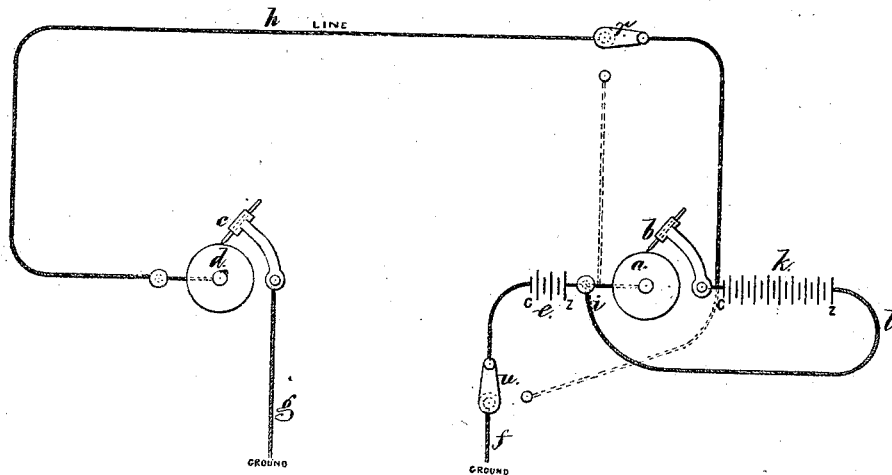


G. LITTLE.  
ARRANGEMENT OF ELECTRICAL CIRCUITS FOR AUTOMATIC  
TRANSMITTING INSTRUMENT.

No. 108,495.

Patented Oct. 18, 1870.



Witnesses,

*Chas H Smith*  
*Carold Perrell*

*George Little*

# United States Patent Office.

GEORGE LITTLE, OF RUTHERFORD PARK, NEW JERSEY.

Letters Patent No. 108,495, dated October 18, 1870.

## IMPROVEMENT IN THE ARRANGEMENT OF ELECTRICAL CIRCUITS FOR AUTOMATIC TRANSMITTING-INSTRUMENTS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, GEORGE LITTLE, of Rutherford Park, in the county of Bergen and State of New Jersey, have invented and made a new and useful Arrangement of Electrical Circuits for Automatic Transmitting-Telegraph Instruments; and the following is declared to be a correct description thereof.

Telegraphs, in which a strip of perforated paper is employed for transmitting the pulsations or waves of electricity are subject to the risk of inaccuracy, especially on long lines, because the line is liable to become clogged, or one pulsation to run into another, and make an attenuated mark on the chemical paper instead of a distinct dot or dash; this is especially the case where groups of dots are employed to form the characters or letters, and the pulsations pass over long or submarine lines.

Efforts have been made to introduce a reverse current, to neutralize the remaining portion of the pulsation that makes the mark, thus rendering the mark sharp and distinct instead of attenuated; but such means have depended upon mechanism or circuit closers that were delicate to adjust, or liable to become inoperative.

My invention relates to an arrangement of batteries and electrical circuits, so that when the connection is closed, through the perforation of the paper, the two electrical circuits are completed through the brush or stilus, but when the paper intervenes, the two batteries act in opposition to each other, and neutralize the action of that which sends the pulsation to make the mark at the distant station, thereby each pulsation becomes distinct, and the line is cleared, and there is no automatic mechanism to operate the reverse circuit, the perforated paper itself being the only means for operating the two circuits.

In the drawing I have represented, by a diagram, the respective circuits and the arrangement of the connections, there being nothing new in the batteries themselves, or in the transmitting or receiving instruments themselves, they do not require to be described or shown in detail.

The roller *a* and stilus *b* represent the transmitting instrument, the perforated paper passing between them, and being drawn along as usual.

The stilus *c* and roller *d* represent the receiving instrument.

The battery *e* is located so that a pulsation of elec-

tricity passes to the distant station either through the ground connections *f* and *g*, returning over the line wire *h*, or the reverse.

At the same moment the pulsation from the battery *k* passes by the shortest circuit *i l*, the perforation of the paper allowing the stilus to complete that circuit, but the moment the paper intervenes, both circuits are broken at that point, and the battery *k* is then in the main telegraphic circuit, and its action is negative, and its pulsation travels in the opposite direction to that from the battery *e*, and this battery *e* being also in the same circuit, and the poles of the battery being opposed, positive to positive and negative to negative, the pulsation that produced the mark at the distant station is cut short, or its attenuation prevented by clearing the line by the reverse or negative action.

It is to be understood that the relative powers of the batteries *e* and *k* are to be proportioned so as to effect the desired object in the most perfect manner, according to the conditions of the line and the speed of transmission.

Upon short or land lines, the battery *k* may be the strongest, but on submarine cables, or long lines, the batteries *e* and *k* should generally be nearly balanced. I, however, do not limit myself in this particular.

The forces of the batteries *e* and *k* being at times opposed to each other, the batteries remain in a better operative condition, because the positive poles are partially depolarized.

The switches *r u* are turned when the transmitting instrument is to be used for receiving.

The connections at both ends of the line should be arranged the same, and the connections made by switches.

I claim as my invention—

The arrangement of the two separate batteries relatively to the automatic transmitting and receiving instruments and their connections, in substantially the manner specified, so that when the transmitting circuit is broken, the other circuit acts with a reverse circuit through the transmitting battery, substantially as set forth.

Signed by me this 6th day of August, 1870.

GEORGE LITTLE.

Witnesses:

CHAS. H. SMITH,  
HAROLD SERRELL.