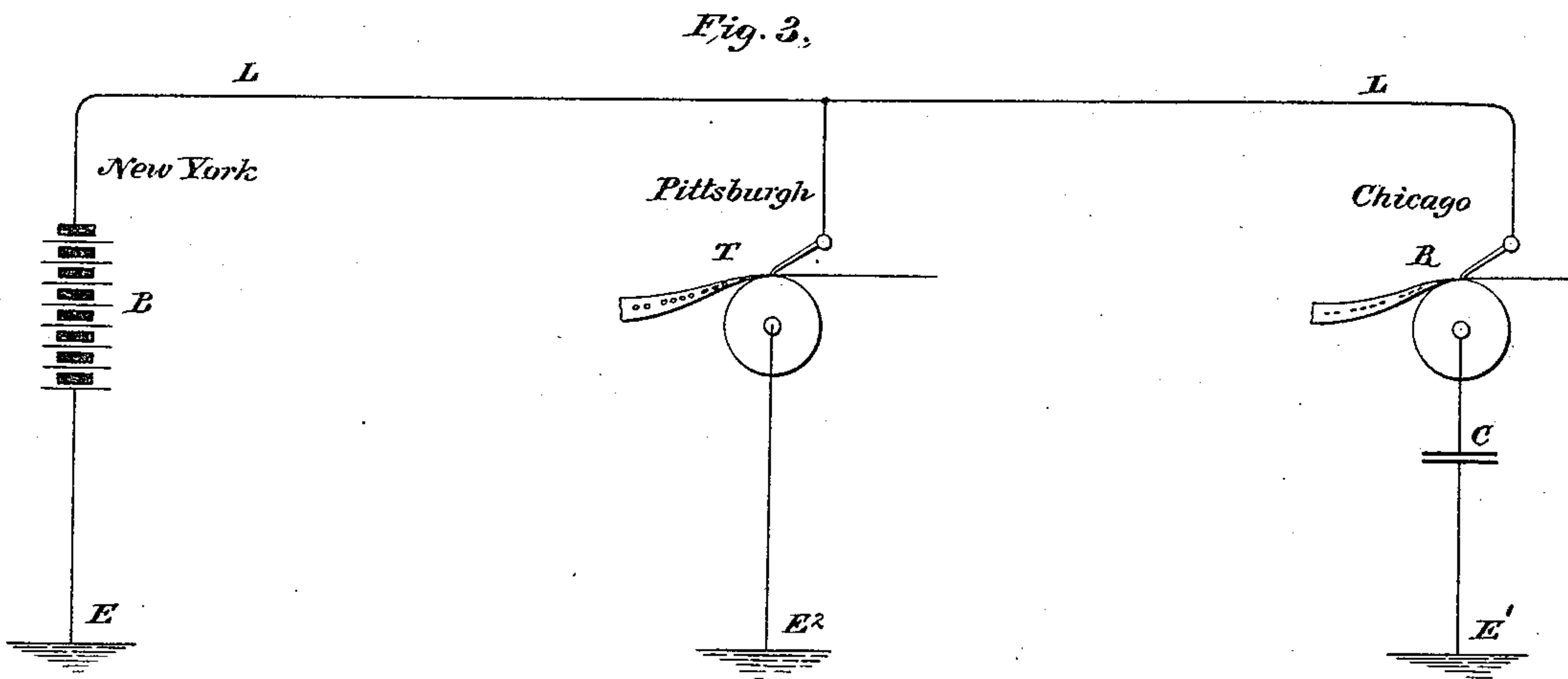
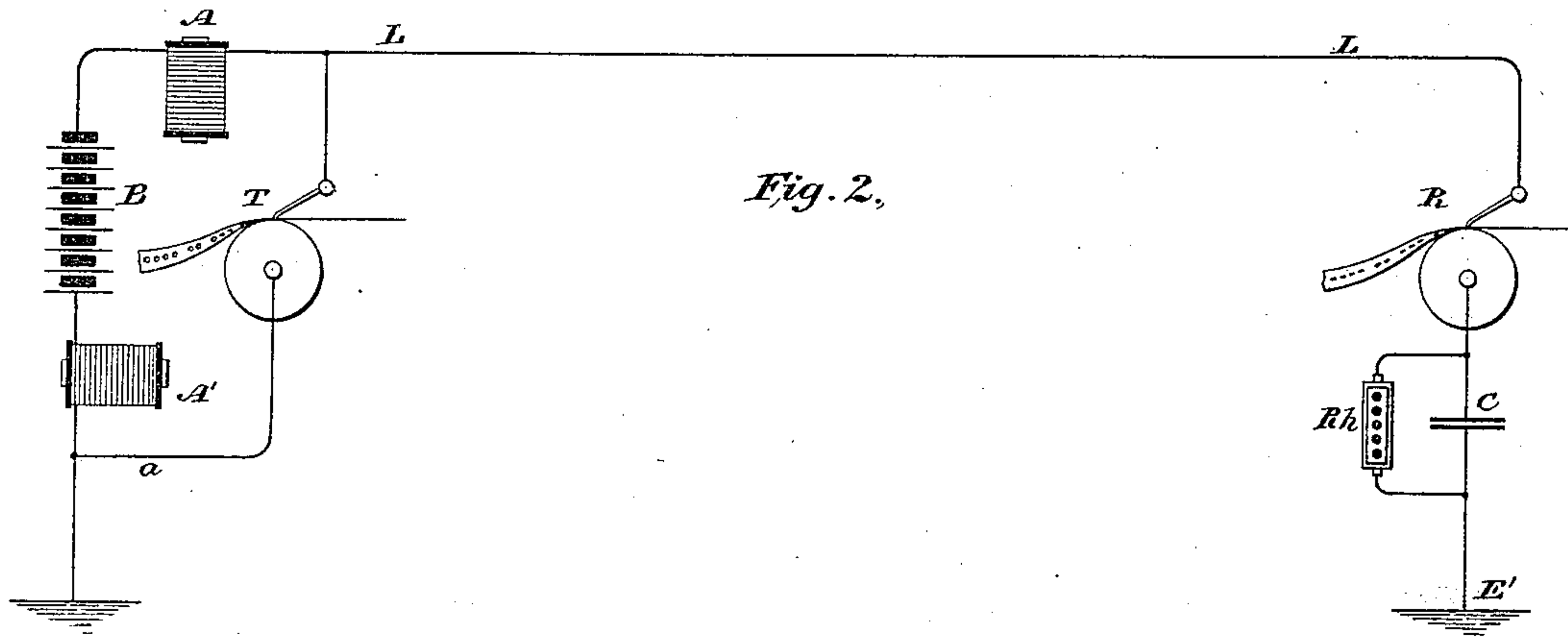
