

E. BERLINER.
Microphone.

No. 225,790.

Patented Mar. 23, 1880.

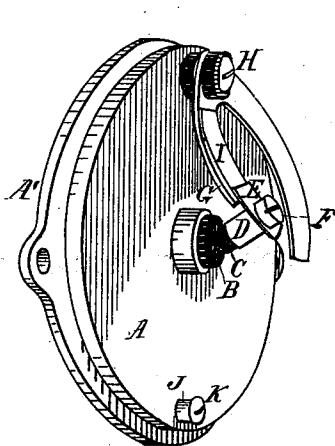


FIG. 1.

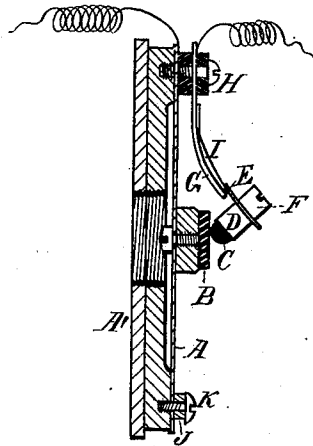


FIG. 2.

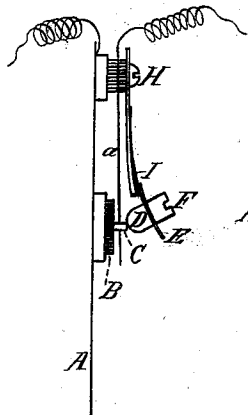


FIG. 3.

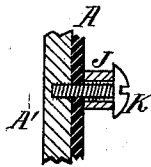


FIG. 5.

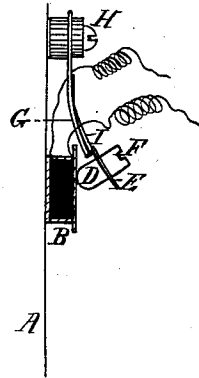


FIG. 4.

Witnesses:
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By his Atty.
Alex. L. Hayes

UNITED STATES PATENT OFFICE.

EMILE BERLINER, OF BOSTON, MASSACHUSETTS.

MICROPHONE.

SPECIFICATION forming part of Letters Patent No. 225,790, dated March 23, 1880.

Application filed November 12, 1879.

To all whom it may concern:

Be it known that I, EMILE BERLINER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Microphones, of which the following is a specification, reference being had to the accompanying drawings.

In an application for Letters Patent of the United States filed September 5, 1879, I have described a microphone in which the two electrodes are maintained in contact with each other by the action of gravity, and one of the electrodes slides toward the other in an inclined support.

The first part of the present invention is an improvement upon the microphone described in said application; and it consists of a microphone in which the contact between the two electrodes is varied during the transmission of sounds by the variation in the pressure between the two electrodes caused by the pressure of a pendulous weight suspended in such a manner that it is kept from reaching its point of rest by the interposition of the electrodes, one of which may be attached to the weight.

It also consists in suspending this weight by a band or ribbon of some flexible material, whereby the suspended electrode is prevented from moving from side to side on the fixed electrode, and thus causing an imperfect transmission of sounds.

In the accompanying drawings, Figure 1 is a view in elevation of a microphone constructed according to the principle of my invention, and Fig. 2 is a sectional view of the same. Figs. 3 and 4 are views of other forms of microphone embodying the principle of my invention, and Fig. 5 is a view in section of my improved damper.

In these several figures the same letters refer to the same parts.

The microphone which is represented in Figs. 1 and 2, and which is easily and cheaply made, and is efficient in action, is constructed as follows: A is the diaphragm for receiving the sound-waves, which diaphragm is supported in the usual manner; and B is a block of hardened carbon, having a smooth surface, which is in a plane parallel to the plane of the diaphragm, and which

block is attached to the center of the diaphragm, and forms one of the electrodes. The other electrode consists of a piece of hardened carbon, C, fixed in a cylinder of metal, D, which cylinder has a plate of metal, E, attached to it by the screw F, or in any other suitable manner.

