

(No Model.)

J. R. EDWARDS.
Telegraphic Sounder.

No. 231,290.

Patented Aug. 17, 1880.

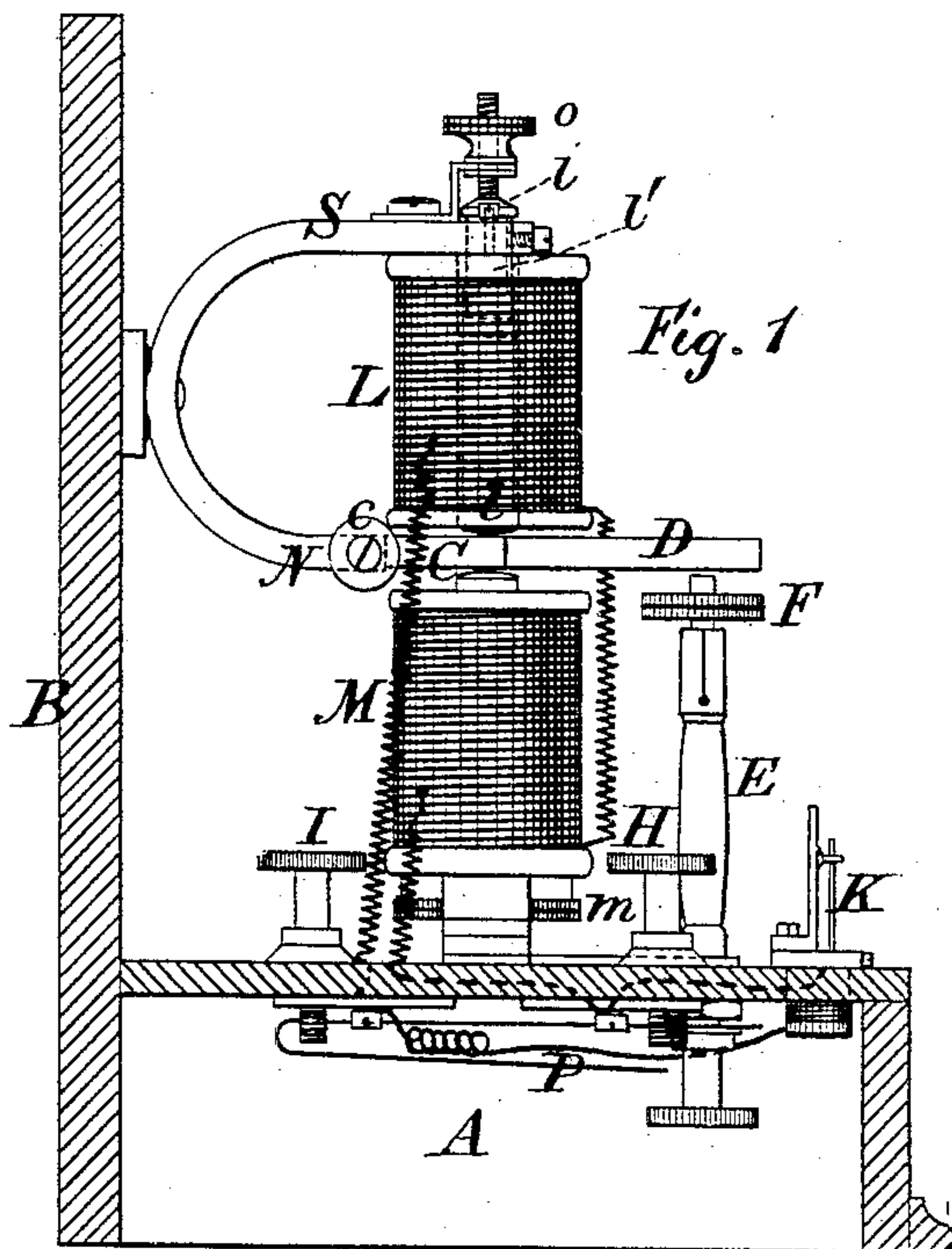
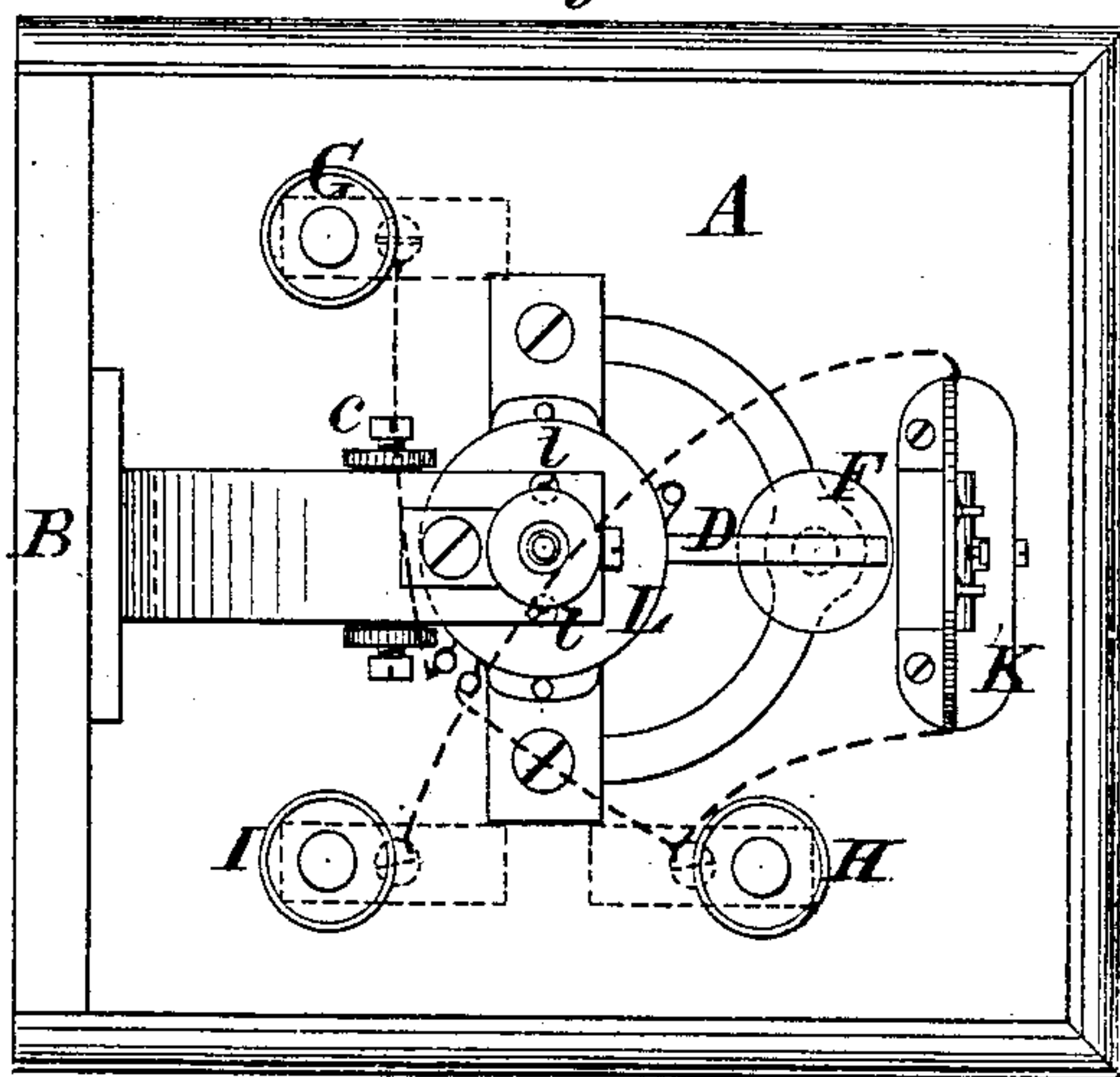


