

C. A. RANDALL.
TELEPHONIC APPARATUS.

No. 312,896.

Patented Feb. 24, 1885.

Fig. 1.

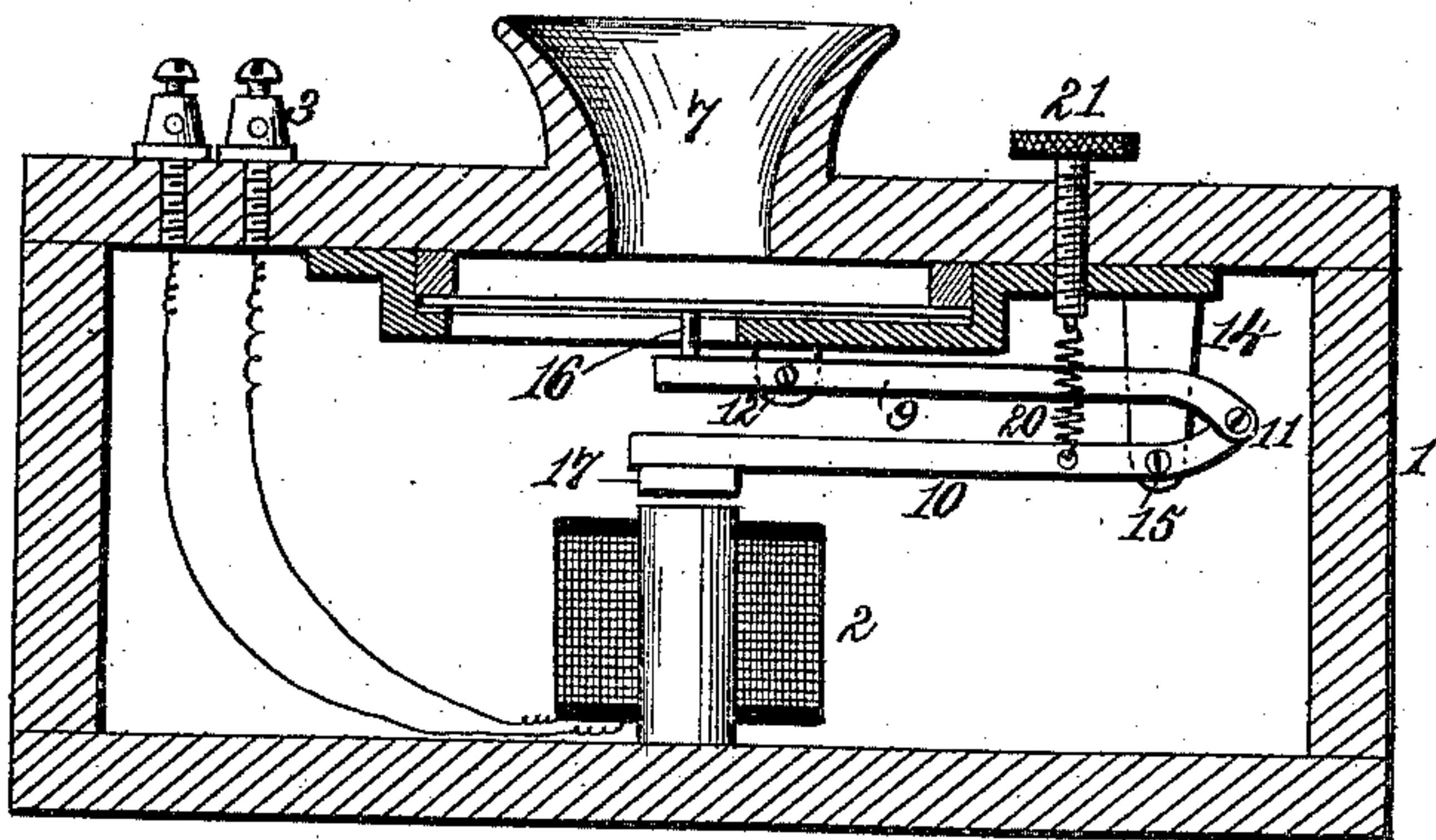
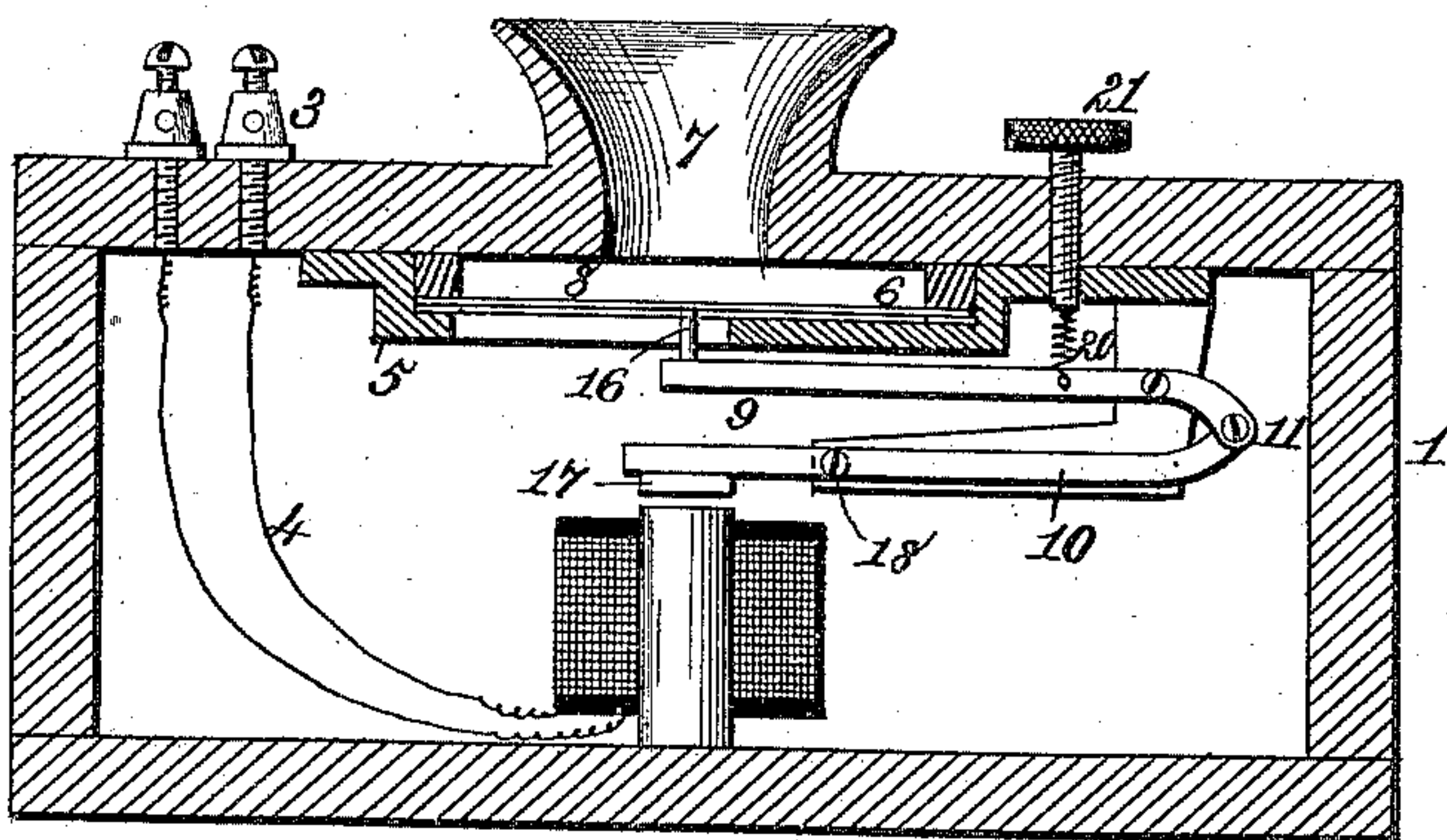


