

(No Model.)

C. ADER.
Magneto Telephone.

No. 241,580.

Patented May 17, 1881.

Fig. 1.

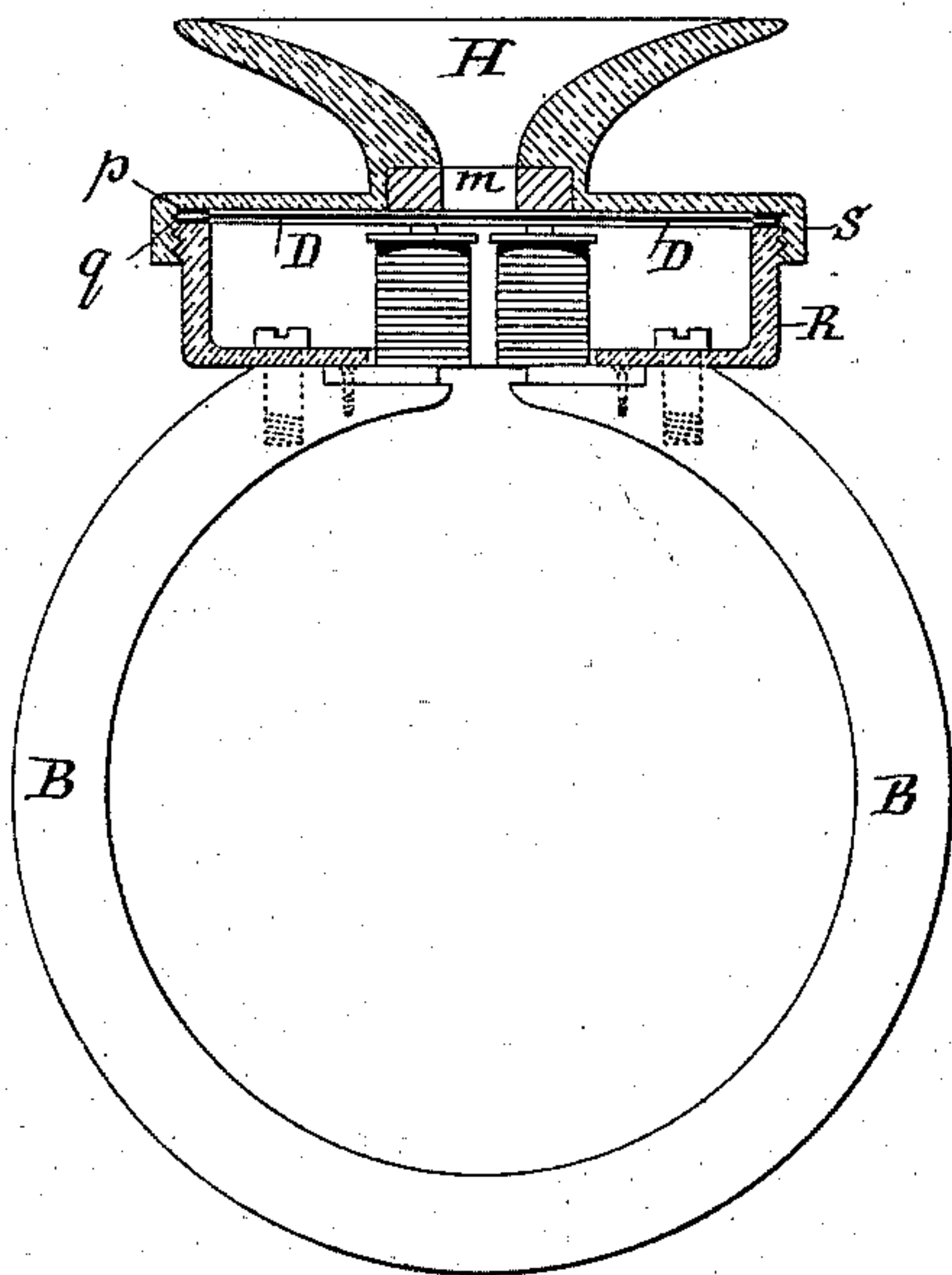


Fig. 4.

