

G. M. PHELPS.
Speaking-Telephone.

No. 220,209.

Patented Sept. 30, 1879.

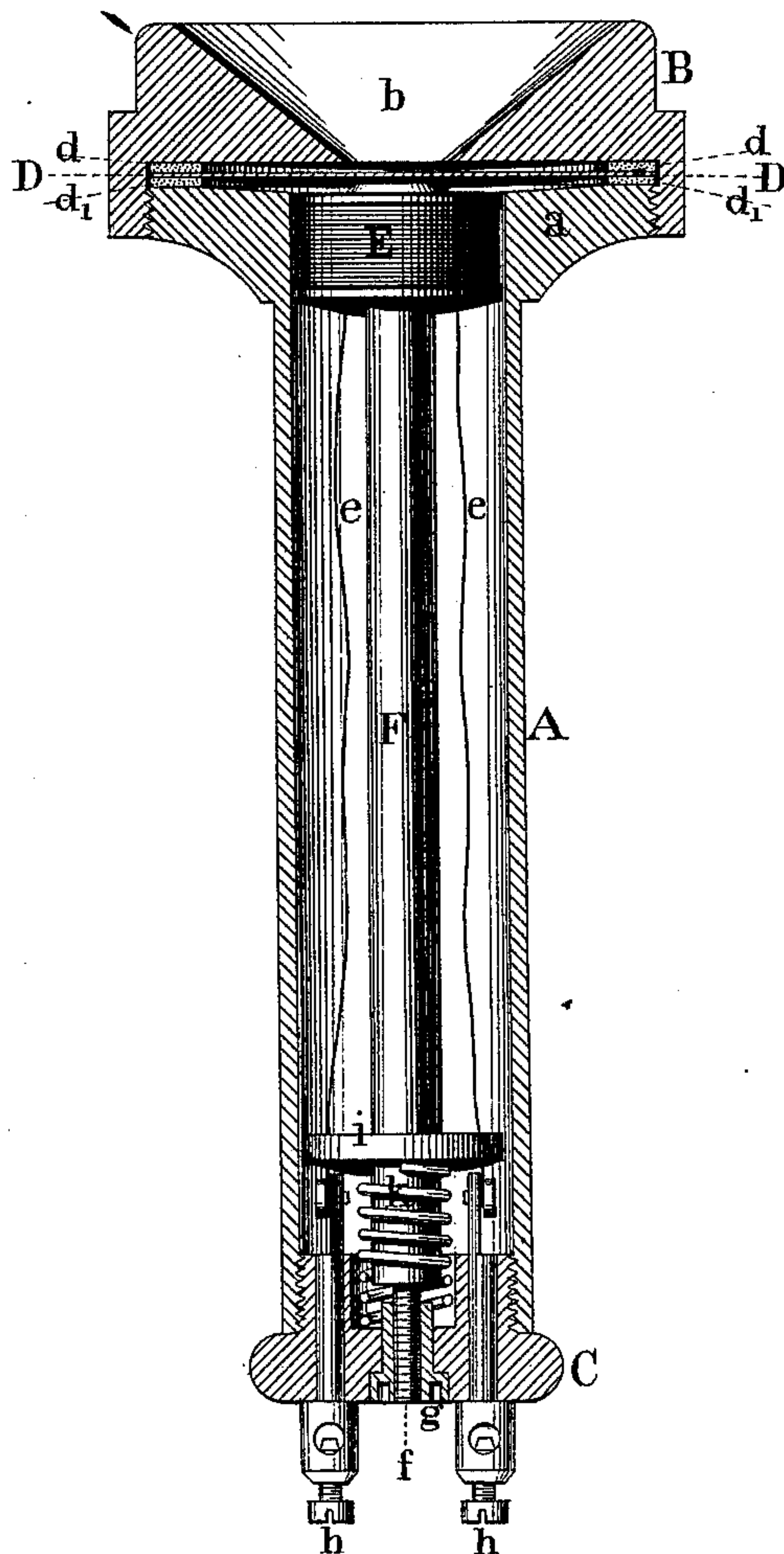


Fig: 1.

