

E. GRAY.
Speaking-Telephone.

No. 204,029.

Patented May 21, 1878.

Fig 1.

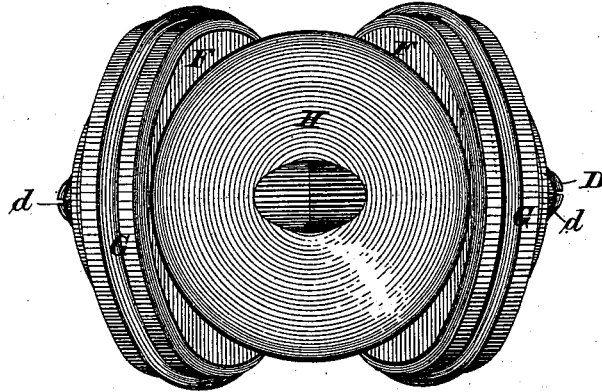


Fig 2.

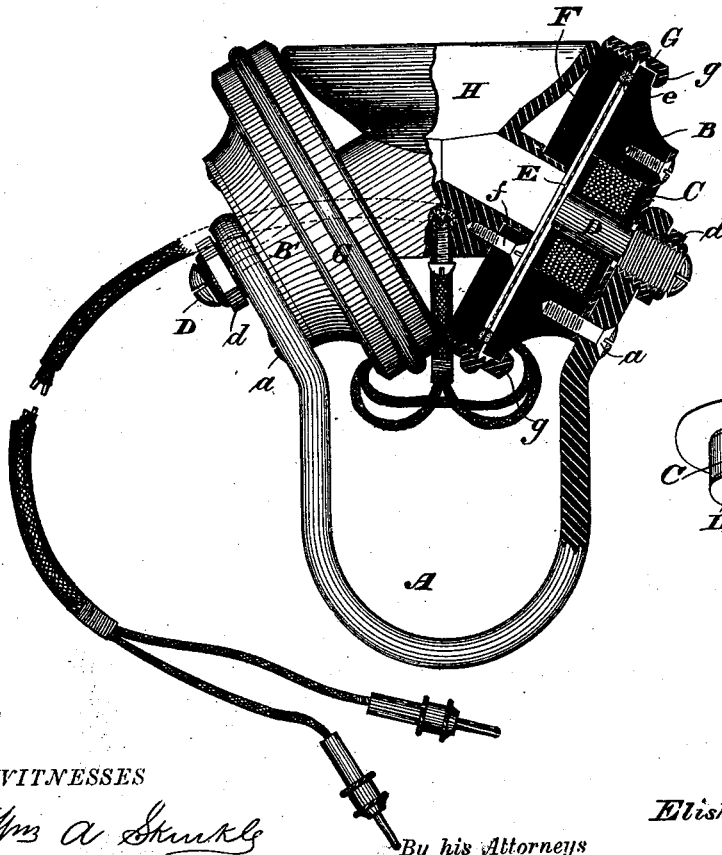
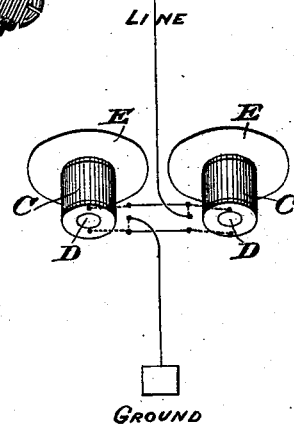


Fig 3.



WITNESSES

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ELISHA GRAY, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. 204,029, dated May 21, 1878; application filed March 21, 1878.

To all whom it may concern:

Be it known that I, ELISHA GRAY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Speaking-Telephones, of which the following is a specification:

My present invention relates to and constitutes an improvement upon speaking-telephones heretofore invented by me, for which sundry applications for Letters Patent of the United States are now pending.

The object of my invention is, while preserving the portable feature of the instrument, so as to enable it to be handled with facility, to secure an increased volume and clearness of sound.

These ends I attain by mounting two diaphragms, each provided with an electro-magnet secured to the poles of the permanent U-shaped magnet, common to both, at such an angle with reference to each other as to admit of the use of a common mouth-piece so shaped as to allow the lips of the speaker to approximate as closely as possible to both diaphragms.

The subject-matter and advantages of my invention are hereinafter specifically designated.

The accompanying drawings represent all my improvements as embodied in one apparatus in the best way now known to me. Obviously, however, some of these improvements may be used without the others, and in apparatus differing in details of construction from the one herein represented.

