2 Sheets—Sheet 1.

E. GRAY.

TELEPHONIC TELEGRAPH APPARATUS.

No. 175,971. Patented April 11, 1876.

Fig 1

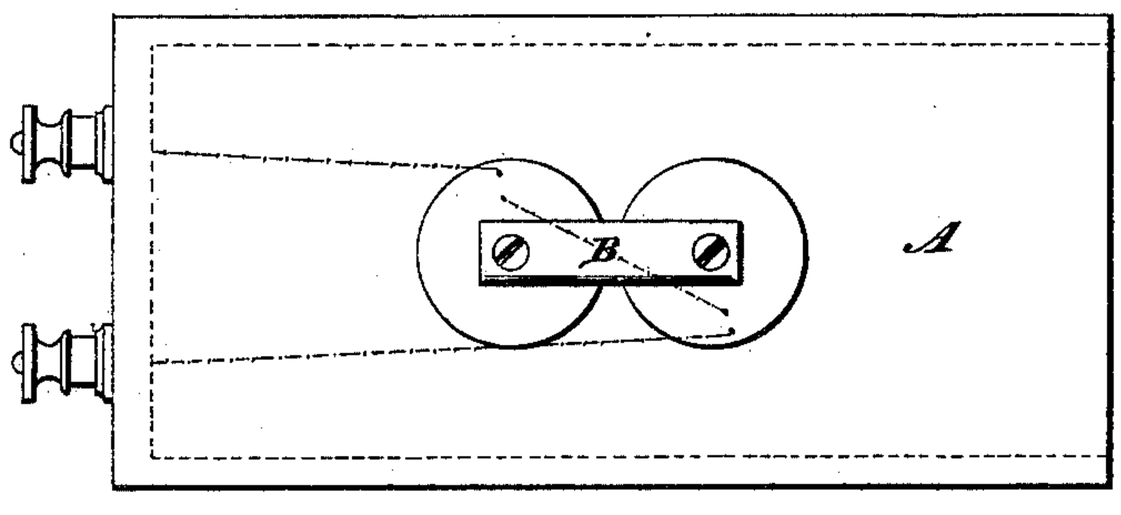
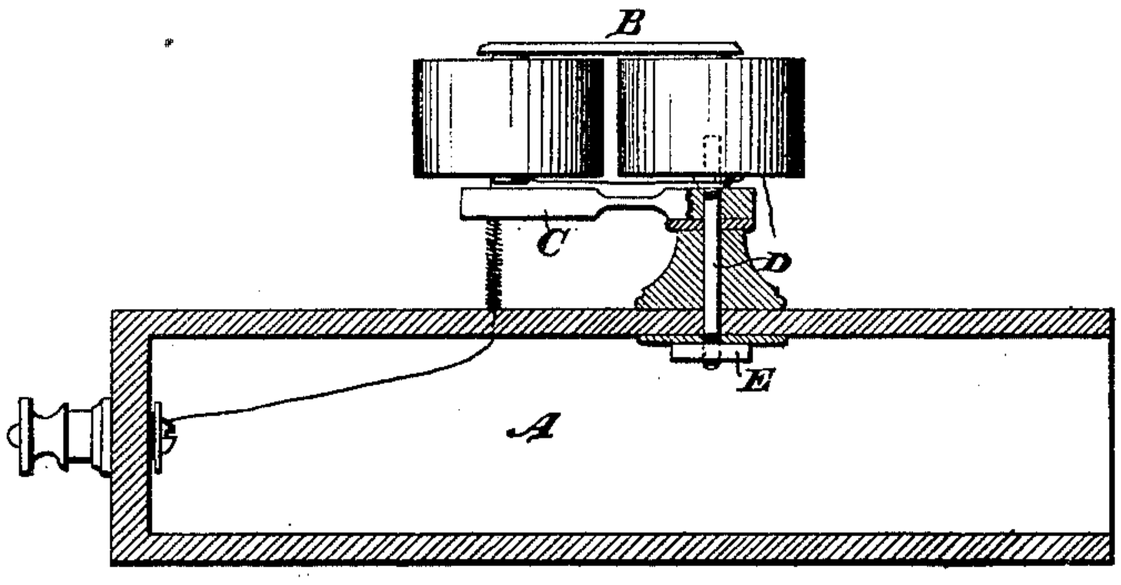


Fig 2.



