

J. H. IRWIN.
Telephone-Transmitter.

No. 225,388.

Patented Mar. 9, 1880.

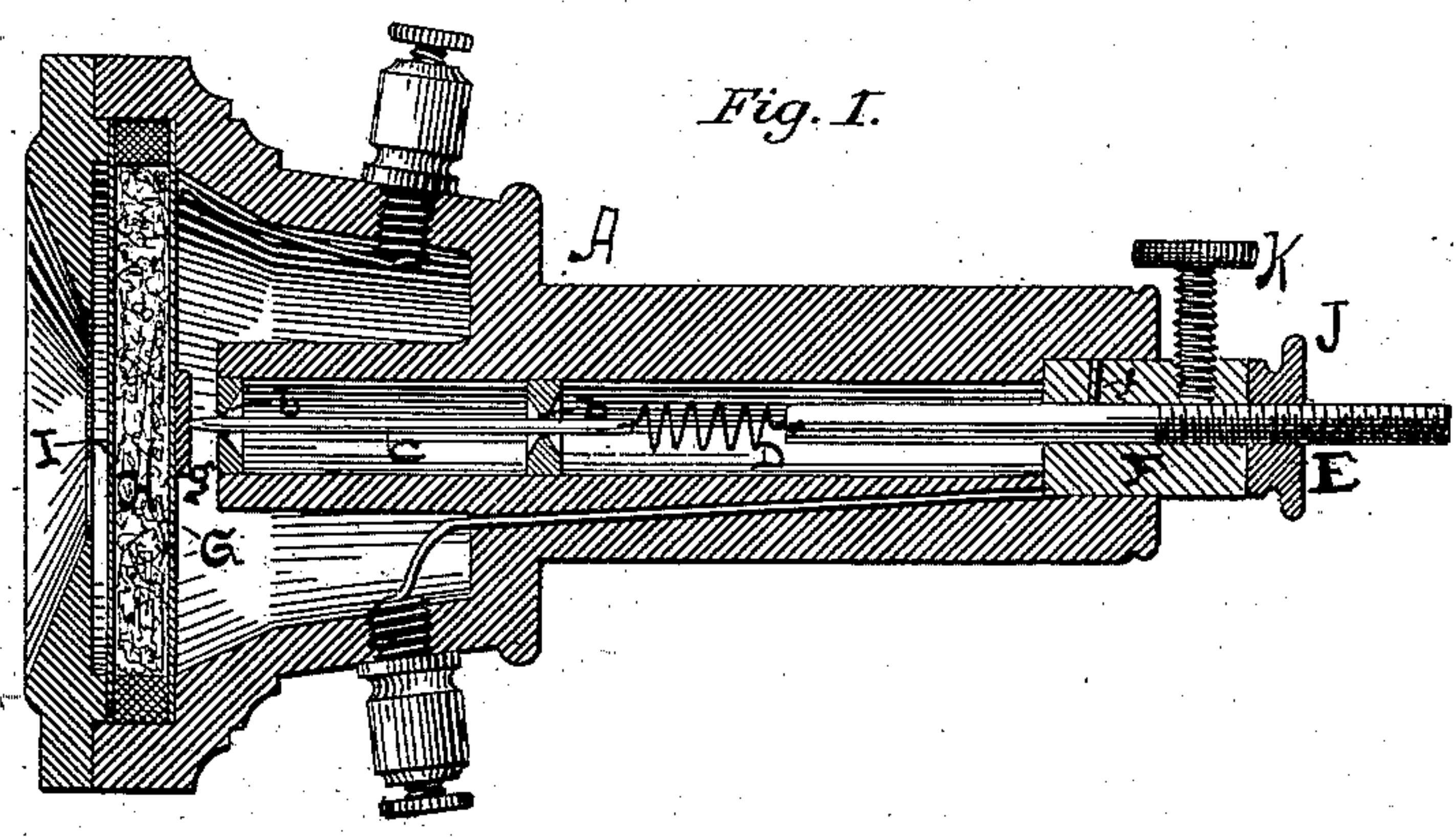


Fig. 1.

