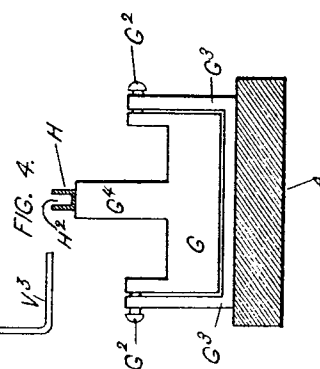
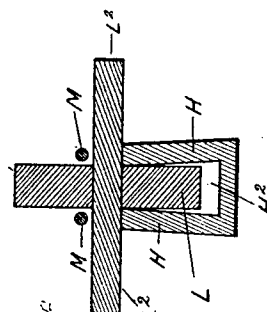
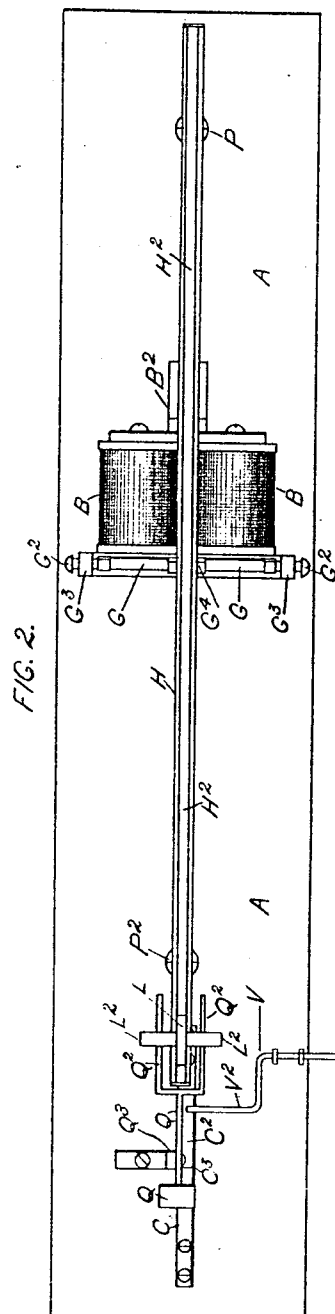
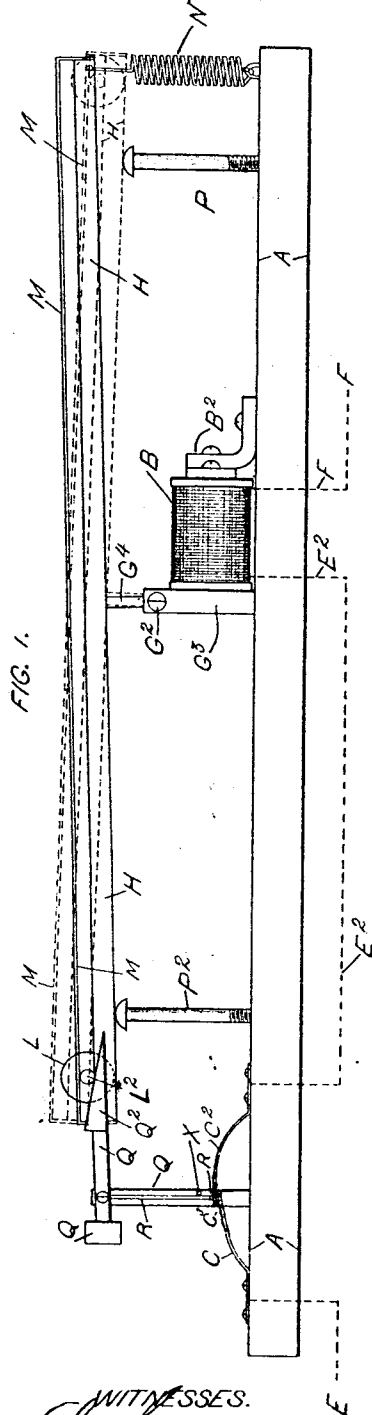


(No Model.)

A. L. CLOUGH.
ELECTRIC CUT-OUT.

No. 467,919.

Patented Feb. 2, 1892.



WITNESSES.
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ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 467,919, dated February 2, 1892.

Application filed August 24, 1891. Serial No. 403,604. (No model.)

To all whom it may concern:

Be it known that I, ALBERT LUCIEN CLOUGH, a citizen of the United States of America, and a resident of the city of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Electric-Circuit Openers or Breakers, of which the following is a full, clear, and exact description.

This invention relates to the opening or breaking of electric circuits at a given or determined lapse of time from and after their closing.

