

(No Model.)

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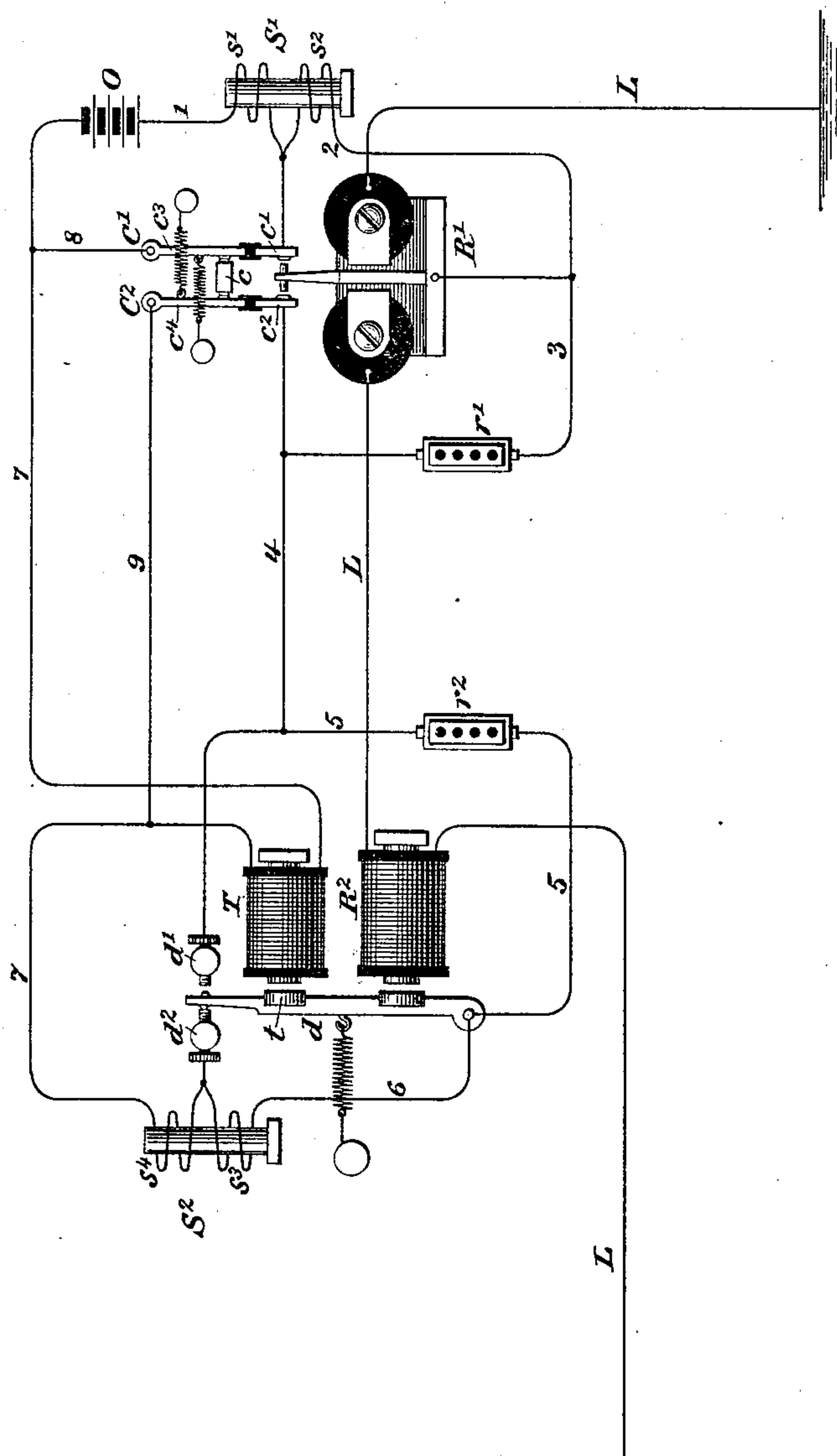
J. W. LARISH.