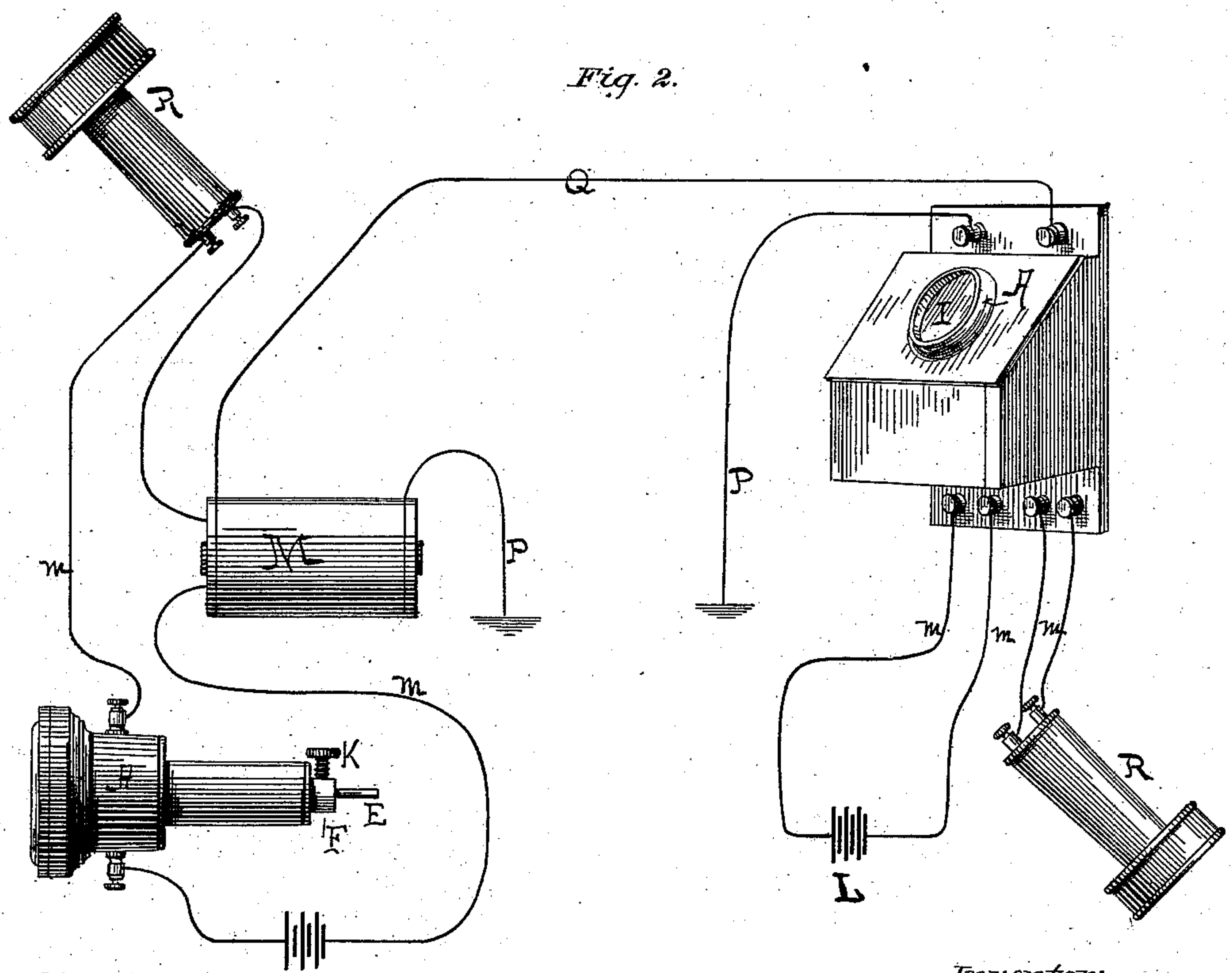


Fig. 2.

Attest:
Clarence Poole
L. Hammond Marshall.

Inventor:
John H. Irwin
By his atty R. D. Smith

J. H. IRWIN.
Telephone-Transmitter.

No. 225,388.