The invention, in substance, consists of an electro-magnet and metal contact-pieces adapted to be placed in and out of contact, and all in suitable electric connection for a closure of an electric circuit through said magnet when said contact-pieces are in contact, and for the opening or breaking of said circuit when said contact-pieces are out of contact, and of an armature adapted with the closure of the circuit to move toward and with the opening of the circuit to be free to move from the magnet, in combination with a track bar or rail intermediately held on and to move with said armature and thereby tilted and so inclined lengthwise in one direction with the closure of the electric circuit and in the opposite direction with the opening of the electric circuit, a roll or other device adapted to move or travel along the length of and in whatever direction the track may be inclined, means adapted to hold said contact-pieces in contact, and means to receive said roll or traveler and to secure by the action of it thereon a breaking of the contact of said contact-pieces and thereby breaking or opening the electric circuit on which the armature moves off from the magnet, tilting and placing said track in an oppositely-inclined direction for the then movement or return of the traveler thereon, so that when the electric circuit is closed and thereby the track tilted and placed again in its inclined direction, as before, said traveler again moves over the track to again break or open the electric circuit, as before, and so on.

In the drawings forming part of this specification, an electric-circuit opener or breaker of this invention is illustrated.

Figure 1 is a side elevation. Fig. 2 is a

plan view. Fig. 3 is a transverse vertical section, line 3 3, Fig. 2. Fig. 4 is a transverse vertical section, line 4 4, Fig. 1.

In the drawings, A is a base or board for convenience in supporting the various parts, working and stationary, of the circuit opener or breaker of this invention.

B is an electro-magnet of any of the well-known or other suitable forms of construction. This magnet at one end is held on and projected horizontally from a vertical bracket B², which is fastened to the base A, and the magnet at its other end is uncovered, all as well known.

C C² are two bow-shaped and spring-metal contact-pieces located on the base beyond the poles of the magnet and in the same vertical plane, and both at one end suitably secured to the base, and at their other and free ends lapping over each other and otherwise, so that they can be pressed into and on release of said pressure can automatically move out of contact.

E is a wire connected to contact C, and F² is a wire connected to contact C² and leading therefrom and connected to one pole of the electro-magnet, the other pole having a wire F leading off therefrom, and said wire F and wire C are to be in electric connection with an external circuit, (not shown,) all as well known and so that with said contact-pieces C C² pressed into contact an electric circuit is closed through the electro-magnet, and with said contact-pieces C C² out of contact said electric circuit is opened or broken.

G is an armature suspended vertically and at its opposite vertical edges on screw-pins G² between the parallel uprights of a frame G³, suitably held on the base A and all so that the armature is free to swing toward and away from the magnet, all as well-known and according as the electric circuit of the magnet is closed or opened.

G⁴ is an upward extension of the armature, and H is a track rail or bar held intermediately of its length, preferably at its middle, on the upper end of said extension and extending in opposite directions from said armature lengthwise of the base A. The track H, as shown, has an open groove H², extending from end to end, but closed at its opposite ends.

L is a wheel having on its opposite sides projected axles L^2 , and as a whole adapted so that placed on one track its axles L^2 can roll along the upper edges of each side of and its wheel can project and enter into the groove of the track.

M M are two guard-wires that extend lengthwise and are fastened at each end to the track, one on one side and the other on the other side and both above the axles of the wheel, and all so as to prevent the wheel from leaving the track in its travel therealong, as hereinafter particularly explained.

The track arranged as described, as is obvious, is tilted or oscillated by the swing of the armature in opposite directions, and it and the armature and magnet are severally adapted so that with a closure of the circuit of the magnet the armature moves toward the magnet and so the track is tilted and inclined lengthwise toward the metal contact-pieces and so held by the magnet so long as the circuit is closed, and with an opening or breaking of the electric circuit of the magnet the armature is left free to move away from the magnet, and so being moved to tilt the track and incline it lengthwise from the metal contacts, said movement of the track and armature being secured by means of the then reaction of a spiral spring N, which at its opposite ends is connected to the end portion of the track the farther removed from the metal contact-pieces and to the base A.

P P^2 are vertical headed screw-pins, one at each end portion of and directly under the track and both screwed into the base, and thus adapted to be vertically adjustable. These pins serve as stops to the inclination of the track, the one P to it in one of its directions and the other P^2 to it in the other of its directions.

Q is a horizontal balanced lever fulcrumed on the upper end portion and on one side of a post Q^3 secured to the base A and having a depending detent R in position when the lever is in its normal position to be in contact with the upper face of the upper contact-piece C^2 , and then to hold said contact-piece in contact with the upper side of the lower contact-piece C, in which position of said contact-pieces the circuit of the magnet is closed, as before stated.