MEANS FOR PREVENTING FALSE SIGNALS ON REVERSALS IN
QUADRUPLEX TELEGRAPHS.

No. 329,749.

Patented Nov. 3, 1885.

Fig. 1.



Witnesses

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(No Model.)

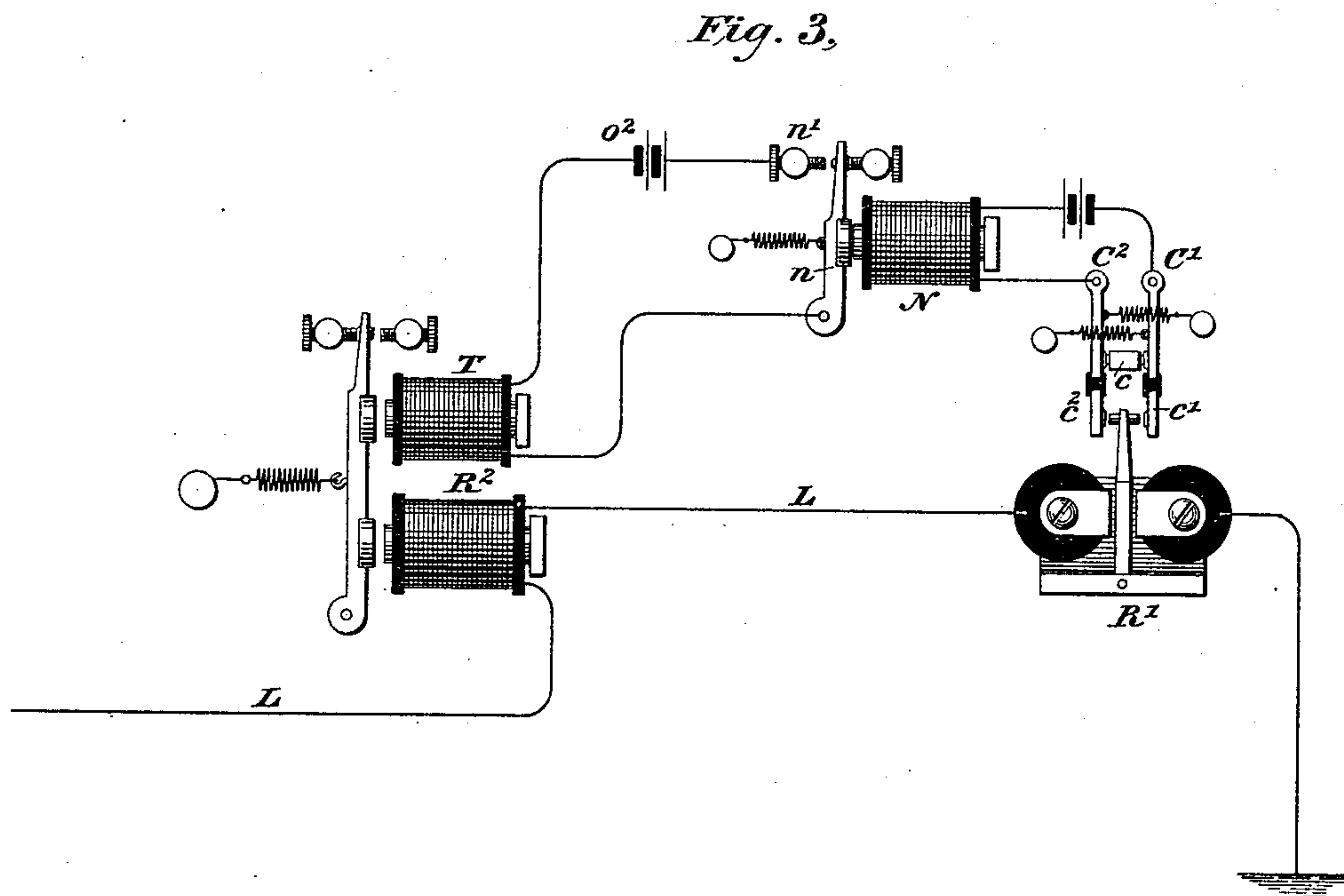