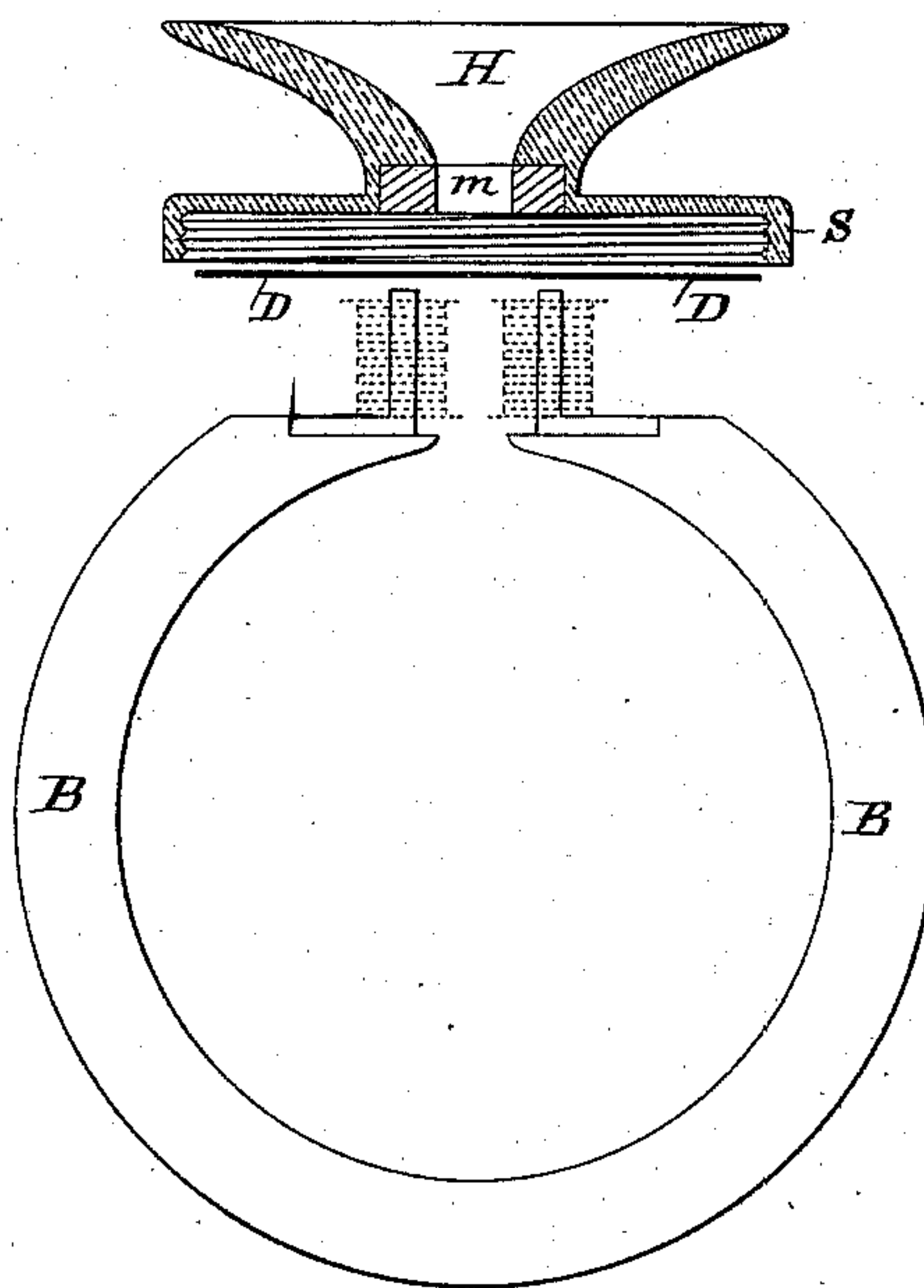


Fig. 5.