Patented Mar. 9, 1880.

Fig. 3.

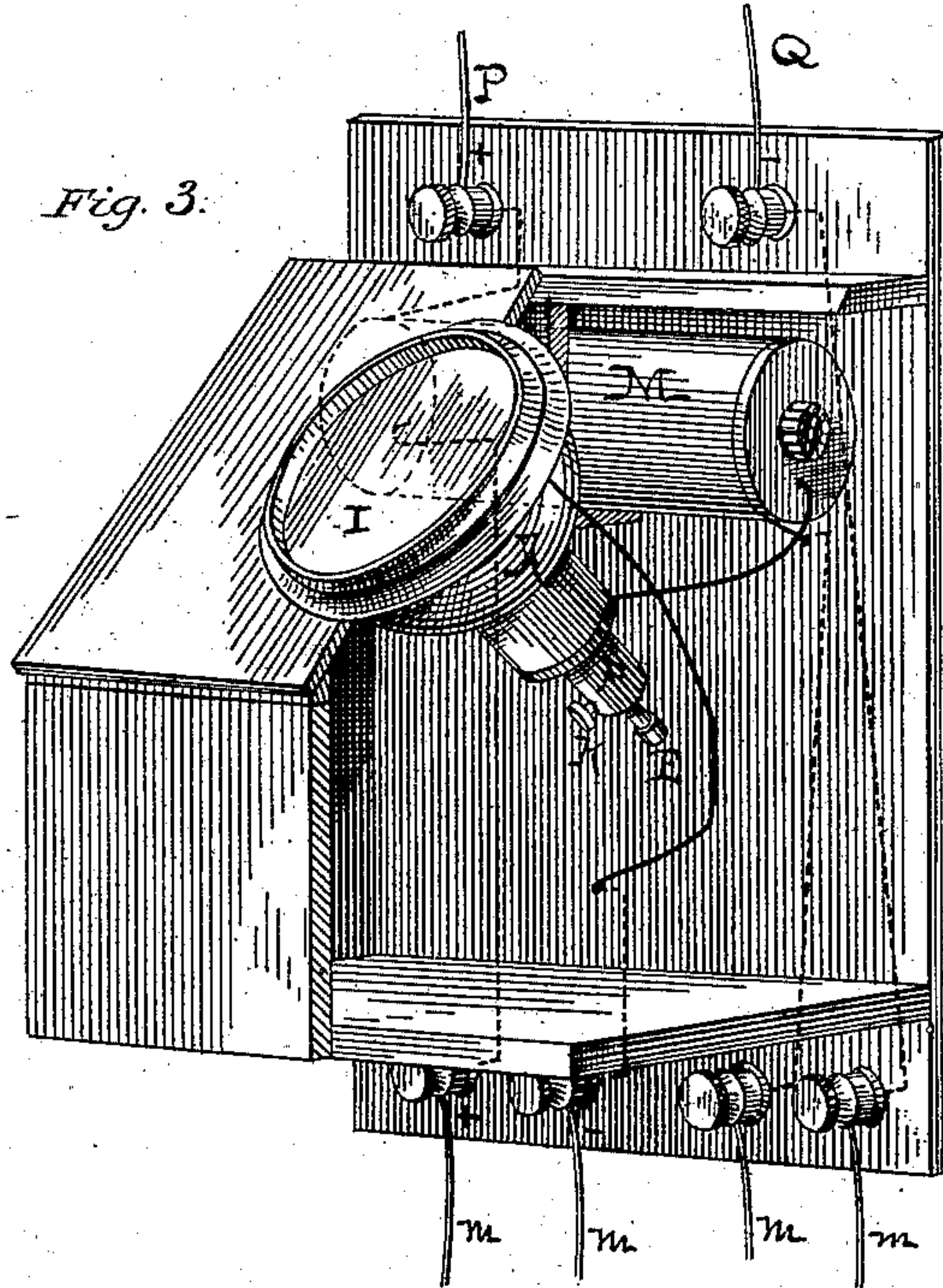


Fig. 5.

