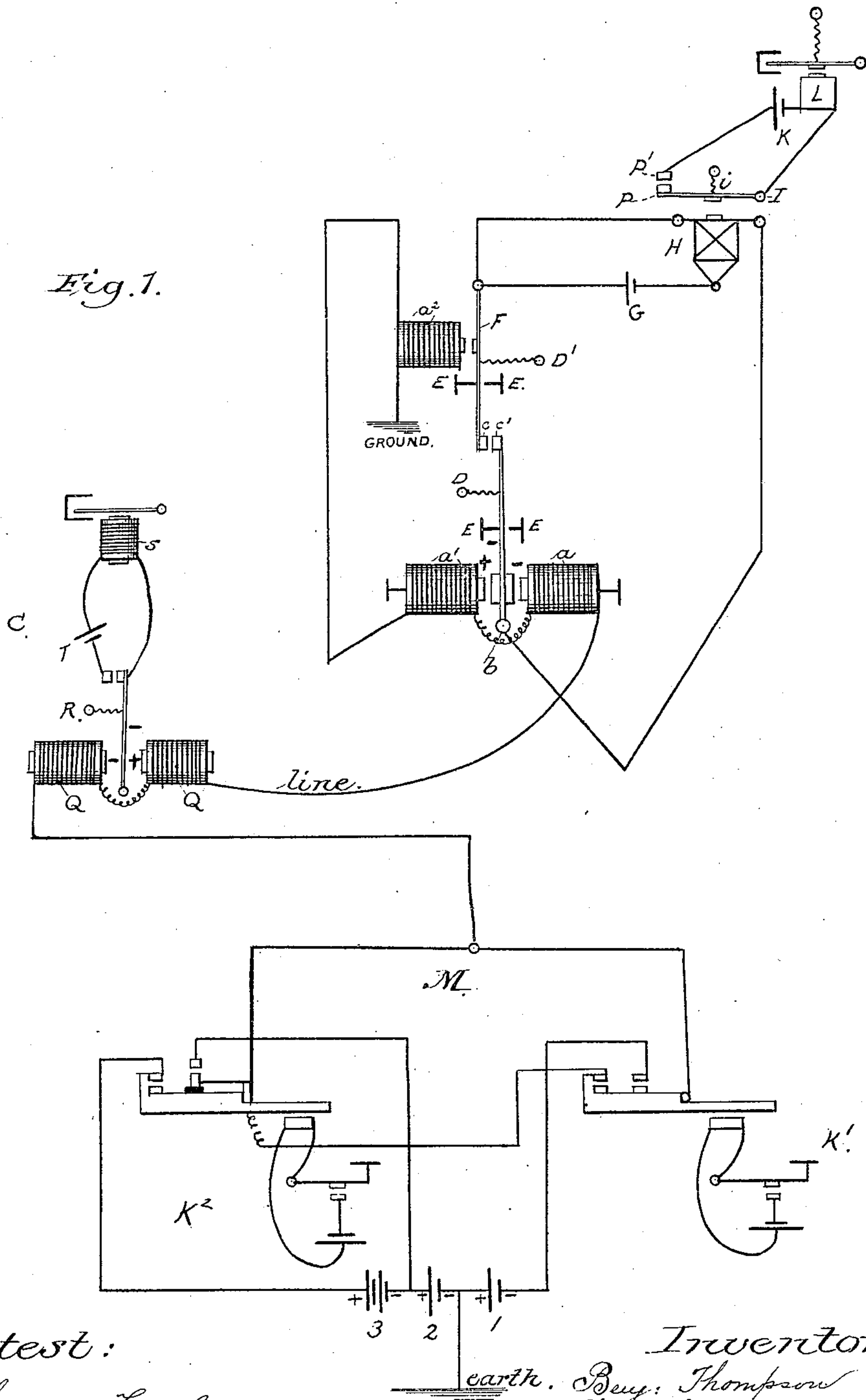


B. THOMPSON & C. SELDEN.

QUADRUPLIX TELEGRAPH.

No. 246,244.

Patented Aug. 23, 1881.



Attest:
J. Walter Fowler,
R. K. Evans

Inventors:
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(No Model.)