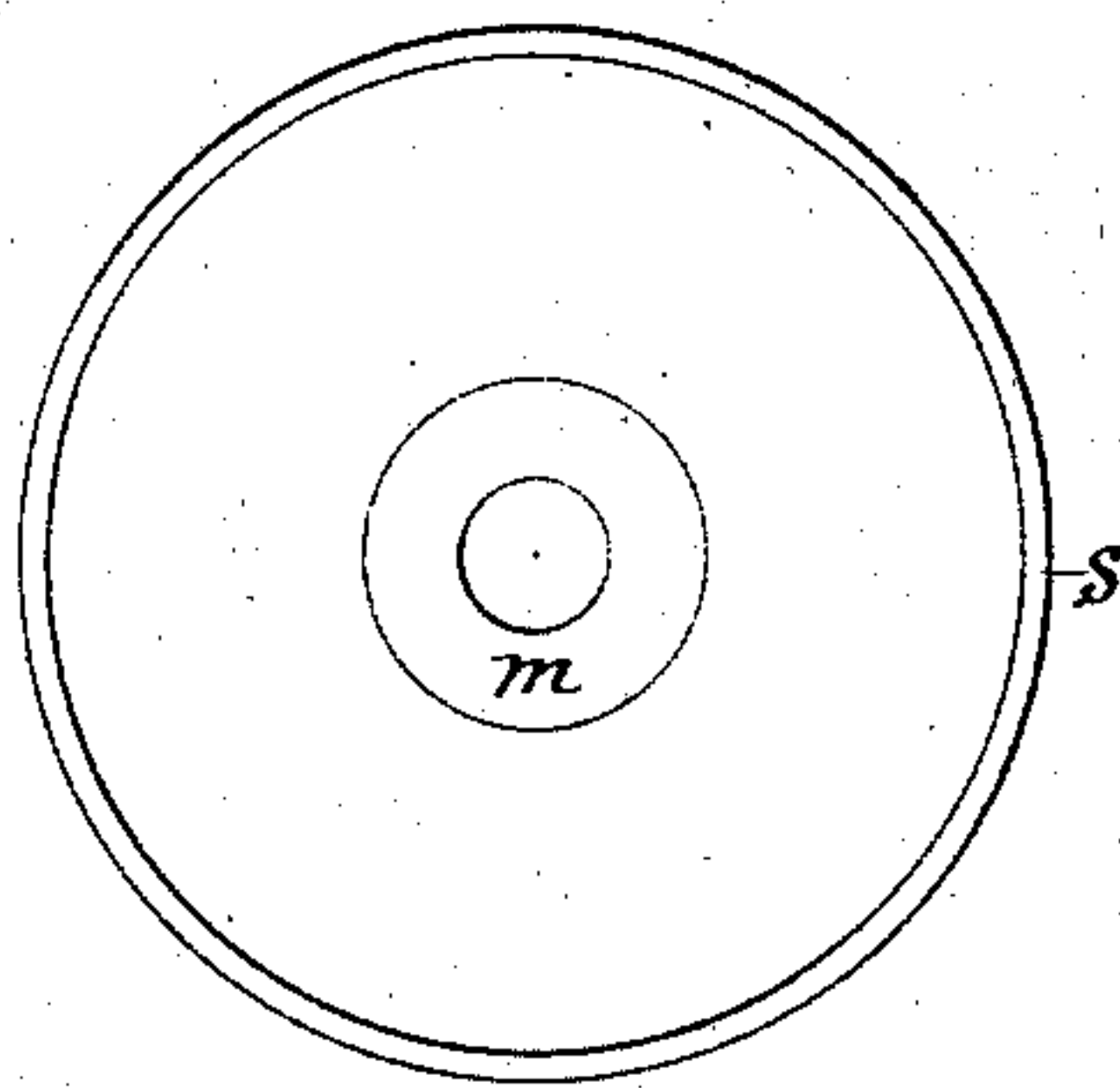


Fig. 6.