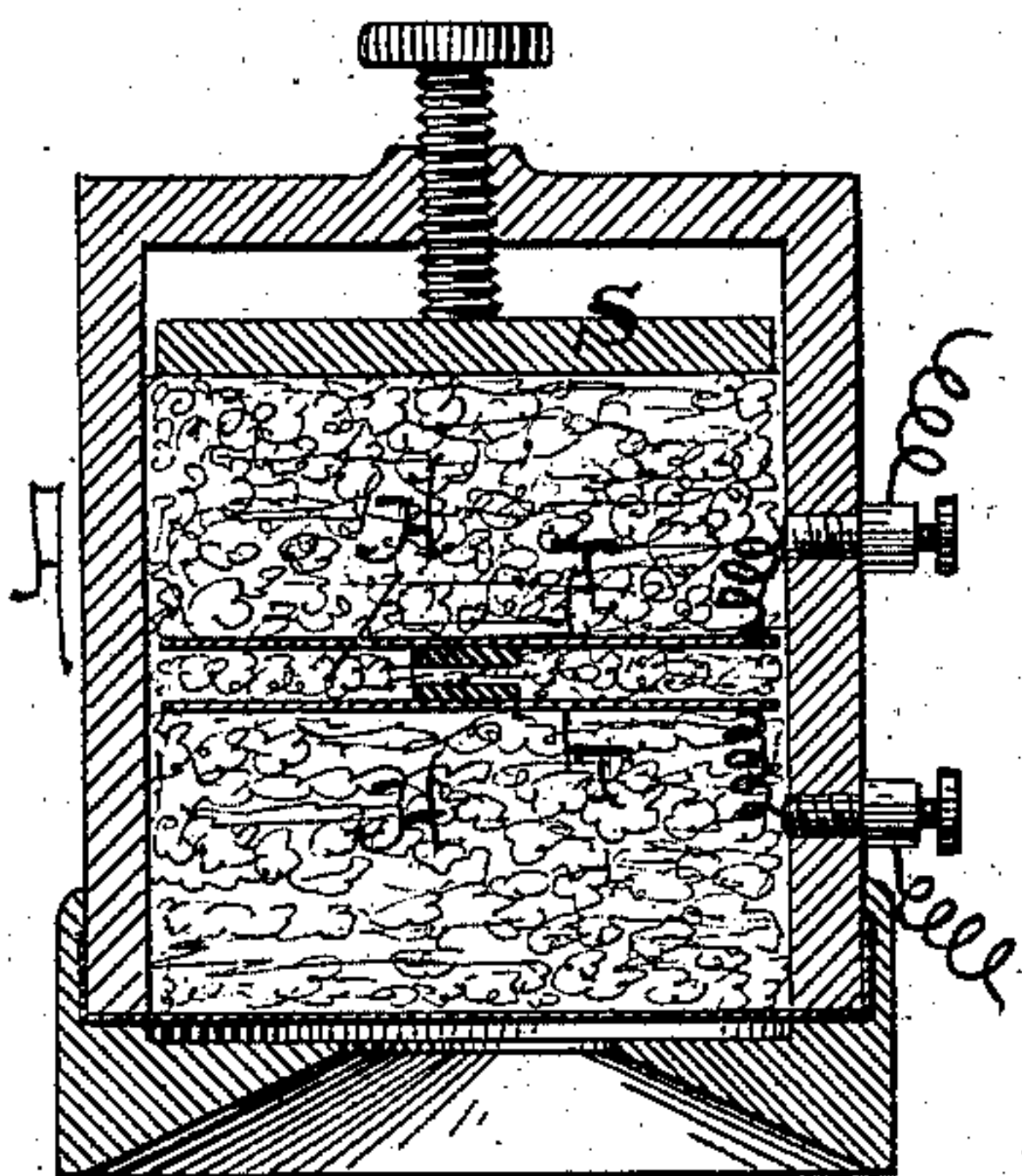