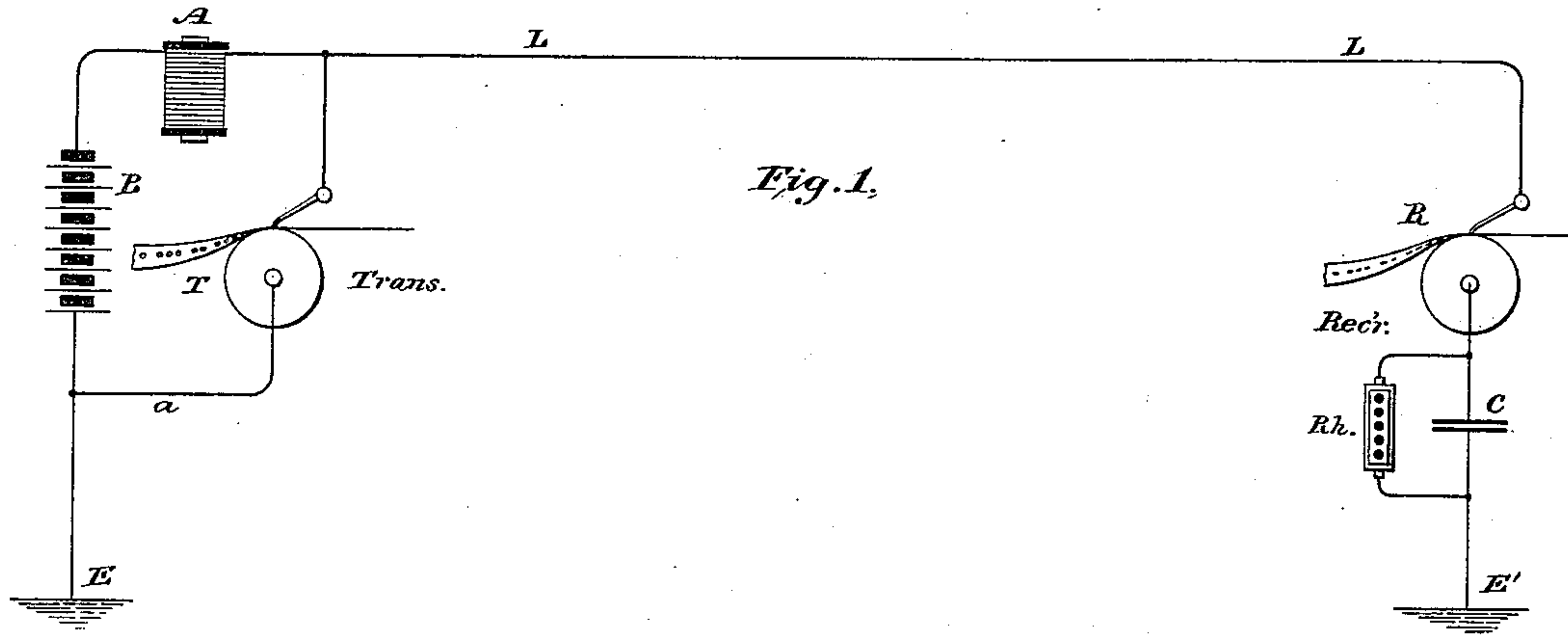