Figure 1 represents a plan or top view of my improved apparatus; Fig. 2, a view in elevation thereof, one side being shown in vertical section through the center of the magnet; and Fig. 3 shows an arrangement on circuit.

A battery may be employed arranged upon circuit, either as shown in my application filed October 29, 1877, (Case 3,) or as in that filed January 17, 1878.

A permanent U-shaped or horseshoe steel magnet, A, constitutes the handle of the instrument, and may be highly finished and ornamented, if desired. A rubber disk, B B', of about one-half an inch in thickness and of a diameter slightly larger than the diaphragm, is secured to each pole of the magnet by screws *a*. A small helix, C, wound upon a hard-rub-

ber spool about an inch in diameter, and about equal in length to the thickness of the disk B B', is firmly inserted in each disk, and provided with the ordinary connecting-wires. A soft-iron core, D, screws into each pole of the permanent magnet A, and is firmly secured therein by a check-nut, *d*. The soft-iron core slides loosely through the helix, and is held permanently charged by the pole of its respective magnet. This core is adjustable relatively to the diaphragm by unscrewing the check-nut and turning the core back or forth with a screw-driver until properly adjusted, when the check-nut is screwed up again, thus holding the core securely in position.

A diaphragm, E, is firmly secured in place between the disk B and the screw-cap F. Rings *e*, of paper or other suitable material, are interposed between the diaphragm and disk and cap, respectively, and these parts are all securely clamped together by a brass ring, G, provided with a flange, *g*, overlapping the disk and an internal screw-thread, in which the cap F screws.

I do not claim in this application the use of rings of paper or other suitable material on either or both sides of the diaphragm, to act as a dampener or excluder of external vibrations, as such a ring is shown in another application for Letters Patent of the United States, filed by me January 16, 1878.

I disclaim the combination of the disk, the cap, the interposed diaphragm, and the flanged ring overlapping the disk and screwing over the cap to clamp the diaphragm firmly at its edges.

I also disclaim two or more magnetic cores, whose enveloping helices or coils are placed in a circuit 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 in the pending application of George M. Phelps, filed February 11, 1878.

The mouth-piece H, of metal or other suitable material, terminates in a bifurcated tube, each branch being secured to its respective cap F by screws *f*, so as to bring the mouth of each tube over the center of its respective diaphragm.

The diaphragms, it will be observed, are arranged at an angle of about forty degrees

with reference to each other, by which means the lips of the speaker are brought very near both diaphragms, so that practically each diaphragm is actuated with the same energy as a single one constructed in the ordinary way, by which means I am enabled to generate almost double the electro-motive force that a single diaphragm will. In consequence of this organization articulate words are transmitted with greater force and clearness than they are with a single diaphragm under the same circumstances.

Each telephone is a counterpart of the other, and the apparatus thus constitutes what I term a "bipolar telephone."

The handle, it will be observed, is loop-shaped, affording a firm grasp to the operator, constituting a means by which it may be suspended or attached in any position desired, and serving as a common support for the telephones, by which they may be brought close together relatively to a common mouth-piece, the advantages of which construction are obvious.

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

1. A bipolar telephone constructed, substantially as hereinbefore set forth, with two diaphragms approximating each other at one edge, arranged at an acute angle, and having a common mouth-piece, whereby the lips may be brought close to each diaphragm to increase the electro-motive force.

2. The combination, substantially as hereinbefore set forth, of two telephones mounted upon a common support at an acute angle to each other, with an interposed bifurcated mouth-piece secured to said support.

3. The combination, substantially as hereinbefore set forth, of a permanent magnet, two diaphragms mounted thereon at an acute angle to each other, and approximating at one edge, with an interposed bifurcated mouth-piece, each branch of which comes opposite the center of its respective diaphragm.

4. The combination, substantially as hereinbefore set forth, of the permanent magnet, a screwed soft-iron core passing therethrough, and the check-nut on the core, whereby the core may be adjusted relatively to the diaphragm.

5. The combination, substantially as hereinbefore set forth, of two telephones, with a looped handle upon which they are mounted, and a common mouth-piece.

6. The combination, substantially as hereinbefore set forth, of a permanent horseshoe magnet, constituting a looped handle, with a telephone mounted on each pole thereof, and an interposed mouth-piece.

In testimony whereof I have hereunto subscribed my name.

ELISHA GRAY.

Witnesses:

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