

G. M. PHELPS.
Speaking-Telephone.

No. 209,289.

Patented Oct. 22, 1878.

Fig: 1.

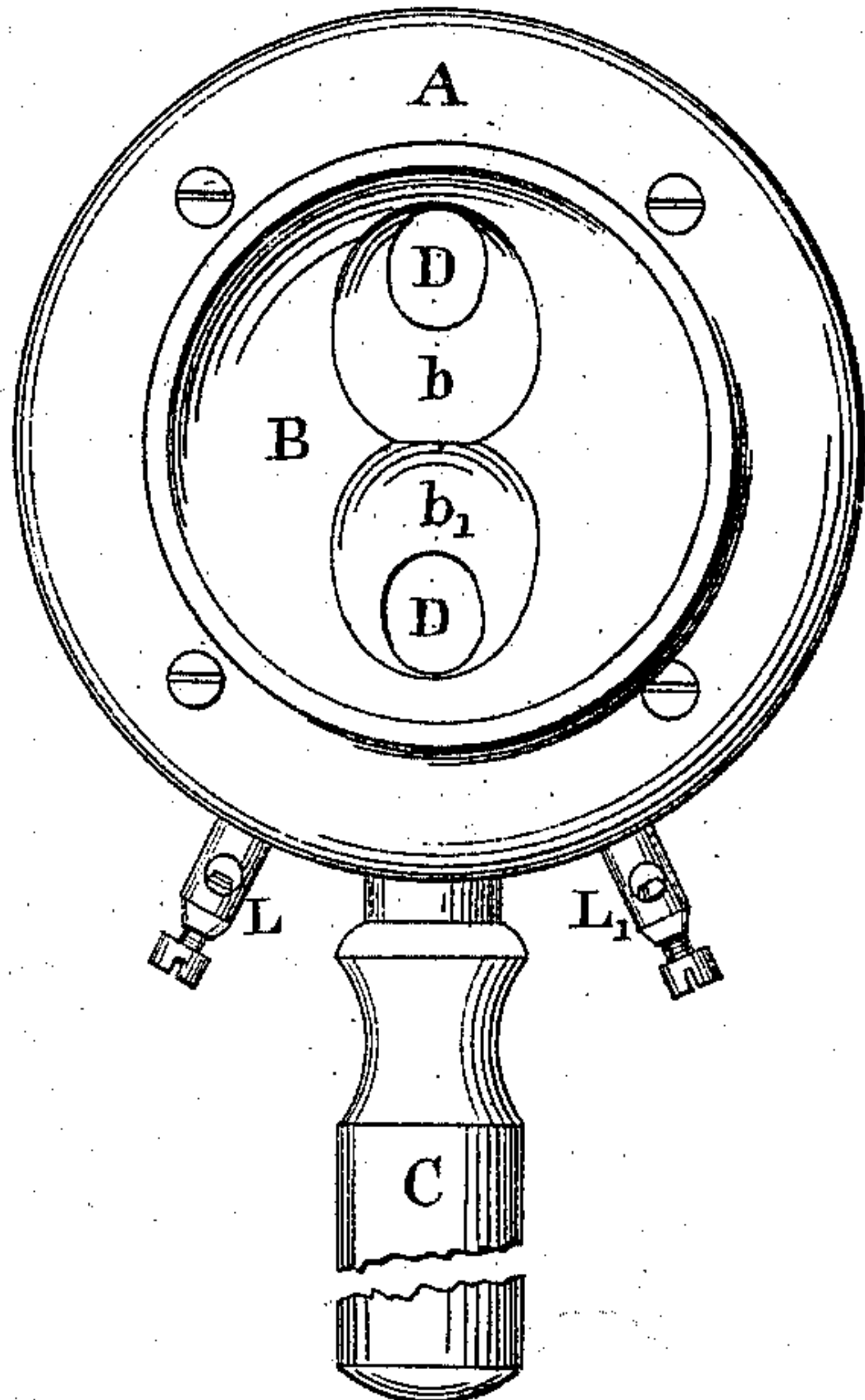


Fig: 2.

