(No Model.)

F. H. BROWN.

TELEPHONE.

No. 481,138. Patented Aug. 16, 1892.

Fig. 1.

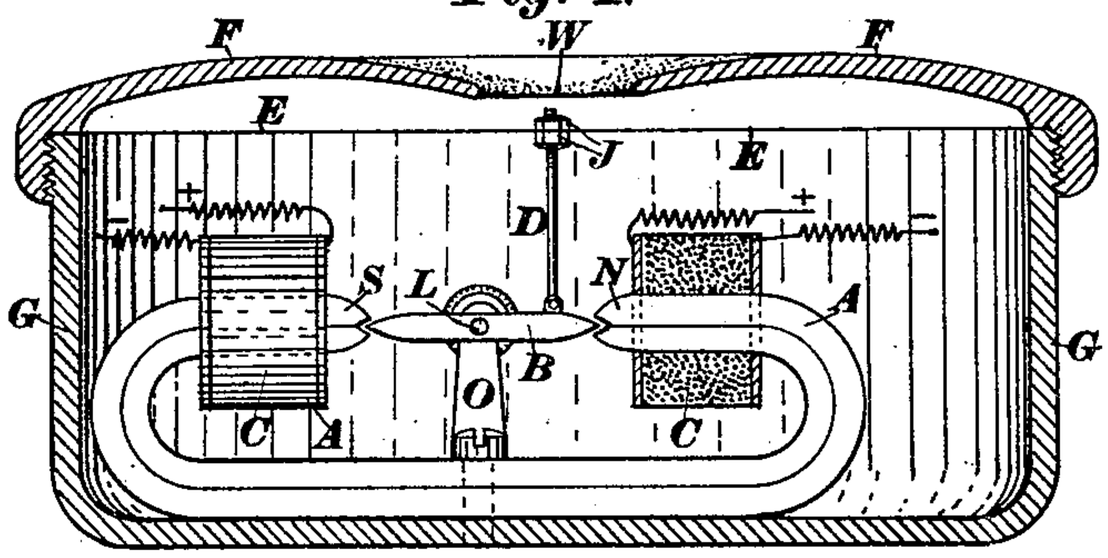


Fig. 2.

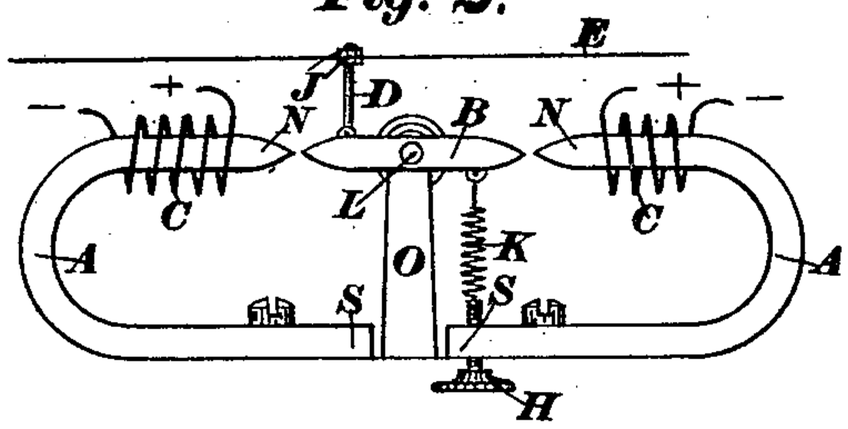


Fig. 3.

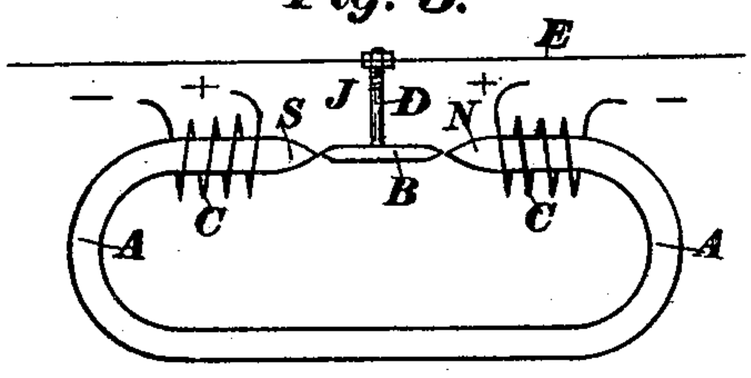
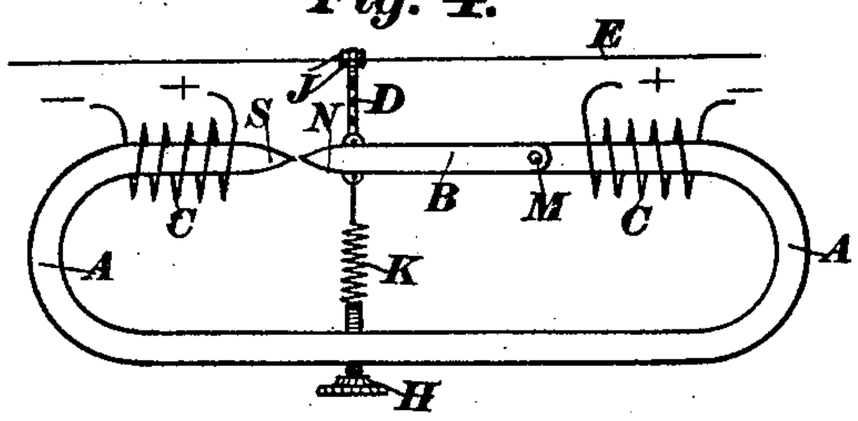


Fig. 4.



