(No Model.)

E. BERLINER.

TELEPHONE TRANSMITTER.

No. 344,514. Patented June 29, 1886.

Fig. 1.

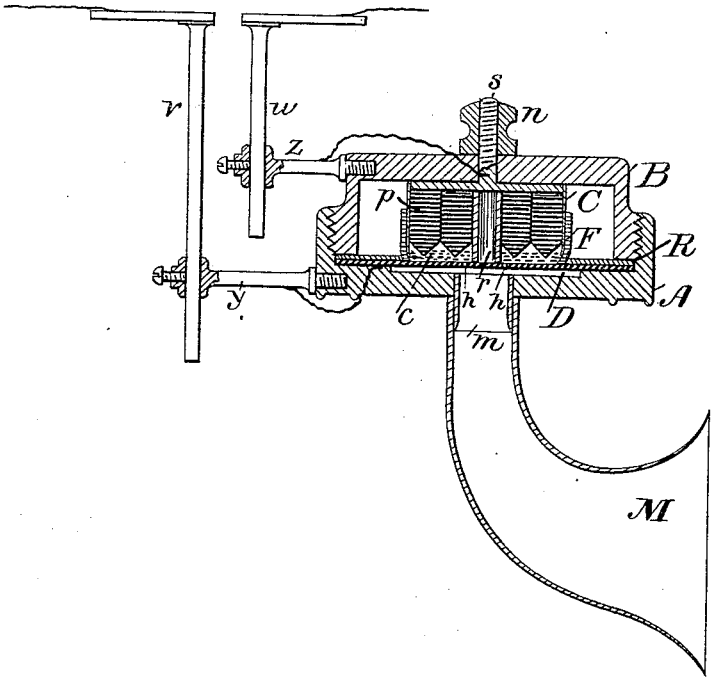
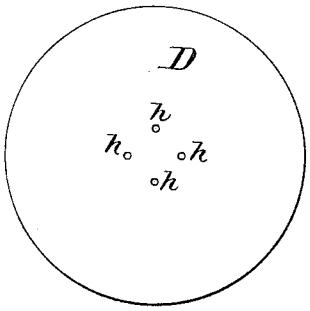


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

EMILE BERLINER, OF WASHINGTON, DISTRICT OF COLUMBIA.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 344,514, dated June 29, 1886.

Application filed January 7, 1886. Serial No. 187,918. (No model.)

To all whom it may concern:

Be it known that I, EMILE BERLINER, residing at Washington, in the District of Columbia, have invented certain Improvements in Telephone-Transmitters, of which the following is a specification.

My invention relates to that class of telephonic transmitters in which finely-divided conducting material in a loose and free state is included in an electrical circuit to vary the current-strength in harmony with the sound-waves. A diaphragm, preferably of carbon, forms one electrode of the circuit. The finely-divided conducting material rests thereon and is there confined by a cell or chamber, from the back plate of which one or more carbon pendants—such as carbon rods—project into the divided conducting material, and are therein constantly immersed. From the center of this cell a soft-rubber rod or cylinder, fixed to the back or rear wall of the cell, makes contact with the diaphragm at or near its center, and serves to damp its vibrations. The edge of the cell is furnished with a ring or strip of felt or rubber, which assists in damping the vibrations of the diaphragm while it confines the divided conducting material within the cell. Near the center of the diaphragm are a series of holes or perforations too small in size to admit of the passage of a particle of the finely-divided conducting material, but admitting of the passage of air which serves to stir up or vibrate the finely-divided conducting material.

I provide a mouth-piece through which sound-waves are directed upon the diaphragm, which is intended to imitate or reproduce some conditions governing the passage of sound to the drum of the human ear. It is constructed of soft rubber or felt, or it may be of any substance, provided the interior walls be formed of a soft flexible material—such as soft rubber or felt. It is preferably curved in its form, as shown.

For the purpose of adjusting the transmitter to suit the varying heights of different individuals, it is placed upon fixed vertical rods located in the wall or other support. Sockets fixed to the telephone are arranged to fit these rods and slide easily up or down. They are secured in any desired position by set-screws. I prefer to form these rods of metal and to include them in the electrical circuit.

The accompanying drawings illustrate my invention.

Figure 1 is a cross-section through the transmitter, its mouth-piece, and supports. Fig. 2 shows the perforated diaphragm.

The transmitter has a case of hard rubber formed in two sections, A and B.

R is a ring of metal fitting into the case-section A.

D is the diaphragm of conducting material, preferably of carbon.

C is a cell or chamber of metal, to the rear wall of which a series of carbon pendants are fixed. These pendants are carbon rods, and the proportions of the cell and pendants are such that the points of the pendants approach very near to the diaphragm. The pendants are preferably fixed to the back plate in two concentric circular rows having six rods in each row. To the center of the back plate a soft rubber tube or cylinder, *r*, is fixed. It is of sufficient length to make contact with the diaphragm, and its function is that of a damper upon the vibrations of the diaphragm.