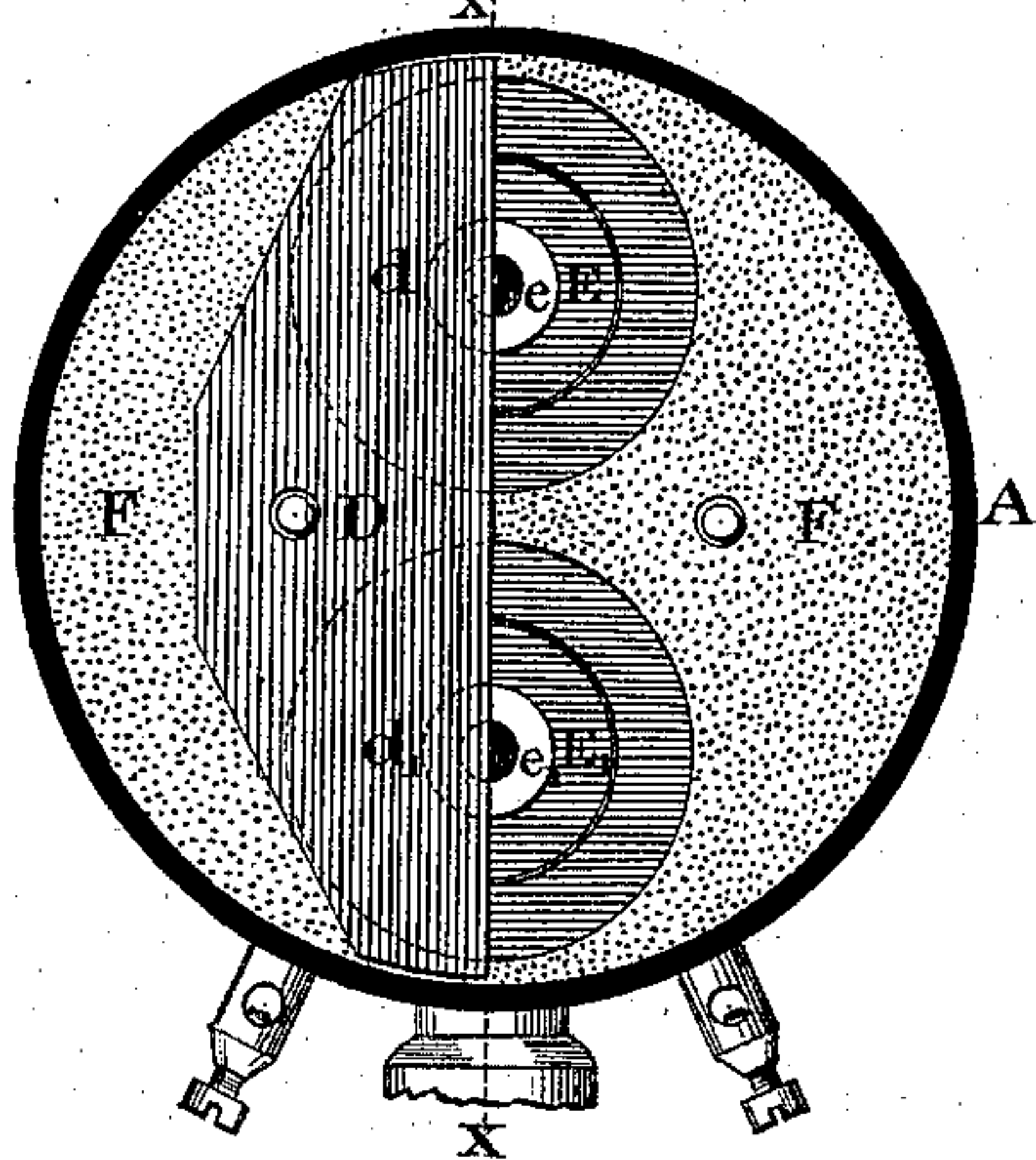