WITNESSES

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By his Attorney

INVENTOR

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2 Sheets—Sheet 2.

E. GRAY.

TELEPHONIC TELEGRAPH APPARATUS.

No. 175,971. Patented April 11, 1876.

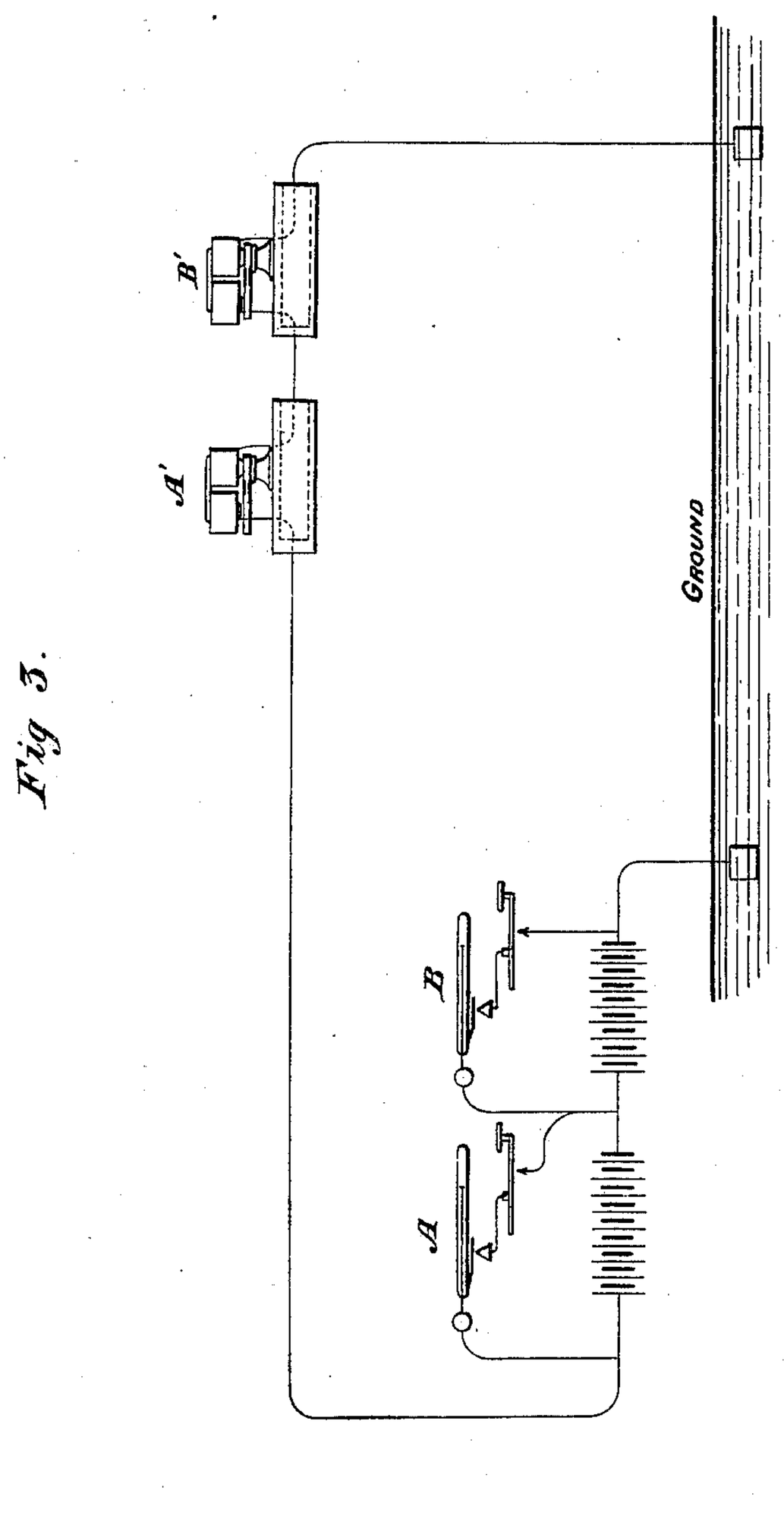

Fig 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

ELISHA GRAY, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN TELEPHONIC TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. **175,971**, dated April 11, 1876; application filed January 8, 1876.