2 Sheets—Sheet 2.

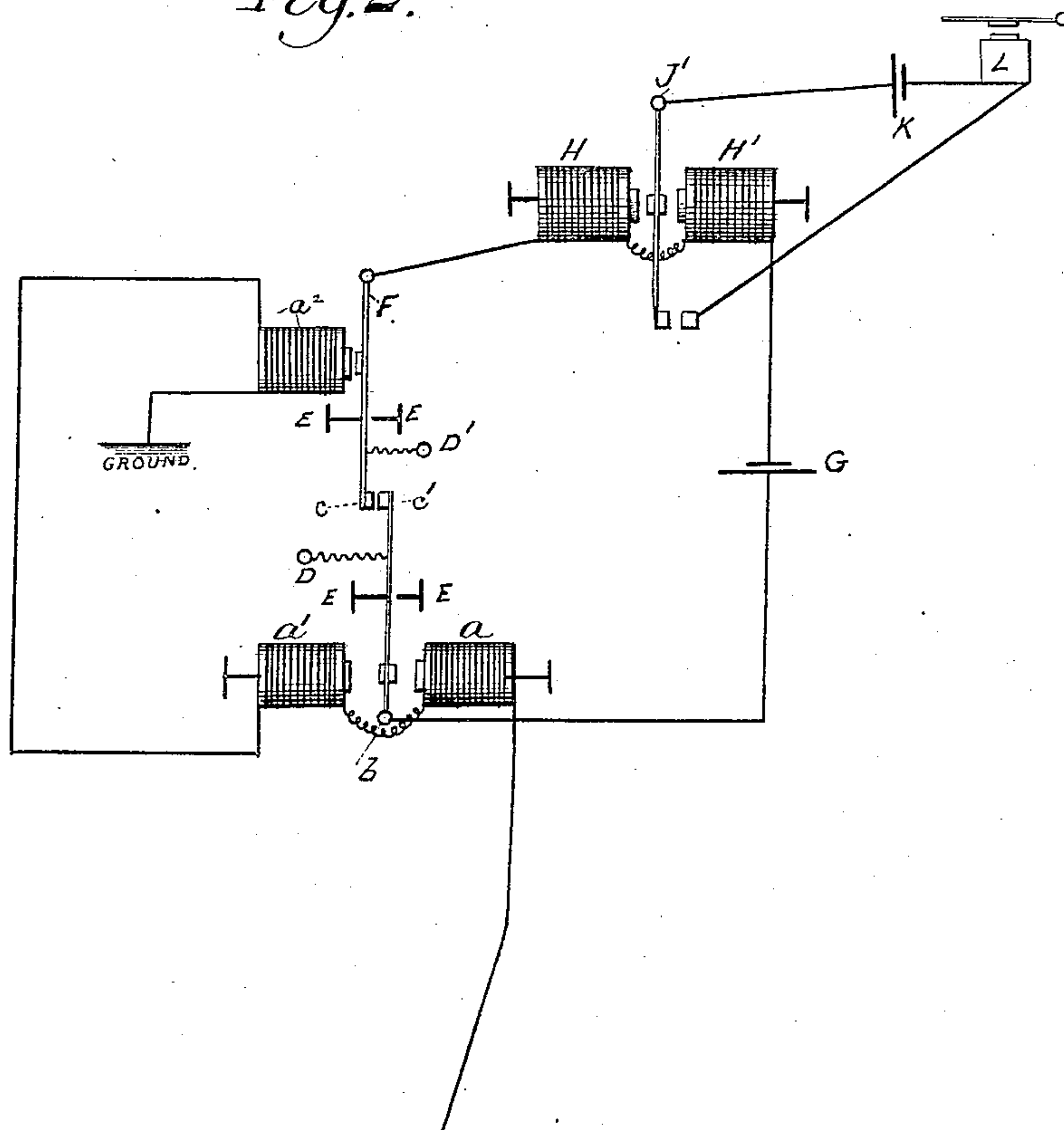
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Fig. 2.



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UNITED STATES PATENT OFFICE.

BENJAMIN THOMPSON AND CHARLES SELDEN, OF TOLEDO, OHIO.

QUADRUPLIX TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 246,244, dated August 23, 1881.

Application filed November 18, 1880. (No model.)

To all whom it may concern:

Be it known that we, BENJAMIN THOMPSON and CHARLES SELDEN, of Toledo, State of Ohio, have invented a new and useful Improvement in Multiple Telegraphs, of which the following is a clear, full, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

10 Figure 1 is a general plan view of the apparatus. Fig. 2 illustrates modifications of the same.

Our invention relates to a system of multiple telegraphy; and it consists in the combinations of devices hereinafter explained and claimed.

To enable others skilled in the art to make and use our invention, we will proceed to describe the exact manner in which we have carried it out.

20 In the drawings, M shows the transmitting arrangement of Patent No. 196,057, issued to B. Thompson October 9, 1877.

In Fig. 1 are shown the electro-magnets $a a'$ of the polarized relay, acting upon the polarized armature for governing the armature b . $E E$ are back-stops. $D D'$ are tension-springs, and $c c'$ are contact-points. The electro-magnet a^2 governs the armature F . G is a local battery. H is a differentially-wound electro-magnet, and I its armature, with attached tension-spring i . $P P'$ are contact-points. K is a local battery, and L is a reading-sounder.

In Fig. 2 the polarized relay electro-magnets $a a'$ govern the armature b , and $E E$ are back-stops. $D D'$ are tension-springs. $c c'$ are contact-points, and a^2 is an electro-magnet governing the armature F . G is a local battery. $H H'$ are the magnets of a polarized local relay governing armature j' . K is a local battery, and L is a reading-sounder.

In Fig. 1, $Q Q'$ is a polarized relay. T is a local battery, and S a local electro-magnet, and R is a tension-spring.

