

E. BERLINER.  
Microphone.

No. 224,573.

Patented Feb. 17, 1880.

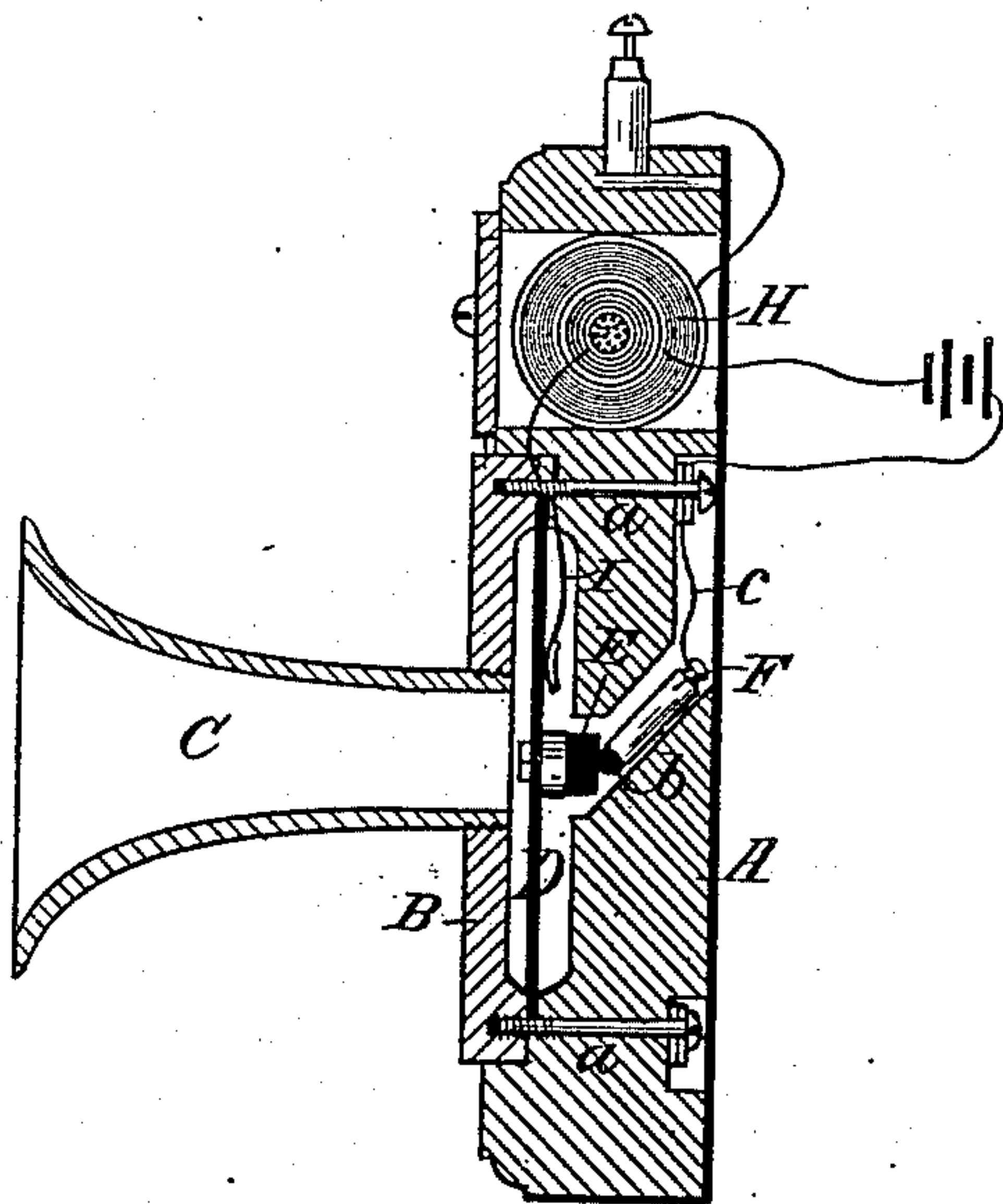


FIG. 1.

