

(No Model.)

2 Sheets—Sheet 1.

A. K. EATON.
Telephone.

No. 237,838.

Patented Feb. 15, 1881.

FIG. 3.

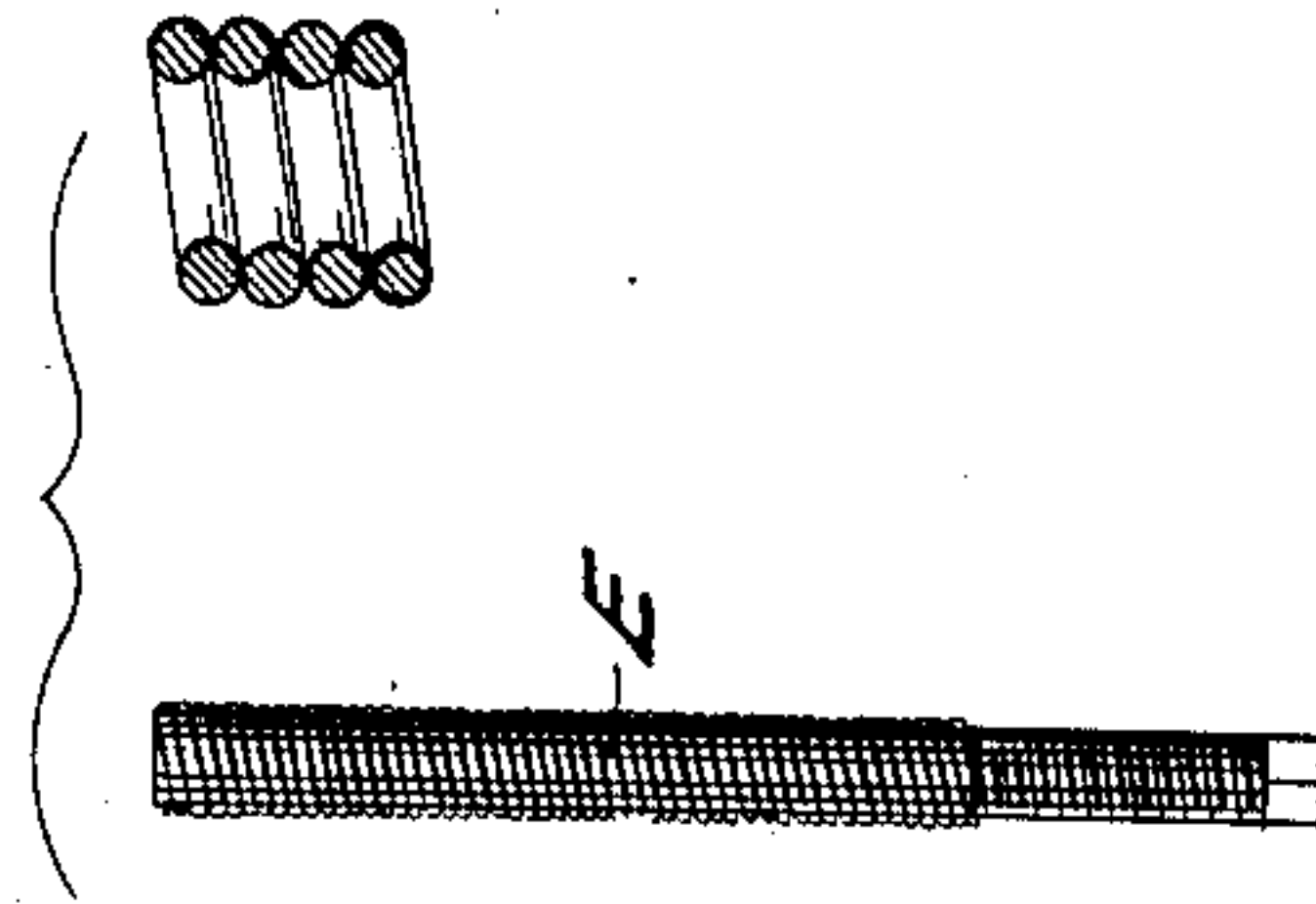
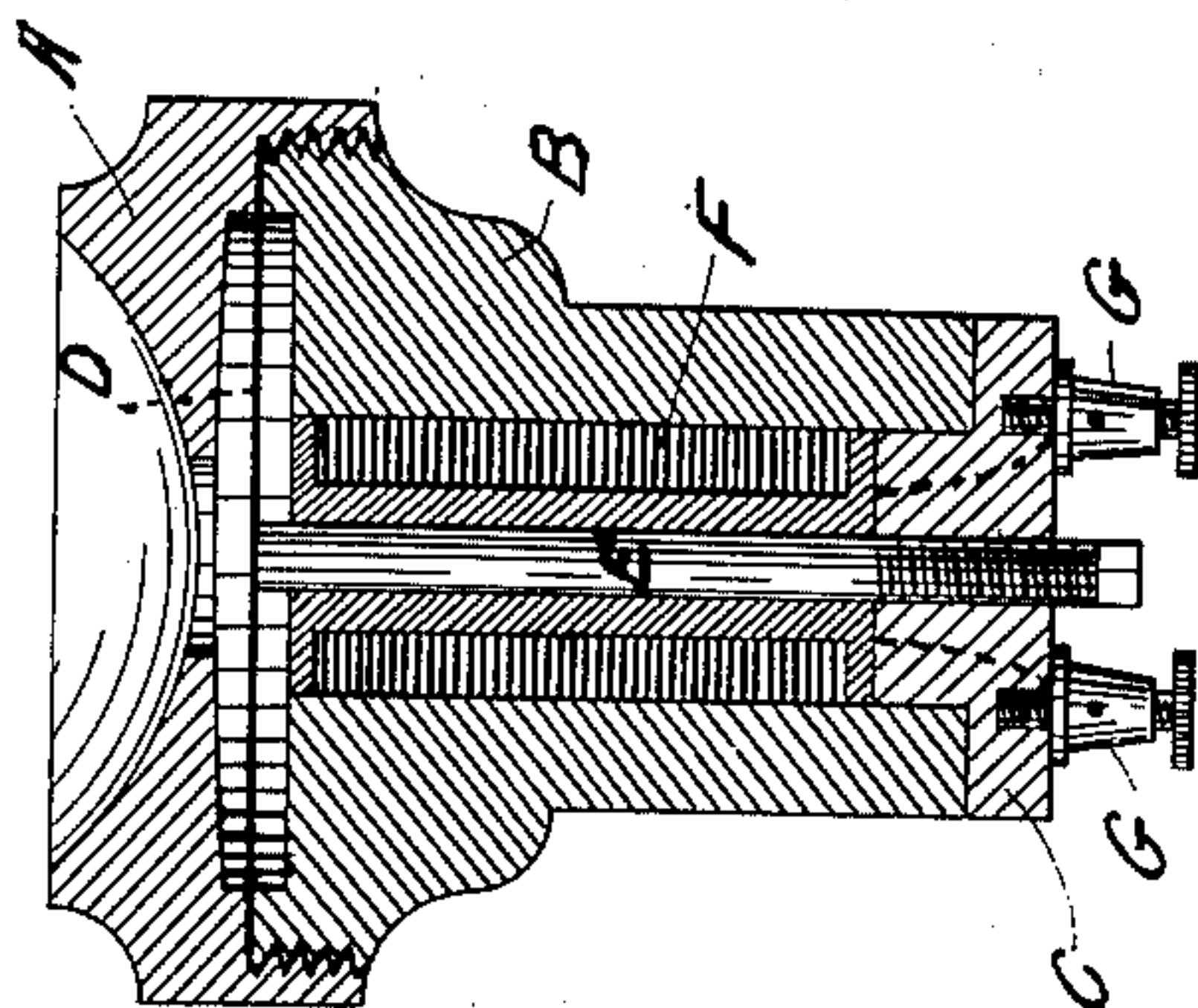