G is a plate of metal, which is attached at one end to the diaphragm A by means of a suitable insulated screw, and is inclined outward; and to this plate G, near the screw H, is attached one end of a ribbon or band, I, of some flexible conducting material, such as metallic foil, or a metallic web of cloth, paper, or some similar flexible substance metallized or otherwise rendered conducting, which band or ribbon is attached at its other end to the plate E, which rests upon the end of the plate G.

The cylinder D and strip I thus form a pendulum, which has its point of suspension above the carbon block B, and is prevented from reaching its point of rest by the contact of the carbon piece C with the carbon block B, and consequently bears upon the face of the said block with a force proportional to the weight of the cylinder D and the distance of the center of gravity of the pendulum from its point of rest. This microphone can therefore be adjusted to any desired degree of sensibility, either by varying the weight of the cylinder by varying the distance of the surface of the carbon block B from the surface of the diaphragm, so as to increase the inclination of the pendulum, or by adjusting a movable weight on the cylinder in such a manner as to vary the distance of the center of gravity of the pendulum from the surface of the carbon block B, and this weight may be the screw F.

It is important in a microphone, in order to insure the clear transmission of sounds, especially of articulate sounds, that the suspended electrode should be prevented from moving from side to side on the fixed electrode; and I obtain this result in the present invention by the use of the ribbon or band I for supporting the weight D, whereby the carbon piece C is prevented from moving from side to side on the surface of the carbon block B. The support afforded to the plate E by the end of the plate G also contributes to this result.

The electrodes B and C may be made of any conducting substance.

Fig. 3 represents a form of microphone in which one of the electrodes, C, is made of platinum, and is attached to a light metallic spring, *a*, which forms part of the circuit. In this case the pendulous weight rests upon the electrode C, and the band or ribbon need not be a conductor.

Fig. 4 shows another form of microphone, in which the transmission of sounds is obtained by the variations in pressure upon a button of finely-divided carbon. In this case, also, the ribbon or band I need not be a conductor.

The improved damper is shown at Fig. 4, and consists of a ring of soft rubber or other similar elastic substance inserted between the diaphragm and the head of the screw K which secures the diaphragm to the support A'.

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

1. A contact telephone or microphone consisting of two electrodes of an electric current in contact with one another, which contact is varied during the transmission of sounds by the variation in the pressure upon said contact of a pendulous weight, which is kept out of its point of rest by the interposition of said electrodes, substantially as and for the purpose set forth.

2. A contact telephone or microphone in which one electrode forms part of a pendulum which is kept out of its point of rest by the contact of said electrode with the opposite electrode, thereby producing pressure at the contact between the said electrodes, substantially as and for the purpose set forth.

3. In a contact telephone or microphone having no frictional or rubbing electric con-

tact, and provided with a diaphragm and a damping device for modifying the vibration of the diaphragm, a suspended weight affecting the electrical contact between the electrodes in contact with one another, said weight being held in position from at least two points, which are situated on opposite sides of the center of gravity of said weight, substantially as and for the purpose set forth.

4. In a contact telephone or microphone, the combination of a vibrating surface forming one pole of an electric current, a pendulous weight forming the opposite pole, and a band or ribbon of flexible material suspending the said weight, which band or ribbon may or may not be a conductor, substantially as and for the purpose set forth.

5. In a contact telephone or microphone, the combination of a band or ribbon of metallic foil or its equivalent and an electrode suspended therefrom, substantially as and for the purpose set forth.

6. In a contact telephone or microphone, the combination of the flexible band I and the supporting-plate G, substantially as and for the purpose set forth.

7. In a contact telephone or microphone, the combination of the diaphragm A, carbon block B, carbon piece C, adjustable weight D, plate E, flexible band or ribbon I, and supporting-plate G, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of the subscribing witnesses.

EMILE BERLINER.

Witnesses:

CHARLES E. BURLINGAME,
ALEX. L. HAYES.