(No Model.)

H. C. STRONG.

Relay Telephones.

No. 235,658. Patented Dec. 21, 1880.

Fig. 1

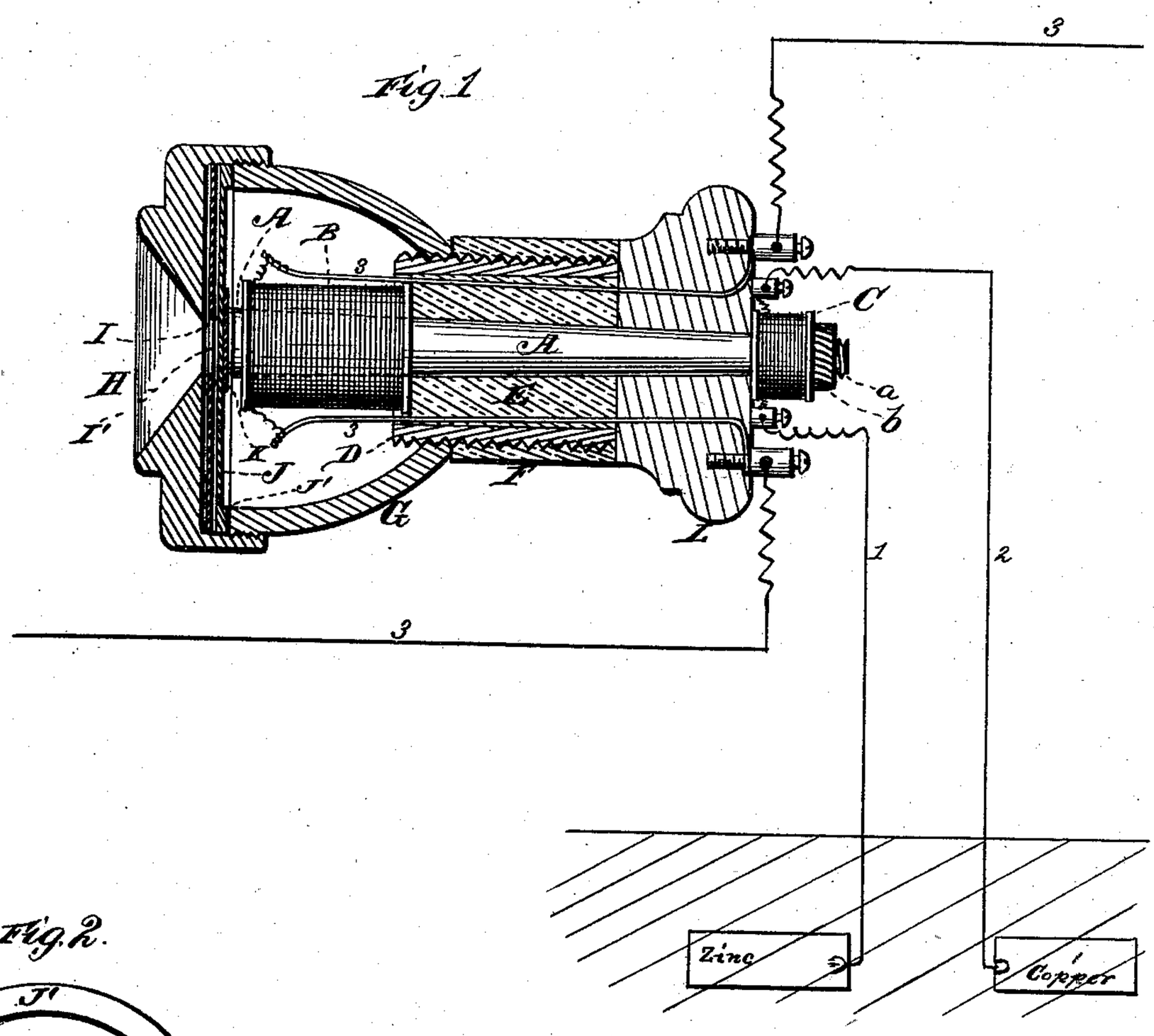


Fig. 2.

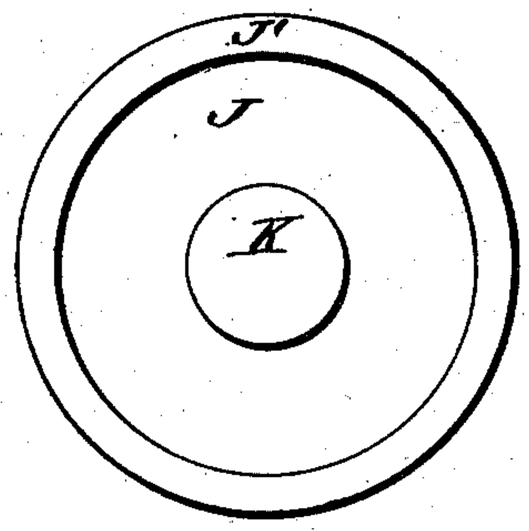
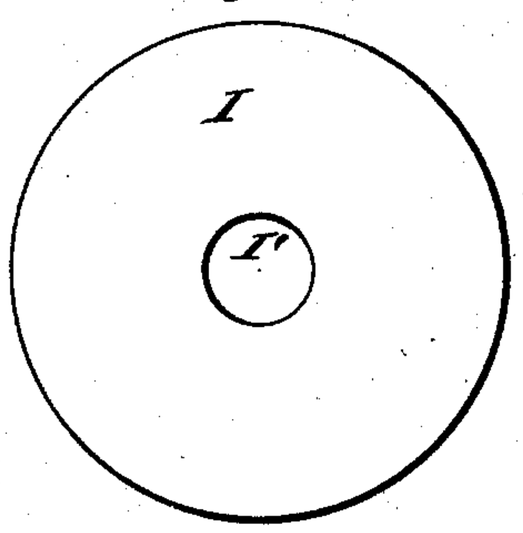


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

HENRY C. STRONG, OF CHICAGO, ILLINOIS.

