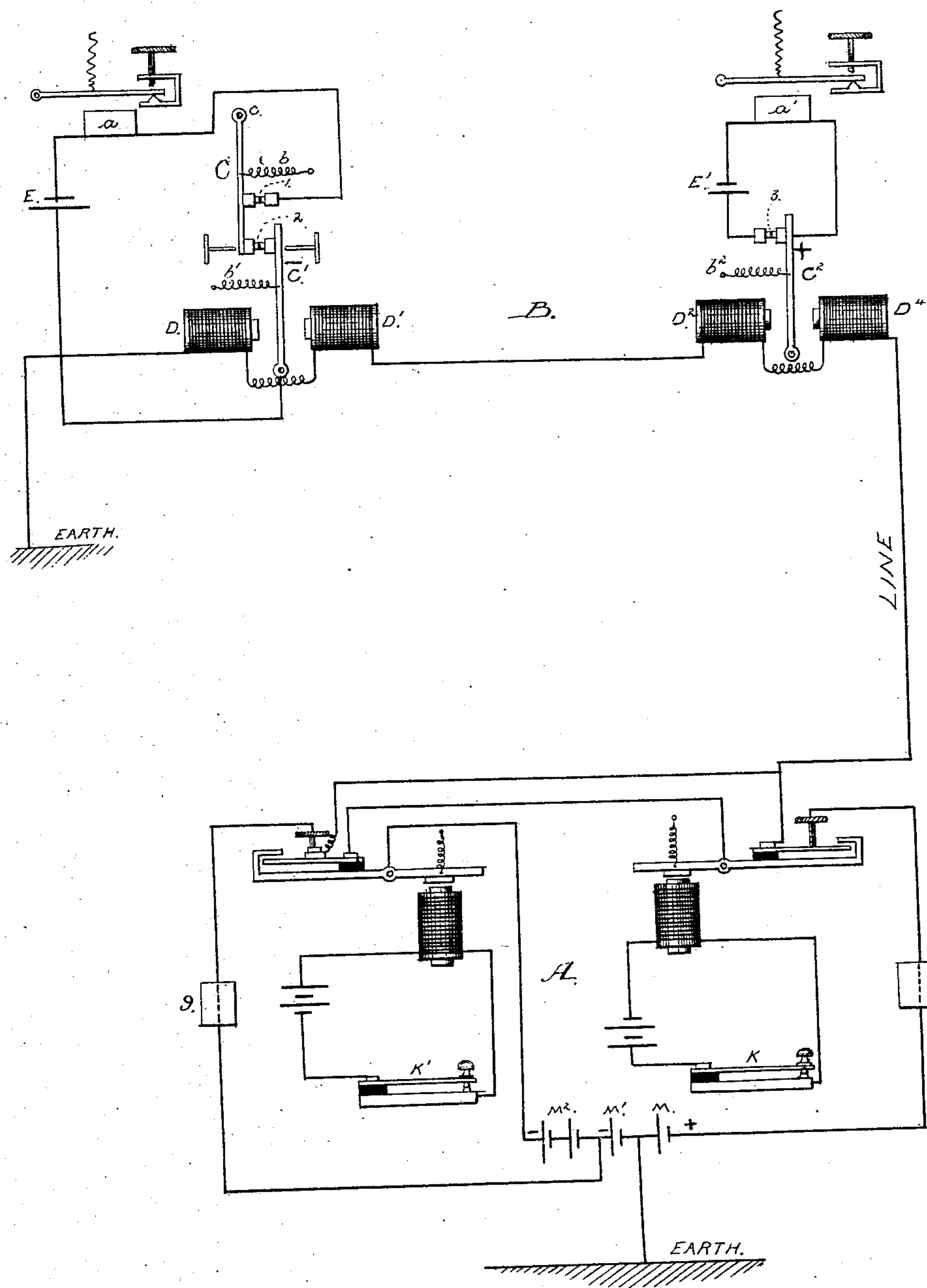


(No Model.)

B. THOMPSON.
QUADRUPLEX TELEGRAPH.

No. 245,102.

Patented Aug. 2, 1881.



Witnesses:

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UNITED STATES PATENT OFFICE.

BENJAMIN THOMPSON, OF TOLEDO, OHIO.

