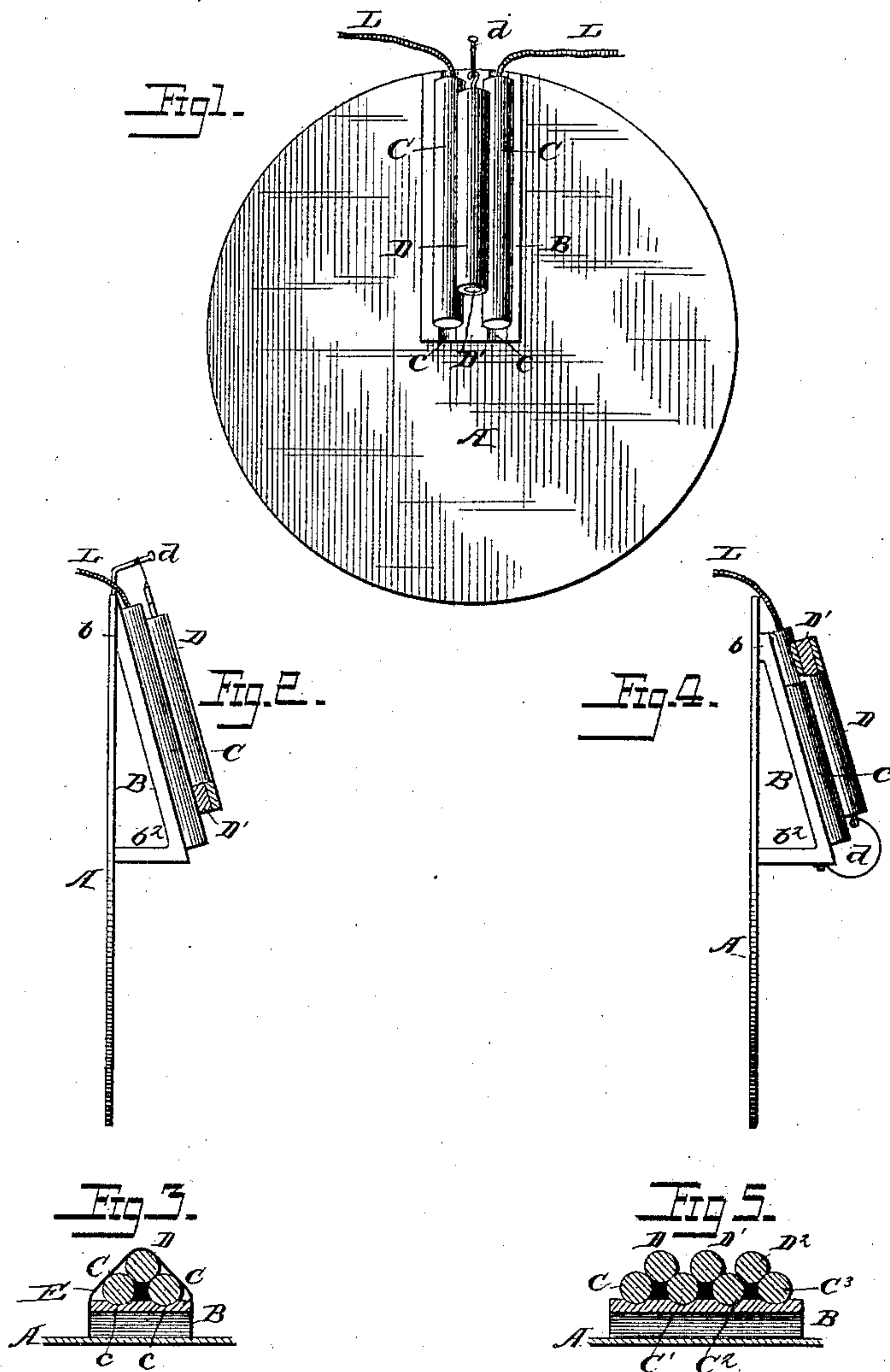


(No Model.)

T. WALLACE & O. A. EN HOLM,  
MICROPHONE.

No. 353,337.

Patented Nov. 30, 1886.



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# UNITED STATES PATENT OFFICE.

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## MICROPHONE.

SPECIFICATION forming part of Letters Patent No. 353,337, dated November 30, 1886.

Application filed January 26, 1886. Serial No. 183,844. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS WALLACE and OSCAR A. EN HOLM, citizens of the United States, and residents of the city, county, and State of New York, have invented certain new and useful Improvements in Microphones, of which the following is a specification.

Our invention relates to microphones, and has for its object to improve the construction of such instruments and to render them cheap, simple, and effective, and at the same time more delicate and of greater capacity, with the least liability of getting out of adjustment; and to these ends our invention consists in a microphone constructed substantially as hereinafter pointed out.