When keys K' and K^2 are open batteries 2 and 3 flow to line, and being of a certain polarity and strength the armature of relay $Q Q'$ is held in a position that opens its local circuit, while the tension of spring D' is overcome and armature F is attracted toward electro-magnet a^2 . The armature b of electro-magnets $a a'$ is attracted in the same direction; but, owing to

the position of back-stops $E E$, the points $c c'$ do not remain in contact, and as one circuit through differentially-wound local electro-magnet H is thereby broken its armature is attracted, and the points $P P'$ being kept separated the sounder L remains uncharged. When key K' alone is closed battery 1 is placed to line, and being of a polarity opposite to that of the normal current, or the current flowing when keys K' and K^2 are open, the armature of the relay $Q Q'$ is attracted in the direction of tension-spring R , closing its contact-points and recording a signal on the sounder S . At the same time the armature b of relay $a a'$ is attracted toward electro-magnet a , and armature F of relay a^2 , governed by the tension-spring D' , which is set above the automatic force exerted by the diminished current coming from 1 or from 2 alone, is carried from magnet a^2 , and points $c c'$ are not in contact a sufficient length of time to record a signal, owing to the position of the back-stops $E E$; hence no signal is recorded on sounder L . When key K^2 is alone closed battery 3 is taken off of line, leaving battery 2 in line-connection only. The effect of this battery upon relay a^2 , governing armature F , is overcome by tension of spring D' , which causes contact-points $c c'$ to close and differentiates the action of the circuit of local battery G , through the differentially-wound local magnet H , while the attached spring to armature I closes the local points $P P'$ and records a signal on sounder L . When keys K' and K^2 are closed simultaneously batteries 1 and 2 are short-circuited and battery 3 cut out; hence no battery is placed to line. The armature of relay $Q Q'$ is by the tension of the spring R forced to close its contact-points, thus recording a signal on sounder S , while the armature b of relay $a a'$, governed by spring D , and armature F of relay a^2 , governed by spring D' , are brought in contact at points $c c'$, which closes both circuits of differentially-wound magnet H , whose armature I , governed by spring i , closes points $P P'$, thus recording a signal on sounder L .

In the drawings, Fig. 2, the same general idea is shown, the difference being in the arrangement of the repeating-magnet $H H'$, which in Fig. 2 is governed thus: When the armatures F and b are in contact a local battery,

G, charges the polarized repeating-magnet H H', when its local points are closed and signal recorded on sounder L. When armatures F and b are not in contact the armature J' of the repeating polarized magnet H H' is held in a position that opens its contact-points, owing to the adjustment of coil H and its permanent magnetism.

We have shown and described an arrangement for sending two messages in one direction; but it is to be understood that the same arrangement may be used to form a quadruplex telegraph by the employment of the well-known methods of neutralizing outgoing currents at the sending-station.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as described, of a polarized relay adapted to hold its lever against a stop and in position where it can make contact with another armature-lever by the action of a normal current, a diminished current of the same polarity as the normal, or by its own action when no current is flowing, and a second relay, whose armature, when against its back-stop, is adapted to make contact with the first lever, so as to complete a local circuit, and is provided with a retractor adjusted above the effects of any but currents of normal strength.

2. The combination, substantially as described, of a polarized relay adapted to hold its armature against a stop in position where it can make contact with another armature-lever by the actions of currents of a normal polarity, or by its own action when no current is passing, and to hold the armature out of position against another stop by the action of reversed currents, a second relay, whose armature is provided with a retractor-spring adjusted so as to hold the armature in a retracted position to make contact with the first when the normal current is diminished, a local battery, and a differential receiving or repeating sounder, one of whose differential coils completes its circuit through the armature-levers when they are in contact.

3. The combination, substantially as described, of a polarized relay whose armature is provided with a spring applied so as to assist the action of the currents of the normal polarity—*i. e.*, of the polarity prevailing when both transmitting-keys are open—and a second relay provided with a retractile spring adjusted above currents of less strength than the normal currents, and applied to the armature so as to tend to carry it in an opposite direction to that imparted to the first armature-lever by the action of its spring, and into a position where it will make electrical contact with the first-said lever.

4. The combination, with a key system in which signals are transmitted by diminishing the normal current without changing its polarity, by diminishing the normal current and simultaneously reversing its polarity, and by withdrawing the current from the line of a receiving relay system for responding to the diminished current of normal polarity and to withdrawal of current, consisting of two relays, whose armatures are adapted to make contact with one another and form part of a local circuit, one relay provided with a retractile spring adjusted so that it can be overcome only by the current of the normal strength, and the other a polarized relay adjusted to hold its relay-armature in position to make contact with the first when acted upon by currents of the normal polarity, or when no current is passing, substantially as described.

5. In a multiple telegraph, the combination of relay electro-magnets $a a' a''$, armatures F b, springs D D', battery G, differentially-wound repeating electro-magnet H, stops E E, battery K, and sounder L, when constructed and arranged to operate substantially as and for the purpose herein described.

BENJAMIN THOMPSON.
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Witnesses:

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A. H. EVANS.