

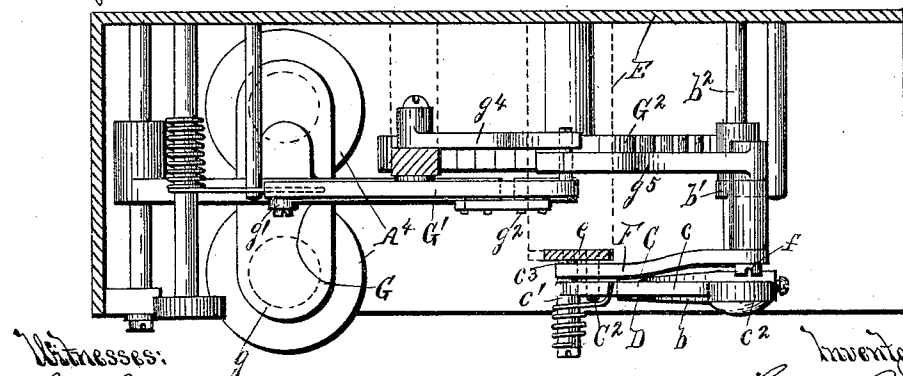
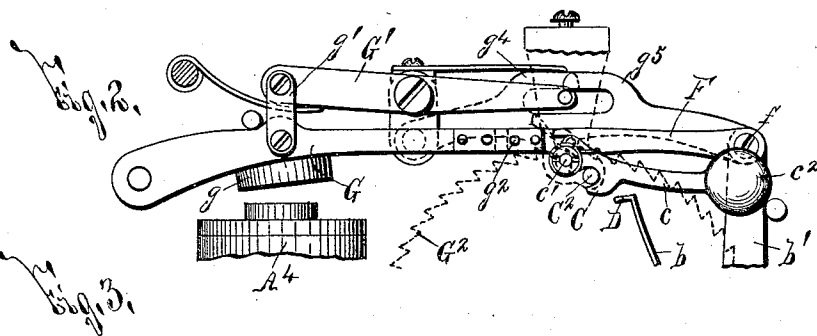
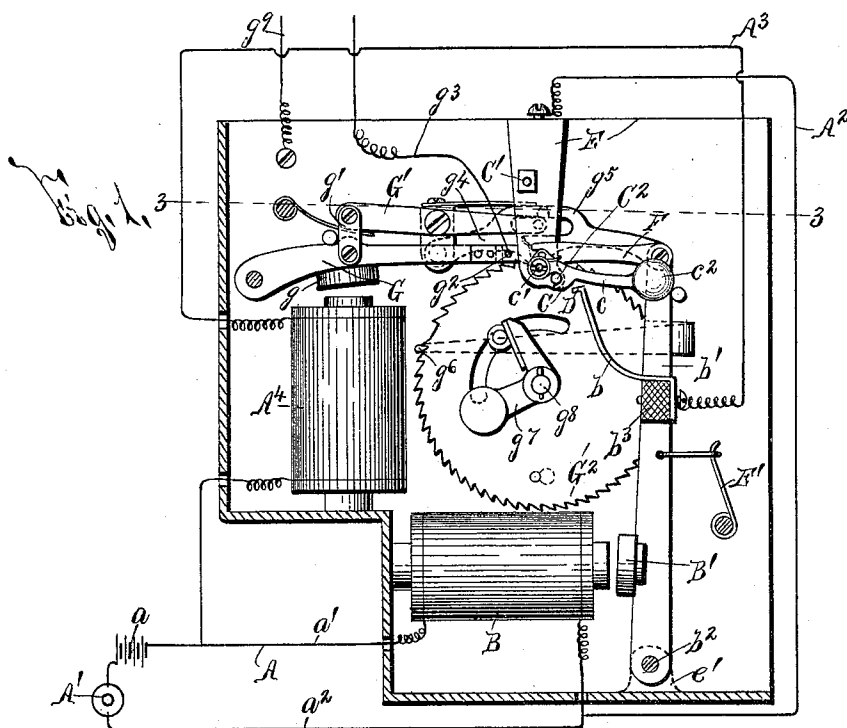
(No Model.)

