T. A. EDISON.

Circuits for Automatic Telegraphs.

No. 141,776. Patented August 12, 1873.

Fig. 1.

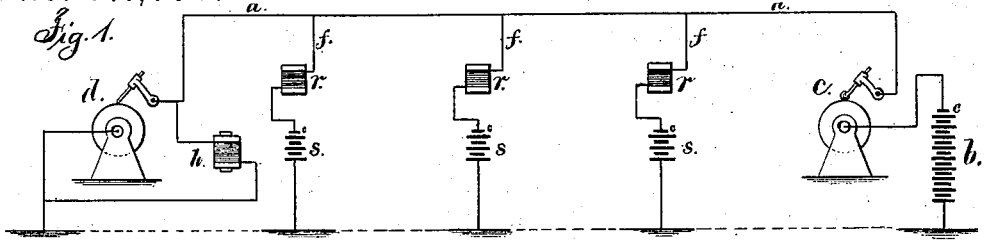


Fig. 2.

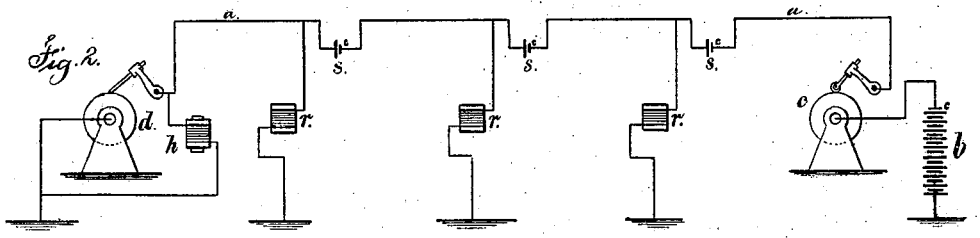


Fig. 3.

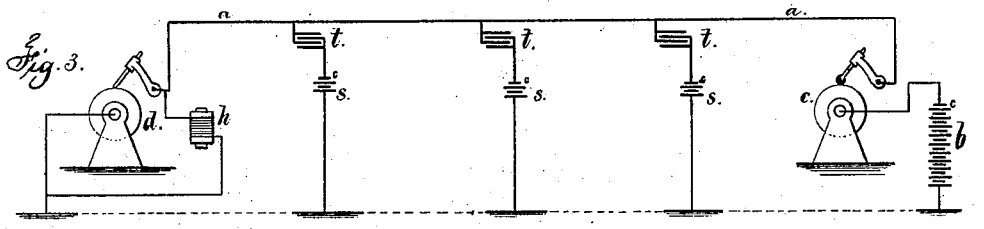


Fig. 4.

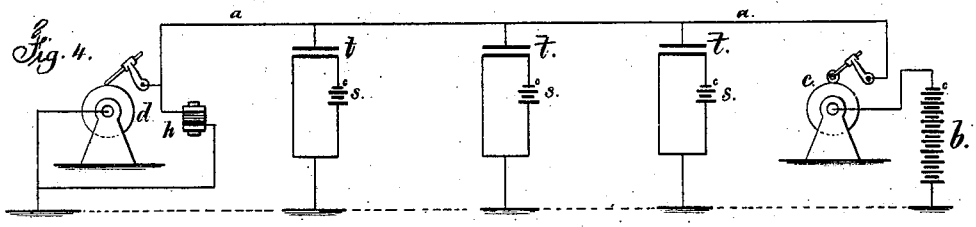


Fig. 5.

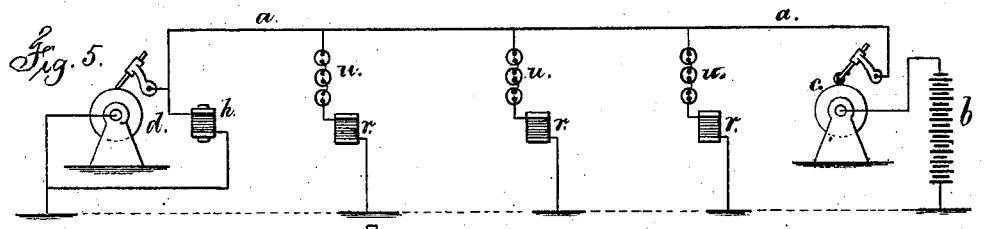
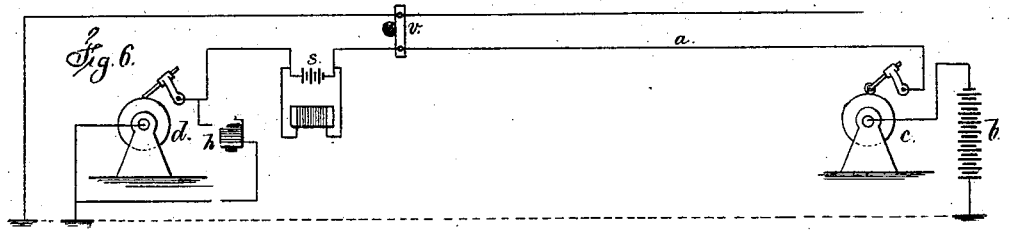


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN CIRCUITS FOR AUTOMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **141,776**, dated August 12, 1873; application filed January 15, 1873.