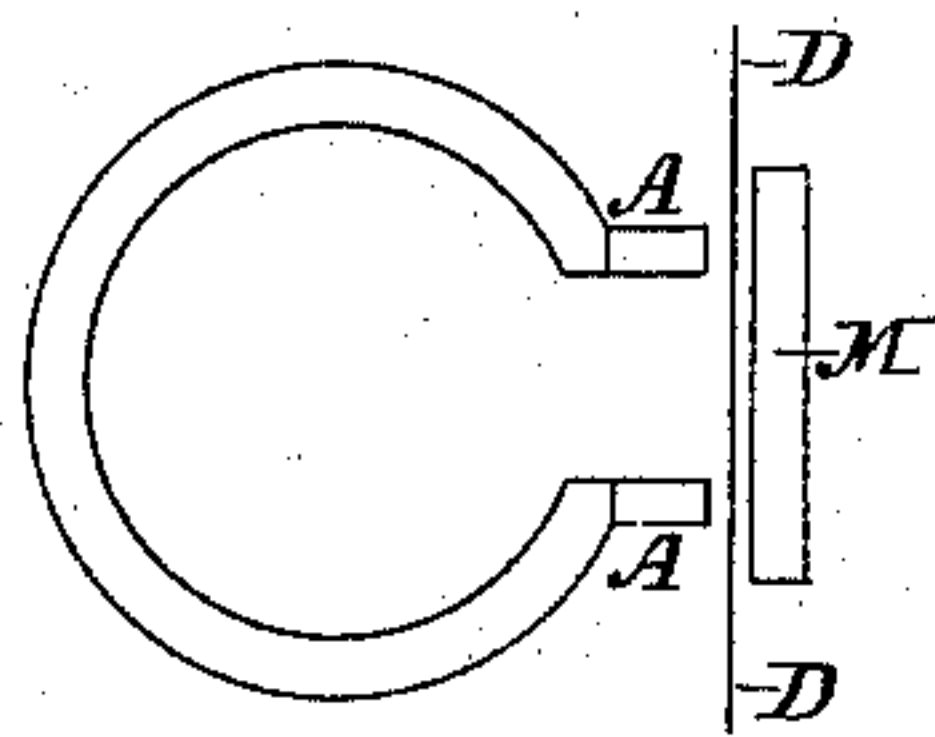


Fig. 7.

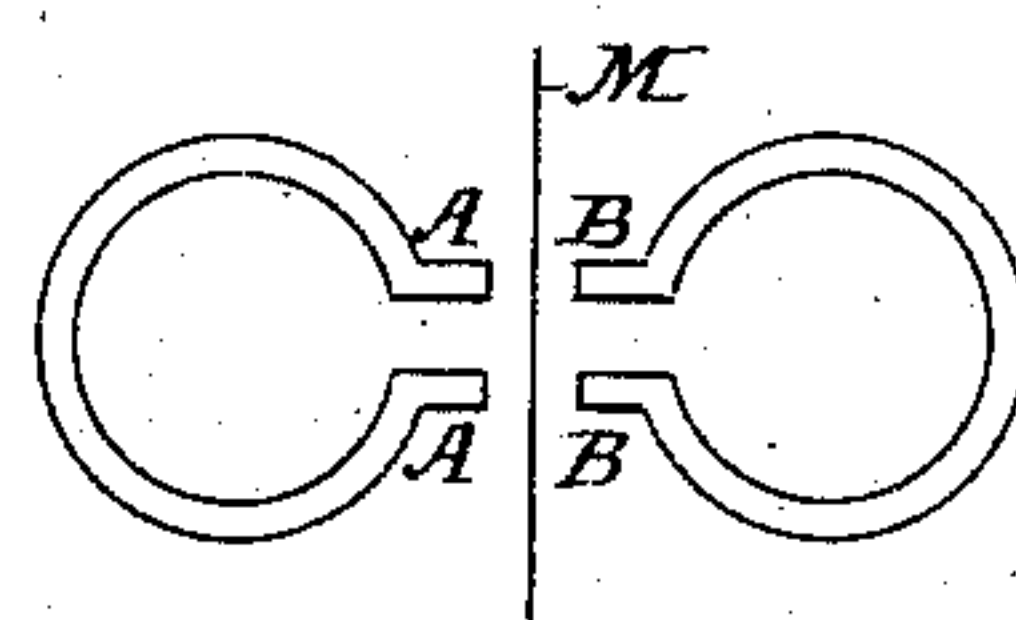


Fig. 2.