Fig. 2.



Witnesses.

Robert Everett.

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UNITED STATES PATENT OFFICE

CHARLES A. RANDALL, OF BROOKLYN, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL IMPROVED TELEPHONE COMPANY.

TELEPHONIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 312,896, dated February 24, 1885.

Application filed April 7, 1879.

To all whom it may concern:

Be it known that I, CHARLES A. RANDALL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Telephonic Apparatus, of which the following is a specification.

In ordinary telephonic transmitters or receivers the amount of vibration or movement of the diaphragm is exceedingly small. In a transmitter this small movement alone is given to the contact-points, carbon, or other current-controlling device, the result being a very small range of electrical variation over the line for affecting the receiving-magnet, which in turn causes only a small movement of its diaphragm, the resultant sounds being thin and weak.

The object of the present invention is to increase the volume of these resultant sounds, so that the instrument, so to speak, talks louder, and also that currents of much greater range of variation may be transmitted, and the instrument consequently worked at great distances.

To these ends the invention consists, broadly, in the combination, with the magnet, armature, and diaphragm of a telephone, of a mechanical device for amplifying either the movement of the diaphragm or armature, according as the instrument is to be used as a receiver or transmitter.

It also consists in the combination of lever devices, which will be hereinafter fully set forth, in connection with the magnet, armature, and diaphragm of a telephone.

In the accompanying drawings, Figure 1 is a sectional view of a transmitting-telephone embodying my invention. Fig. 2 is a similar view showing a telephone organized to act as a receiver.

The numeral 1 designates the casing of a telephone, in which is arranged a magnet, 2, consisting of a core and coil, said magnet being connected with the binding-posts 3 of the circuit-wires by suitable conductors, 4. The casing 1 has a suitable mouth-piece, 7, beneath or beyond which is arranged an annulus, 5, which is recessed to form an air-chamber, 6, with which the mouth-piece communicates. The annulus supports and holds

in position the vibrating diaphragm 8, which is acted upon by a compound lever consisting of two frames or arms, 9 10, bent or curved and pivoted together, as indicated at 11. As shown in Fig. 1, the arm 9 is pivoted at the point 12 to a suitable support, 13, extending from the annulus 5, and the arm 10 is pivoted to a support, 14, at the point 15. The free end of the arm 9 is provided with a point, 16, which impinges against the center of the diaphragm, and the other arm, 10, carries at its free end a soft-iron armature, 17, which operates in conjunction with the electro-magnet in the ordinary manner.

An instrument organized as shown in Fig. 1 is intended to be used as a transmitter, since it is evident that the arrangement of levers therein shown will cause the armature to have a greater movement than the diaphragm, and hence it follows that the currents induced will be stronger, and consequently have a more powerful effect upon the receiving-telephone.

In the arrangement shown in Fig. 2 the position of the armature and point bearing upon the diaphragm is reversed—that is to say, the lever 10, which carries the armature, is pivoted near its armature-bearing end, as is shown at 18, and the lever 9, which carries the point 16, is fulcrumed to the support 14, the two levers being, however, still connected by a pivot-joint. By the arrangement shown in Fig. 2 it is evident that any vibration imparted to the compound lever will cause an amplified movement to the diaphragm, thus giving out the sound much stronger and louder than a diaphragm vibrated in the ordinary manner by the direct magnetic impulses.

A spring, 20, is combined with the lever for returning the same to its normal position after each electrical impulse of the armature, and a set-screw, 21, is resorted to for regulating the pressure of said spring.

What I claim is—

1. In a telephone, a magnet and its armature, a diaphragm, and a mechanical device for increasing movement connected with said diaphragm and armature, whereby a vibratory movement in the said diaphragm may impart a movement of greater amplitude to the armature, substantially as described.

2. A telephone embodying in combination the magnet, diaphragm, and lever, with its fulcrum nearer to the diaphragm than to the poles of the magnet, said lever carrying at one
5 end an armature in front of the magnetic poles, and being in contact at the opposite end with the diaphragm, substantially as described.

3. A telephone embodying in combination a diaphragm, an armature, and a lever hav-
10 ing its fulcrum between the center of the diaphragm and the poles of the magnet, and op-

erating to communicate the movement of the armature to the diaphragm, and vice versa, substantially as described.

In testimony that I claim the foregoing I
15 have hereunto set my hand in the presence of the subscribing witnesses.

CHAS. A. RANDALL.

Witnesses:

JAMES L. NORRIS,

JAS. A. RUTHERFORD.