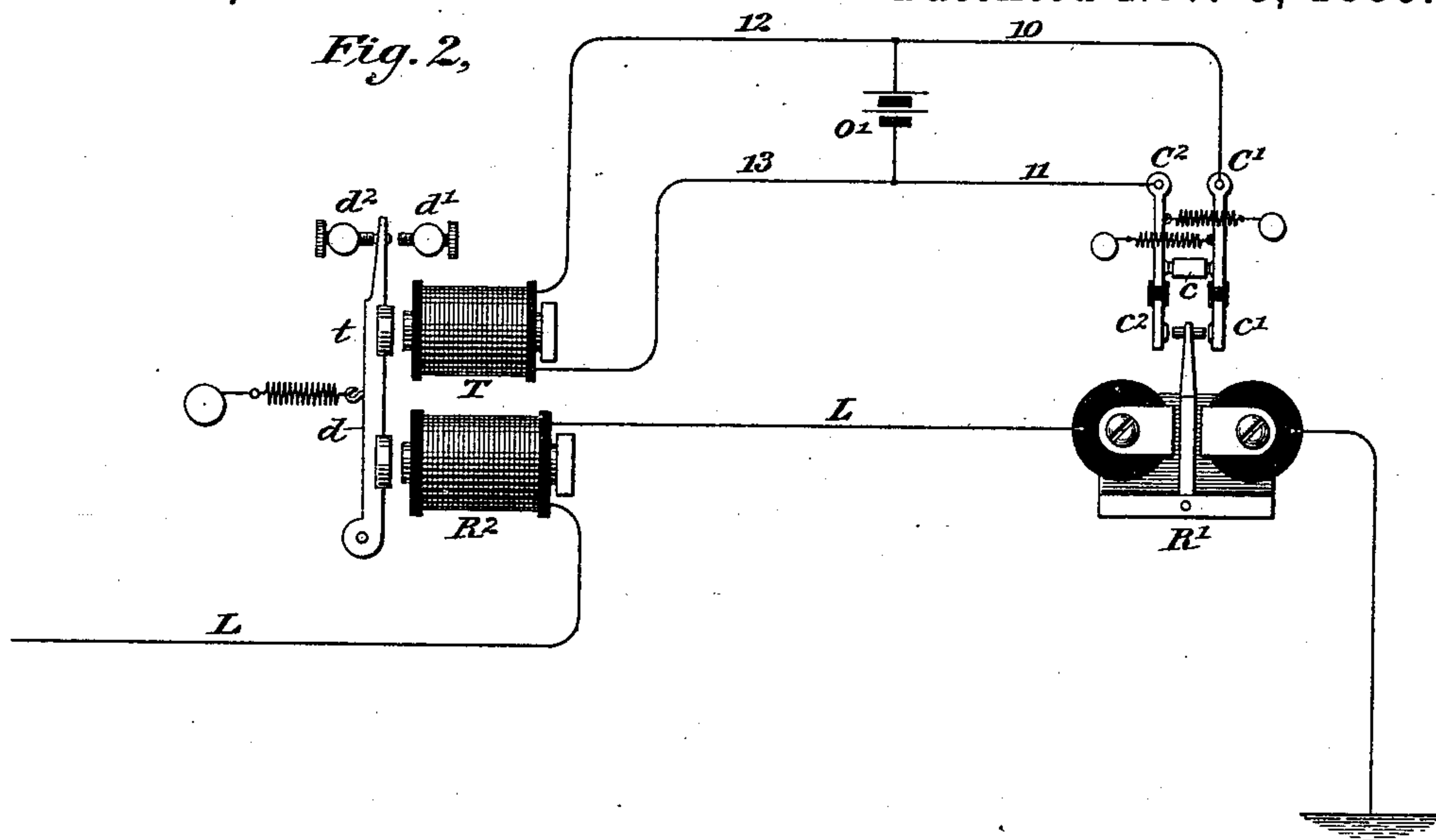
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MEANS FOR PREVENTING FALSE SIGNALS ON REVERSALS IN QUADRUPLIX TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 329,749, dated November 3, 1885.