FIG. 2.



FIG. 1.



WITNESSES.

W. B. Townsend
John J. Diffley

INVENTOR.

A. K. Eaton

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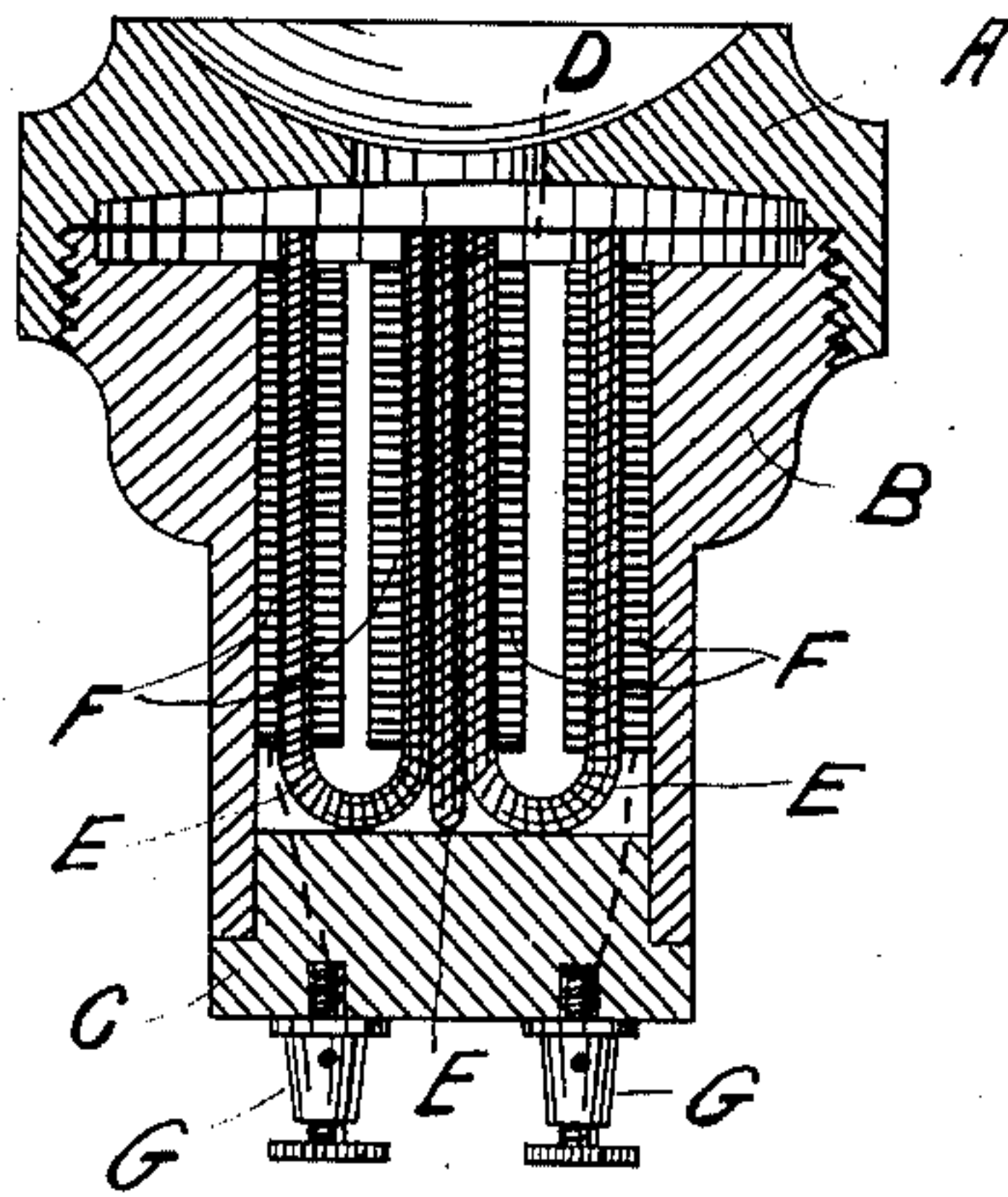


FIG. 4.

WITNESSES.

W. B. Townsend
Jos. J. Riffley

INVENTOR.

Asahel K. Eaton

UNITED STATES PATENT OFFICE.

ASAHEL K. EATON, OF BROOKLYN, NEW YORK, ASSIGNOR TO EATON
TELEPHONE COMPANY, OF NEW YORK.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 237,838, dated February 15, 1881.

Application filed November 20, 1880. (No model.)

To all whom it may concern:

Be it known that I, ASAHEL K. EATON, of Brooklyn, New York, have invented a new and useful Telephone, of which the following is a specification.