(No Model.)

F. ANDERSON.  
AUTOMATIC TELEGRAPH.

No. 426,749.

Patented Apr. 29, 1890.



Witnesses  
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# UNITED STATES PATENT OFFICE.

FRANK ANDERSON, OF PEEKSKILL, NEW YORK.

## AUTOMATIC TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 426,749, dated April 29, 1890.

Application filed September 30, 1889. Serial No. 325,475. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK ANDERSON, a citizen of the United States, residing at Peekskill, in the county of Westchester, in the State of New York, have made a new and useful Invention in Telegraphy, of which the following specification, taken in connection with the accompanying drawings, is a full and exact description.

My invention relates particularly to improvements in that branch of telegraphy known as "automatic" or "rapid" telegraphs, and is directed to improvements upon prior applications for patents filed by me in the United States Patent Office, but notably upon my application, Serial No. 286,087, filed on the 22d day of September, 1888, and patented July 16, 1889, No. 406,982; and its objects are, first, to increase the initial effect of the charging source upon the line during the operation of transmitting signals without adding additional battery-power; second, to increase the resistance of the shunt in the local circuit, which embraces the transmitter and the transmitting-battery without interfering with or diminishing the capacity of the apparatus to offer a decreased resistance to the statical discharge at the transmitting-station; third, to utilize, so far as possible, a minimum amount of transmitting-battery and to avoid the waste thereof, and to decrease sparking in the short circuit at the transmitter. I attain these objects by the method and apparatus hereinafter described, but particularly pointed out in the claims which follow this specification.

It is a well-known fact that if an electro-magnet be charged with a current of electricity, and if the circuit of the charging-generator be then broken the electro-magnet acting as a storer of electrical energy discharges what is technically known as an "induced" or "extra" current, which has the same direction in flow as that of the charging-battery. I make use of this principle for the purpose of accomplishing the objects above referred to, as I will now describe.

Referring to the drawings, Figures, 1, 2, and 3 are modified forms of the apparatus above referred to.

L is the main line earthed at the transmitting-station at E and at the receiving-station of E'.

B is the charging-battery, and T the transmitter, located in a shunt  $\alpha$ , and consisting of a metallic transmitting-cylinder with a pen and a perforated fillet, preferably of the form disclosed in my prior patent, No. 406,982.

R is the receiver consisting of a metallic receiving stylus and cylinder of well-known form with a sensitized or equivalent receiving-fillet.

c is a condenser having one pole connected to the receiver and the other to the earth at E'.

Rh is a rheostat shunting the condenser.

The apparatus so far described constitutes the major part of the subject-matter of my prior patent, No. 406,982.

For the purpose of accomplishing the objects above referred to I simply insert an electro-magnet having preferably a magnetic core and being of such capacity as to produce the desired result, this feature of course depending upon the electrostatic capacity of the line, the charging capacity of the battery, and such other proportions as naturally suggest themselves to one skilled in the art.

The operation of the apparatus is as follows: The line being normally charged, the electro-magnet is of course also charged, and when the transmitter is set in motion and the short circuit through the shunt  $\alpha$  broken by the interposition of those portions of the fillet which interrupt the circuit, the electro-magnet acting by virtue of the charge sends an extra current of increased potential to the distant station, and being of much higher potential than the battery itself necessarily gives an instantaneous record on the receiving-fillet, which is strengthened by the direct battery flow. When the transmitting-pen passes into the next perforation, the magnet is again charged, the battery being put upon short circuit through the shunt  $\alpha$ , as before, while the major portion of the statical charge from the line also passes out to earth at E through the shunt  $\alpha$ , as described in my prior patent above referred to. It will be seen that owing to the increase of the resistance offered to the shunt-circuit  $\alpha$  by the increased resistance of the magnet A there is much less waste of the transmitting-battery current when the short circuit is closed.