RELAY-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 235,658, dated December 21, 1880.

Application filed May 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. STRONG, of the city of Chicago, and county of Cook, and State of Illinois, have invented certain new and useful Improvements in Relay-Telephones; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification; and I designate my invention "an improved telephone with relay attachments," the telephone-magnet being securely attached to telegraph-relay cores when used on long circuits.

My invention consists, first, of a metal tube, in which is inserted, through a socket or opening in the lower portion, a beveled bar-magnet, to which is attached a spool of insulated wire, the same as used in telegraph-instruments. The magnet and spool thus combined adjust or turn within the tube below, but not touching the diaphragm of non-conducting substance, to which is attached a soft-iron disk, just above the magnet, as large as the end of the magnet beneath it. Above this non-conducting diaphragm I place a secondary diaphragm, with a perforation in the center thereof, and, just above the soft-iron disk, attached to the non-conducting diaphragm. By this combination of diaphragms a peculiar augmented magnetic effect is produced in the receiving-telephone, neutralizing induction and magnifying the tones of the human voice when received from the speaker at the remote end of the circuit, in nowise diminished by the length of the circuit or the high tension of the electric current of the telephonic closed circuit.

My invention consists, second, of a spool or coil of insulated wire attached to the lower or opposite end or pole of the magnet and fastened by a nut on the end of the magnet, the thread of which engages with the thread cut on the end of the magnet, holding both spools on the beveled magnet firmly in their place, the beveled form of the magnet producing an increased magnetism within the iron tube, for the reason that there is a larger amount of metal at the end next the diaphragm, and consequently greater attraction and repulsion than there would be were the magnet of the same size throughout its length. Thus securely attached, the additional coil at the lower end of the magnet serves as a relay when connected by wires, as I attach them, to plates of metal of opposite polarity, placed in the earth or in water on the earth, as most convenient. The electric earth-currents derived in this manner are attracted toward and flow through the magnet-coils of the telephones, intensify the polarity of the magnet, making communication distinct and reliable on long circuits, and lessening the induction. The ground-plates, arranged as described herein, may be connected, as shown in the drawing in Letters Patent No. 192,856, granted to S. J. M. Bear on 10th of July, 1877, or in any suitable manner by which the electric earth-current may be generated and transmitted to the coil of the relay on the lower end of the magnet.

Figure 1 is a sectional view of the telephone, showing the beveled magnet in elevation. Fig. 2 is an inverted plan of the non-conducting diaphragm having the metal disk attached; and Fig. 3 is a plan of the perforated metallic diaphragm.

Referring by letter to the drawings, A designates the beveled magnet, having the spool B at one end and the spool C at the other end.

D designates the iron tube, threaded upon its exterior and encased in vulcanized rubber F.

E is vulcanized rubber surrounding the magnet A within the tube D.

G designates a metal cup which screws upon the iron tube D.

H is the wooden cap or mouth-piece which screws upon the cup G and holds the diaphragms I and J in place above the enlarged end of the beveled magnet A.

K designates the metal disk attached to the paper diaphragm J, which latter has a ring, J′, which rests upon the cup G.

I′ designates the perforation in the diaphragm I.

By screwing the cup G upon the tube D the diaphragms may be adjusted nearer to or farther from the end of the magnet A.

1 and 2 designate the battery-wires, and 3 3 the line-wires.

L is the head of the telephone, to which the posts are secured. *b* is a securing-nut on the threads *a*.

I do not limit myself to any particular mode of construction of the iron tubes for my tele-

phones, but make use of iron tubes in order to comply with magnetic radiations affecting soft iron, which becomes magnetized when placed near a permanent magnet, and becomes demagnetized on being withdrawn from the presence of the magnet. The iron tube, not being a permanent magnet, has an attractive influence for the end of the beveled permanent magnet, and increases the polar attraction therein when the telephone is in circuit. I thus duplicate the diaphragms, and place them near, but not in contact with, the end of the beveled magnet within the iron tube, and the magnetisms pervading the metal in the double diaphragms and iron tubes react on each other while in the presence of the beveled magnet, such magnetic reaction producing distinct articulation in the telephone through which the communication is being received, allaying the induction so common in speaking-telephones in use.

I have found by actual experiment with a telephone constructed as herein described and shown, that induction is allayed so as to be unheard, or, at most, heard only very faintly.

What I claim as new, as my invention, and desire to secure Letters Patent for, is—

1. In a telephone, the beveled bar-magnet A, carrying the spools B and C, in combination with the iron tube D, casing E and F, and the double diaphragm I I′ J K, constructed and operating substantially as and for the purposes set forth.

2. In a telephone, the combination, with the magnet A, spools B and C and tube D, and casings E F, of the adjusting-cup G, carrying the double diaphragms I J, substantially as and for the purposes set forth.

3. In a telephone, the beveled bar-magnet, in combination with the spools B and C, and the securing-nut *b*, as set forth.

HENRY C. STRONG.

Witnesses:
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