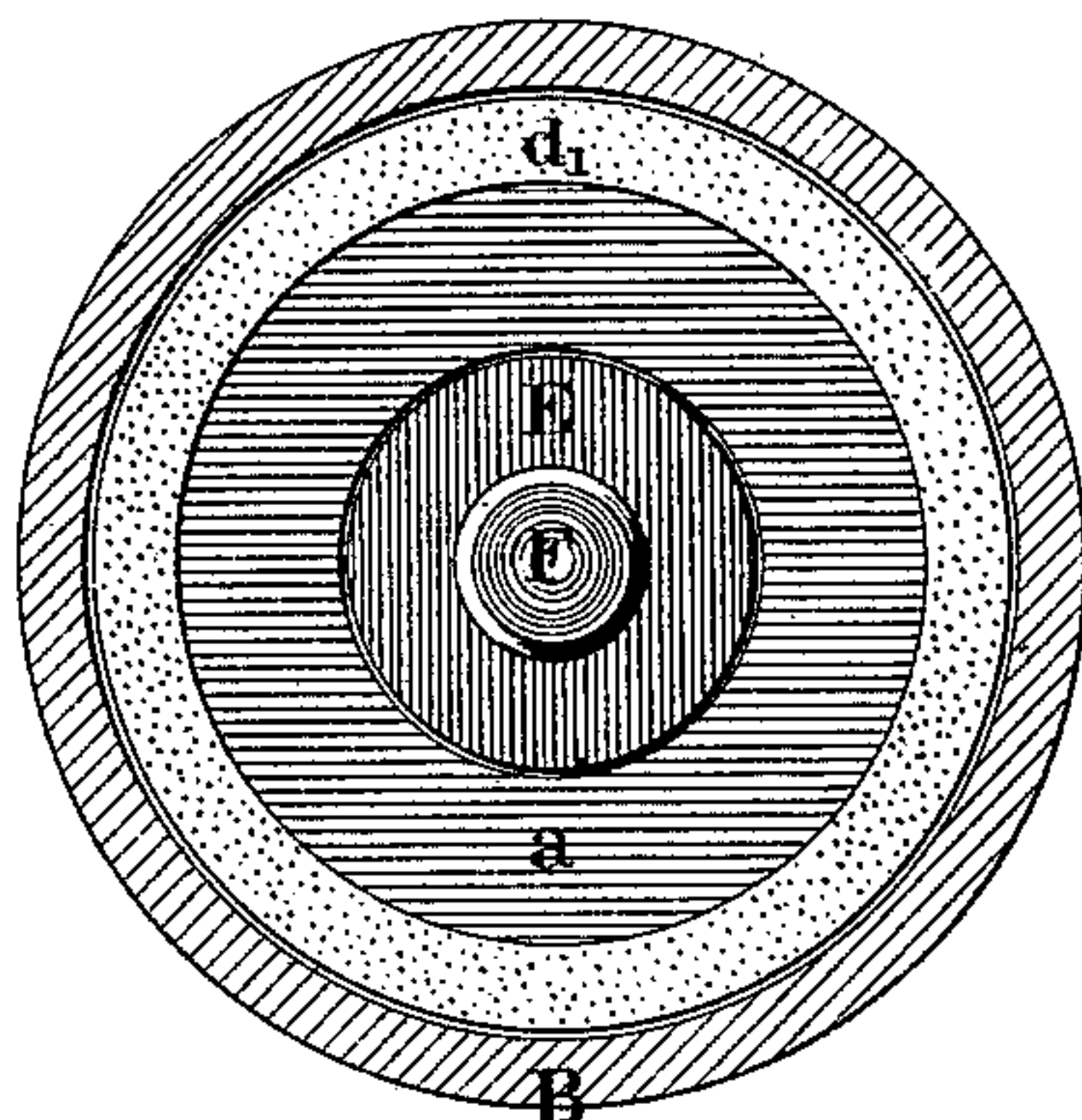


Fig: 2.