2 Sheets—Sheet 1.

G. W. HEY.
CIRCUIT CLOSER.

No. 520,427.

Patented May 29, 1894.



Witnesses:
H. C. Chase,
C. Schenck.

Inventor
George W. Hey,
By Arthur C. Parsons
Attorney.

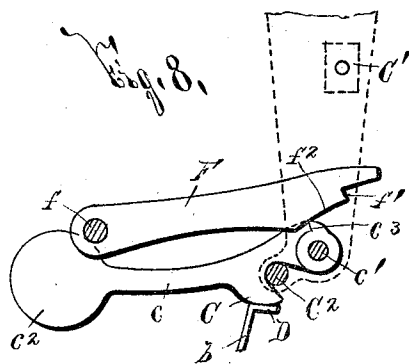
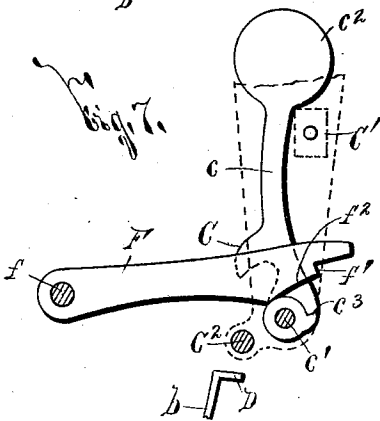
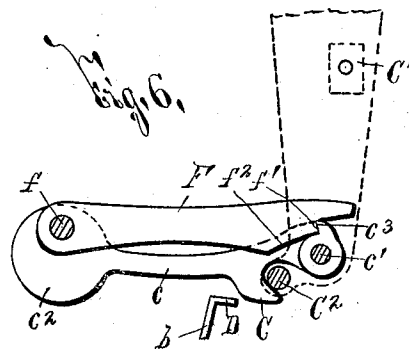
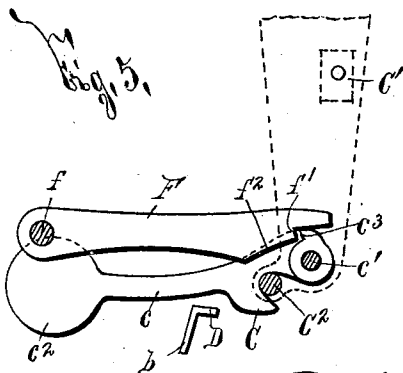
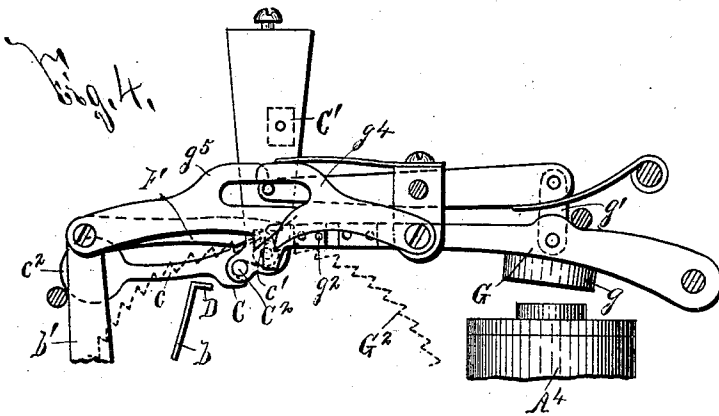
(No Model.)

2 Sheets—Sheet 2.

G. W. HEY.
CIRCUIT CLOSER.

No. 520,427.

Patented May 29, 1894.



Witnesses:
H. Chase,
C. Schoenck,

Inventor
George W. Fry
Attorney,
Arthur C. Parsons

UNITED STATES PATENT OFFICE

GEORGE W. HEY, OF SYRACUSE, NEW YORK.

CIRCUIT-CLOSER.

SPECIFICATION forming part of Letters Patent No. 520,427, dated May 29, 1894.