My invention relates to the construction of an electro-magnetic telephone in which is involved the principle of the expansion and contraction of an iron or steel rod, or its equivalent, or by the making or breaking by the increase or diminution of the electric current carried around the rod, as hereinafter described. I effect this by means of different forms of apparatus, illustrated in the accompanying drawings.

Figure 1 represents one of the simplest forms of this invention, and consists of a solid soft iron or steel bar, E, inclosed in a helix, F, of insulated wire. The plate D is of hard rubber, mica, wood, or any non-magnetic material.

A magnet-diaphragm, or one capable of inducing magnetism, is wholly unnecessary, but of course may be used, its action being strictly mechanical.

It will be seen that the central bar is in direct contact with the diaphragm.

The principle involved in this instrument is the one discovered by Professor Page—i. e., that when an electric current is allowed to flow through a coil which includes a soft iron or steel core the core expands and contracts in length as the current is made or broken, producing a distinct click.

I find that it is not essential that there should be an absolute make-and-break action of the current, but that any modification of the strength of the current will make itself heard in the central bar.

The diaphragm D is actuated directly by the pressure of the core upon its center, and repeats any sounds—such as vocal or instrumental music or articulate speech—transmitted to it through any of the different forms of transmitting apparatus in use. The Reiss transmitter operates the instrument quite satisfactorily. The form described, however, is the first and simplest produced, and has given place to others of a better character.

The bar E, Fig. 2, made up of fine iron wires, acts more effectually than the solid core;

but this falls far-short of the action of the spiral bar E, Fig. 3. This core I make of a spiral closely wound, so that its successive turns are in absolute contact. The material is preferably annealed piano-wire. By this last device I obtain results that are very clear and distinct, and louder than when I use the ordinary magneto-telephone as a receiver. I have found that this apparatus may be also used as a transmitter. Its action in this respect is explainable on the supposition that the vibrations of the plate D, which are produced by the impingement of the air-waves, are concentrated at the point where the plate is in contact with the core, and by setting up a molecular disturbance in the bar act to vary the current flowing through the coil F.

In Fig. 4 is shown a modification of my invention in which I use the form of a multipolar magnet for which I received Letters Patent dated May 28, 1878. In this case, also, the cores may be solid and in direct contact with the non-magnetic diaphragm, or, as here shown, they may consist of closely-wound spirals constructed as before described.

When desired, several spirals within the same coil may be used. In such a case they may be arranged in contact with the plate and in close contiguity, or they may be arranged one within the other, and their ends may abut separately against the diaphragm, or may be attached to a common block or piece, against which the diaphragm rests.

I do not claim, broadly, a wire spiral as the core of the telephone-coil when arranged to impart movement to a diaphragm; nor do I claim to be the first to communicate movement to a plate or diaphragm mechanically from the core of an electro-magnet, inasmuch as this has heretofore been done; but in all cases of which I am aware intermediate parts have been used between the core and the non-magnetic plate.

I am aware that the core of a magnet has been extended in the form of a recurved spring bent around over the solid core and a non-magnetic diaphragm attached to the flat side of said spring. I am also aware that the core has been provided with an enlargement made in the form of a flanged head or disk, the pro-

jecting flange or head resting in contact with a magnetic diaphragm or armature, so as to leave a space for the to-and-fro movement of the diaphragm at its center. I am aware, also, that an open spiral to which is attached a diaphragm has been used as the core of a magnet. In all these devices the construction is such that there is bodily movement to and fro of the parts in response to magnetic attraction, whereas in my device I depend simply upon the linear expansion and contraction of the core due to the molecular changes consequent upon magnetization and demagnetization, as before explained.

15 What I claim as my invention is—

1. The combination of a magnetizing coil or helix, a central rod or bar, and a plate of non-magnetic material transverse to said bar and in direct and solid contact with the end there-
20 of.

2. In a telephonic receiver, a magnetizing

coil or helix inclosing a closely-wound spiral of magnetizable material the successive turns of which are in contact, substantially as described.

3. The combination, in a telephonic receiver, of a magnetizing-coil, an inclosed spiral closely wound, so that its successive turns are in contact, and a sounding-plate, against which the end of said spiral impinges, substantially as described.

4. An electro-magnet whose coil or helix embraces a closely-wound spiral the successive turns of which are in contact, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ASAHEL K. EATON.

Witnesses:

H. C. TOWNSEND,
JOHN J. DIFFLEY.