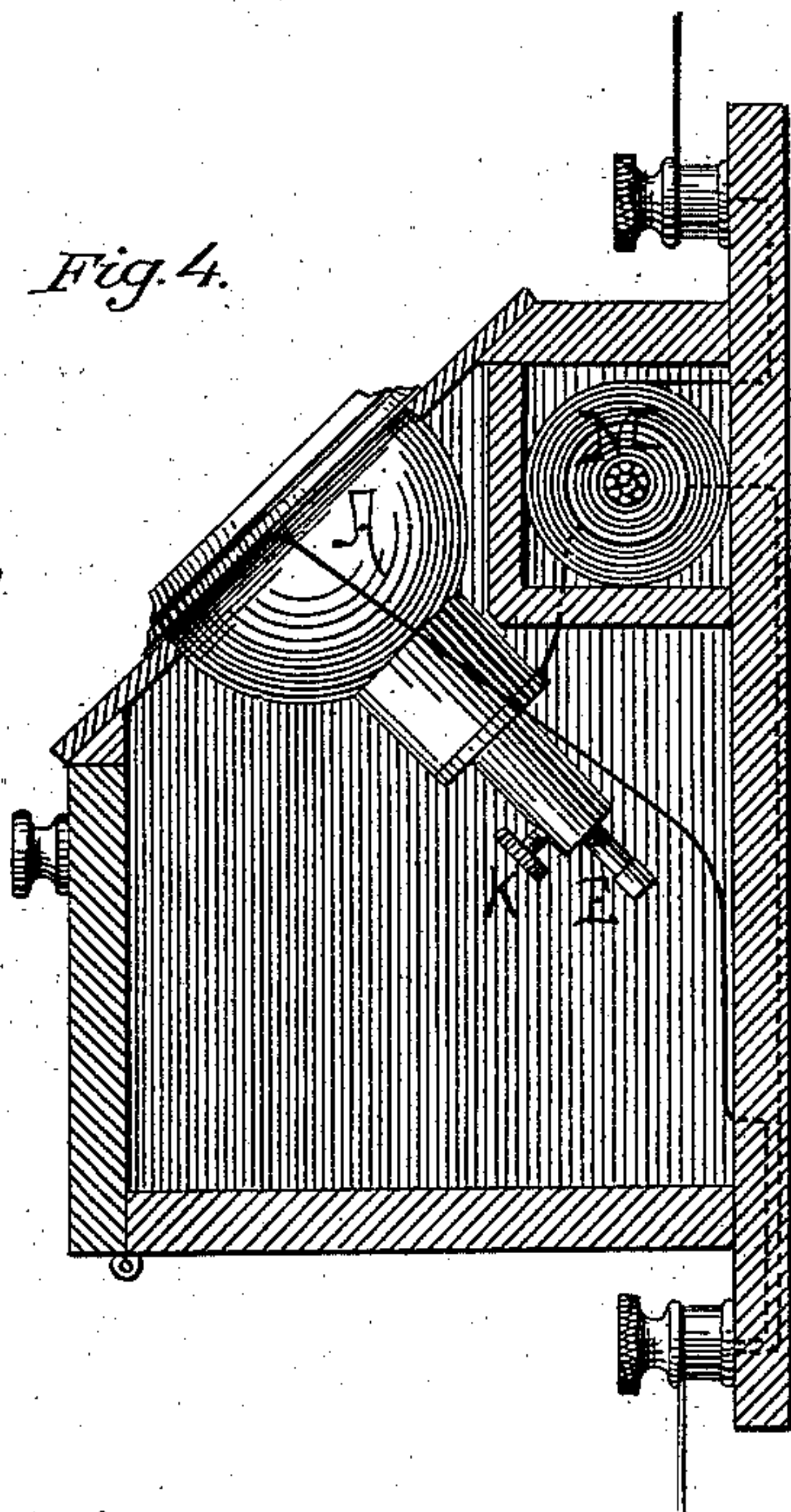