Application filed March 11, 1893, Serial No. 465,486. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. HEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Circuit-Closers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My present invention relates to improvements in electric circuit closers, and has for its object the production of a simple and practical device, which is economically manufactured, is durable and effective in use, and is easily and practically operated by an electric circuit or other apparatus connected to move one of the terminals of the circuit closer to and fro, and to hold the same in its operative position; and to this end it consists, essentially, in a movable terminal, a second terminal movable toward the former terminal, and means for forcing the movable terminal from its operative position for releasing said movable terminal when in its inoperative position and for holding the second terminal in its operative position.

The invention furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is an elevation, partly in section, showing my improved circuit closer applied to a selective automatic circuit-closing mechanism, which forms no part of this present application. Fig. 2 is an elevation of parts of the mechanism shown at Fig. 1 illustrating particularly my present invention enlarged and in its inoperative position. Fig. 3 is a horizontal sectional view, taken on line —3—3—, Fig. 1, additionally illustrating my improved circuit-closer, and the mechanism to which it is applied. Fig. 4 is a rear elevation of the parts as shown at Fig. 2. Fig. 5 is a detached rear elevation of the separate terminals of my circuit closer, the weighted lever carrying one of the terminals, and the connection detachably connected to said le-

ver, the parts being shown as in their normal position with a lost motion between said weighted lever and connection. Fig. 6 is a similar elevation of the parts as shown at Fig. 5, the connection being shown as in engagement with the engaging projection of the weighted lever, and Figs. 7 and 8 are similar elevations, the weighted lever being shown in its inoperative position at Fig. 7 and the terminals as in contact at Fig. 8.

I have shown the circuit closer as forming part of a selective or automatic signal operating circuit closer, but it will be readily understood that the same, although particularly adapted for use as a part of said circuit closer, may be separated therefrom and may be used alone or in connection with other apparatus.

—A— represents an electric circuit consisting of a battery —a—, positive and negative wires —a'—a²—, and an electric switch or key —A'—, and —B— represents an actuating magnet connected to the wires —a'—a²—.

—C—D— represent the terminals of my improved circuit closer, which are so relatively supported and arranged as to be forced into contact with each other, or to be moved from their normal position without making contact with each other by the passage of current pulsations through the circuit —A—. The terminals C D are carried by any suitable supports, the support for the terminal C consisting of a lever c and that for the terminal D of the armature lever b' of the magnet B, which is provided with an upturned terminal carrying arm b. The lever —c— is preferably hinged at one end upon a pin —c'—, and is provided at its other end with a weight or enlargement —c²—, and the terminal —C— is arranged between the two extremities of said lever and is formed with a beveled face. The armature lever —b'— is hinged at its lower end upon a pin —b²—, is provided between its two extremities with an armature —B'—, and at its upper end with an insulated arm —b³—, to which the lower end of the terminal arm —b— is suitably secured. The pivotal pin —c'— for the lever —c— is carried by any suitable support as an arm —e— provided on a supporting

frame —E—, and the pin —b²— is mounted in a similar support as a lug —e'— upon said frame. The terminal —D— is directly beneath the lever —c—, and is normally separated from the terminal —C—, and, as the magnet —B— is energized, the armature lever —b'— is rocked toward said magnet and the terminal —D— is forced toward the terminal —C— to its operative position. As the circuit —A— is broken by the action of the switch —A'— or other suitable means the magnet —B— loses its magnetism, and the armature lever —b'— is retracted by a suitable spring or other retractive mechanism —E'— connected to return the lever —b'— and the terminal —D— carried thereby to their normal inoperative positions.

