

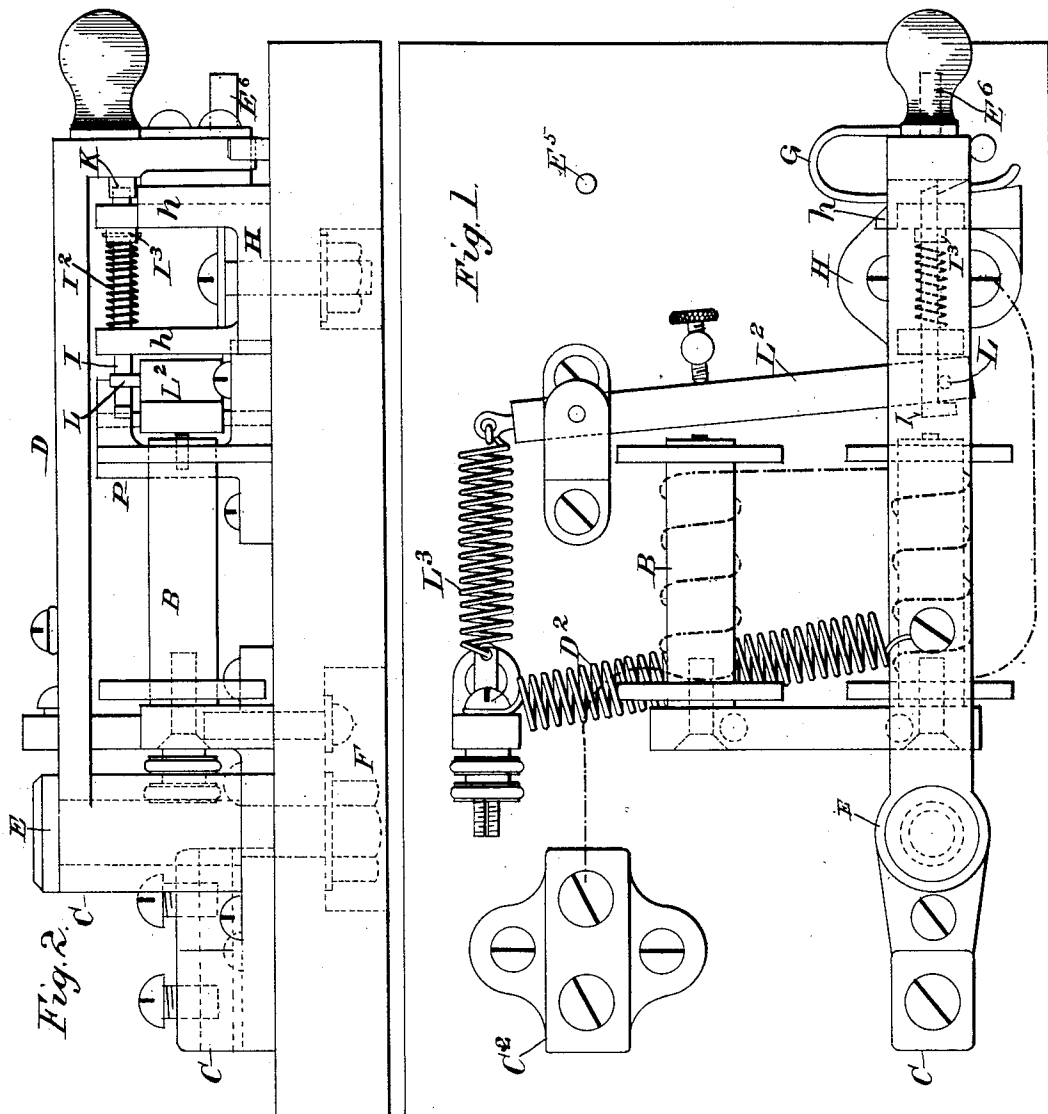
(No Model.)

2 Sheets—Sheet 1.

C. O. MAILLOUX.
AUTOMATIC ELECTRIC CUT-OUT.

No. 482,374.