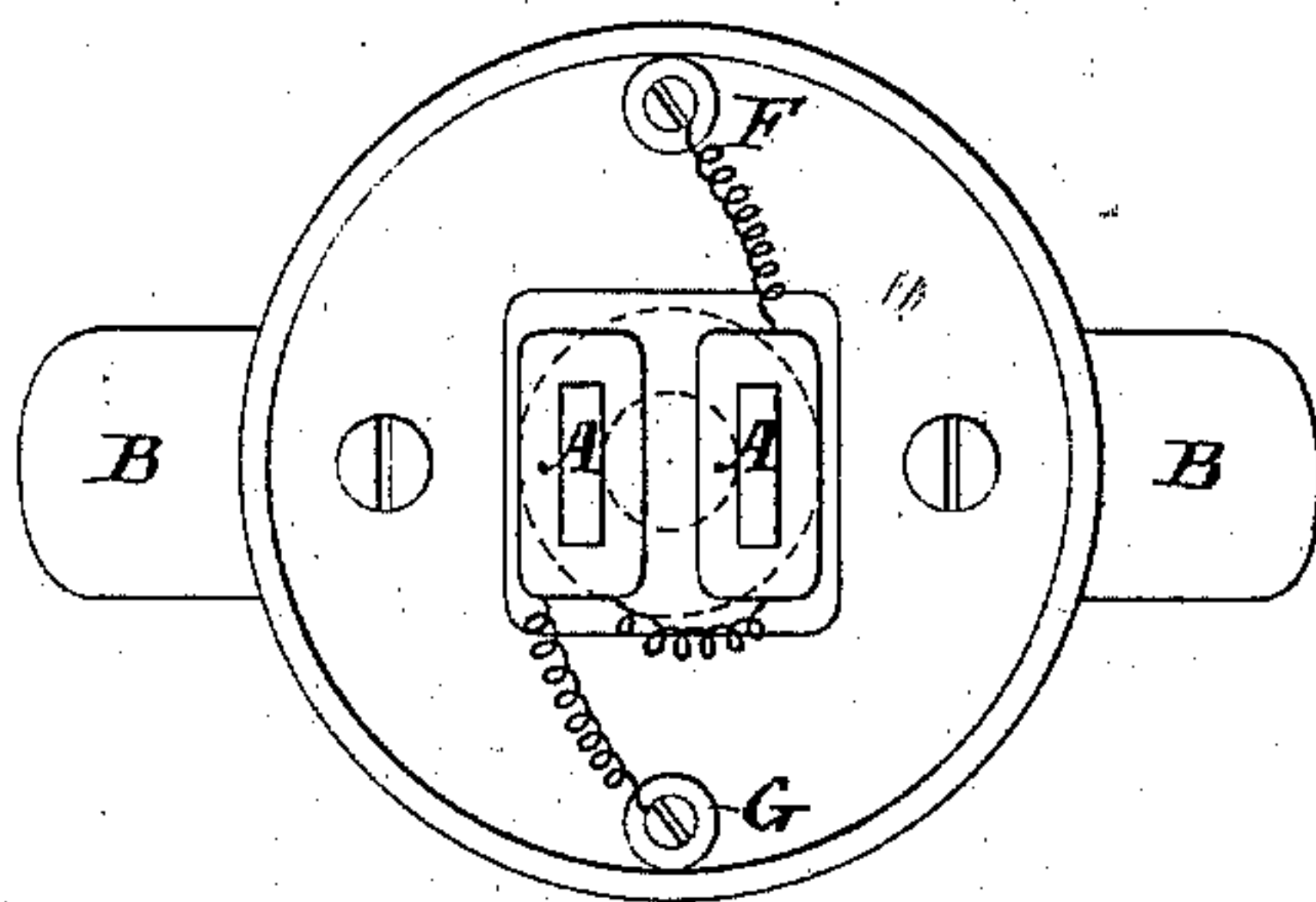
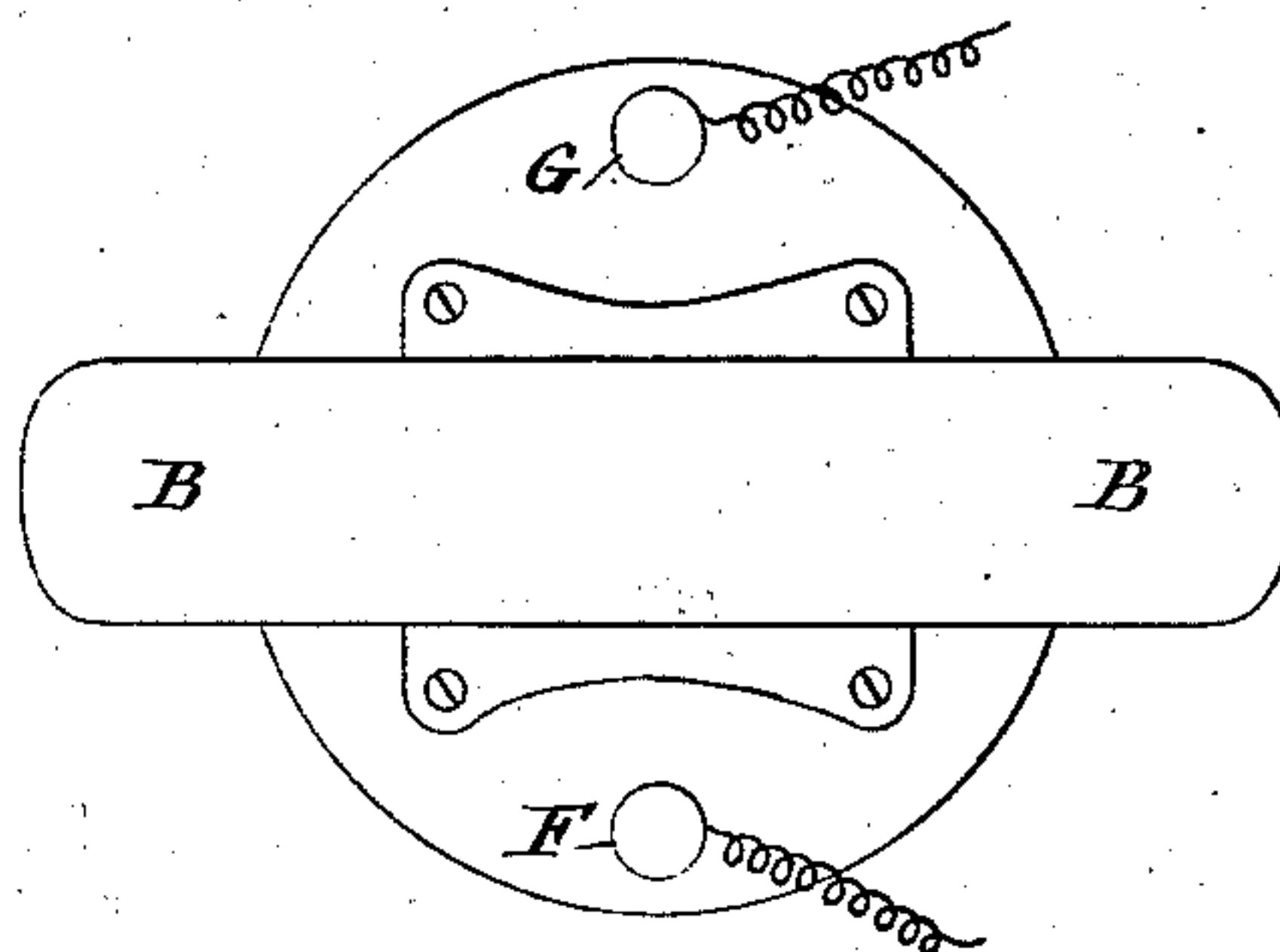