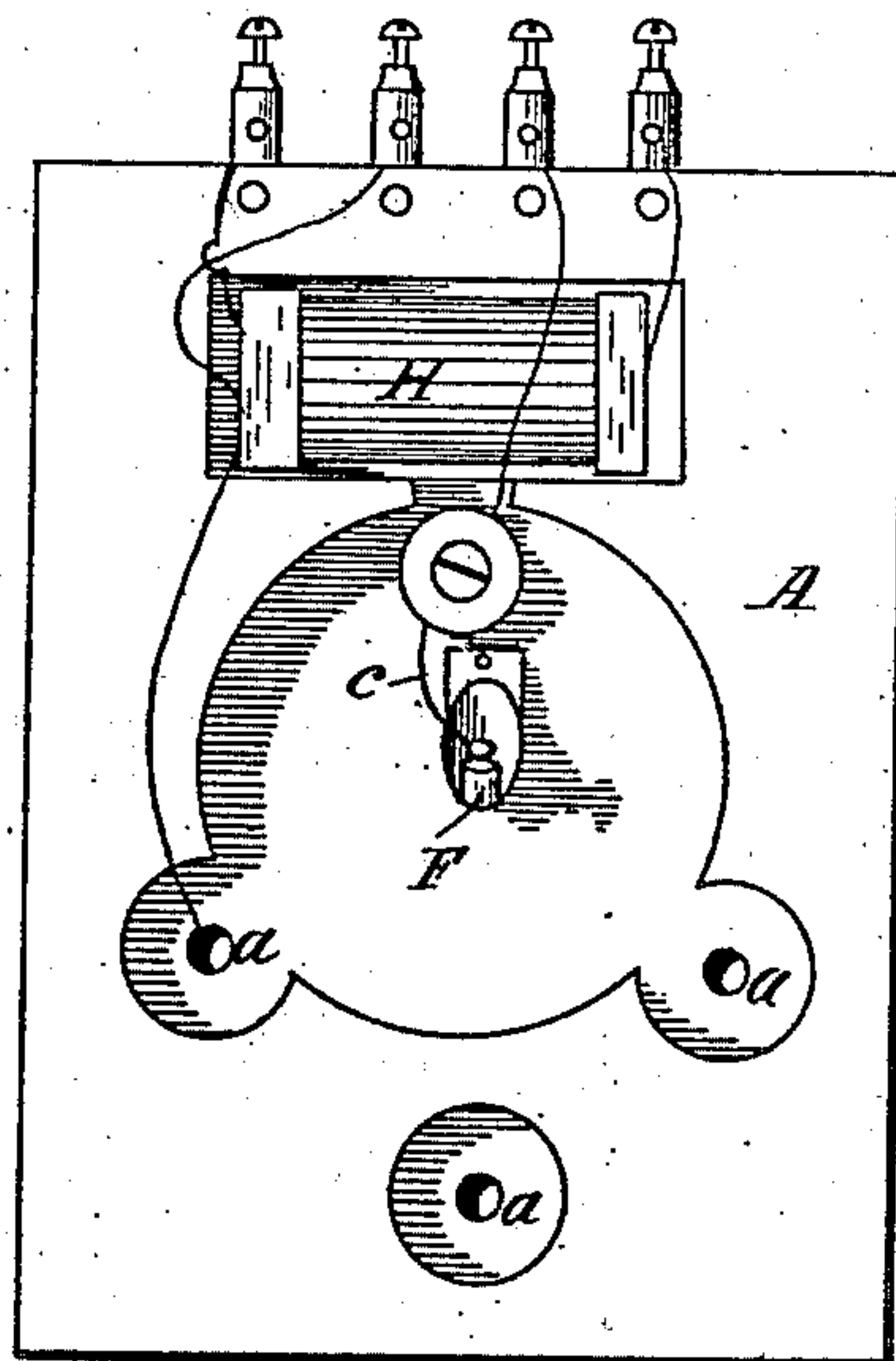


FIG. 2.