QUADRUPLIX TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 245,102, dated August 2, 1881.

Application filed August 5, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN THOMPSON, of Toledo, Lucas county, in the State of Ohio, have invented a new and useful Improvement in Quadruplex Telegraphs; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification, and in which the figure shows the arrangement of the several parts.

The nature of this invention relates to certain improvements in the art of telegraphy, by means of which two messages may be simultaneously transmitted over a single wire in the same direction; and it consists in a peculiar arrangement of the receiving apparatus and connections, and is an improvement on Patent No. 196,057, issued to Benj. Thompson October 9, 1877.

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

In the drawings, A shows the transmitting, and B the receiving, station. The transmitting-station A is substantially the same as in Patent 196,057, there being added thereto two small resistance-coils, 9 and 10, for the purpose of equalizing resistances for incoming currents, while the receiving arrangement is a modification of the receiving arrangement shown in said patent.

Referring to the receiving-station B, the magnets D D' govern the armature C', which armature is a permanent magnet; but any well-known pattern of polarized magnet may be used.

C is a swinging bar governed by spring b and armature C', which armature is governed by the spring b'. The local points of contact upon the armature C' and bar C are numbered 1 and 2.

E is a local battery, and a is a sounder.

D² and D⁴ represent magnets of a polarized relay acting upon armature C², and b² is a spring governing said armature.

3 are local points of contact upon armature C².

E' is a local battery, and a' is a sounder.

When both keys K and K' are open main batteries M' M² flow to line with that polarity which tends to force armature C² of relay D²

D⁴ in opposition to spring b², and, being of sufficient strength, overcomes the tension of spring b² and opens the local circuit of sounder a' by separating the points 3. It also forces armature C' of relay D D' in the direction of spring b' and in opposition to the spring b, and is of sufficient strength to separate points 1 and open local circuit of sounder a. When key K is alone closed main battery M flows to line with the polarity which tends to force the armature C² in the direction of the spring b², and closes local circuit of sounder a' by contact of points 3, and also forces armature C' toward magnet D', separating points 2 before signal is felt on sounder a, this motion being accelerated by spring b. When key K' is alone closed the main battery M' flows to line with a polarity which tends to hold the armature C² of relay D² D⁴ in such a position that local points 3 remain open, and also reduces the force upon armature C', so that spring b is of sufficient strength to overcome the effects of spring b' and bring points 1 and 2 in contact. Sounder a is charged and signal recorded. When both keys K and K' are closed no battery flows to line, and the tension-spring b² causes armature C² to connect points 3, causing signal on sounder a', while spring b' causes armature C' to connect local points 2 and still not separate points 1, and thus a signal is recorded on sounder a.

The diagram, as shown and herein described, admits of the transmission of two messages simultaneously in the same direction, and by the use of the usual methods of differentializing the magnets two messages may at the same time be transmitted in the opposite direction over the same wire.

Having thus explained my improvement, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a key system in which one of the keys transmits signals by a diminution of the normal current strength and the other by a diminution of the normal current strength accompanied by a reversal of polarity, of a polarized receiving-instrument whose armature is provided with a supplemental contact-lever and contact-points and connections, as described, and opposing retracting-springs, one upon the armature-lever arranged to assist the action of the normal current, and the other upon the supplemental

lever, said springs being adjusted as described, so that the spring upon the supplemental lever is insufficient to overcome the strength of that upon the armature-lever assisted by the force exerted by the normal current, but is sufficient to overcome its strength when supplemented only by the force exerted by the diminished current of the same polarity.

2. The combination, with a key system in which one of the keys transmits signals by a diminution of the normal current strength, the other by a diminution of the normal current strength accompanied by a reversal of polarity, and both together by a cessation of current, of the two oppositely-polarized receiving-instruments, one adjusted to close its local by

reversal of the normal current strength or by cessation of current, and the other provided with a supplemental contact-lever, contacts, and connections, as described, and two opposing springs adjusted and arranged so that the spring upon the armature-lever assists the action of the normal current in overcoming the spring upon the supplemental lever, so as to hold the latter out of contact with its stop, but is insufficient for this purpose when the normal current is diminished or withdrawn.

BENJAMIN THOMPSON.

In presence of—

H. C. ROEMER,

J. N. REED.