This apparatus depends for its operation upon the principle that the current in flowing



through the shunt charges the magnet to its full capacity for an instant, and when flowing to line on breaking the shunt intensifies the record by reason of the instantaneous and increased potential acting in a manner somewhat analogous to the hydraulic ram in hydraulics.

I do not limit myself to the location of the electro-magnet A at a point between the line and the charging-battery. It may be located at a point between the charging-battery and the earth, and two such magnets may be used, as substantially shown at A A', it being understood that said magnets must be so situated as to be within the shunted circuit, but directly in the main line, always leaving the low-resistance path *a* for the outflowing statical discharge. Nor do I limit myself to this specific apparatus disclosed in Figs. 1 and 2 for producing the result described, as I believe my invention is of such scope as to include any apparatus which will act to give an instantaneous and increased potential upon the line at the time that the battery is short-circuited or removed from circuit at the transmitting-station.

In Fig. 3 I have shown a modified form of apparatus in which the transmitter is located at a different station from the transmitting-battery and in which the statical charge remaining in the line itself between the transmitting-station and a distant station is utilized to aid in sending the signal to the station desired. In this instance the transmitter is located at Pittsburg, the receiver at Chicago, and the transmitting-battery at New York, said parts being earthed, respectively, at E<sup>2</sup>, E', and E. In the operation of this modified form of the apparatus, when the transmitting-battery B is earthed through the transmitter T and the earthed connections E<sup>2</sup> and E, that portion of the line between New York and Pittsburg is charged. When the transmitting-pen passes on to the fillet and the circuit is broken at Pittsburg, the statical charge remaining in the line between New York and Pittsburg is added to the direct charge of the battery and an increased wave or impulse is transmitted to the receiving-station at Chicago and an instantaneous record thereof is made.

I find that with apparatus constructed in accordance with the above description I obtain a clear and well-defined record, and that in no instance does there occur such an absolute discharge of the line through the shunt *a* as that the first dot-impulse which may go to line will be rendered imperfect, as is sometimes liable to be the case in the use of my prior apparatus, where the contact of the pen with the cylinder in the transmitter lasts for a considerable length of time, thereby discharging the line so completely that when the battery is again connected to line some little time is required to charge. It will be seen at a glance that with the present apparatus the very instant the battery is con-

nected to line the device utilized for giving the impetus will charge the line instantaneously, and with the result I have indicated.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The described method of giving increased effect to the signaling impulses or currents transmitted over a telegraphic or analogous electrical circuit, consisting in setting up simultaneously a second set of electrical currents or impulses which have a greater potential than the signaling-impulses, substantially as described.

2. The described method of transmitting a single message electrically, consisting in creating two simultaneous sets of electrical currents or impulses over an electrical circuit, substantially as described.

3. In an automatic telegraph, the combination of a main-line circuit, a transmitter, a transmitting-battery, and a device located directly in the main-line circuit between the battery and the transmitter for increasing the charge sent to line, substantially as described.

4. In an automatic telegraph, the combination of a battery which normally charges the line, a transmitter located in a shunt around said battery, and an electro-magnet located in the line, but between the battery and the shunt, substantially as described.

5. A telegraphic transmitter located in a shunt about a transmitting-battery which normally charges the line, in combination with an electrostatic device located in the line between the shunt and the battery, substantially as described.

6. In a system of telegraphy, the combination of a battery which normally charges the line and includes in its circuit a device having electrostatic or charging capacity, with a transmitter in a shunt about the device having such electrostatic capacity, substantially as described.

7. In a system of telegraphy, the combination of a battery which normally charges the line and an electrostatic device with a transmitter located in a shunt about the battery and electrostatic device, substantially as described.

8. In a system of telegraphy, the combination of the following elements: a battery which normally charges the line, a transmitter located in a shunt around the battery, an electrostatic device located in the line between the battery and the shunt, and a receiver located at the receiving-station, substantially as described.

9. In a system of telegraphy, the combination of the following elements: a battery which normally charges the line, a transmitter located in a shunt around the battery, an electro-magnet located in the line between the battery and the shunt, and a receiver located at the receiving-station, substantially as described.

10. In a system of telegraphy, the combina-



tion of the following elements: a battery which normally charges the line, a transmitter located in a shunt around the battery, an electro-magnet located in the line between the 5 battery and the shunt, and a receiver located at the receiving-station and connected to one pole of a condenser having its pole connected to earth, substantially as described.

11. In a system of automatic telegraphy, the 10 combination of the following elements: a main line earthed at both ends, a battery which normally charges the line, a transmitter lo-

cated in a shunt around the battery, an electro-magnet located in the line, but between the battery and the shunt, and a receiver located 15 at the receiving-station, said receiver being connected to a condenser which is located between it and the earth, substantially as described.

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