Witnesses:

L. Eugene Jefferts
William J. Bok.

Inventor:

George M. Phelps
per Frank L. Pope, Atty

UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. **220,209**, dated September 30, 1879; application filed December 21, 1877.

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 Telephonic Instruments, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a certain class of instruments technically known as "speaking-telephones," which are especially adapted to 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 improvement consists in constructing the vocalizing-chamber containing the vibrating diaphragm with its rear wall parallel, or nearly so, to the surface of the diaphragm, and with as little space between them as possible, whereby the confusion and indistinctness of the sounds produced by the vibrations set up in the confined body of air in the rear of the diaphragm are altogether avoided.

In the accompanying drawings, Figure 1 is a longitudinal section of a telephonic instrument embodying my improvements, and Fig. 2 is a transverse section taken in the plane of the line *d d* in Fig. 1.

The instrument shown in the drawings is adapted to be used either for the transmission or the reception of articulate or other sounds, and in its general construction and arrangement does not differ materially from those heretofore used for the same purpose.

The body of the instrument A may be composed of wood, vulcanized rubber, or other convenient and suitable material. It is tubular in form, and is provided with a solid head or flange, *a*, as shown in the figure at one end, upon which is screwed a cap, B. The latter is provided with a conical or funnel-shaped aperture, *b*, passing through it from the outside and opening into a shallow circular vocalizing-chamber formed in the face of the cap which contains the vibrating plate or diaphragm D. This diaphragm is simply a thin elastic disk, preferably of iron or steel. It is

placed with its center in close proximity to the extremity of the core of the helix E, which core is attached to or may form a constituent part of the permanent magnet F. The distance between the end of the core of the helix E and the diaphragm D is adjustable by means of the nut *g*, which may be turned upon the screw *f* by means of a suitable key.

The screw *f* being fixed in the end of the permanent magnet F, the turning of the nut *g* in one direction or the other serves to effect the necessary adjustment, while the pressure of the coiled spring *k* takes up any lost motion which may arise from looseness of the movable parts.

The wires *e e*, which form the extremities of the helix E, terminate in binding-screws *h h*, for the attachment of the conducting-wires of the telegraph-line.

Between the edge of the diaphragm and the body of the instrument are interposed dampers *d d*, which should be composed of some suitable semi-elastic material. I have found a thick porous quality of paper to give very excellent results in practice. These dampers are placed one on each side of the diaphragm, and are preferably made in the form of a flat ring, as shown at *d* in Fig. 2. By the addition of these dampers the clearness of articulation is materially increased.

The walls of the vocalizing-chamber, which contains the vibrating diaphragm D, are made parallel to the surfaces of the diaphragm, or as nearly so as possible.

The space between the rear surface of the diaphragm D and the wall of the vocalizing-chamber, which faces it, is only just sufficient to admit of its free vibration. This method of construction also greatly improves the articulation of the instrument, as in telephones heretofore constructed the presence in the rear of the diaphragm of a body of confined air of sufficient extent to be capable of being thrown into vibrations which are reflected back against the diaphragm tends to render the sounds confused and indistinct. This interference is entirely avoided by the arrangement which I have described, as the body of

air is too small to admit of this action taking place to an injurious extent.

I claim as my invention—

In a telephonic instrument, a diaphragm or vibrating plate, in combination with a vocalizing-chamber, the rear wall of which has its surface parallel, or nearly so, to the surface of the said plate, and closely approximating

thereto, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand this 17th day of December, A. D. 1877.
G. M. PHELPS.

Witnesses:

GERRITT SMITH,
G. A. HAMILTON.