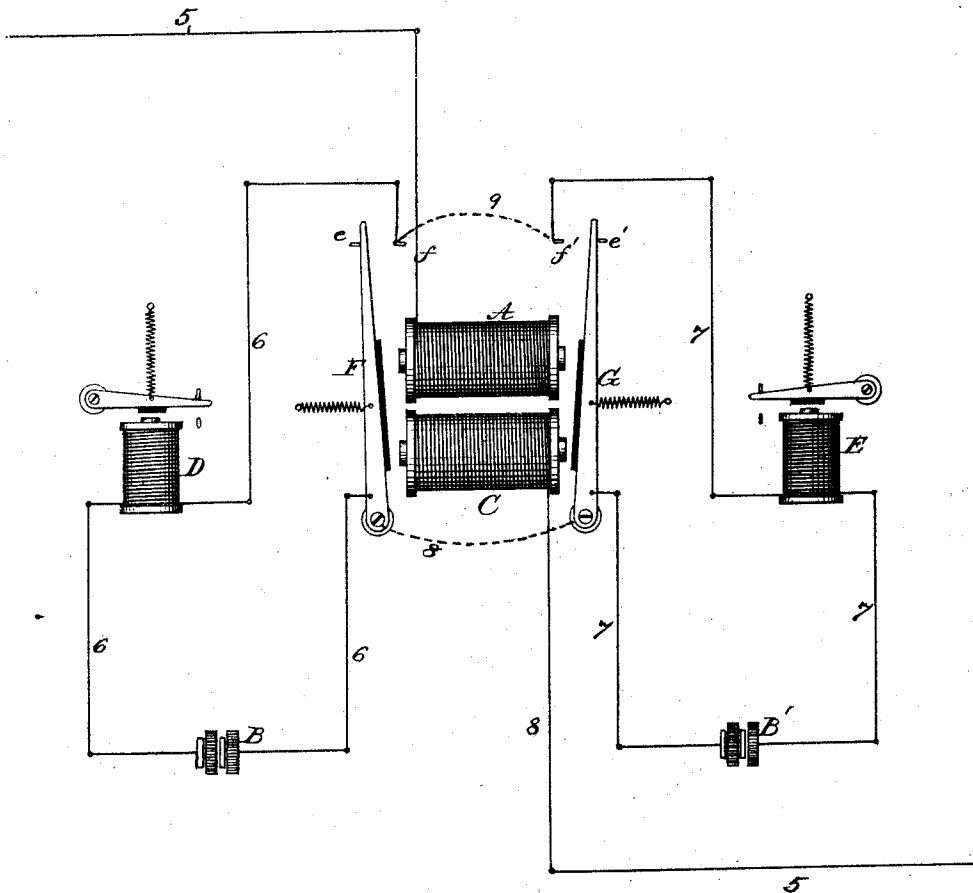


P. B. DELANY.
Telegraph Relays.

No. 152,281.

Patented June 23, 1874.

Fig. 1.



Witnesses.
N. House
A. Campbell.

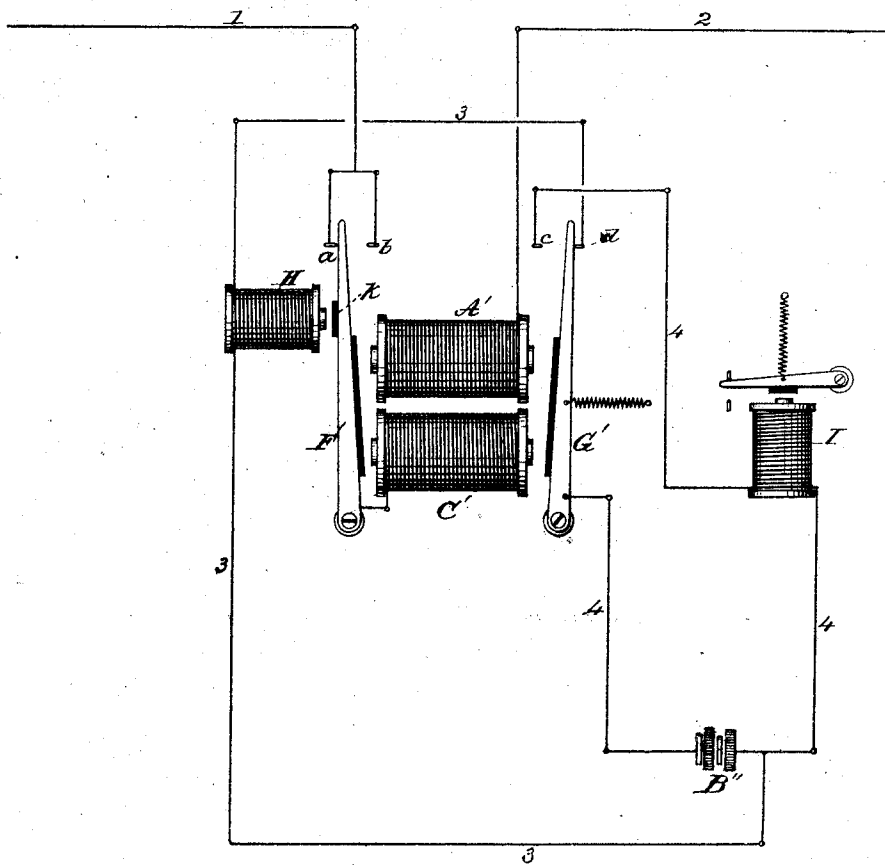
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Telegraph Relays.

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Fig. 2.



