

(Model.)

2 Sheets—Sheet 1.

J. H. IRWIN.
ACOUSTIC TELEGRAPH.

No. 367,042.

Patented July 26, 1887.

Fig. 1.

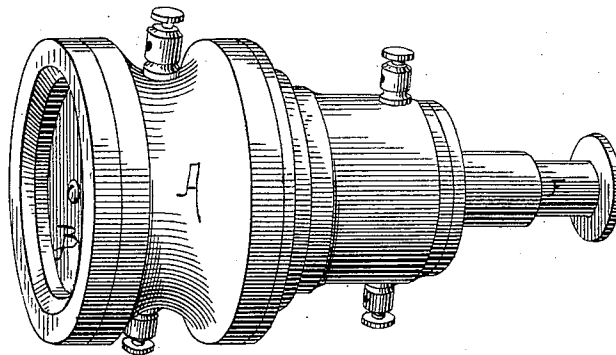
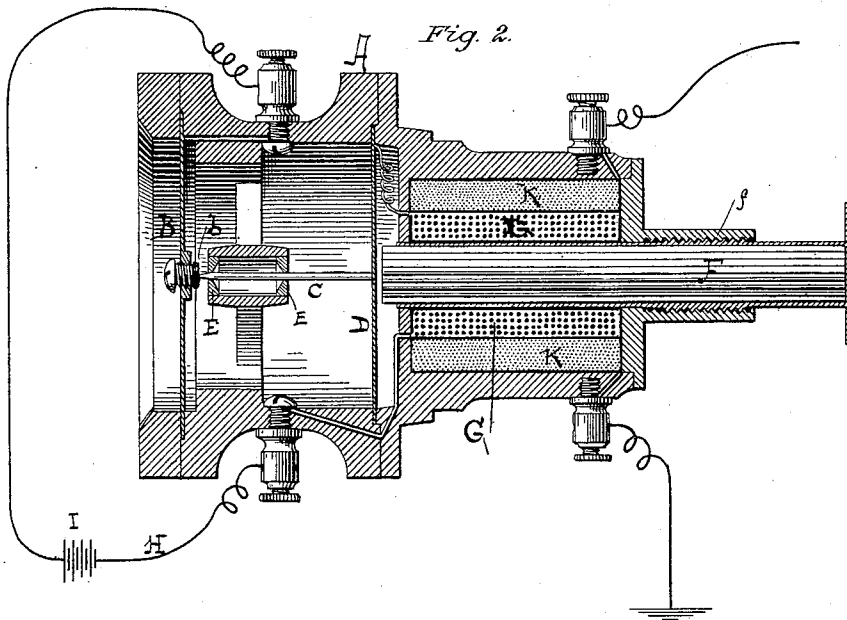


Fig. 2.



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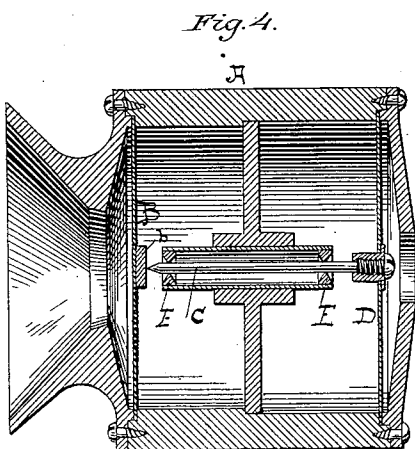
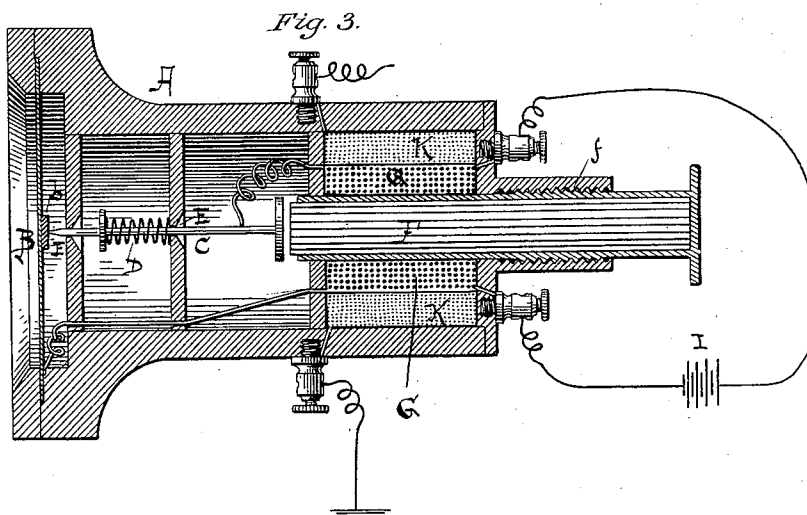
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UNITED STATES PATENT OFFICE.

JOHN H. IRWIN, OF PHILADELPHIA, PENNSYLVANIA.

ACOUSTIC TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 367,042, dated July 26, 1887.

Application filed June 4, 1879.

To all whom it may concern:

Be it known that I, JOHN H. IRWIN, of Philadelphia, in the county of Philadelphia and 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.

Heretofore a principal obstacle to the satisfactory working of acoustic telegraphs arose from the inconstant action of the battery.

When the resistance of the instrument has been adjusted to a certain battery-tension, any variation in said tension will correspondingly impair the action of the instrument.

