T. A. EDISON.

Chemical or Automatic Telegraphs.

No. 150,848. Patented May 12, 1874.

Fig. 1.

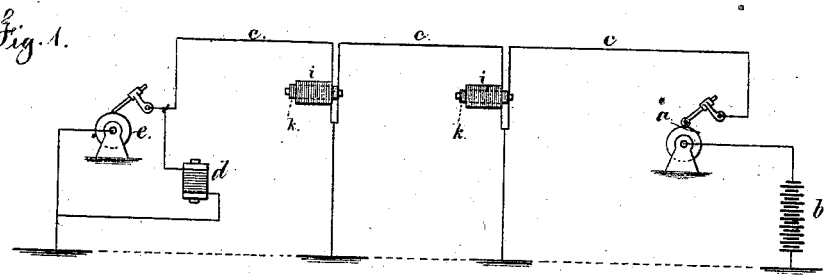


Fig. 2.

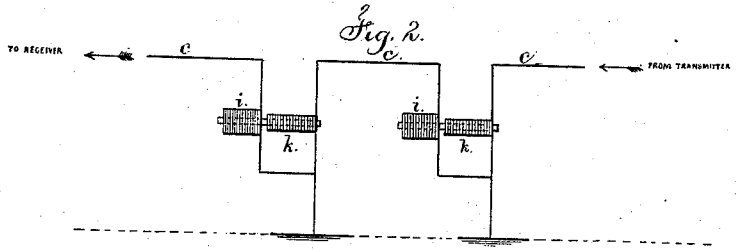


Fig. 3.

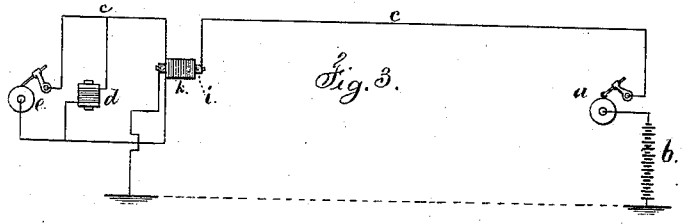


Fig. 4.

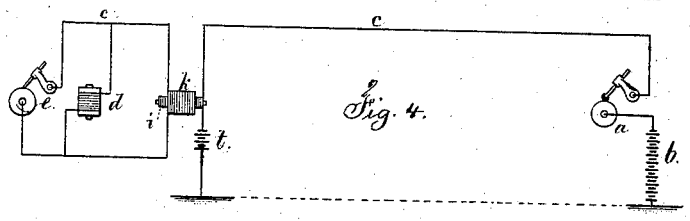
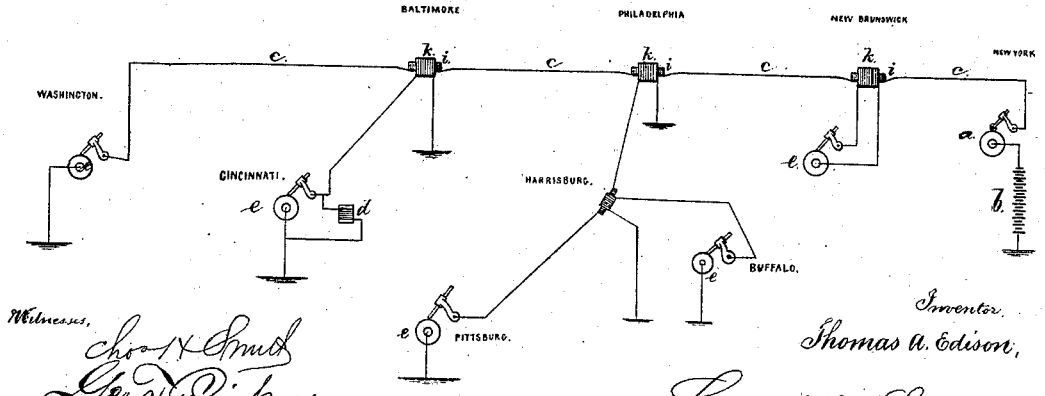


Fig. 5.



Witnesses,
Chas. A. Smith
Geo. T. Pickney

Inventor,
Thomas A. Edison,
Lemuel W. Serrell atty

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF AND GEORGE HARRINGTON, OF WASHINGTON, D. C.