Application filed June 6, 1885. Serial No. 167,850. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. LARISH, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Quadruplex Telegraphs, of which the following is a specification.

The invention relates to the class of apparatus employed for receiving signals embodying two telegraphic messages and transmitted over a single conductor at the same time.

The special object of the invention is to provide means for operating two receiving-instruments by currents from a local battery in such a manner as to preclude the possibility of repeated or false signals being given.

The invention consists in organizing the receiving apparatus in substantially the following manner: In the main-line circuit there are two relays—preferably a polar and a neutral relay—responding to different classes of currents. Each relay is provided with a receiving-instrument, both of which are included in the circuit of a local battery. The local battery has its circuit-connections at all times complete, but the armature-levers of the relays are organized to variously shunt different portions of the local circuit, in which there are included the coils or portions of the coils of the receiving-instruments. It is by shunting such portions that the receiving-instruments are caused to respond. Each instrument is preferably constructed with two opposing coils, the one of which is included at all times in the local circuit, while the other is included in a portion which may be shunted by the armature-lever of the corresponding relay. In practice it is preferred to employ one polar relay and one neutral relay.

In another application of even date herewith there is described and shown an organization of apparatus designed to carry out this portion of the invention. It is well known that a reversal of the main-line current for the purpose of operating the polar relay is liable to cause a false signal to be made by the neutral relay. To prevent the occurrence of such false signals, there is applied to the armature-lever of the neutral relay a second or additional electro-magnet, which is included in

the circuit of the local battery. Normally, this second electro-magnet is shunted through a circuit of comparatively no resistance; but when the neutral relay is actuated the shunt is opened and the additional magnet is placed in circuit by reason of the pressure exerted by the armature-lever of the polar relay. If a reversal in the direction of the current occurs, the shunt-circuit will remain open until after the reversal. The additional magnet thus remains vitalized by reason of the local battery, and even though the neutral relay-magnet should be momentarily demagnetized its armature-lever will be held forward by the second electro-magnet.

In the accompanying drawings, Figure 1 is a diagram illustrating the invention. Figs. 2 and 3 illustrate modifications.

Referring to the drawings, R' represents a polar relay, and R^2 a neutral relay, both of which are included in a main line, L . The polar relay is provided with two contact-points, c' and c^2 , between which the lever c vibrates. The points c' and c^2 are carried upon pivoted arms C' and C^2 , respectively, but are insulated therefrom, as shown. Suitable yielding springs, c^3 and c^4 , hold the arms against a resting-stop, C , with which they make metallic contact, thereby completing an electrical connection from one to the other. The springs c^3 and c^4 are of sufficient strength to withstand the pressure which the lever c exerts when the line is traversed by a current of the strength only required to actuate the relay R' . A current of greater strength, such as employed for operating the relay R^2 , will cause the arm C' or C^2 to move away from the stop C , accordingly as the lever c is against the arm C' or C^2 . The neutral relay R^2 is provided with an armature-lever, d , which responds only to currents of greater strength than required to actuate the relay R' , and it is provided with a back or resting contact-point, d^2 , and a front contact-point, d' . A local battery, o , has one pole connected by a conductor, 1, with the point c' , and from this point by a conductor, 2, with the armature-lever c ; thence by conductor 3 to the point c^2 ; thence by a conductor, 4, to the point d' of the relay R^2 ; thence by a conductor, 5, with the lever d of this relay;

