

(No Model.)

G. R. LEAN.
ELECTRO MAGNETIC DEVICE.

No. 459,786.

Patented Sept. 22, 1891.

Fig: 1.

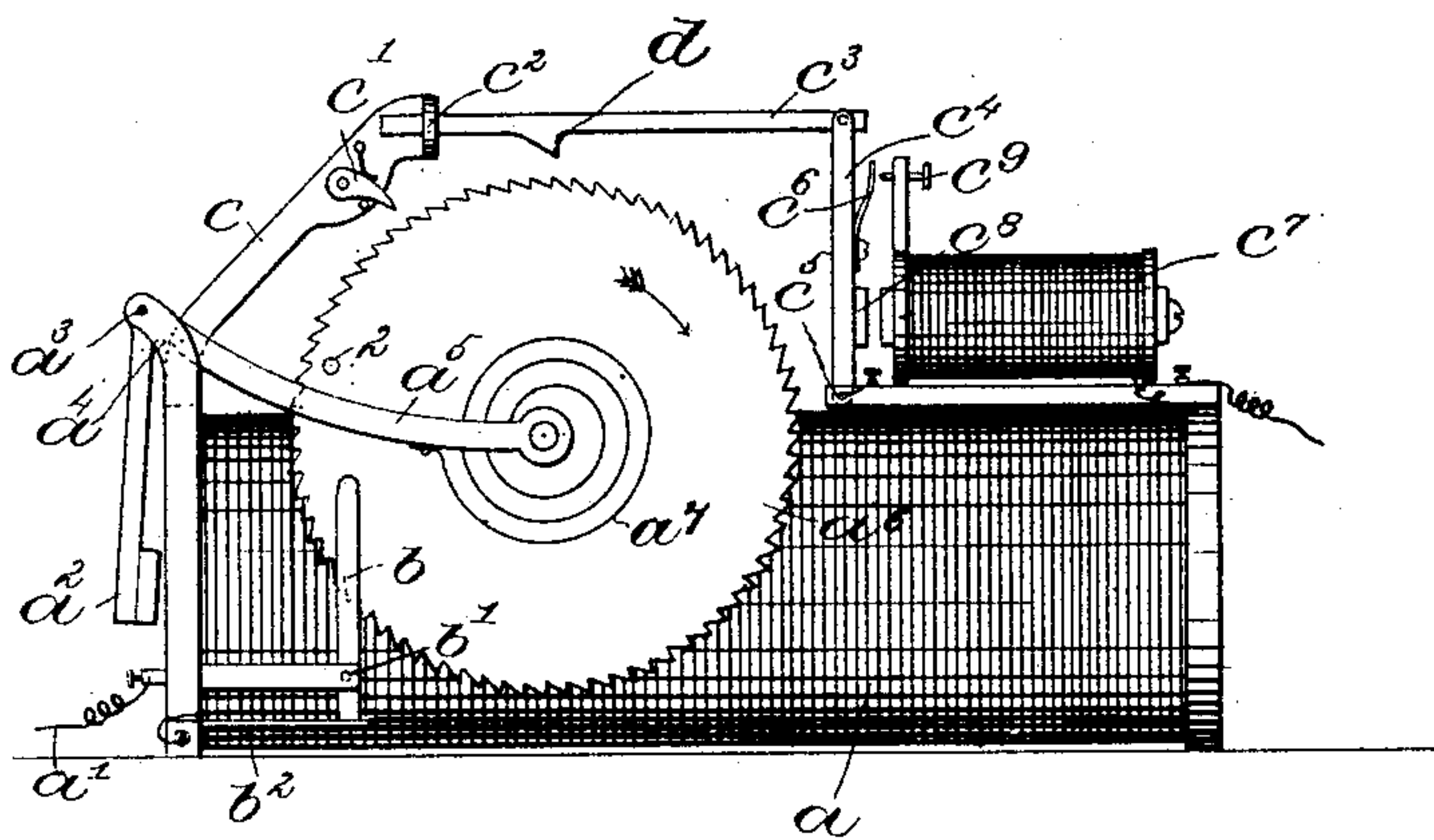
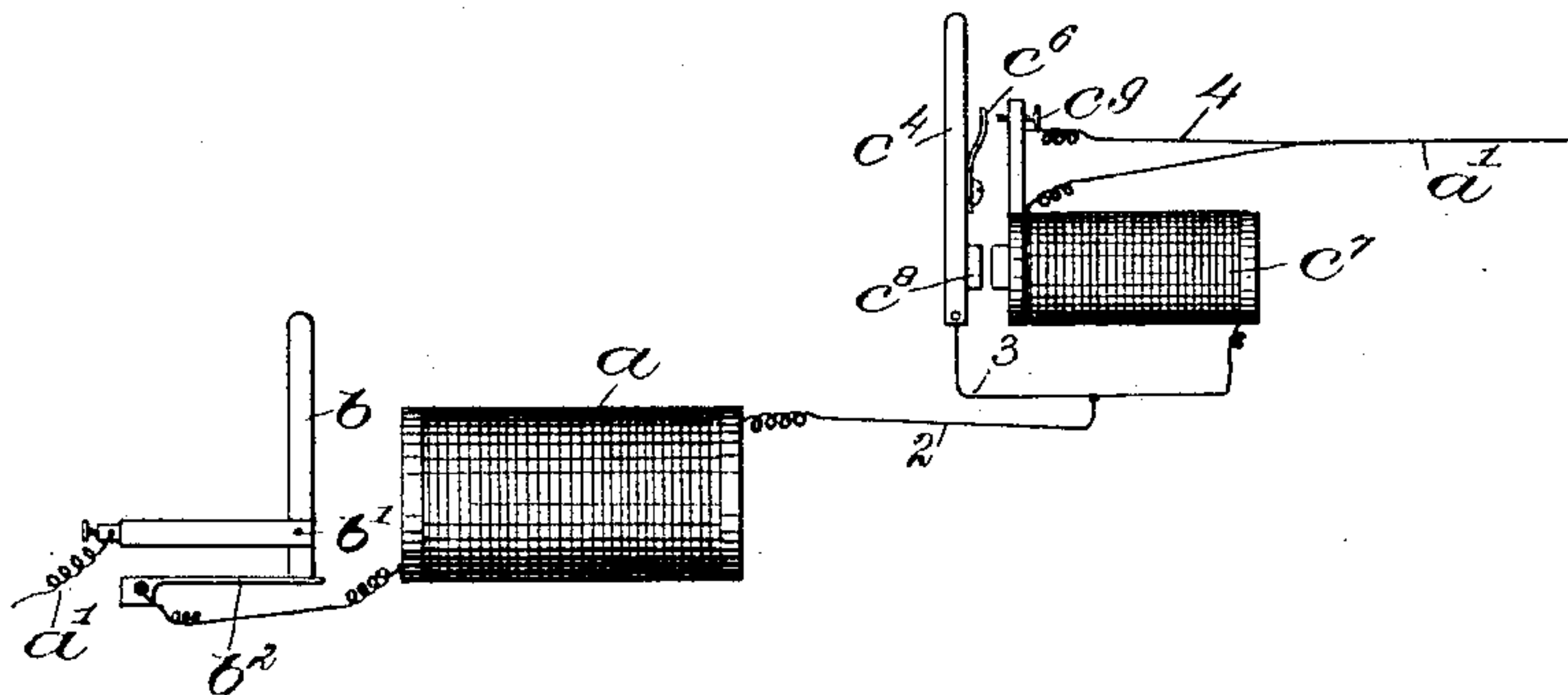