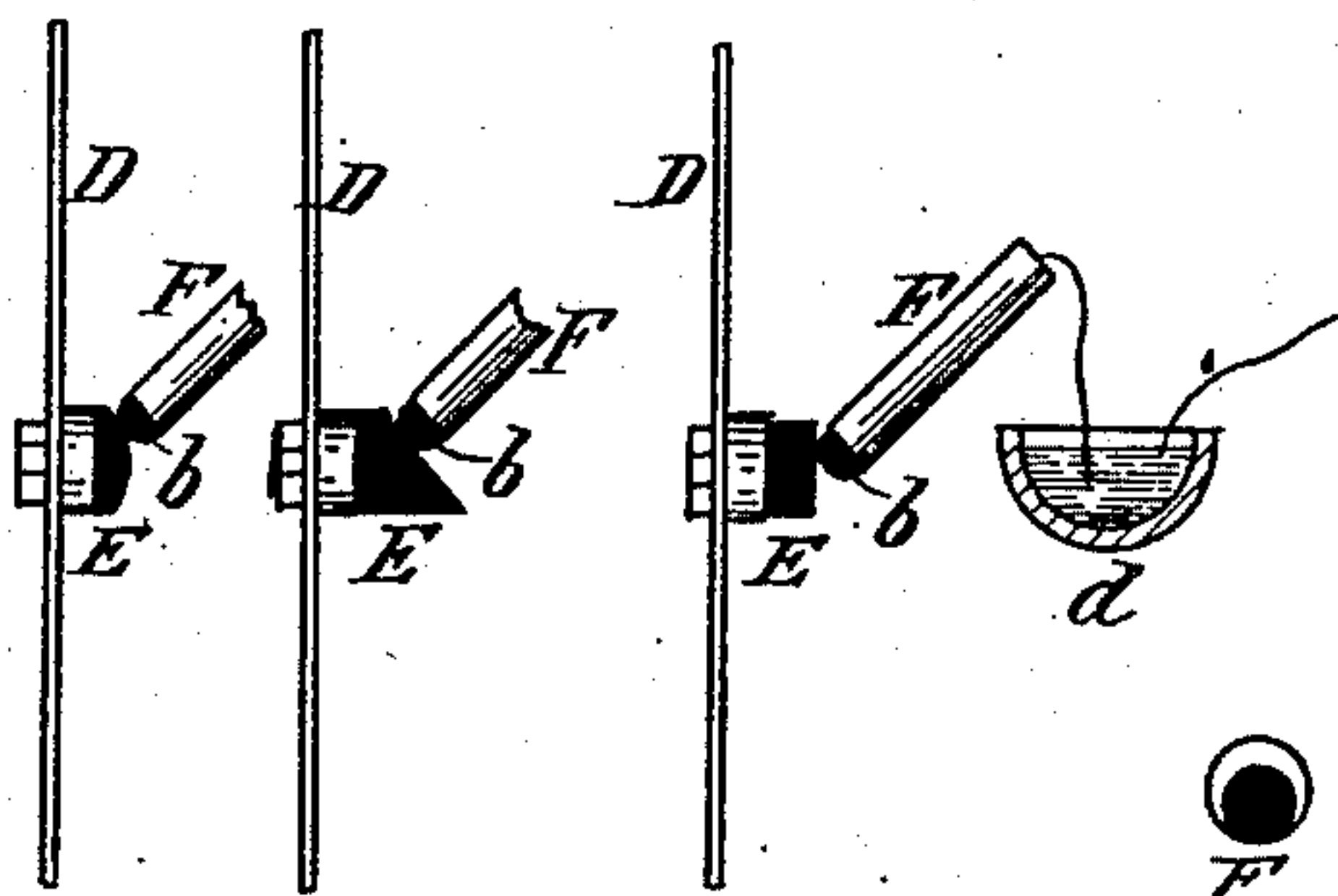


FIG. 3.