The lever Q at one end portion projects beyond the end portion of the track toward the contact-pieces and at such projecting portion has parallel tines Q^2 , suitably separated to allow said end portion of the track when inclined toward the contact-pieces to enter between them sufficiently to have the upper edges of said tines along their length above the upper edge of the track along which the axles of the traveler or wheel rolls, as stated, and said upper edges have an inclination toward and in a direction opposite to the inclination of the track when it is entered between said tines. By depressing the tined end portion of the balanced lever the detent is swung in a direc-

tion to pass off from the upper metal contact-piece C^2 at its free end, on which said contact-piece springs upward, breaking its contact with the lower contact-piece and placing its end edge C^3 in position to prevent, on the return movement of the detent, the detent from passing onto the upper metal contact-piece until said contact-piece is depressed sufficiently therefor—as, for instance, by the downward pressure thereon of the crank portion V^2 of a horizontal shaft V, turning in suitable bearings of the base and having a crank-handle V^3 for convenience in operating it.

As the circuit-breaker described is shown, Fig. 1, the circuit is closed, and owing thereto the track is inclined toward the contact-pieces $C C^2$ and the traveler L L^2 has moved from the then upward end toward the then lower end of the track and has entered at and onto the lower end portion of the inclined forked arm Q^2 of the balanced lever Q, so that on the traveler then continuing its movement over said forked arm the balanced lever at its inclined end portion is depressed, thereby swinging detent R of said lever off from the upper contact-piece C^2 , leaving it free to spring upward and out of contact with the lower contact-piece C and so opening the circuit, when by the action of the spiral spring N the track M is tilted in the opposite direction (dotted lines, Fig. 1) and the traveler returned to the then lower end of the track and into position, when the circuit is again closed and the track inclined, as before, to again travel over the track and onto the balanced lever, and thereby open the circuit, and so on as before.

The opening of the circuit by the swing of the detent is caused by the gravity of the traveler in action on the balanced lever and the opening of the circuit is maintained until the upper contact-piece C^2 , by means of the crank-arm V^2 , is pressed into contact with the lower contact-piece C, on which the detent R, because of the then swing of the balanced lever, moves into position over the upper contact-piece, and so holds the circuit closed until it is again opened, as before.

Until the upper contact-piece is returned to contact with the lower contact-piece, as stated, the detent is stopped against returning to its normal position, because of its then abutment against the edge C^2 at the free end of the upper contact-piece C^2 ; but this obstruction is relieved by depressing the upper contact-piece, as stated.

X is a pin on the post Q^3 for a stop to the return movement above explained of the detent R.

From all the preceding description it is plain that the closure in each instance of the circuit through the electro-magnet depends wholly upon the time required for the traveler to travel from one end to the other of the track, and again it is plain that the circuit, when opened so remains until it is intentionally closed by means of the crank-arm V^2 , as before explained. It thus appears that

the closure of the circuit of the electro-magnet can be made by the circuit-breaker to cover a determined period from the time it was first closed to the time it is automatically broken, as before stated.

An electric circuit of a magnet and a circuit-breaker, all as explained and as before stated in connection with an external circuit, enables the external circuit and the circuit of the electro-magnet to be closed, as desired, for separate determinate periods of time, but in no case for a greater period than the determined period of time required for the movement of the traveler and the breaking or opening of the circuit of the electro-magnet, as has been stated.

This invention, as to the track, traveler, and detent to hold the metal contact-pieces in and to release them from contact, broadly considered, is not to be limited, for, plainly, these may be varied in many respects without departing from the invention described.

The contrivances of this invention have, among others, these advantages: first, that a small amount of electric energy is required and it is very sensitive; second, that the time to elapse for the closure and before opening of the circuit may be readily adjusted and regulated, as desired; third, that they are simple and economical to manufacture and certain in operation.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. The combination, with an electro-magnet, an armature of said magnet, and movable contact-pieces severally in suitable electric connection, of a track held on and movable with said armature, a traveler to traverse said track, a movable detent to hold said contact-pieces in and to allow them to move out of contact, and a carrier for said detent, substantially as and for the purposes described.

2. The combination, with an electro-magnet, an armature of said magnet, and movable contact-pieces severally in suitable electric connection, of a track M, held on and movable with said armature, a wheel or roll traveler L L², a movable detent R to hold said contact-pieces in and to allow them to move out of contact, and a carrier for said detent, consisting of a balanced lever Q, fulcrumed on a suitable support and having one end of forked shape to receive between its tines an end of, and the upper edge of said end inclining toward, the track, substantially as described, for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALBERT L. CLOUGH.

Witnesses:

L. B. CLOUGH,
ARTHUR H. HALE.