F is a ring of felt, fixed to the cell C. Its outer edge is contracted by the pressure of metal ring R, and rests upon the diaphragm D.

A mass of finely-divided conducting-material—such as granulated carbon *c* in a loose and free state—is placed within cell C in sufficient quantity to fill the space between the pendants and diaphragm about two-thirds full, thus immersing a portion of the pendants. The felt ring F forms a means for confining the carbon to the cell, while the diaphragm, being free to vibrate, varies the degree of separation between itself and the pendent carbon rods. Ring F also serves to delicately damp the vibration of the diaphragm. The cell C is fixed to the case-section B by screw *s* and nut *n*, and forms one electrode of the transmitter, the diaphragm D the other. Near the center of the diaphragm I place a series of perforations, *h*. These are too small in size to permit the passage of any carbon granules, but the air set in motion by the vocal organs of the speaker passes freely through these perforations and assists in disturbing the carbon granules, co-operating in that respect with the movements of the dia-

phragm due to the same cause. A section of hard-rubber tubing, *m*, is fixed into case-section A, and upon *m* is slipped or sprung the mouth-piece M. The interior wall of this mouth-piece is of a soft velvety nature, to secure which I prefer to form the mouth-piece of soft rubber having something the consistency of rubber tubing. It is conoidal in outline, and is so formed that its axis is a gradual curve.

For the purpose of affording a vertical adjustment to accommodate the transmitter to the varying heights of different users, I fix to the case two metal rods, *y* and *z*, having sockets at their outer ends to admit the free movement of metal rods *v* and *w* therethrough. The rods *v* and *w* are to be fixed to the wall or other suitable permanently-located support. The set-screws in the ends of rods *y* and *z* afford means of securing the transmitter at any desired point upon the rods *v* and *w*. The electrodes of the transmitter are respectively connected to *y* and *z*, which, with the rods *v* and *w*, are included in the electrical circuit. The electrical circuit passes *via* elements *v y* D *c p* C to *z* and *w*.

The operation of this transmitter is otherwise similar to those of its class.

I am aware of Letters Patent No. 336,268, granted February 16, 1886, for the invention of Henry S. Thornberry, describing and claiming a telephone-transmitter having a diaphragm, a mass of finely-divided conductive material resting thereon, and one or more pendants or projections extending into said finely-divided material; and I do not claim the construction described and claimed in said Letters Patent, as my invention is confined to the use of pendants of carbon, which are not claimed or described therein.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, in a telephonic transmitter, of a diaphragm forming one electrode, a mass of finely-divided conducting material resting thereon, and one or more carbon pendants projecting into the said conducting material forming the complementary electrode.

2. The combination, in a telephonic transmitter, of a carbon diaphragm forming one electrode, a mass of finely-divided carbon particles resting thereon, and one or more carbon pendants projecting into the carbon particles forming the complementary electrode.

3. The combination, in a telephonic transmitter, of a vibratory diaphragm having a series of perforations near its center forming one electrode, a mass of finely-divided conducting material resting thereon, and a complementary electrode in electrical contact therewith.

4. In a telephonic transmitter, the combination of a diaphragm, a cell containing finely-divided conducting material having a ring of flexible insulating material fixed thereto upon the edge adjacent to the diaphragm with which it makes contact, serving to confine the divided conducting material, and forming a damper for the diaphragm.

5. The combination, in a telephonic transmitter, of a vibrating diaphragm, a cell confining a mass of finely-divided conducting material, and a damper for the diaphragm consisting of a projection of flexible or elastic material fixed to the said cell and making contact with the diaphragm near its center.

6. In a telephonic transmitter, the combination of a diaphragm, a cell containing finely-divided conducting material having a ring of flexible insulating material fixed thereto upon the edge adjacent to the diaphragm and in contact therewith, and a projection of flexible or elastic material fixed to the cell and in contact with the diaphragm near its center.

7. The combination, with a telephone, of a tube or mouth-piece the interior wall of which is of a soft or yielding nature.

8. The combination, with a telephone, of a tube or mouth-piece of soft rubber in the form of a cone the axis of which is a curved line.

9. In a telephonic transmitter, a diaphragm having a series of perforations at or near its center, a mass of finely-divided conducting material resting thereon, and a confining-cell arranged substantially as described.

10. The combination, in a telephonic transmitter, of a diaphragm forming one electrode, a mass of finely-divided conducting material forming the current-varying medium, and one or more carbon projections, more or less immersed in the said conducting material forming the complementary electrode.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMILE BERLINER.

Witnesses:
A. POLLOK,
PHILIP MAURO.