Patented Sept. 13, 1892.



ATTEST:
J. H. Mudd
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INVENTOR:
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(No Model.)

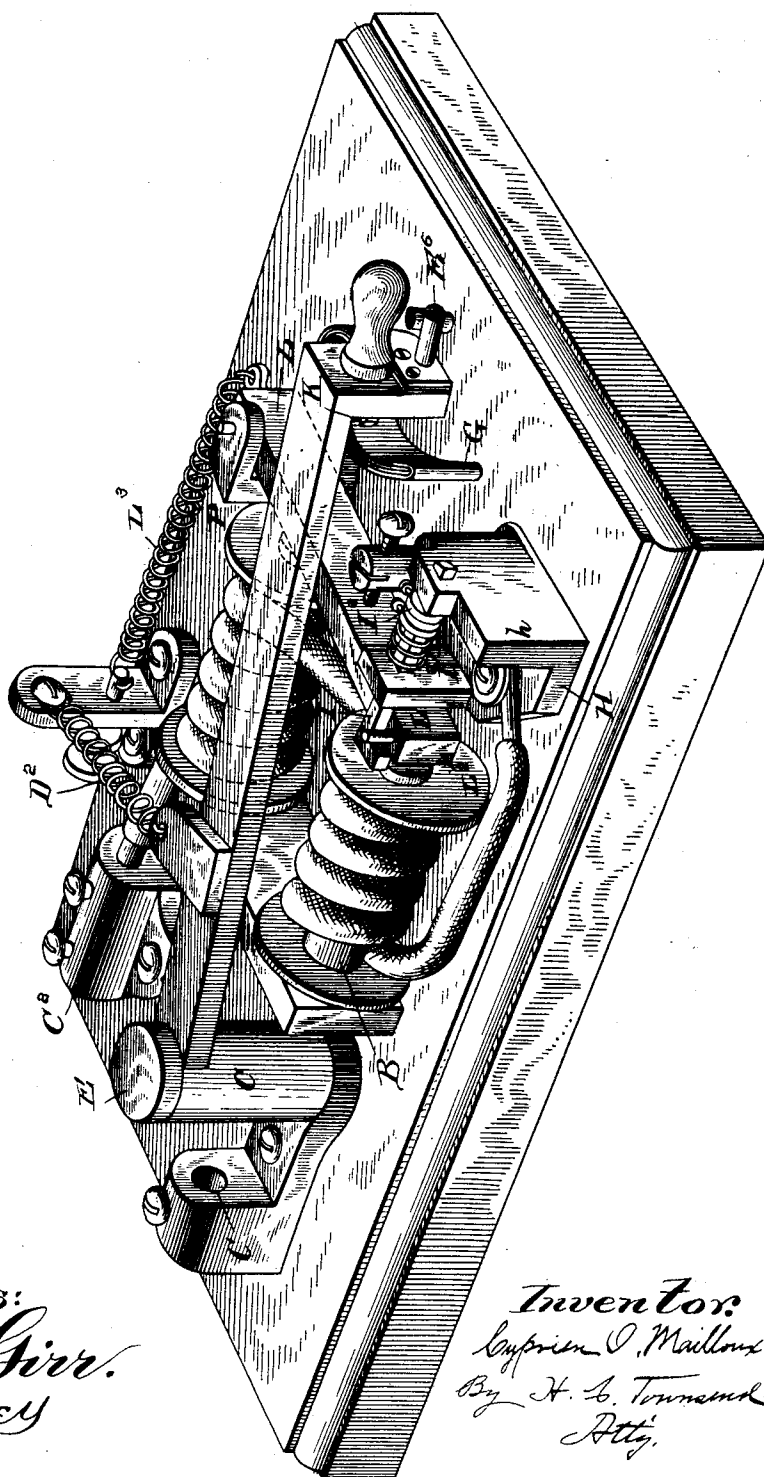
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Fig. 3.



