(No Model.)

W. R. NUTTING.

TESTING AND BREAKING CIRCUITS.

No. 260,043. Patented June 27, 1882.

Fig. 1.

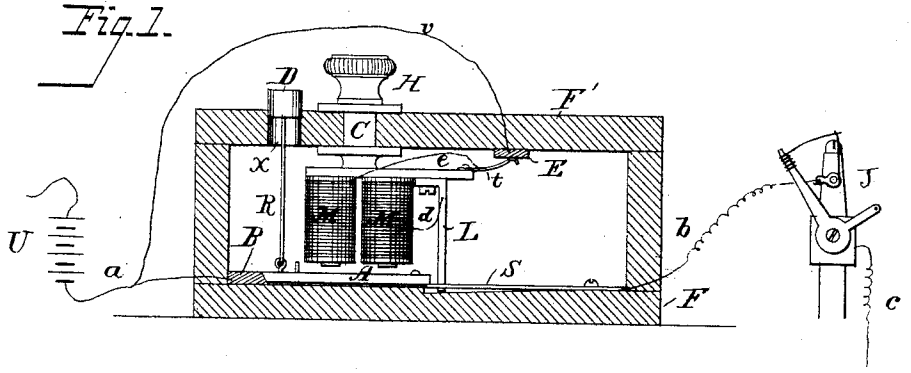


Fig. 2.

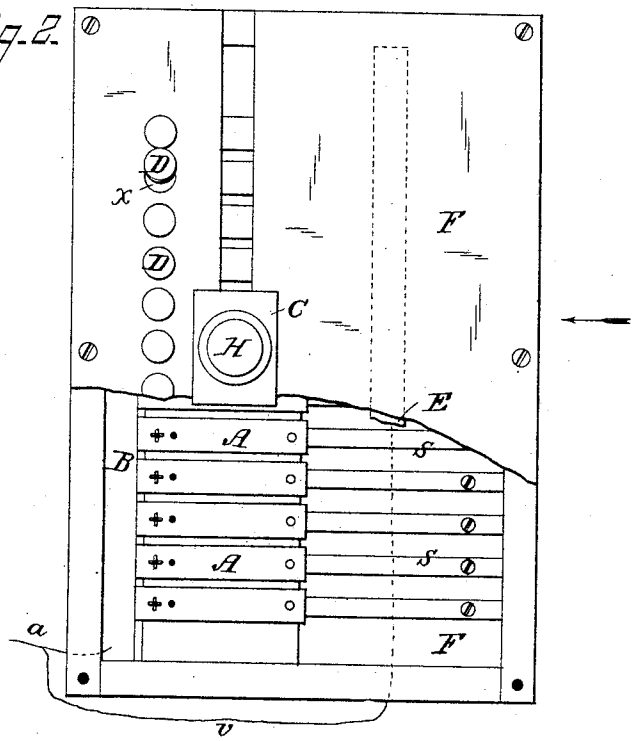
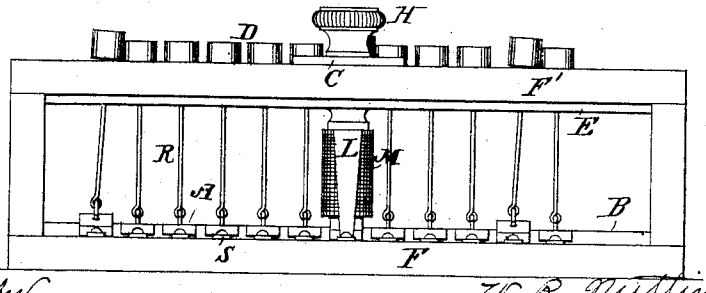


Fig. 3.



Attest:
Courtney A. Cooper
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W. R. Nutting
By his attorney
Charles E. Foster

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM R. NUTTING, OF REVERE, MASSACHUSETTS.

TESTING AND BREAKING CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 260,043, dated June 27, 1882.

Application filed May 9, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. NUTTING, of Revere, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Testing and Breaking Circuits, of which the following is a specification.

My invention relates to that class of electric apparatus in which a temporary current from an open battery is used to effect the desired operations of lighting, signaling, or whatever they may be, the current at other times being broken; and the object of my invention is to automatically detect and break any current upon a series of circuits which through any accident is unduly continued, thereby preventing the exhaustion of the battery.

In the drawings, Figure 1 is a transverse section, showing a device for carrying out my invention. Fig. 2 is a plan, part of the cap-plate removed; Fig. 3, an edge view, looking in the direction of the arrow, Fig. 2.

My invention is applicable to any apparatus in which there are a series of circuits, each in connection with devices constructed to be operated from an open-circuit battery by a temporary current. It is well known that in all such apparatus a circuit will sometimes become accidentally closed, and continues so when the apparatus is not in actual operation, resulting in the battery becoming exhausted or run down, so that no effective results can be secured when the apparatus is put into use. To avoid this result I combine with a series of wires constituting so many circuits, each including a battery and the device to be operated, which I term the "apparatus," appliances whereby a closed circuit is automatically detected and broken. Different appliances may be used for this purpose. One which I have found to be effective is shown in the accompanying drawings, in which F is a board or base of any suitable kind supporting a bar, B, connected by a wire, *a*, with one pole of an open-circuit battery, U, the other pole being grounded.