IMPROVEMENT IN CHEMICAL OR AUTOMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **150,848**, dated May 12, 1874; application filed January 15, 1873.

CASE 64.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Newark, in the county of Essex and State of New Jersey, have invented an Improvement in Telegraphic Circuits, of which the following is a specification:

It is well known that in the induction-coil of an electro-magnet or primary helix a secondary current is induced or set up, and that this can be conveyed over a wire, and will pulsate with the primary current through the magnet-helix.

In chemical telegraphs great rapidity can be obtained upon short lines, while upon long lines the speed is rapidly diminished by increasing the distance. The current required in chemical telegraphs and cables is comparatively weak. I therefore make use of the secondary current from an induction-coil of an electro-magnet or primary coil as a relay for continuing the transmission of the message in long lines, and that without lessening materially the rapidity, and without blurring the message, as received, by tailings resulting from surplus or static electricity in the line, as now usual in long lines.

By the means before mentioned, all mechanical devices and movements, such as armatures, levers, and relay circuit-closers, are dispensed with, and the electrical operation alone relied upon, and I am able to operate chemical-telegraph lines with a rapidity heretofore unsurpassed. I divide the line up into sections of suitable lengths—say, about four or five hundred miles each—employing a line from the transmitting-station as long as can be used to advantage, and then introducing an induction-relay, either reaching to the receiving-station or to the next induction-relay. In some instances I make use of the induction-relay in operating local or branch circuits.

In the drawing, *a* is the transmitting-instrument; *b*, the battery; *c*, the line-wire of the main circuit. *k* is the induction-relay, and *e* is the receiving-instrument.

The induction-relay is preferably of large wire with a large number of convolutions, so as to obtain an increased quantity in the induction-current. One coil may be outside the other coil, as shown in Figure 1, or the induction-coil *i* may be separate upon the same core, as the primary helix *k*, as seen in Fig. 2. The primary or main circuit passes through the helix *k;* thence to the earth. The secondary or induction circuit is connected from the coil *i* to line-wire and distant instrument, and also to the earth.

In Fig. 1 the entire line is represented as divided into three sections, the first one being operated by the primary current, and the second section by the induced current, which, in turn, operating in the second induction-relay, operates in the third circuit that extends to the receiving-instrument. The number of circuits operated by induced magnetism may be increased, and I remark that, in consequence of the instantaneous action of the induced current, the transmitting-machine has to be worked with great rapidity, and that the dot-alphabet is preferable to the dot-and-dash alphabet.

In Fig. 3 a single primary circuit is shown, with an induction-circuit to operate the receiving-instrument. A rheostat or adjustable rheostat may be employed to regulate the proportion of current passing to the chemical paper.

In Fig. 4 a battery, *t*, is applied to the line near the induction-relay, of less power than the transmitting-battery, and with the opposite pole to the line, so as to clear said line, with rapidity, of static electricity or attenuation in the pulsations. In this case the induced or secondary current is produced by the increase and decrease of the current.

In Fig. 5 the transmitting-instrument is illustrated as being at New York, and working to Washington, and at Philadelphia and Baltimore primary and secondary coils, so that the induced circuits set up at these places can work to Cincinnati and Pittsburg; and at Harrisburg an induction-coil that sets up a second induction-circuit to Buffalo.

At any of the receiving-stations there may

be an electro-magnet in a local circuit to set up a counter-circuit when the pulsation ceases, to prevent tailing, as shown at *d*.

If required, there may be branch circuits, resistances, and connections to the earth from either the primary or the secondary circuits, to aid in clearing the line of surplus electricity.

In rapid automatic telegraphy the secondary current, although but momentary, is of greater intensity when the primary current is prolonged, (as with a dash,) so that the difference between dots and dashes is apparent in the chemical paper; and in cases where the difference is not sufficiently apparent the dot-alphabet will be used.

I do not claim the secondary circuit acting in a magnet to produce a signal.

I claim as my invention—

A circuit for chemical telegraphs, composed of the primary circuit operated by the transmitting-instrument, and an induction-relay coil to act in the receiving-instrument by a secondary circuit, substantially as set forth.

Signed by me this 12th day of December, 1872.

THOMAS A. EDISON.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.