thence by conductor 6 to the point d^2 , and by conductor 7 with the remaining pole of the battery. The receiving-instrument S' of the relay R' is wound with two coils, s' and s^2 , the former of which is included in the conductor 1, while the latter is included in the conductor 2. A current from the battery o , traversing both these coils, neutralizes each the effect of the other. When, however, the lever c makes contact with the point c' , the coil s^2 is shunted through the lever c , and thus the instrument S' responds by reason of the current traversing the coil s' only. A resistance, r' , is included in the conductor 3 for the purpose of equalizing the resistance of the circuit of the battery o , and this resistance is placed in circuit when the coil s^2 is cut out of circuit, and vice versa, to compensate for the resistance of the coil s^2 . The receiving-instrument S^2 of the relay R^2 is also preferably constructed with two coils, s^3 and s^4 . This instrument is preferably of the character known as a "repeating-sounder," constructed to reverse the signals received. The coil s^3 is included in the conductor 6 and the coil s^4 in the conductor 7. When, therefore, the lever d is against the stop d^2 , the coil s^3 is shunted, and the instrument is vitalized by the current traversing the coil s^4 . When, however, the electro-magnet R^2 is vitalized by a current of sufficient strength to actuate the armature-lever d , the shunt-circuit is opened, and the current of the battery o is forced to traverse both coils s^3 and s^4 , and the current traversing the one neutralizes the effect of the current traversing the other. In the conductor 5, leading from the point d' to the lever d , there is included in the artificial resistance r^2 , the function of which with reference to the coil s^3 is the same as that of the resistance r' with reference to the coil s^2 . It will be understood that unless the batteries be well adjusted there may sometimes be produced a false signal upon the instrument S^2 by reason of the movement of the armature d when in its forward position upon a reversal of the current in the main line for operating the instrument R' . To obviate this, an additional electro-magnet, T , is applied to a corresponding armature, t , upon the lever d . This magnet is included in the conductor 7; but it is normally shunted by means of the conductors 8 and 9, respectively, leading from points in the conductor 7 upon opposite sides of the electro-magnet T to the arms C' and C^2 , respectively. It will be evident, therefore, that unless the line be traversed by a current of sufficient strength to actuate the instrument R^2 , the shunt-circuit will be complete through the conductors 8 and 9 and the arms C' and C^2 ; but when the line is traversed by a current of the strength required to actuate this relay, then the lever c will press the arm C' or C^2 away from its resting-stop C and thereby interrupt the shunt-circuit. The lever d will then be held in its forward position, not only by the action of the electro-magnet of the relay R^2 , but also by the magnet T . If, there-

fore, a reversal of the current takes place at that moment and the relay-magnet be demagnetized, the shunt-circuit of the magnet T will remain interrupted an instant after the reversal takes place, and before this circuit is completed the magnet R^2 will be again charged by the main-line current, so that no false movement will be made by the armature-lever d . As soon as the current of the main line is interrupted, the shunt-circuit will be completed and the electro-magnet T again cut out of circuit.

In Fig. 2 there is shown a modification in which the electro-magnet T is vitalized by currents from a separate local battery, o' , instead of from the battery O . For this purpose the arm C' is connected by a conductor, 10, with one pole of the battery o' , the other pole of which is connected by a conductor, 11, with the arm C^2 . The respective poles of the battery are also connected by the conductors 12 and 13 through the electro-magnet T . When the instrument is at rest, as shown in the drawings, the battery is shunted around the electro-magnet T ; but when the polarized relay R' is vitalized by a current of the strength required to operate the relay R^2 , then the shunt-circuit of the battery o' will be opened by the pressure of the relay-lever against one or the other of the arms C' or C^2 , thereby causing the electro-magnet T to be vitalized.

The operation of the device is essentially the same as that described with reference to Fig. 1, although it will be evident that no change of resistance in the circuit of the battery O will be occasioned in this organization.