Fig. 4.



Attest:

Clarence Poole
L. Hammond Marshall.

Inventor:

John H. Irwin
By his Atty R. D. Smith

UNITED STATES PATENT OFFICE.

JOHN H. IRWIN, OF MORTON, PENNSYLVANIA.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 225,388, dated March 9, 1880.

Application filed December 19, 1879.

To all whom it may concern:

Be it known that I, JOHN H. IRWIN, of Morton, in the county of Delaware, in the State of Pennsylvania, have invented new and useful Improvements in Acoustic Telegraphs; and I do hereby declare that the following is a full and exact description of the same.

In all telephones the medium of transmission is necessarily one capable of responding to the vibrations of sound-waves, and in all electric telephones the responsive vibration of such medium is transformed into undulations of the electrical current by means of a plane of variable resistance in the line wherein the resistance is made variable by the vibrations referred to. The sensitive medium referred to has generally been in the form of a disk of some elastic material.

The adjustments of the points of contact and resistance to produce the desired effect are exceedingly delicate; and it is a desideratum to obtain such an adjustment and such qualities of vibration as will enable the instrument to respond to vocal articulations uttered in a low tone close to the sensitive medium without being capable of responding to all of those sounds which are ordinarily so delicate as to be inaudible to the unaided ear. The reason for this is manifest, because an instrument may be capable of transmitting all of the articulate sounds of words spoken in its vicinity, and also capable of transmitting a great multitude of sounds which are practically inaudible in themselves, but are made audible to the listener at the receiving-instrument, and with the effect there of confusing the words spoken at the transmitting-instrument, so that it is difficult for the listener to separate the articulate sounds from the inarticulate ones.

I have secured the desired result in a very satisfactory manner by dampering the sensitive medium of the transmitting-instrument with some suitable elastic fibrous material distributed over the surface of the diaphragm. I will herein describe such an arrangement and such material as I have found to be satisfactory.

In my patent dated October 22, 1878, No. 209,266, I have described a needle, preferably pointed with platinum, in contact with another needle or pencil, preferably of carbon, supported by means of a spring, and specified in said patent that said elastic support might be either above or below said needle, the essential matter being the maintenance of said contact with a pressure of the requisite delicacy and as nearly uniform as possible.

In the instrument shown and described in said patent the sensitive medium above mentioned was the base of the instrument itself. In this patent the sensitive medium described is a thin disk of metal, mica, or other suitable material secured to the base of the instrument, and a needle, preferably of platinum, with its end resting upon the center of said disk. I prefer to interpose between said disk and the end of said needle a body of carbon, which, for this purpose, may be a thin slice of small diameter, which it is convenient to secure to the disk by means of solder, the under surface of the carbon having been previously electroplated with copper for the purpose of enabling the solder to adhere; and my present improvement relates to the dampering of said disk to reduce its power of response to sounds more delicate than the low tones of the voice, so that said vocal tone or tones of similar volume alone shall be transmitted.

That others may fully understand my invention, I will more particularly describe the method of carrying it into effect which I prefer, without, however, limiting myself exactly to the details of structure or to the materials described, and having reference to the accompanying drawings, wherein—

Figure 1 is a vertical section of the instrument in the form which I prefer to give it. Fig. 2 is a diagram exhibiting the method of use which I have preferred. Fig. 3 represents, in sectional perspective, my instrument arranged as a stationary transmitter. Fig. 4 is a longitudinal vertical section of the same. Fig. 5 represents a modification in structure.

A is the supporting frame-work of the instrument. It may be of any form desired or suitable. In said frame-work there are prop-

erly arranged anti-friction guides *b b* for the needle C, as heretofore described and patented by me. One end of said needle is mounted upon a spring, D, which I prefer to make of fine coiled wire. Said spring is attached at one end to said needle and at the other end to an adjusting-rod, E, which is capable of longitudinal motion in a bearing, F, for the purpose of adjusting the pressure of the spring D. The spring D may be made of a flat elastic strip, or in other forms, if desired; but I prefer a spring of coiled wire, as shown.

The free end of the needle C rests upon the center of the elastic disk G, the edges of which are supported by the frame A. The disk G is a sensitive medium, which is caused to vibrate by the impact of sound-waves. The point of contact between said disk and the needle constitutes the point of varying resistance in the electric line, wherein the resistance is varied by the vibrations of the disk G in response to the impact of sound-waves. I prefer to interpose between said disk and the end of the needle C a thin slice of carbon, G, which may be electroplated and soldered to said disk, as hereinbefore set forth.