Referring to the accompanying drawings, forming part of this specification, for a more particular description, Figure 1 is a plan view of one form of a microphone embodying our invention. Fig. 2 is a side view of the same. Fig. 3 is a cross-section of Fig. 1. Figs. 4 and 5 are modified forms.

Many attempts have heretofore been made to construct microphones that shall be effective and practical; but they have been subject to more or less objections, either in regard to delicacy of operation under all conditions or expense of manufacture.

Our object has been to construct a microphone that is simple and cheap, and not liable to get out of order, and at the same time be capable of transmitting all kinds of sounds, from the faintest whisper to the loudest talking, without mutilating the sounds and without adjustment of the parts.

In carrying out our invention any sort of a can or box may be used to support the working parts, and we have shown in the drawings these latter parts only, as they can be applied to the case in any well-known manner.

We use a diaphragm, A, of any suitable material, without regard to its structure or thickness, as we have found that any kind will work, from a thin sheet of paper-board to a thick piece of wood. Upon this diaphragm we mount a bridge-piece, B, of any suitable non-conducting material—such as wood, rubber, or the like—and this bridge-piece is tapered at one end, as *b*, and this end is secured

to the edge of the diaphragm, while the other end rests upon a foot-piece, *b*<sup>2</sup>, which is secured to the center of the diaphragm. The bridge-piece may be conveniently secured in this position by glue, mucilage, &c., and is preferably made in one piece. The face of the bridge is grooved at *c c*, to receive the bars of carbon or electrodes C C, which may be secured in any manner, as by glue. These bars C C are each connected to one end of the line-wire L L, one portion of which goes to the distant station, while the other is connected to the ground, or in any other usual way, the battery being interposed directly in the line at any desired locality. The terminals of the line-wire are connected to the ends of these pieces C C by solder or by being wrapped around the end, or any other equivalent manner that will give good electric contact. Upon these bars is placed a bar, D, which rests loosely thereon, and is suspended by a fine cord from the pin or screw *d*, or held up by means of a supporting-pin. This bar or electrode is weighted at its lower end, as at *D'*, by boring the same and inserting some heavy metal, as lead. The bar D thus rests lightly upon the bars C C, and forms the connecting-link between the latter, so that the electric current flows from one of the bars C to the bar D, and from this to the other bar C, and in this manner we obtain a very delicate but continuous contact between the electrodes, the weighted end of the bar D preventing it from being thrown out of contact by any sound-vibrations, no matter of what character. These bars or electrodes are made of the best hard carbon, (and we prefer what is known as "Carri's carbon,") and their surfaces are highly polished, so that they present to each other a great number of very fine points of contact, and as the vibrations of the diaphragm under the influence of sound-waves are imparted to them, there is a very delicate variation of each and all of these fine contacts, and the electric current is therefore varied to a great degree.

In order to properly protect the carbon bars from extraneous substances that might interfere with their operation or their high condition of polish, we provide a cover, E, which may be of paper or the like, and which we se-



cure to the sides of the bridge-piece by gum, and which extends over the electrodes, as seen in the drawings.

Instead of using three electrodes, a greater number may be used when desirable; and in Fig. 4 we have shown one modified form, in which the carbons  $C$   $C'$   $C^2$   $C^3$  are secured to the bridge-piece, and the carbons  $D$ ,  $D'$ , and  $D^2$  rest upon them, and one end of the line-wire is connected to the carbons  $C$  and the other to the carbons  $D$ , so that the current passes through them in multiple arc.

We are aware that carbon bars secured directly on the diaphragm and having a carbon bar or ball resting on them, and also that half-disk carbons secured on a bridge fastened to the central portion of the diaphragm and a disk-carbon suspended to rest on the said half-disks, have been used in microphones; but our invention is distinguished from such constructions, in that the suspended bar is weighted and resting on and between the carbon bars on the bridge, and is much less liable to be thrown out of contact by the vibration of the diaphragm, and the bridge has one end connected at or near the edge of the diaphragm, while the elevated end is at the center thereof, thus increasing the susceptibility of the microphone to slight vibrations.

Having now described our invention, what we claim is—

1. The combination, with the diaphragm, of the bridge-piece secured thereto, the bars secured to the bridge-piece and connected to the line, and the suspended and weighted bar resting on and between said bars, substantially as described.

2. The combination, with the diaphragm and the bridge-piece carrying the carbon bars, of a covering connected to the bridge-piece and extending over the bars, substantially as described.

3. The combination, with the diaphragm, of the bridge-piece, the elevated end of which bears upon the center of the diaphragm and the other is secured at or near the edge of the carbon bars carried by the bridge-piece, and the weighted bar resting upon and between the fixed bars, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS WALLACE.  
OSCAR A. EN HOLM.

Witnesses:

GUSTAVE FRANK,  
C. L. CANMANN.