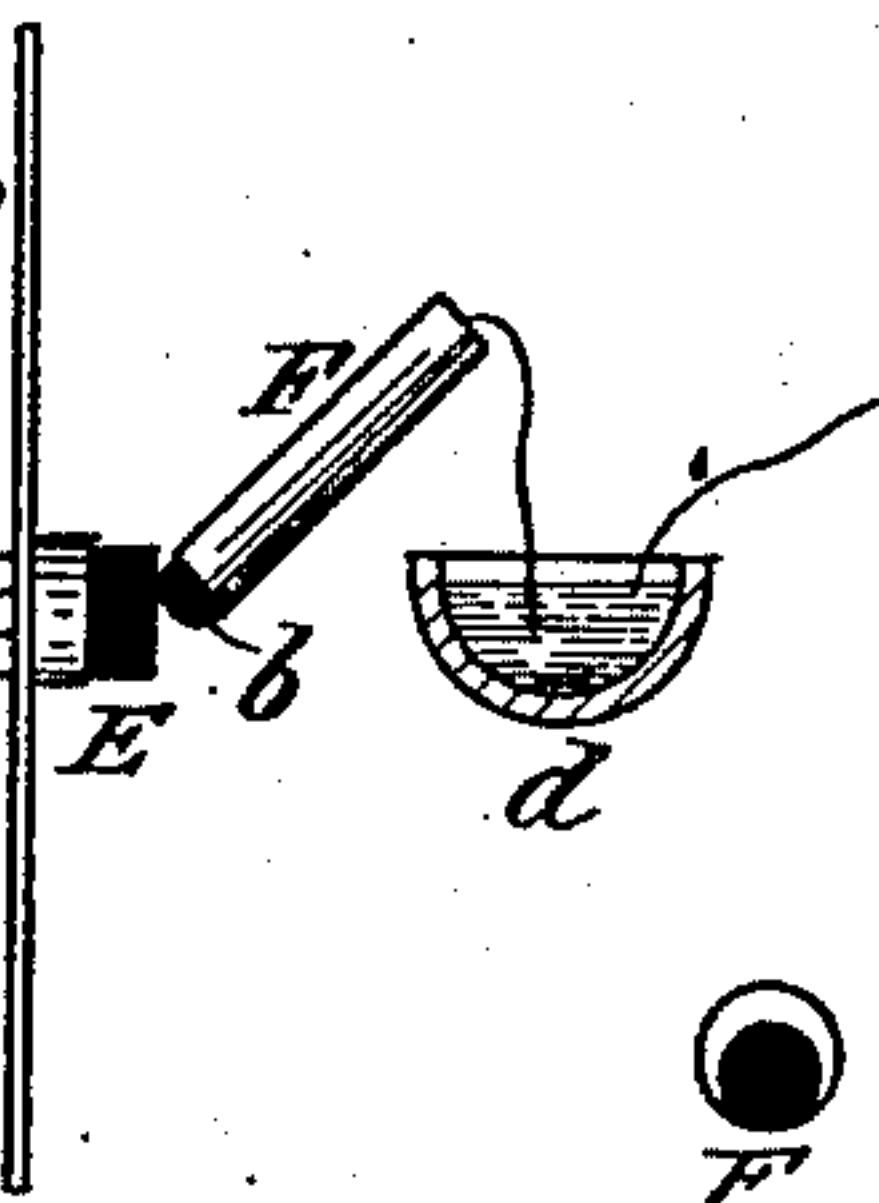


FIG. 4.



FIG. 5.

Witnesses:

Alex. L. Hayes

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# UNITED STATES PATENT OFFICE.

EMILE BERLINER, OF BOSTON, MASSACHUSETTS.

## MICROPHONE.

SPECIFICATION forming part of Letters Patent No. 224,573, dated February 17, 1880.

Application filed September 5, 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 or Contact-Telephones, of which the following is a specification, reference being had to the accompanying drawings.

This invention is an improvement upon the microphone for which I filed an application for a patent of the United States August 11, 1879; and it consists in dispensing with the clamping device for fixing the carbon pin in position, in maintaining it constantly in contact with the diaphragm by the action of gravity, and in connecting the carbon pin to the battery by a device that will not interfere with said action.