The instrument constructed as described is capable of transmitting sounds so delicate that they are inaudible to the unaided ear, and the purpose of my invention is to modify this capacity so that said disk will be less sensitive, and only transmit the articulate tones of the voice; and for this purpose I place in contact with said disk a quantity of elastic fibrous material, H, and I have found loose wool, silk, or cotton to be highly satisfactory. To confine this elastic material in contact with said disk, I place a second disk, I, in the framework A, parallel with the disk G, and place said elastic material between said disks, and submit said elastic material to such a degree of compression as may be found most advantageous by pressing the disk I toward the disk G. This degree of compression, however, is very slight.

Disks G and I are not rigidly confined at their edges, and are therefore capable of motion bodily to or from each other, so that under the impact of sound-waves the said disk may move without buckling at some point between the center and edge, and therefore short nodal points are designated in the vibration of these disks, and disks of larger size than usual may, for that reason, be employed.

The force imparted to the spring D is such that the needle C will be maintained in contact with the disk G with that certain force whereby the best results are maintained. That certain force must be experimentally determined by each instrument, and the pressure of the spring D is so adjusted that the needle is maintained with an approximate uniform force in contact with said disk, in whatever po-

sition the instrument may at the moment be. In this way the instrument becomes entirely portable, and may be handled in a manner similar to any other portable telephone.

The adjusting-rod E is made with a longitudinal groove, into which the small pin *f* projects from the bearing F, and said rod is thereby prevented from turning on its axis. The upper end of said rod may be provided with an external screw-thread, and the screw-nut J may be fitted thereon to move said rod longitudinally when desired. A set-screw, K, fixes the rod E at any point of adjustment desired.

Fig. 3 represents a modified form of damped instrument, which, for some purpose or some situations, may be preferred to the needle-instrument above described. In this modified instrument the inclosing-case is a cylinder having a mouth-piece at one end and an adjusting-screw and piston at the opposite end. Near about the center there are two transverse disks or diaphragms, unattached to the cylinder, and each provided at its center and opposite to each other with two small disks of carbon. The electric line-wires enter said cylinder through properly insulated orifices, and are connected severally with said disks. Now, the space within said cylinder and between said disks is occupied by some elastic fibrous substance, preferably wool, silk, or cotton, as hereinbefore set forth, and the same is put under the requisite compression by means of the adjusting-screw first mentioned.

In diagram 2 I have represented the manner of mounting and connecting the electric circuit with these instruments which I have found to be satisfactory and advantageous.

L L are the batteries, one at each station. M M are induction-coils, the primary wires of which are connected at one side with the battery L, and at the other side with the instrument A by the wires *m n*, so as to constitute a closed circuit with the battery.

The secondary or induction coil is connected at one end with the earth by the wire P, and at the other end constitutes a line-wire, Q, which extends to the next and succeeding station, which is similarly provided with battery, transmitter, and induction-coil. Ordinarily, with each transmitting-instrument A there is also a receiving-instrument, R, which may be of any improved style, and said instrument is placed in the line Q. If, however, for any reason said receiving-instrument is absent, the transmitting-instrument A may be used as a receiver. The line Q will then extend from one induction-coil M to the similar induction-coil at the next station.

Having described my invention, what I claim as new is—

1. In a telephone, a sensitive freely-vibrating medium which is not under tension, com-

bined with a damper composed of a suitably-elastic fibrous material, substantially as set forth.

5 2. In a telephone having a sensitive or vibrating disk, G, a damper, H, composed of some suitably-elastic material, and a second disk, I, whereby said damper material is compressed and held in contact with the disk G.

3. In a telephone, a sensitive vibrating disk, G, having free edges and capable of vibrating bodily, combined with electrodes maintained in contact.

J. H. IRWIN.

Witnesses:

R. D. O. SMITH,
N. B. SMITH.