farther from the diaphragm-electrode, as may be required.

The electrodes are evenly balanced and are hung upon the rod or bar with easy play and movement and at an angle of about forty-five degrees. The pointed ends near the diaphragm-electrode, resting against the adjustable soft-rubber cushion, which is also mounted substantially at right angles to the diaphragm, are arranged to follow the adjustment either toward or from the diaphragm, thus creating a more perfect and delicate adjustment.

The apparatus is placed in a battery-circuit and connected with the primary portion of the induction-coil E by the wires *e e'*, which are connected respectively to the diaphragm-electrode by a small piece of metal secured between the diaphragm and the diaphragm-electrode by the screw *b*, and to the balanced or movable electrodes by the metal rod upon which the electrodes hang, and which, as herein previously shown, is thoroughly insulated from the diaphragm, the arms upon which it is mounted being made of non-conducting material.

The several electrodes may all be composed of the same material, or each of a different material, and any one or all of them may be composite in their character. The cheapest material known to me is carbon in its usual form; but I have attained good results from electrodes composed of iron, silver, platinum, or aluminium, especially the last named.

It will be observed that, inasmuch as all of my electrodes are mounted upon and carried by the diaphragm, no one of them can vary in its adjustment, as the provisions for adjustment are such that the rubber cushion must press equally upon all of the movable electrodes.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a suitable diaphragm-electrode arranged as described, of a series of movable or balanced electrodes mounted on the diaphragm, but insulated therefrom and swung on a rod having devices for adjusting the balanced electrodes laterally, for the purpose set forth.

2. The combination, with the diaphragm-electrode having the oblique face and movable or balanced electrodes mounted on the diaphragm, having pointed or reduced ends, of a rubber cushion, the pointed ends of said electrodes lying between the cushion and the oblique face of the diaphragm-electrode.

3. The combination, with a diaphragm-electrode and movable or balanced electrodes mounted on the diaphragm, but insulated therefrom and swung on a rod or bar having means for adjusting said movable electrodes laterally, of a rubber cushion against which lie or rest the lower ends of the movable electrodes, for the purpose set forth.

4. The combination, with the movable or balanced electrodes having reduced ends and

swung on a rod or bar having means for moving said electrodes laterally, of the rubber cushion against which the reduced ends of the movable electrodes rest, said cushion having devices for adjusting the ends of the movable electrodes with relation to the cushion and diaphragm-electrode, for the purpose set forth.

5. The combination, with a diaphragm-electrode, of posts mounted upon the diaphragm, movable balanced electrodes mounted upon said posts, and an adjustable cushion, also mounted upon said posts, the cushion to regulate the adjustment of the balanced electrodes, substantially as and for the purpose set forth.

6. The combination, with a diaphragm-electrode, of posts mounted upon the diaphragm, said posts carrying an adjustable cushion, springs for increasing the distance between the cushion and diaphragm-electrode, and screws for depressing the spring and decreasing said distance, substantially as specified.

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

JULIUS EMMNER, JR.

Witnesses:
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