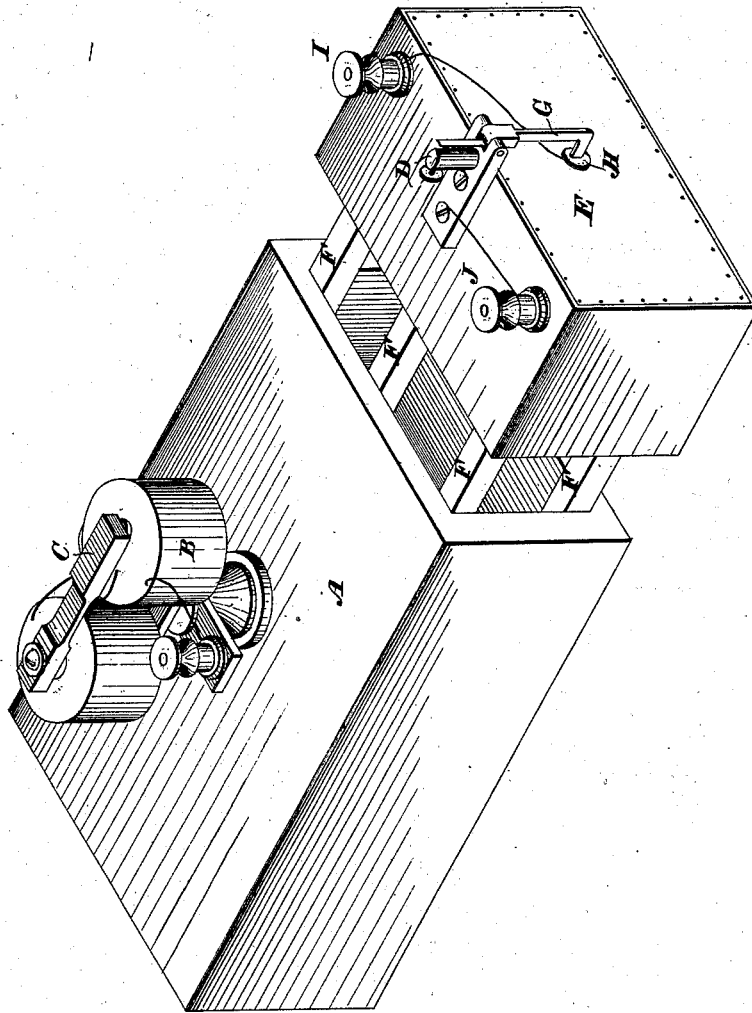


E. GRAY.
LOCAL CIRCUIT BREAKERS FOR ELECTRO-HARMONIC
TELEGRAPHS.

No. 194,671.

Patented Aug. 28, 1877.



WITNESSES

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By *his* Attorney

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UNITED STATES PATENT OFFICE.

ELISHA GRAY, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS
TO THE HARMONIC TELEGRAPH COMPANY, OF NEW YORK CITY.

IMPROVEMENT IN LOCAL-CIRCUIT BREAKERS FOR ELECTRO-HARMONIC TELEGRAPHS.

Specification forming part of Letters Patent No. **194,671**, dated August 28, 1877; application filed
February 15, 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 a certain new and useful Improvement in Local-Circuit Breakers for Electro-Harmonic Telegraphs, of which the following is a specification:

My invention relates to electro-harmonic telegraphs of the class shown 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 of the United States filed by me February 23, 1875.

In this application I have shown and described an instrument for receiving musical tones called an "analyzer," composed of a series of vibrating instruments, each tuned to a different pitch, and receiving from a transmitter those tones only which correspond to its own fundamental vibrations.

I have also shown in said application and in my patent No. 166,094 of July 27, 1875, a method of and apparatus for making and breaking a local circuit, so as to record Morse and other signals in the ordinary way, the analyzer taking the place of the common Morse relay.

In a later application, filed January 8, 1876, I have described a new form of analyzer, consisting of a tuned bar or reed suitably attached to an electro-magnet, and the whole mounted upon a resonant box, closed at one end, the cavity of which is tuned to the same fundamental as that of the aforesaid reed or bar.

The object of my present invention is to furnish an attachment to the last-named analyzer, whereby the vibrations of the air-column within the resonant cavity are made to produce a corresponding vibration in a diaphragm suitably mounted in front of said cavity, which vibrations are communicated to a secondary spring or bar, such as described in my Patent No. 166,094 aforesaid, dated July 27, 1875, which bar operates a local circuit in a manner similar to that therein shown, which local circuit may be attached to any of the various forms of telegraphic recording-instruments.

The accompanying drawing represents a view, in perspective, of my improved apparatus.

To a resonant box, A, with its electro-magnet B and reed C mounted upon it, as described in the aforesaid application filed January 8, 1876, is attached a short section, D, of a box, over one end of which is stretched a diaphragm, E, made of some thin substance, such as thin parchment or gold-beater's skin, the whole forming a chamber with its mouth facing that of the box A, which section or chamber is held in place by the sliding bars F.

The bars F are rigidly attached to the inside of the short box D, and fit closely and slide inside of the box A. By means of these slides the position of the box D, with its diaphragm, can be readily adjusted to such distance as will produce a maximum effect upon the diaphragm E when a tone is sounded in the box A.

A vibrating bar or spring, G, mounted on the sliding section, is provided with an adjusting-screw, to regulate its tension in the manner described in my Letters Patent No. 166,094 of July 27, 1875, aforesaid.

In the center of the diaphragm E is fastened a small metal plate containing a platinum point, H, against which the end of the bar G rests. This small metal plate is connected with a binding-post, I, by means of a small wire, and by the same means the binding-post J is electrically connected with the vibrating bar G.

The operation of the apparatus is as follows: When a note is transmitted to the magnet B, which is in unison with the reed C and resonant box A, said note will sound, and throw into sympathetic vibrations the air-column in the box A. These vibrations will be transmitted from the mouth of the box with sufficient force to throw into vibration the diaphragm E, and if the bar G is suitably adjusted, so that its natural rate of vibration is slower than that of the diaphragm E and of the air-column, it will rattle or jar upon the metal plate in the same manner as described in my previous applications and patents, and in the same manner will open and close a lo-

cal circuit that may be attached to the binding-posts I and J, and operate any recording mechanism that may be attached.

In this arrangement I have the double advantage of being able to read directly from the tone, and at the same time I may or may not be using recording apparatus, as just described.

It is obvious that two or more sounding-boxes and circuit-breakers, such as described, capable of producing tones of different pitch, may be used for analyzing a series of corresponding tones of different pitch simultaneously transmitted over a single wire, as mentioned in the applications hereinbefore recited.

I disclaim the combination of an electromagnet, vibrating reed, sounding-box or resonator of corresponding pitch, and a local-circuit-breaking apparatus actuated by the vibrations of a column of air in said resonator, having conceded priority of this subject-matter to Thomas A. Edison.

I claim as of my own invention—

1. The combination, substantially as hereinbefore set forth, of a sounding-box, the column of air contained in which is thrown into vibration by tones transmitted through an electric circuit, an adjustable box or chamber, across which a diaphragm is stretched, and a local-circuit-breaking mechanism mounted on said adjustable section.

2. The combination, substantially as hereinbefore set forth, of a sounding-box, a diaphragm, a local circuit, and a circuit-breaking lever vibrating more slowly than the diaphragm, by which said local circuit is controlled.

In testimony whereof I have hereunto subscribed my name.

ELISHA GRAY.

Witnesses:

E. C. DAVIDSON,
H. T. EARNEST.