In Fig. 3 still another method of vitalizing the magnet T by a local battery is shown. In this instance the local battery o^2 is placed in a circuit which is completed and interrupted by the movements of a lever, n , of a repeating sounder, N . The back stop, n' , is connected with one pole of the battery o^2 , the other pole of which is connected through the magnet T with the lever n . The sounder N is included in the circuit of the local battery o^2 , the circuit-connections of which are made and interrupted by the arms C' and C^2 by the movements of the lever of the relay R' . Normally, therefore, the electro-magnet T is vitalized, and the armature-lever n is held down; but when a strong current traverses the main line L , then the circuit of the battery o^2 is interrupted and the electro-magnet T is vitalized.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with a main line, a neutral and a polar relay, of a local battery, two receiving-instruments included in the circuit of same, a supplementary magnet applied to the armature-lever of the neutral relay and included in the circuit of the local battery, and means for causing the same to be vitalized during the moment of reversal of the main-line currents of the strength employed for actuating the neutral relay.

2. The combination, substantially as herein-

before set forth, with a polar and a neutral relay and means for operating the same, of a local circuit, two receiving-instruments, respectively controlled by said relays and included in said local circuit, an independent magnet applied to the armature-lever of the neutral relay, and means for causing the same to be vitalized and demagnetized by the operation of said polar relay.

3. The combination, substantially as hereinbefore set forth, with a polar and a neutral relay, of an electro-magnet applied to the armature-lever of said neutral relay, a battery in the circuit of which said electro-magnet is included, a shunt-circuit around said electro-magnet, and means for controlling the connections of said shunt-circuit by said polar relay.

4. The combination, substantially as hereinbefore set forth, with a polar and a neutral relay, of a local battery the connections of which are controlled by said relays, two receiving-instruments included in the circuit of said local battery, means for variously shunting portions of the circuit of said local battery through the instrumentality of said relays, an additional electro-magnet applied to the armature-lever of the neutral relay and included in the circuit of said local battery, a shunt-circuit around said electro-magnet, and means for causing the connections of said shunt-circuit to be open at the moments of the reversals of the main-line currents having a given strength.

5. The combination, substantially as hereinbefore set forth, of a main line, a neutral and a polar relay included in the same, a second electro-magnet applied to the armature-lever of said neutral relay, a local battery, two receiving-instruments in the circuit of said local battery, means for shunting the coils or a portion of the same of either one or both of said receiving-instruments through the instrumentality of said relays, two yielding contact-arms applied to the armature-lever of said polar relay, a resting-contact for the same, circuit-connections around said second electro-magnet through said levers and contact, and means for moving one or the other of said arms from

its contact by the operation of a current of the strength required to operate said neutral relay.

6. The combination, substantially as hereinbefore set forth, with the main line, the neutral and the polar relays included in the same, the battery *o*, having its connections substantially as described, the additional electro-magnet *T*, included in the circuit of said battery, the shunt-circuit around said magnet, which is completed while the neutral relay is inactive, but is interrupted when the neutral relay is operated, the arms *C'* and *C''*, and the stop *C* for completing and interrupting said shunt-connections, all controlled by the polar relay, substantially as described.

7. The combination, substantially as hereinbefore set forth, of a neutral relay and a polar relay, each having a front and a back contact-stop, a local battery connected with all of said stops, two receiving-instruments operated by currents from said local battery, means for actuating said receiving-instruments by the movements of the levers of said relays between their respective stops, and an electro-magnet for holding the lever of the neutral relay in a given position upon the momentary demagnetization of the neutral relay, which electro-magnet is included in the circuit of the local battery.

8. The combination, substantially as hereinbefore set forth, with a telegraphic main line and a relay included therein, of a local battery the connections of which are controlled by said relay, and a supplementary electro-magnet applied to the relay armature-lever and having its coils included in the circuit of said local battery, a shunt-circuit around said electro-magnet, and means for completing and interrupting the connections of said shunt-circuit at will, substantially as described.

In testimony whereof I have hereunto subscribed my name this 29th day of May, A. D. 1885.

JOSEPH W. LARISH.

Witnesses:

GEO. H. USHER,
SIDNEY H. SMITH.