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UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN TELEGRAPH-RELAYS.

Specification forming part of Letters Patent No. **152,281**, dated June 23, 1874; application filed November 28, 1873.

To all whom it may concern:

Be it known that I, PATRICK BERNARD DELANY, of Washington city, District of Columbia, have invented certain new and useful Improvements in Telegraphic Relay - Magnets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

It is well known to telegraphers that there is great difficulty on leaky lines in adjusting the retractile springs of telegraphic relays at any station to correspond with the electric tension at such station. Taking terminal stations, for instance, if at one such station an operator adjusts his relay to get the writing from the other terminal, the tension of his spring will be so great that when he transmits his own armature will not respond promptly; or, as is commonly called, it will "drag," thus confusing his own writing. At way-stations the same difficulty is experienced, different adjustments being required to receive from either terminal, according to the condition of the line as regards distance and insulation upon the side received from. Again, in working telegraphic lines, the signals are given by interrupting the continuity of the circuit. If there be a battery, as there usually is, at each terminal, the battery at the terminal not transmitting is constantly in connection with the line-wire, and yet, while the connection at the other terminal is interrupted, there is a constant current escaping therefrom through leaks, &c., often so strong on leaky lines as to keep the instruments of way-stations (especially those near thereto) closed, so that the signals from the transmitting terminal station are not heard at such way-station. Now, the object of this invention is to lessen, if not entirely obviate, these difficulties resulting from leaky lines; and, to accomplish this, I dispense with the back yoke ordinarily found in two-spool electro-magnets, in such case making them substantially two straight electro-magnets, and place a pivoted armature at each end. Where a straight one-spool core has been used, I apply an armature to each

end. These armatures have retractile springs of different tensions, so that a strong current will affect both, or a weak current the one having a spring of slight tension. This forms the first part of my invention.

The second part consists in placing one armature of a relay so constructed directly in the main-line circuit. The front and back stops of such armature are both connected to the main line, the path of the current being through the electro-magnets, the armature, and one of its stops. It follows, then, that when the armature is moving from one stop to the other the main line is completely broken, thus giving notice to all stations, and especially those whose relay-magnets would be held closed by the current from leaks, that the line is in use.

For a more comprehensive explanation, reference is made to the following detailed description and the accompanying drawings, forming part of this specification, in which—

Figure 1 is a diagram view of a relay embodying the first part of my invention, and Fig. 2 is a diagram view of a relay embodying the second part of my invention.

Referring to Fig. 1, 5 5 is the main line, passing through A and C, which are the spools of an ordinary electro-magnet; but, instead of being connected by a back yoke, so as to form, as usual, a horseshoe-magnet, the back yoke is dispensed with, and each becomes, in fact, a straight electro-magnet. At each end armature-levers F G are pivoted, bearing the ordinary armatures, which play between the stops *ef* and *e' f'*. As shown in the drawing, there are two sounders, D E, and local batteries B B', with their circuits 6 6 and 7 7, the armature F, and stop *f*, and forming part of the circuit 6 6, and G *f'* forming part of the circuit 7 7. Instead of this arrangement, however, both armatures and stops may form parts of branches of one local circuit, in which a sounder is placed, as indicated by dotted lines 8 9. The effect, in both cases, is the same, both armatures, when affected, operating to close sounder-circuits.

The operation of this device is as follows: If, at a terminal station, the operator adjusts the spring of one armature—say of G—so as to just get his own writing, and of the other, F, so as to just get the writing of the other terminal, now, although there may be great

difference in the strength of current, when either station is writing, one armature will respond promptly, and enable the message to be read without difficulty. If the relay be used at an intermediate station, the springs are adjusted, one for either terminal, and the same result is obtained.

Referring to Fig. 2, A' C' are the spools of an electro-magnet, having armatures F' G', arranged as described in Fig. 1. The lever F has, however, no retractile spring, but is held away from the magnets by the additional magnet H, acting on additional armature K on such lever. This magnet H is in a circuit from the local battery B', which circuit is closed through such magnet whenever the lever G is at its back stop through such lever, back stop d, and circuit 3 3 3. The sounder I is in a circuit from the same battery through lever G', its front stop e, and circuit 4 4 4, so, when the main-line circuit 1 2 is broken, its retractile spring draws back G, which closes the circuit 3 3, causing the magnet H to draw back F. The main line 1 2, however, passes through both contact-points a b of F, through F', the magnets, and thence to the line. Hence, it follows that every movement of F' completely destroys, for an instant, the continuity of the circuit. Now, there may be upon the line such an amount of leakage from either end as would cause the armatures at any of the way-stations to stick, and thus leaving the operators at such stations in ignorance of the line's

being used, if the ordinary relays be used; but, if the relays be thus arranged, the movement of F' causing a complete break in the circuit, all of such way-station relays will respond, thus showing that the line is in use.

While I have described my invention as applied to relays, I have done so only for convenient illustration, as it may be applied to magnets used for many other purposes.

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

1. A relay having two armatures and two armature-levers, capable of different adjustments, substantially as and for the purpose set forth.

2. In combination with a relay-magnet having two armatures, the additional magnet, substantially as and for the purpose set forth.

3. In combination with a telegraphic circuit, an armature and its stops, arranged to momentarily break such circuit on the movement of the armature between its stops, substantially as and for the purpose set forth.

4. In combination with a relay having two armatures, one or more sounders, the circuits of which are closed by the movement of either armature of the relay, substantially as and for the purpose set forth.

PATRICK BERNARD DELANY.

Witnesses:

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