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TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 481,138, dated August 16, 1892.

Application filed March 23, 1891. Serial No. 386,094. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Magneto-Telephones, of which the following is a specification.

My invention consists of apparatus for transmitting articulate sounds telephonically and is an improvement on former devices, inasmuch as it admits of a greater quantity of wire being used on the induction-coils, thus allowing the magneto-electrical impulses to be transmitted over longer circuits than heretofore. In this art we are limited in the amplitude of the node of vibration of the inductive body on account of its close proximity to the magnet, as if the inductive body is removed far enough away from the magnet to permit of a large node of deflection and vibration without coming in contact with the magnet. It will also be so far removed from the intensified field as to induce only a feeble magneto-electric influence. If moved close within the intensified field, the inductive body will impinge against the magnet and thus stop all sounds. This being the difficulty in the state of the art, I have endeavored to overcome this hitherto-insurmountable obstacle to the efficiency of a magneto-electric telephone. To obviate this I use the following method and device:

Figure 3 represents a permanent magnet with its two poles in position to be acted upon by an inductive body. These poles may be of similar polarity, as in Fig. 2, or dissimilar, as in Fig. 3. The magnets A A are wound near their poles with helices of wire, which can be so coupled as to obtain either a quantity or an intensity current. By connecting the ends of each representing the outgoing currents a current of quantity will result—that is, each spool will contribute its quota simultaneously and the volume or quantity will be double. When coupled in reverse condition, a higher tension will result, the same law governing them as in coupling battery-cells. Fig. 3 shows the armature B placed between the two poles of a permanent magnet A A and connected by means of a wire or a small rod D to the vibrating body E. This diaphragm E is preferably made of white spruce or other suitable wood, as I find by experiment that this wood reproduces the tone qualities of the voice much more sensitively than metal, as is more commonly used in magneto-telephones. It is not necessary that the vibrating disk in my method should be made of magnetically-inductive material, as the pivoted armature connected with the vibrating disk is the inductive body that interrupts the magnetic lines emanating from the poles of the magnet or magnets. This armature is pivoted at its center at L and has a free motion across the poles of the magnets, and, being free to vibrate and firmly attached to the vibrating diaphragm, interrupts the magnetic lines in harmony with the sound-waves of the voice. One form of pivoted support for the armature is shown in Figs. 1 and 2, in which O indicates uprights, through which pass the thumb-screws, provided with pivotal points on which the armature is suspended. I find that when constructed as in Fig. 3, the magnetic tension on the armature offers considerable opposition to the free deflection of the armature, and it requires quite a loud tone of voice to obtain the requisite results. To obviate this, I construct my device as shown in Fig. 2 or Fig. 1.

In Fig. 2 a suitable torsional spring is attached to one end of the armature and the other end of spring to a suitable adjusting-screw. By turning this thumb-screw to the left or right the tension exerted by the magnetic lines is to a degree overcome and placed, as it were, on a balance and is more free to vibrate. I prefer, however, the method shown in Fig. 1. In this construction I place two magnets together, as shown at A A. The pointed poles of these magnets are slightly separated, as shown, and between these double poles the ends of the armature are placed an equal distance from each. In this manner each point or pole pulls on the armature with about equal force, and the result is that the magnetic force exerted on it is comparatively *nil*, and the armature is therefore free to vibrate and there is less resistance to the vibrating diaphragm resolving itself into its full amplitude of vibration, thus rupturing the lines to a greater extent, and the resultant electrical impulses are correspondingly greater. In Fig. 1 the magnets A

A are fitted with helices of wire C. The diaphragm and magnets can be placed in a suitable inclosing case or box, as shown at G in Fig. 1, with a suitable top, as at F, with an orifice or opening W. In this construction the magnets and diaphragm can be made of unusually large size without diminishing their efficiency. If made after this form of construction, after being once put together it will not be necessary to adjust the telephone, as in the state of the art, as the magnetic pull of the magnets on the armature will place it parallel and equidistant, and the diaphragm can then be adjusted to it by means of the two jam-nuts J J, as shown in Fig. 1.

I find that the form of construction as shown in Fig. 1, is the best for transmitting-telephone, and when desired to use it as a receiving-telephone it is best to have the spring K, Fig. 2, attached to one end of the armature and the thumb-screw turned a little, just so as to exert enough tension to draw it a little out of the condition of equal torsion from the magnets. In this condition I have obtained the best results as a receiver. I have also obtained good results to make the armature of steel and hinge it to one of the poles of the magnet, the armature then forming a part thereof, as shown in Fig. 4. I have also been able to talk with the parts described as steel magnets made of soft iron and the armature of steel magnetized. The diaphragm may be made of inductive or non-inductive metal or of wood. I have also obtained good results to construct as in Fig. 1, but to make the armature of steel polarized and to place it in reverse polarity to the field or large magnets.

Having thus described my invention, I claim—

1. In an apparatus for transmitting articulate sounds telephonically, the combination of a permanent magnet, one pole of which is movable in close proximity to the other pole, a diaphragm, and a connection between the diaphragm and the movable pole of the magnet, substantially as set forth.

2. In an apparatus for transmitting articulate sounds telephonically, the combination, with one or more permanent magnets with magnetic fields of dissimilar polarity, of an inductive body within the said field and movable transversely thereto, a diaphragm, and a connection between the diaphragm and the inductive body, substantially as set forth.

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