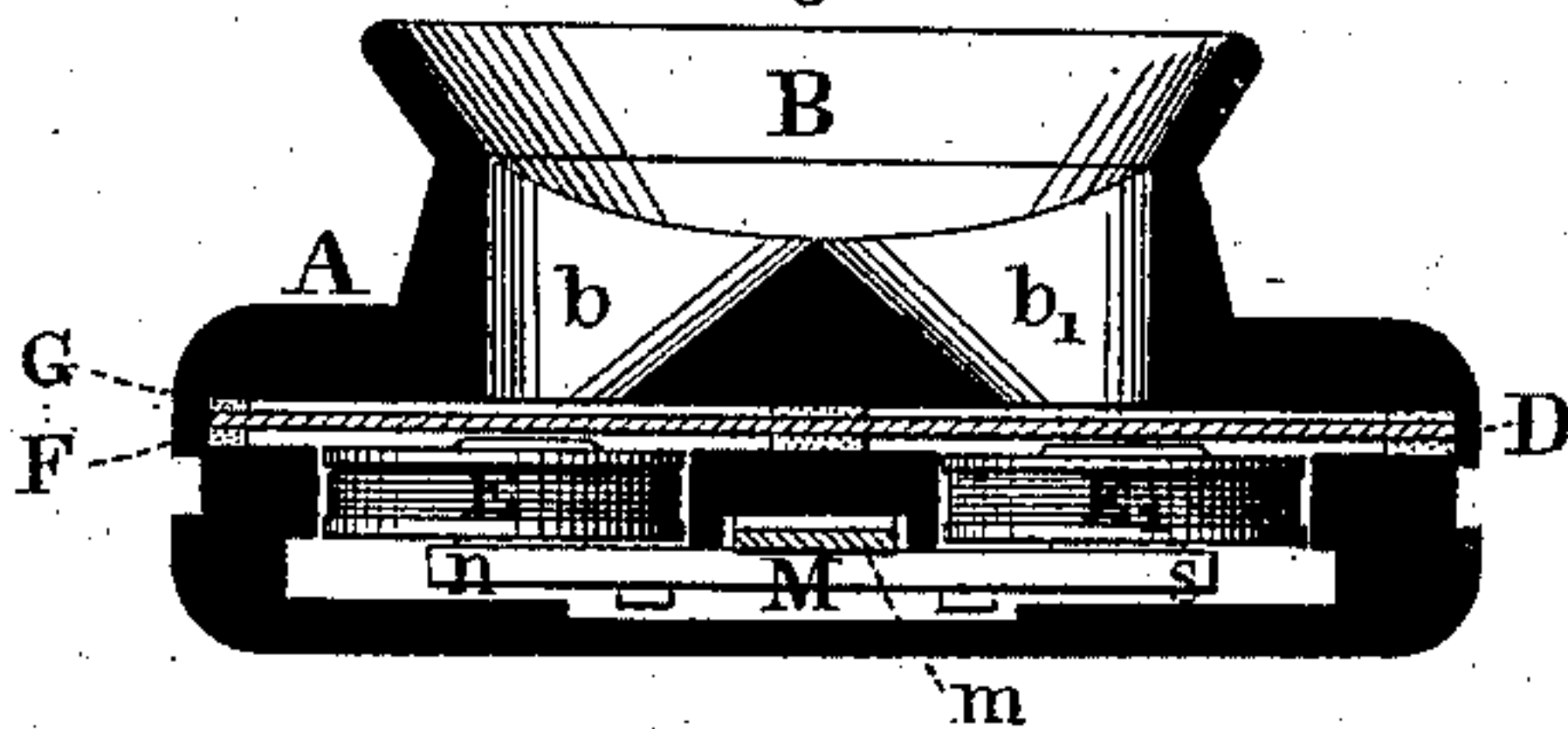