The object of the first part of my invention, therefore, is to make the instrument self-regulating with reference to fluctuations in the battery-tension by means of an electro-magnetic regulator in a short or local battery-circuit, in contradistinction to the method shown in my patent of June 24, 1879, wherein the electro-magnetic regulator is in the longer line-circuit.

The instrument to which I prefer to apply my present improvement is of the form heretofore patented by me, consisting of a pointed needle provided with an elastic support and in pointed contact with a plane sensitive to the impact of sound-waves, whereby the resistance at an attenuated place in the circuit is varied by and in accordance with the variations imparted by the impact of sound-waves, though I do not propose to limit my improvement to instruments of this description further than may be necessary in view of my patent of June 24, 1879.

The second part of my invention relates to improvements in magneto-electric telephones; and it consists in a disk-armature sensitive to sound-waves placed in front of and within the magnetic field of an electro-magnet, consisting of a soft-iron core with a primary coil in a short battery-circuit and a secondary coil wound over said primary and in connection with the line-wire, whereby the induction-coil is inclosed within the dimensions of a hand or portable instrument.

That others may fully understand my invention, I will particularly describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a perspective view of one form

of my instrument. Fig. 2 is a longitudinal section of my instrument. Fig. 3 is a longitudinal section of a modified form of my instrument.

A is the frame or casing of the instrument.

B is the plane, sensitive to the impact of sound-waves; and C is the needle or conductor, provided with an electric support, D, which presses the needle against the sensitive plane with a certain pressure, which may be regulated by adjustment of the parts. The needle C is mounted in guides E E, whereby its motions are entirely longitudinal, and all lateral vibrations are restrained.

At the center of the sensitive plane or disk B, I prefer to mount a piece of carbon, *b*, against which the point of the needle or conductor C rests. The carbon *b* may be made adjustable as to the disk B to secure the desired contact with the point of the needle or conductor C; or the adjustment for said contact may be secured by adjustment of the parts B, C, and D, as before stated. The contact at *b* having been adjusted for a certain battery-tension, it is apparent that fluctuations of said tension will cause the resistance at *b* to be too great or too little, as the case may be. To obviate this undesirable effect I propose herein to employ a counterbalancing electro-magnet which shall be excited by the same battery and circuit, and therefore subject to fluctuations in power corresponding to the fluctuations in battery-tension. F is the soft-iron core of said magnet, and G is the helix surrounding the same and forming a part of the short battery-circuit H. I is the battery.

The direction of the current may be from the battery to the helix G, thence through the armature and needle or conductor C to the disk B and return to the battery. If the battery-current weakens, the excitement of the magnet F decreases and its attraction for the armature D correspondingly decreases and the contact at *b* increases, permitting an increased passage of electricity, thus maintaining an equilibrium of acoustic effect.

An increase in battery-tension produces an opposite effect, increasing the attraction for the armature D and correspondingly increasing resistance at *b*. The core F may be adjusted longitudinally in some convenient manner, one good way being by means of a screw

like that shown at *f*. With instruments of this class it is common to employ an induced line-current, and I place the induction-coil *K* over the primary coil or helix *G*; or, instead of placing the induction-coil around the helix, the primary wire may be extended to an induction-coil located elsewhere.

The conductor *C* may be pressed upon the disk by a spring independent of the armature, as shown in Fig. 3.

Fig. 4 represents a modification of structure, wherein the needle-electrode is made movable and adjustable by means of a screw-connection instead of the screw-adjustment of the carbon electrode shown in Fig. 2.

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

1. The sensitive disk *B* and conductor *C*, held against said disk with an adjustable and elastic pressure, combined with a counterbalancing electro-magnet the helix whereof is in the short battery-circuit *H*, in common with said disk and conductor, whereby the said magnet may be caused to vary the contact at *b* in correspondence with the variations in the battery-tension.

2. The sensitive disk *B*, conductor *C*, and elastic armature *D*, organized substantially as shown, combined with the electro-magnet *F*, the helix *G* whereof is in the short battery-circuit *H*, in common with said disk and conductor, for the purpose of self-regulation of resistance at *b* in correspondence with fluctuations of the battery-tension, as set forth.

3. The sensitive disk *B* and conductor *C*, moving longitudinally only in guides *E*, as set forth, combined with an elastic adjustable armature, *D*, to support said conductor in contact

with said disk with substantially uniform pressure.

4. An electro-magnet, *F*, having its helix near one end and in connection with a short battery-circuit, combined with an induction-coil, *K*, over said primary or helix, and a disk-armature, *D*, sensitive to sound-waves in the magnetic field in front of said magnet.

5. An electro-magnet, *F*, in a short or local battery-circuit, provided with a tension-regulator and with an induction-coil wound over the primary of said magnet and in connection with the line-wire, combined with a flexible disk-armature sensitive to sound-waves, arranged near the pole or poles of said electro-magnet, and thereby constituting a portable transmitter in the primary circuit of the electro-magnet.

6. An electro-magnet, *F*, wound with an induction-coil over a flexible armature arranged near the pole or poles of said electro-magnet, and a transmitter arranged in the primary circuit of the electro-magnet.

7. The combination of two diaphragms, one having the capacity of receiving and transmitting sound-waves and the other acting as a contact-spring to maintain the continuity of the circuit.

8. The combination of two yielding diaphragms and interposed conducting-buttons, each secured upon its respective diaphragm and with their adjacent faces in contact, whereby their pressure upon each other may be readily adjusted and maintained.

JOHN H. IRWIN.

Witnesses:

CHAS. F. R. HEUCKEROTH,
WILLIAM L. VOELKER.