Fig. 2.



Witnesses:—

Will Frazer.
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Inventor:—

John R. Edwards,
by his Attorney.
Frank L. Pope

UNITED STATES PATENT OFFICE.

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TELEGRAPHIC SOUNDER.

SPECIFICATION forming part of Letters Patent No. 231,290, dated August 17, 1880.

Application filed March 29, 1880. (No model.) Patented in England February 7, 1879.

To all whom it may concern :

Be it known that I, JOHN R. EDWARDS, of Liverpool, England, in the Kingdom of Great Britain and Ireland, have invented certain
5 new and useful Improvements in Telegraphic Sounders, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates particularly to the construction of receiving-instruments designed
10 for use in connection with the so-called "Morse system" of telegraphy, and which are known as "sounders."

The nature of my improvement consists in a
15 certain novel combination and arrangement of permanent and electro magnets in connection with a polarized armature, by means of which I am enabled to construct a sounder which can be placed directly in the main circuit of a tele-
20 graph-line, and operated with equal facility and effectiveness either by the so-called "double-current" system, in which the signals are produced by the alternate transmission of positive and negative currents, or by the ordinary
25 single-current system, in which the signals are produced by alternately making and breaking a circuit through which a current of one polarity is passing.

My invention consists, first, in arranging
30 two electro-magnets with their poles facing each other on opposite sides of an armature which vibrates between them, in combination with a permanent magnet having one of its poles in magnetic contact with the armature
35 and the other with the core of one of the electro-magnets; second, in placing a polarized and a neutral magnet in the same circuit, but on opposite sides of a vibrating polarized armature, and in so arranging them that the normal magnetism of the polarized magnet and
40 of the armature will be opposite to each other; third, in constructing an electro-magnet with its core divided transversely in two parts, one part being stationary and facing the movable
45 armature, and the other part being movable longitudinally with reference to the stationary part; fourth, in constructing a polarized electro-magnet in the manner last described, the movable portion of the core being attached to
50 one pole of a permanent magnet, whereby the intensity of the normal magnetism in the sta-

tionary portion of the divided core may be conveniently regulated.