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:

In automatic telegraphing the speed of the pulsations is such that the line becomes surcharged, and the mark upon the chemical paper is attenuated to such an extent that one mark runs into another, or dots appear like dashes. The chemical paper is now made very sensitive, and a very feeble current is sufficient for making the mark; but in long lines the difficulty in clearing the line of the static electricity has been so great as to reduce the speed of transmission in order to obtain legible characters.

My present invention has been devised and successfully employed for effecting the clearing of the line without injury to the transmission of the pulsations.

Leaks and ground-connections have before been employed. My invention, therefore, does not relate thereto.

I make use of a battery, or a number of batteries, at a distant station, or distributed along the line, such battery or batteries being much weaker than the sending-battery, and connected in such a manner to the main line as to direct upon the same a current of opposite polarity, which has to be overcome by the pulsations from the sending-station; but these are always sufficient, and the slight reverse current, acting in detail upon the line-wires, keeps them free from any attenuation in the transmitting pulsations, thereby increasing the rapidity of automatic telegraphing, especially on long lines, and rendering the writing clear and sharp.

In the diagrams on the drawing, *a* represents the line; *b*, the transmitting-battery; *c*, the transmitting-instrument; and *d*, the receiving-instrument. In the former a strip of perforated paper and stylus are employed; in the latter a strip of chemical paper and a stylus.

In Figure 1 there are several branch circuits, *f*, in which are placed rheostats or resistances *r*, that may be adjustable, and also batteries *s*, that are of the proper power, and placed with the opposite pole to the line to that of the battery *b*, so that the line is operated upon in detail, at suitable distances apart—say every one hundred miles, more or less—and the line freed from tailing; and the same is opposed to the main current, but not sufficiently powerful to neutralize the same or to interfere with the transmission. These batteries *s* are so proportioned or adjusted as to be equal to the static electricity or current generated by the passage of the main current. The rheostats or resistances *r* are sufficient to prevent the battery *b* being short-circuited through the various branch-circuit connections to the earth, and to cause the proper proportion of said battery-current to reach the receiving-instrument.

In Fig. 2 the same parts are employed; but the opposition batteries *s* are placed in the main line, and distributed along the same. The branch circuits to the earth, with resistances, act with the local opposition batteries to establish currents counter to the main current.

In Fig. 3 the effect produced is the same as before described; but in place of rheostats there are condensers *t*, and the opposition local batteries *s*, acting upon the condensers, establish an opposite polarity on the plates of the condenser that are connected with the line to the polarity of such plates when influenced by the transmitting-battery, thereby neutralizing the tailings by charging the line statically in opposition to that from the main current.

The condensers may be connected with the opposition local batteries, in the manner seen in Fig. 4, so that the plates that are connected to the line-wire will also be connected to one pole of the battery, and the other plates of the condenser will be connected with the earth and the other pole of the battery, the operation being similar to that before set forth.

In Fig. 5 the parts are the same in their operation as those before described; but instead of ordinary batteries, cups *u*, containing platina or carbon strips and acidulated water, are employed, so that when the pulsation on the main line ceases to charge such cups a momentary reverse current is established to neu-

tralize the tailing by instantly freeing the line of any electric charge.

In Fig. 6 the line-battery *s* is introduced at the receiving-station, to neutralize any local current that may leak from one insulator to another upon the poles *v*, and tend to charge the line sufficiently to produce a light continuous mark upon the paper, the battery *s* not being sufficient to interfere with the pulsations for the message, although its poles are opposed to the same.

The electro-magnets, at *h*, are in a shunt, connected at both sides of the receiving-instrument, to neutralize any tailings at the instrument, as in my application No. 61, dated November 9, 1872.

I claim as my invention—

The use of an opposition or secondary battery of weak power at one or more points, to act in the main line in opposition to the pulsations from the transmitting-instrument, to free the main line of surplus or static electricity, substantially as set forth.

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

Witnesses: THOMAS A. EDISON.

GEO. T. PINCKNEY,

CHAS. H. SMITH.