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UNITED STATES PATENT OFFICE.

CYPRIEN O. MAILLOUX, OF NEW YORK, N. Y.

AUTOMATIC ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 482,374, dated September 13, 1892.

Application filed September 9, 1890. Serial No. 364,422. (No model.)

To all whom it may concern:

Be it known that I, CYPRIEN O. MAILLOUX, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Automatic Electric Cut-Outs, of which the following is a specification.

My invention relates to that class of electric cut-outs in which the cut-out or circuit-opening switch is normally locked from movement by a suitable catch or detent which is operated by an electro-magnet for the purpose of releasing the switch when the current in the magnet reaches a predetermined strength.

The object of my invention is to provide an apparatus which shall be certain and reliable in its operation and shall also be simple and compact in construction.

My invention consists in the combinations of devices and details of construction more particularly hereinafter described, and then specified in the claims.

In the accompanying drawings, Figure 1 is a plan of an apparatus embodying my invention. Fig. 2 is a side elevation. Fig. 3 is a perspective view of the apparatus.

A is a suitable base-board of some insulating material, upon which the parts are fastened.

D is a switch-lever which is pivoted to swing in a plane parallel to the base and is properly mounted upon a block C, of some conducting material, which forms a conducting terminal of the apparatus and to which a wire of the circuit may be fastened by a proper binding-screw.

E is a bolt which forms the pivot of the switch-lever and, passing through the hub of the same, is fastened in place by the nut F.

B is an electro-magnet of any simple construction, and I^2 the armature thereof.

I^3 is a retracting-spring which tends to hold the armature away from the poles of the magnet and may be adjusted by a suitable device, as indicated, to determine the extent to which the current must increase in the coils of the magnet before the armature shall begin to move from retracted position.

The switch-lever D carries a suitable split

contact-spring G, which is adapted to close circuit upon one of two vertical extensions h , rising from a plate H, of conducting material, secured to the base.

D^2 is a spring which is attached to the lever and tends to throw the same away from position of contact, so as to open any circuit formed through said switch-lever and the plate or block H. The switch-lever is held in circuit-closing position by means of a latch or detent I, which moves in suitable bearings in the two projections h , and is engaged by a projection K on the switch-lever when the latter is locked. A spring I^2 tends to throw the catch or detent into position to lock the lever. The detent or latch is actuated by the armature I^2 through the intervention of the pin L, carried by the armature, and a hook upon the detent with which said pin may engage or through any other suitable device.

To determine the point at which the armature I^2 in its forward movement shall release the switch, I provide means for adjusting the relative position of the parts of the detent and armature which engage with one another at the time the switch is released by such forward movement. For this purpose the detent itself may be conveniently provided with an adjustable stop I^3 , that by engaging with an abutment—such as the projection h —determines the extent to which the said detent shall move under the influence of the spring I^2 . By shortening this distance it will be obvious that the end of the detent engaged by the armature-lever will be set into such position that the armature will require to move farther forward and closer to the poles of its magnet before it strikes the detent, whereas by giving a contrary adjustment of the stop the detent may be allowed to move farther back under the influence of the spring, and the parts which are engaged will thus be set into such relative position that the armature will engage the detent at an earlier point of its movement toward the poles of the magnet.

The reason for permitting the armature to move with freedom for a slight distance before it assumes the task of unlocking the switch and for providing the adjustment just