With each of the apparatus J to be operated is connected one of a series of flexible blades, S, by a wire, *b*, a ground-wire, *c*, leading from the circuit-breaker of such apparatus J, and between the bar B and each blade S is arranged a tilting plate, A, preferably of soft iron, which, when in its normal position, is in contact with both the bar and the blade, as shown. In a cover-piece or overhanging support, F′, are holes *x*, one above each plate A, each adapted to receive a nicely-fitting block or head, D, on a rod, R, jointed to the plate A below, so that when the latter is raised the head will pass from the hole and, falling to one side, catch upon the support F′ and hold the plate in its elevated position. The support F′ constitutes the guide for a sliding carrier, C, movable over the plates A A by means of a knob, H, and supporting an electro-magnet having two coils, M M, the poles of the magnet being above and nearly in contact with the plates A.

A spring-finger, *t*, extends from the carrier and rests against a bar, E, insulated and supported adjacent to the carrier, and connected by a wire, *v*, with the wire *a*, and an insulated arm, L, extends downward from the carrier, and has a rounded end, which, as the carrier is moved over the blades S, depresses them, successively breaking contact between said blades and the plates A.

A wire, *d*, connects the arm L and electro-magnet, and a wire, *e*, the electro-magnet and finger *t*. When a circuit is closed at any one apparatus J it will be completed by the parts in the position shown in Fig. 1, from the ground-line *c*, through the apparatus J, wire *b*, blades S, plate A, bar B, wire *a*, battery U, and ground. Ordinarily such circuit is temporarily made only to be broken to effect the operation of the apparatus J, the circuit being again completed by the circuit-breaker on the apparatus being closed for a moment and then opened and left open to prevent the battery from being exhausted; but the circuit-breaker of the apparatus will sometimes accidentally remain closed or a circuit will be accidentally established at some point of the line. In such case the fact may be detected and the defect remedied by the device above described by moving the carrier C back and forth over the supplemental circuit-breakers. Thus, if the carrier is brought above a plate, A, and blade S, when the circuit in the operating line is broken, the only effect will be to depress the blades S by contact with the arm L, the circuit remaining broken; but if the circuit containing such circuit-breaking devices should happen to be

closed the depressing of the blade S will break it, and at the same time the electro-magnet and its appliances will be thrown into circuit through the blade S, arm L, coils M M, wire *e*, finger *t*, bar E, wire *v*, battery, and ground. This only temporarily breaks the main circuit; but as the magnet is in circuit it attracts and raises the plate A, constituting for the time being the armature, the block D retaining the plate in its raised position, so that as the carrier passes away and the blade S returns to its first position the plate A remains up and the main circuit continues broken. When this operation is repeated with the current-breaking plates of each line every circuit which is complete is detected and broken automatically.

It will be seen that each blade S acts as a spring to maintain the armature-plate A in contact with the bar B until the blade is depressed, when the armature is perfectly free to move without obstruction under the influence of the magnet.

I do not limit myself to the devices described, as they may be varied. Any suitable retaining device may be substituted for the headed rod R. Any other suitable circuit-breaker may replace the plates A and blades S, and the carrier may be guided and supported differently, or the electro-magnet and its appliances may be supported on a swinging arm.

It will also be seen that, instead of making part of each circuit-breaker serve as a temporary armature, the magnet may carry with it a permanent armature so constructed as to establish a temporary connection with each circuit-breaker, thereby opening the latter when the armature is raised.

It will be seen, further, that an alarm may be connected with the above-described appliances to indicate to the eye or ear when a closed circuit has been established.

It will be apparent that the device above described may be operated in connection with a very sensitive magnet capable of detecting a slight leak, and that by an occasional movement of the carrier, without the exercise of any care or ability on the part of the operator, any closed circuit may be at once detected and broken.

After the circuit has been broken at the proper point the parts may be restored to their former position by simply releasing the detent holding open the circuit-breaker.

I claim—

1. The combination, with apparatus adapted to be operated in connection with a series of temporary circuits from an open-circuit battery, of a circuit-seeker comprising an electro-magnet and a series of plates, A, and connections whereby the magnet is put in circuit when the main circuit is established, and, by the attraction of an armature to the magnet, breaks the main circuit, substantially as set forth.

2. The combination of a series of circuit-breakers, each in a circuit including an apparatus to operate in connection with temporary currents from an open-circuit battery, of a movable electro magnet, connections whereby the same is put in circuit when in proximity to any one of the said circuit-breakers which is also in a completed circuit, and appliances whereby the movement of the armature is made the means of breaking such main circuit, substantially as set forth.

3. The combination, in a series of circuit-breakers, of an electro-magnet movable past the same, and constructed to open any circuit-breaker included in a circuit improperly closed, and a retainer whereby a circuit-breaker when so opened is prevented from closing on the removal of the magnet, substantially as set forth.

4. The combination of the movable electro-magnet and its connections and the bar B, armature-plate A, and spring-blades S, substantially as set forth.

5. The combination of the bar B, series of plates A, and blades S, retainers for said plates, bar E, and carrier supporting an electro-magnet, and arm L, and electric connections, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM R. NUTTING.

Witnesses:

F. O. McCLEARY,

WILLIAM PAXTON.