—F— is a connection or link for preventing contact of the terminals —C—D— as the magnet —B— is energized and the terminal —D— forced to its operative position. To effect this result the connection —F— rocks the lever —c— upwardly to its position shown at Fig. 7, and releases said lever so as to permit the same to fall downwardly by gravity and permit the engagement of the terminals —C—D—, providing the terminal —D— remains in its operative position. The weight of the support or lever c, and particularly the weight of its enlarged end c² is the means for bringing said support to its normal position, but it is evident that a suitable spring or other similar device may be used for this purpose. This connection —F— is preferably hinged at —f— to the armature lever —b'—, and is provided with a shoulder —f'— for engaging a tooth or projection —c³— upon the pivoted end of the lever —c—. The shoulder —f'— of the connection —F— and the engaging projection —c³— of the lever —c— are preferably so arranged and constructed that, as best seen at Fig. 5, there is a slight lost motion between said parts for enabling the connection —F— to elevate the lever —c— by a well defined impact against its tooth —c³—. Consequently the force of the blow given to the lever —c— rocks the same upwardly with great rapidity and the projection —c³— swings forwardly from engagement with the shoulder —f'— of the connection —F— and an inclined face —f²— extending downwardly and inwardly from said tooth rides upon the hub of the lever —c—, as clearly shown at Fig. 7. The connection —F— is, therefore, detachably engaged with the lever —c—, and the lever —c—, after being forced to its elevated position, is free to assume its normal depressed position, and, if the terminal —D— remains in its operative position, the terminal —C— is engaged thereby. The practical engagement of the terminals is facilitated by the weighted end of the lever —c—, which rocks the terminal —C— firmly against the terminal —D—. Suitable stops —C'—C²— regulate the upward and downward movement of the lever —c—, and consequently as the armature lever —b'— is rocked toward

and away from the magnet —B— by the passage of current pulsations over the circuit —A—, and by the retracting mechanism —E— the lever —c— is continually forced upward and permitted to fall downward. On the contrary, if the armature —B'— of the armature lever —b'— remains in engagement with the magnet —B—, the terminal —D— remains in its operative position, and the terminal —C— is engaged therewith upon the descent of the lever —c—.

As is clearly illustrated in the drawings the support for the terminal C is integral therewith, and the support for the terminal D is separable and insulated therefrom, but it is evident that both terminals may be formed separable from their supports and insulated therefrom, and that both terminals may be formed integral with their supports, providing said supports are insulated from each other.

The terminals —C—D— are connected to the circuit —A— by the respective wires —A²—A³—, and, when in contact, a magnet —A⁴— connected to the wire —A³— is energized by the current from the battery —a—. As the circuit from the terminal —C— is through the hinge pin —c'— of the lever —c— carrying said terminal I connect said lever and pin by a coiled electric conductor —C³—, which acts also as a spring for returning the lever —c— to its normal position.

The magnet —A⁴— is shown as provided with an armature —g— carried by a lever —G—, which is connected by a link —g'— to one end of a lever —G'—, and is provided with a terminal —g²— connected at its inner end to a circuit wire —g³—. The opposite end of the lever —G'— is engaged with a stop dog —g⁴— and with a feeding dog —g⁵— for the ratchet wheel or disk —G²— for forcing said dogs out of operative position. The feeding dog —g⁵— is shown as supported on the armature lever —b'—, and said lever is provided with a stop dog —g⁶—. The ratchet wheel —G²— is provided with a lug which engages a pivoted terminal —g⁷— connected by its pivotal pin —g⁸— and the frame —A— to a second circuit wire —g⁹—. It will be understood, however, that the ratchet wheel —G²—, its feeding and stop dogs, the armature lever —G—, the lever —G'— connected thereto, and the circuit wire —g³—g⁹— form no part of my present invention and consequently it is unnecessary to further illustrate or describe said parts.

It will be readily understood from the foregoing description and upon reference to the drawings that my improved circuit-closer is readily operated by current pulsations through the circuit —A—, and serves to open the circuit connected to its terminals, and it will be noted that the circuit is not opened until the movable parts carrying the terminals cease their movement, and that this action is occasioned by the passage through the electric circuit of a current pulsation of

longer duration than the passage of the current pulsation, which merely brings to its operative position the terminal normally out of operative position and immediately retracts said terminal to its normal position before its engagement by the remaining terminal.