described is as follows: When the armature is fully retracted for a considerable distance from the pole of the magnet, it will be attracted with but a small proportion of the force which would act upon it with the same current flowing through the coils if it were close to the poles. As the armature approaches the poles there will result an immense increase in the magnetic pull upon it with the same current; or, in other words, with the same given current which will start the armature there will be developed a stronger pull after the armature has moved closer to the pole. The great advantage of the device is that it can be so accurately adjusted to determine the point at which the armature shall assume the work of unlocking the switch. At the same time the force required to start the armature may be adjusted by determining the tension of the spring that tends to hold it back, its adjustment being capable of regulation with certainty and precision. As the power of the armature increases very rapidly as it approaches near to the pole, a very slight change in the adjustment of the parts which engage to determine the point of engagement will affect very materially the power with which the catch shall be moved. While it is of course desirable to have as large a movement allowed to the catch as possible, it is also desirable that it should be moved with considerable power. Should it be found, therefore, that the catch inclines to stick or that the device acts with uncertainty from the failure of the catch itself to move readily, then the point at which the armature shall engage with the catch or assume the work of moving it may be adjusted so that the armature will have moved closer to the magnet, and, therefore, will be in a position to be pulled more strongly when it engages. Under other conditions of the apparatus the adjustment may be such that the armature will engage at an earlier point in its forward movement. Hence by this adjustment the margin of power necessary to effect a release is always ample and the action of the device may be regulated according to varying conditions.

E^5 is a stop-pin which is engaged by the projection E^6 from the switch-lever. In the drawings the parts are shown in the normal position, or that which they occupy when the circuit is closed. The connections are as follows: from terminal C through switch-lever D, block H, thence by the wire secured thereto by a suitable binding-screw through the coil of magnet B, and to the opposite terminal block C^2 , to which the opposite wire of the circuit is fastened. In the position of the parts shown it will be seen that the armature L^2 is not connected with the detent or catch, and that a considerable movement of the same forward under the influence of the magnet is required before it shall become connected with the detent. The spring L^3 is set according to the strength of current which

it is desired shall flow before the circuit shall be opened. When that strength of current is attained, the armature L^2 will begin to move forward unimpeded, excepting by the spring and the friction of its own bearing, and as it moves will come into a stronger magnetic field, so that with the same current flowing it will gradually move with an increased power, and finally when it engages the detent or catch will be acted upon by a strong magnetic pull and forcibly move the catch so as to release the switch. The latter will thereupon move under the influence of the spring and open the circuit.

While I have shown a particular form of detent or catch and manner of mounting the same, I do not limit myself to such form nor to the particular forms of switch-lever and releasing-magnet shown. The particular construction of the details of the mechanism shown and described is, however, simple and in practice has been found to work with great certainty.

What I claim as my invention is—

1. The combination, substantially as described, of a cut-out switch, a releasing detent or catch therefor, an electro-magnet whose armature is adapted to engage said catch after it has begun its movement under the influence of the magnet, and means for adjusting the relative position of the parts of the armature and detent which engage when the armature is moved forward, whereby the point at which the armature shall encounter the resistance of the catch in its forward movement may be determined or adjusted.

2. The combination, substantially as described, of the switch-lever, the sliding detent or catch I, the spring L^2 , acting on the same, an armature-lever L^2 , and a pin and connecting-hook between the same and the catch, as and for the purpose described.

3. The combination, substantially as described, of the switch-lever D, the contact-spring G, secured to the end thereof, a conducting-block secured to the base and having a vertical extension with which said spring makes contact, a sliding detent mounted on said extension and adapted to engage with the lever to hold it in circuit-closing position, and an electro-magnet and armature for actuating said detent, as and for the purpose described.

4. The combination, substantially as described, of a switch-lever D, mounted on a terminal block or binding-post of the apparatus, electro-magnet B, armature-lever L^2 , sliding catch I, and the spring G, carried by the switch-lever and adapted to make connection with a vertical contact-face upon a conducting-block secured to the base-plate of the apparatus, as and for the purpose described.

5. The combination, substantially as described, with the switch, of the catch or de-

tent therefor, an armature adapted to engage the catch in its forward movement toward the pole of the magnet, and an adjustable stop I³ upon the catch for determining its position with relation to the armature, as and for the purpose described.

Signed at Washington, in the District of

Columbia, this 9th day of September, A. D. 1890.

CYPRIEN O. MAILLOUX.

Witnesses:

HENRY E. COOPER,
ARTHUR L. BRYANT.