To all whom it may concern:

Be it known that I, ELISHA GRAY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Art of Transmitting Musical Sounds Telegraphically, as well as certain new and useful improvements on apparatus for so transmitting such sounds, of which art and apparatus the following is a specification:

My invention relates to electro-harmonic telegraphs of the class shown and described in Letters Patent of the United States granted to me July 27, 1875, and respectively numbered 166,095 and 166,096, and in an application for Letters Patent filed by me February 23, 1875.

The object of my invention is to dispense with local batteries and sounders, and all adjustment at the receiving end of the line, which end I attain by means of an apparatus which analyzes composite tones transmitted electrically through a wire, whereby the operator is enabled to read directly from the tone transmitted.

The subject-matter claimed hereinafter specifically will be designated.

In the accompanying drawings, which show so much of my improved apparatus as is necessary to illustrate the invention herein claimed, Figure 1 is a plan or top view, and Fig. 2 a side elevation, partly in section, of one of my improved sounders or receivers. Fig. 3 is a diagram, showing my improved transmitting and receiving apparatus as adapted to the transmission of several tones simultaneously.

A resonant-box, A, such as used for intensifying the sound of tuning-forks, is shown as closed at one end. A screw-bolt, D, or other suitable support secured upon this box, sustains an electro-magnet, B, of well-known construction. A vibrating tongue or reed, C, of steel, is also fastened upon the support D, and is united with one pole of the magnet B. The free end of the reed passes close to, but does not touch, the other pole of the magnet.

For convenience of removal or replacement, all the parts of the apparatus may be united by means of a common bolt and nut, E.

The box is tuned to produce a maximum resonance of the desired tone, and the reed is accurately tuned correspondingly. Consequently, as the reed vibrates, the sound of its fundamental tone is intensified by the resonance of the box in accordance with well-known laws of acoustics.

If, now, the electro-magnet be connected in a telegraphic circuit in the same way as one of my analyzers described in the application aforesaid, and the note be transmitted by means of one of my transmitters described in said application for Letters Patent, the note will sound in the box, provided the tone transmitted corresponds with that of the box; otherwise the note will not be heard. Should a second analyzer be similarly placed in the circuit and tuned to a different pitch, and a second note of corresponding pitch be transmitted, it will sound in the box of corresponding pitch without affecting the other. The same rule holds with a larger number.

I have in practice thus analyzed and reproduced as many as eight different tones simultaneously transmitted through a single wire; and, as I have demonstrated, by using the Morse signals eight messages can simultaneously be sent over each wire as rapidly as each operator can transmit with the common telegraphic key, the advantages of my invention are obvious.

I believe it, however, to be practicable simultaneously to transmit a number of messages even greater than that above mentioned.

The reed C is made of a steel bar with parallel sides, the tuning being done by cutting away the sides near the fixed ends, as shown in the drawings. I find this construction, in practice, to obviate the tendency of the reeds to break into nodes, or to respond to notes other than their own, as has been the tendency of other forms of reeds tried by me.

I claim as my invention—

1. The hereinbefore-described art of transmitting musical sounds telegraphically by reproducing such sounds at the receiving end of the line by means of a vibrating reed and a sounding-box of corresponding pitch.

2. The combination, substantially as hereinbefore set forth, of an electro-magnet, a vibrating reed, and a sounding-box of corre-

sponding pitch, united at the receiving end of an electric circuit.

3. The combination, substantially as hereinbefore set forth, with an electric circuit, of a series of electro-magnets, a series of vibrating reeds, producing musical tones of different pitch, and a series of correspondingly-tuned sounding-boxes, whereby each box is caused to sound its own note while rejecting all others.

4. The vibrating reed, constructed as hereinbefore set forth, with parallel sides, and with recesses near its fixed end, whereby its tendency to vibrate in unison with tones other than its own is prevented.

In testimony whereof I have hereunto subscribed my name.

ELISHA GRAY.

Witnesses:
ENOS M. BARTON,
GEO. A. BLISS.