In the accompanying drawings, Figure 1 is a side elevation of a telegraphic sounder embodying my improvements, partly in section,
55 and Fig. 2 is a plan view of the same, a portion of the base being broken away to exhibit the interior mechanism.

A represents the base of the instrument,
60 which is preferably in the form of a hollow box, open at the bottom. B is an upright standard attached thereto, and serving as a support for the curved permanent magnet N S, which is secured to it by screws or otherwise.
65

A straight electro-magnet, L, is firmly attached, by screws *l l* passing into the head of the spool or bobbin, to the uppermost or south end S of the permanent magnet N S, and is thus supported in a vertical position.
70

An armature, C, preferably of soft iron, is pivoted at *c* to the lowermost or north end N of the permanent magnet N S, so as to be free to vibrate a short distance in a vertical direction. The length of this armature is ordinarily such that its extremity is opposite the face
75 of the core *l* of the electro-magnet L, and it is preferably provided with an extension, D, which may be of brass or other non-magnetic metal, projecting somewhat beyond the periphery of the coil of the electro-magnet L. Upon
80 the opposite side of the armature C—that is to say, directly beneath it—is placed a second straight upright electro-magnet, M, which is preferably of about the same size and power
85 as the one first described, so that the poles of the two electro-magnets L and M face each other on opposite sides of the armature C. The electro-magnet M is mounted directly upon
90 the base A, and may be made adjustable vertically in the direction of its length by means of the nut *m*.

The vibrations of the armature-lever D are limited in one direction by the pole of the electro-magnet L, which may with advantage have
95 a stud or plate of non-magnetic metal inserted in it to prevent the armature from adhering too strongly to it, and in the other by the sounding-post E, which is fixed to the base A, and may, if desirable, be provided with an adjustable stop, F, for receiving the impact of
100 the lever D.

The electro-magnets L and M are both included in the same circuit, the terminals of the two being brought to the respective binding-screws G and H.

5 K is a galvanometer or indicator, which is useful when the instrument is to be used in connection with the double-current system, as hereinafter explained. It is connected in a circuit leading from the binding-screw G to
10 the binding-screw I.

The operation of the apparatus is as follows: When no current (or a negative current, as the case may be) is traversing the coils of the electro-magnets L and M the north polarized
15 armature C is held in contact with the face of the core of the magnet L by the magnetism induced therein by the south pole of the permanent magnet N S, which is increased by the action of a negative current in case such current is passing. When, on the contrary, a
20 positive current traverses the electro-magnets, the polarity of the core l is overcome or reversed by its action, causing it to repel, or at least cease to attract, the armature, while, on
25 the other hand, the latter is strongly attracted by the lower magnet, M. Thus the alternate reversal of the polarity of the main current, or the alternate making and breaking of a current of constant polarity, by raising and depressing a telegraph-key in a well-known manner, will cause the armature D to vibrate forcibly
30 between the core l and the stop F, and thus produce sounds which constitute intelligible signals, which may be read and understood by those skilled in the art.
35

The lower portion, l, of the core of the upper electro-magnet L is separated from the upper portion, l', as shown in Fig. 1, and the portion l', which is in magnetic contact with
40 the south pole S of the permanent magnet, is movable in the direction of its length toward and from the fixed portion l by means of the nut O, and by this means the force of the attraction between the upper magnet and the
45 armature may be increased or diminished at

pleasure by varying the distance of the movable from the fixed portion of the core.

In order to increase the volume of sound produced by the apparatus, I place within the hollow base A a solate of sheet-brass or other
50 resonant metal, P, which may be bent double, as shown in the drawings, and this is firmly secured by one edge at one corner to a point directly beneath the foot of the sounding-post E; or it may, with even greater advantage, be
55 fastened by a screw passing through the base A directly to the foot of the post itself.

The vibrations caused by the impact of the lever D are communicated to the plate or resonator P and materially increase the sound of
60 the instrument.

I claim as my invention—

1. Two electro-magnets placed with their poles facing each other on opposite sides of an armature, arranged to vibrate to and fro
65 between them, in combination with a permanent magnet one pole of which is in magnetic contact with the armature and the other with the core of one of said electro-magnets, substantially as set forth.
70

2. An electro-magnet having its core divided transversely in two parts, the stationary part facing the movable armature and the movable part adjustable longitudinally toward or from the stationary part, substantially as set forth.
75

3. A polarized electro-magnet having its core divided transversely into two parts, the stationary part of said core facing a movable polarized armature pivoted to one pole of a permanent magnet and the movable part attached to the other pole of said magnet and adjustable toward or from the stationary part, substantially as set forth.
80

In witness whereof I have hereunto set my hand this 12th day of March, A. D. 1880.

JOHN R. EDWARDS.

Witnesses:

W. J. SULIS,
ROBT. FAUCETT.