In the present example of my invention I have shown one of its most simple and economically manufactured constructions, and it will be readily noted that the same consists of a minimum number of parts, which are economically manufactured, are readily assembled, and are effective and durable in operation. It is evident, however, that considerable change may be made in the detail construction and arrangement of the parts, and consequently I do not herein limit myself to the exact detail construction and arrangement of said parts.

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

1. A circuit-closer comprising a lever or support provided with one of the terminals of an electric circuit, a second lever or support provided with the other terminal of the electric circuit, and a connection between said levers or supports connected to one of the levers or supports with a lost motion, substantially as described.

2. A circuit-closer comprising a lever or support provided with one of the terminals of an electric circuit and provided with an engaging projection, a second lever or support provided with the other terminal of an electric circuit, and a connection having one end connected to one of the levers or supports and the other end engaged with said projection, substantially as and for the purpose set forth.

3. A circuit-closer comprising a lever or support having one extremity hinged and the other weighted and provided with one of the terminals of an electric circuit and with an engaging projection, a second lever or support provided with the other terminal of an electric circuit, and a connection between said levers or supports, having one end secured to one support and the other end detachably engaged with said projection substantially as and for the purpose described.

4. A circuit-closer comprising a lever or support having one extremity hinged and the other weighted and provided between its extremities with one of the terminals of an electric circuit, a second lever or support provided with the other terminal of the electric circuit, and a connection having one end hinged to one of the levers or supports and the other end detachably connected to the other lever or support, substantially as and for the purpose specified.

5. In an electric circuit-closer, the combination of a lever or support having one extremity hinged and the other weighted and provided between its extremities with one of the terminals of an electric circuit, a second lever or support provided with the other terminal of the electric circuit, said latter terminal being normally separated from the former terminal and movable beneath the same, and a connection between the latter lever or support and the former lever or support for rocking the former lever or support upwardly as the latter terminal moves forward into position to contact with the former terminal, substantially as and for the purpose described.

6. In an electric circuit closer, the combination of a lever or support provided with one of the terminals of an electric circuit and having one extremity hinged and provided with a laterally extending engaging projection and having the other extremity weighted, a second lever or support provided with the other terminal of the electric circuit, said latter terminal being normally separated from the former terminal and movable into contact therewith, and a connection between said levers or supports having one end hinged to the latter support and the other end formed with a shoulder for engaging said projection, said shoulder being automatically disengaged from said projection, substantially as set forth.

7. In a circuit closer, the combination of movable terminals, supports for the terminals connected to simultaneously move the terminals to and from their contacting position at each movement of the supports, and means actuated by an electro-magnet for operating the supports to make or prevent contact of the terminals by the variation in the duration of the current pulsations passed through the magnet, substantially as and for the purpose described.

8. A circuit closer comprising in its organization movable terminals, supports connected to move the terminals from their inoperative position to their operative position for making contact at each movement of the supports, means, substantially as described, connected to one support for momentarily forcing the terminal carried by said support from its operative position as the terminal carried by the other support is moved from its normal position to its operative position, and means, substantially as described, for operating the other support, substantially as and for the purpose set forth.

9. In a circuit closer, the combination of movable terminals, supports for the terminals, means for bringing the terminals carried by said supports to their normal positions, an electro-magnet connected to one of the supports for moving the same by a single movement from its normal to its advanced position and thereby bringing the terminal carried by said support into its operative position, an electric circuit connected to said magnet for passing current pulsations of unequal duration through the magnet, whereby the support operated by the magnet is held in its advanced position for unequal durations of time, a connection between said supports for moving the other support simultaneously with the former support and for

releasing said other support and permitting
the same to assume its normal position
whereby the terminal carried thereby makes
contact with the other terminal when in its
5 operative position, substantially as and for
the purpose specified.

In testimony whereof I have hereunto
signed my name, in the presence of two attest-

ing witnesses, at Syracuse, in the county of
Onondaga, in the State of New York, this 6th 10
day of March, 1893.

GEORGE W. HEY.

Witnesses:

M. BAXTER,

CLARK H. NORTON.