Fig. 3.



Witnesses

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CLEMENT ADER, OF PARIS, FRANCE.

MAGNETO-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 241,580, dated May 17, 1881.

Application filed March 15, 1881. (No model.) Patented in France October 24, 1879.

To all whom it may concern:

Be it known that I, CLEMENT ADER, of Paris, in the Republic of France, have invented certain new and useful Improvements in Magneto-Telephones, of which improvements the following specification is a full description.

The object of the invention is more particularly to increase the loudness and clearness of the sounds given out by telephonic receivers; and it consists in placing in such an instrument an exciting or re-enforcing plate of soft iron on the opposite side of the vibratory metallic diaphragm from the magnet, and at a short distance from it. The telephone may be otherwise of ordinary or suitable construction, as this improvement is applicable to magneto-telephones generally.

The invention is based upon a principle or discovery which is believed to be fundamentally new. This will first be indicated, referring to Figures 6 and 7 of the accompanying drawings, and afterward the application of the same to a receiving-telephone will be described, reference being had to Figs. 1, 2, 3, 4, and 5.

When a diaphragm, D, Fig. 6, is placed before the poles of a permanent magnet, A A', it is attracted with a force varying with the distance which separates it from said poles, and being, as well known, inversely as the square of the distance. If an armature, M, of soft iron is placed in front of the poles on the opposite side of the diaphragm the magnetic attraction is considerably greater. This undoubtedly arises from the excitation or re-enforcing action of the armature M, which tends to accumulate the magnetic fluid at the extremity of the poles. It is remarkable that the armature M has no action upon diaphragm D, and that all the effect of attraction is toward the magnet.