Fig: 3.



Witnesses:

William J. Cook
Gerritt Smith

Inventor,

George M. Phelps.

by his Attorney,

Frank L. Pope,

UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. **209,289**, dated October 22, 1878; application filed February 11, 1878.

To all whom it may concern:

Be it known that I, GEORGE M. PHELPS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Speaking or Articulating Telephones, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a class of instruments technically termed "speaking-telephones," which are especially intended for the transmission and reproduction at a distance of sonorous waves or vibrations of every description by means of electrical impulses or waves traversing a circuit of conductors.

My improvements consist, first, in combining two or more vibrating diaphragms and two or more corresponding magnetic cores enveloped in separate helices, connected with the same circuit, with a single mouth-piece or vocalizing-chamber; second, in mounting two magnetic cores, when combined with separate diaphragms and coils and a single mouth-piece, upon opposite poles of the same permanent magnet; and, third, in subdividing a single continuous induction-plate into two or more separate and distinct areas of vibration, thus virtually forming two or more separate diaphragms, each of which acts or is acted upon by a separate magnetic core.

In the accompanying drawings, Figure 1 is a front view of a speaking-telephone embodying my improvements. Fig. 2 is a vertical transverse section of the same, and Fig. 3 is cross-section taken in the plane of the dotted line xx in Fig. 2.

The working parts of the instrument are inclosed within a hollow shell or case, A, which may be constructed of hard rubber, wood, or any other suitable material, and should be provided with a suitable handle, C. A recess is formed within the case A, in which is placed a permanent magnet, M, which forms a yoke to the soft-iron cores $e e_1$, which are enveloped in helices E E of insulated wire, the whole arrangement being precisely similar to that of an ordinary horseshoe electro-magnet with very short cores, except that the yoke M, instead of being of soft iron, is of steel, and permanently magnetized, having its north and

south poles at n and s , respectively. The cores $e e_1$ of this magnet are thus rendered permanently magnetic by induction.

The poles of the cores $e e_1$ project into a shallow circular chamber formed within the case A, the depth of which is just equal to the combined thickness of the inductive plate D and the dampers F G, between which the latter is firmly clamped when the case A is put together.

The inductive plate D is shown in Fig. 2, in which figure one-half of it (to the right of the vertical center line) has been removed in order to exhibit the parts beneath it. A section of the plate D is also shown in Fig. 3. The dampers F and G, between which the plate D is clamped, are composed of thick soft paper, felt, or other equivalent substance, and are each in the form of a flat disk, as seen at F in Fig. 2, but with a circular opening opposite each pole of the magnet.

The effect of this mode of construction is that, when the plate D is compressed between the dampers F and G, the only portions of it capable of being thrown into vibrations are those which are comprised within the area of the circular openings in the dampers, and thus the plate D is virtually converted into two circular vibrating diaphragms, $d d_1$. (See Figs. 2 and 3.)

The mouth-piece B has two conical tubes or passages, $b b_1$, leading from it, by which the sonorous vibrations entering the mouth-piece are simultaneously concentrated upon the two vibrating diaphragms d and d_1 .

As the helices E and E are both placed in or connected with the same electric circuit, the ends of the wires being attached to the binding-screws $L L_1$ for making connection with the line in the usual manner, it will be obvious that the useful effect produced will be nearly or quite double that of the ordinary arrangement, in which a single diaphragm and helix are employed, and by which only one pole of the permanent magnet is utilized.

The distance between the poles of the magnet and the diaphragm may be adjusted by means of simple screws, acting to compress the flat spring m in a manner well understood.

It is obvious that the principle of construction which I have adopted may be carried still

further, if found desirable. For example, the permanent magnet M may be made in the form of a cross, having two north and two south poles, and provided with four helices and four diaphragms, all of which will act in concert, and will re-enforce the action of each other, and even a greater number may be employed, if desirable, without departing in the least from the principle of my invention.

It is also obvious that separate plates might be employed for the separate diaphragms instead of making use of a single plate subdivided into distinct areas of vibration by compression between dampers, as hereinbefore described; but the use of a single plate produces equally good results, and materially simplifies the construction and adjustment of the instrument.

The helices or coils E E may be connected in series or in multiple arc between the binding-screws L and L₁, whichever may be advisable in any particular instance.

I claim as my invention—

1. Two or more magnetic cores whose enveloping helices or coils are placed in the cir-

cuit of one and the same line-wire, two or more vibrating diaphragms, and a single mouth-piece or vocalizing-chamber, when combined, arranged and operated substantially as specified.

2. A permanent magnet having a separate core enveloped in a corresponding helix or coil mounted upon each of its opposite poles, and arranged to receive magnetism therefrom by contact, in combination with two vibrating plates or diaphragms and a single mouth-piece or vocalizing-chamber, substantially as specified.

3. A single induction-plate subdivided into two or more separate and distinct areas of vibration, in combination with two or more magnetic cores and two or more helices or coils, substantially as specified.

In witness whereof I have hereunto set my hand this 5th day of February, A. D. 1878.

GEO. M. PHELPS.

Witnesses:

G. A. HAMILTON,
GERRITT SMITH.