In the accompanying drawings, Figure 1 is a sectional view of a microphone-transmitter embodying my improvement. Fig. 2 is a rear view of the same. Fig. 3 shows modifications in the form of the carbon button on the diaphragm. Fig. 4 shows the manner of connecting the carbon pin to the battery by means of a cup of mercury, and Fig. 5 shows modifications in the form of the opening in the block.

If the vibrating diaphragm of the microphone is placed horizontally, the carbon pin may be suspended above it vertically, and in contact with the diaphragm, by a flexible conductor which will not interfere with the action of gravity; but when the vibrating diaphragm is placed perpendicularly, as is generally the case, the carbon pin may be made to bear upon the diaphragm by the action of gravity by being placed in an inclined opening or perforation in the block behind the diaphragm, to which block the diaphragm is attached. This arrangement is shown in Figs. 1 and 2.

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

A is a block, of wood, vulcanite, or other similar material, which has a recess upon its face, opposite to which recess is fastened the diaphragm D by the screws *a a*.

B is a block, of metal, on the other side of the diaphragm, into which block the screws pass, so as to clamp the diaphragm between the blocks A and B, and C is a mouth-piece screwed into an opening in the block B.

To the back of the diaphragm, at its center,

is suitably secured a block, E, of hardened carbon, and opposite to this carbon block is an inclined opening or perforation in the wooden block A, in which rests loosely the carbon pin F, which, sliding in the inclined opening, is maintained in contact with the carbon block E. This pin F may be made entirely of hardened carbon, or it may be made partly of metal and be provided with a tip of hardened carbon.

In order to obtain as small a surface of contact as possible, it is desirable that the end of the carbon pin in contact with the carbon block should be convex.

I is a metal spring attached to the block A, one end of which spring rests upon the diaphragm and has a covering of soft rubber. The function of this damper is well known, and it will not be required when a diaphragm is used which has but little vibration—as, for instance, one of carbon or hard wood.

H is the induction-coil, which is generally used with a microphone-transmitter, and is constructed and connected in the well-known manner.

The connection of the carbon pin with the battery must be such that it will not interfere with the free movement of the pin in the inclined opening. This result may be accomplished by the use of a soft and pliable wire or any flexible conductor, as shown at C in Figs. 1 and 2, or by the use of a mercury-cup, as shown in Fig. 4.

The face of the carbon block E may be parallel with the diaphragm, as shown in Fig. 1, or it may be convex or form an angle with the diaphragm, as shown in Fig. 3.

The opening in the block A may be elliptical in section, as shown in Fig. 2, or circular or angular in section, as shown in Fig. 5.

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

1. In combination with a vibrating surface forming one electrode of an electric current, an opposite electrode maintained in contact with the vibrating surface by the action of gravity, and connected to the battery by a conductor which will not interfere with said action, substantially as and for the purpose set forth.

2. In a contact-telephone or microphone



having no frictional or rubbing electric contact affected by sound-waves, the combination, with a vibrating surface forming one electrode of an electric current, of a pin forming the opposite electrode, sliding freely on a suitable support inclined at an angle toward the vibrating surface, and connected to the battery in such a manner that its free movement on its support will not be interfered with, substantially as and for the purpose set forth.

3. In combination with a vibrating surface forming one electrode of an electric current, the block A, provided with an opening or perforation inclined downward to the vibrating surface, a pin, F, having a carbon extremity and sliding freely in the inclined opening, so as to make contact at its carbon extremity with the vibrating surface, and a connection between said pin and the battery which will not interfere with the free movement of the pin, substantially as and for the purpose set forth.

4. The combination of the diaphragm D, the carbon block E, the damper I, the block A, the pin F, sliding freely in an inclined opening in the block A, and the flexible conductor c, substantially as and for the purpose set forth.

5. A contact-telephone or microphone having no frictional or rubbing electric contact affected by sound-waves, in which a variation of electric contact is effected by a variation in the pressure exerted by a body moving or sliding freely by the action of gravitation in an angle inclined toward said contact, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand.

EMILE BERLINER.

Witnesses:

ALEX. L. HAYES,  
SAMUEL SNOW.