According to the recognized laws of magnetism the armature M, magnetized by induction, should attract the diaphragm D by bringing it sufficiently close; but no such action takes place, and the diaphragm, even when in contact with the armature, is attracted toward the magnet. To illustrate the effect produced, let the diaphragm be supposed to be ten millimeters from the magnet A and the armature one tenth of a millimeter from the diaphragm on

the opposite side. In these positions, according to the laws of magnetic attraction, by which the attraction varies inversely as the square of the distance, the attractions of the magnet and armature upon the diaphragm should be inversely to the square of their respective distances—or, in other words, that of the armature should be ten thousand times that of the magnet; but, in fact, it is the magnet which attracts. It may reasonably be objected that the magnetization of the armature by induction is not equal to that of the permanent magnet, but it cannot be contended that it is ten thousand times less. If the soft-iron armature M is replaced by a permanent magnet, B, similar to A, (see Fig. 7,) the diaphragm will be attracted by both magnets, and there will be a point between them where the diaphragm is in unstable equilibrium. It is where the distance is the same from both magnets, if they are equal, or at a point nearer the weaker magnet, if they are unequal.

It will be seen, therefore, that in the first experiment there is a phenomenon worthy of investigation; but it is not deemed necessary here to enter into the examination, or to attempt a theoretical explanation thereof. The scientific fact is pointed out, and the practical application of the same to the improvement of the telephone is shown.

Figs. 1 to 5 illustrate a telephone embodying the invention, Fig. 1 being a view in sectional elevation, Fig. 2 a plan with the diaphragm removed, Fig. 3 a bottom view, Fig. 4 a view of the principal parts with the accessory pieces removed, and Fig. 5 a bottom view of the cover pierced for the embouchure or mouth-piece and provided with the exciting or re-enforcing armature.

The magnet is made in the general form of a ring, B, and may be inclosed in a metallic sheath. It presents its two poles A within a short distance of the ordinary metallic or sheet-iron diaphragm D, the two poles being wound with insulated wire in the well-known manner, and the ends of the coils being connected with the binding-posts F and G. The opening for the passage of the sound-waves to or from the diaphragm communicates with the space on the opposite sides of the diaphragm, and is surrounded by the annular exciting or re-enforc-

ing armature *m* of soft iron. This armature is of sufficient diameter to extend beyond the magnetic poles on both sides.

In order to regulate the distance between the armature *m* and the metallic diaphragm *D*, one or more packing-rings, *p*, of metal or other suitable material, are interposed between the edge of the diaphragm and its support, and similar rings can be used to regulate the distance of the diaphragm from the magnet *A*.

The box *R*, which contains the poles of the magnet, is provided with a screw, which engages with the screw-threaded cover *S*, to which the mouth or ear piece *H* is fastened, or with which it is made in one piece. This cover supports the annular armature *m*.

This instrument can be used as a receiver, in connection with a magneto or battery transmitter of any ordinary description, and it gives out louder and clearer sounds than receiving-instruments of the construction heretofore employed. The instrument can be used as a transmitter, but is mainly intended for receiving purposes.

Modifications may be made in the details without departing from the spirit of the invention. An exciting or re-enforcing armature of other than annular shape can be employed. It is not necessary that it should surround the opening for the passage of the sound-waves, although the annular armature so placed is preferred.

The forms, dimensions, proportions, and materials of the accessory parts can be varied.

It is evident that the assemblage and construction of the parts should be modified if wood or rubber (vulcanite) be used in place of the metal of which the box and embrochure or mouth-piece are constructed.

The curved form of magnet enables it to be

easily held in the hand; but other forms can be employed.

Having now fully described the said invention and the manner of carrying the same into effect, what I claim is—

1. A magneto-telephone comprising, in combination with an electro-magnet and diaphragm, a piece or plate of soft iron in front of the poles of the magnet and on the opposite side of the diaphragm, substantially as described.

2. The combination of the electro-magnet, diaphragm, and exciting or re-enforcing armature of soft iron, and adjusting devices, substantially as described.

3. The combination, with the electro-magnet, diaphragm, box, and cover pierced with a hole for the passage of the sound-waves, of an annular soft-iron armature surrounding the said opening and arranged upon the opposite side of the diaphragm from said magnet, substantially as described.

4. A hand-telephone comprising, in combination with the permanent magnet, its coils and diaphragm, an exciting or re-enforcing plate or armature of soft iron, substantially as described.

5. The method of increasing the attraction of a diaphragm toward a magnet by redistributing and accumulating the magnetic fluid at the extremity of the poles by the aid of an exciting or re-enforcing piece or armature of soft iron, substantially in the manner described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

C. ADER.

Witnesses:

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AUG. VINCK.