Fig: 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE R. LEAN, OF BOSTON, MASSACHUSETTS.

ELECTRO-MAGNETIC DEVICE.

SPECIFICATION forming part of Letters Patent No. 459,786, dated September 22, 1891.

Application filed April 11, 1891. Serial No. 388,541. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. LEAN, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Electro-Magnetic Devices, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object to construct an electro-magnetic device for restoring a circuit to its normal condition after it has remained in its abnormal condition a certain length of time, it being especially adapted
15 for opening a circuit after it has been closed a definite length of time to thereby save the batteries.

In using normally-open circuits I have found that they are frequently closed accidentally or otherwise, and while so closed the batteries run down and lose their efficiency, and the device forming the subject of this invention is for the purpose of preventing such an occurrence.

25 In accordance with this invention a time-switch is employed for opening the circuit, which is operated by an electro-magnet included in and connected with or controlled by the circuit.

30 Figure 1 shows in side elevation an electro-magnetic device embodying this invention, and Fig. 2 a diagram to be referred to.

An induction-coil a , or it may be an electro-magnet of any usual or suitable construction, is included in the circuit a' , which is normally open. The armature a^2 , normally retracted, is pivoted at a^3 to a suitable support a^4 , and carries an arm a^5 , in which is journaled a ratchet-wheel a^6 . A spring a^7
40 may be employed, if desired, one end of which will be attached to the ratchet-wheel a^6 or its shaft, and the other end to the arm a^5 . A pin 2 projects from one side or face of the ratchet-wheel, and a switch-arm b , pivoted at
45 b' , normally lies in the path of movement of the pin 2 to be struck and moved by it as the ratchet-wheel is revolved. The lower end of the switch-arm b bears upon a spring or equivalent b^2 , fixed to a suitable support. A
50 stationary frame or arm c is secured to the support a^4 , which bears a spring-controlled pawl c' , which will serve as a back-stop for the

ratchet-toothed wheel a^6 when said ratchet-wheel is brought into engagement therewith. The arm c is also herein shown as arranged 55 to furnish a suitable guide or support c^2 for an arm c^3 , loosely connected to the upper end of a lever c^4 , pivoted at c^5 , and carrying a flexible contact-spring c^6 , and also the armature c^8 of an electro-magnet c^7 . A contact-point c^9 is provided, with which the flexible contact-spring c^6 co-operates. A wire 2 connects the coils a and c^7 , a wire 3 leads from the wire 2 to the lever c^4 , and a wire 4 leads from the contact c^9 to the wire a' . The arm 65 c^3 carries a pawl d , which is adapted to engage and move the ratchet-toothed wheel a^6 when the latter is brought into engagement with it. The normally-open circuit includes the wire a' , support for the switch b and 70 switch-arm, spring b^2 , coil a , wire 2, coil c^7 , and wire a' , and when said circuit is closed the first change caused will establish a circuit including wire a' , support for switch, switch-arm, and spring b^2 , coil a , wires 2 and 3, lever 75 c^4 , contact-spring c^6 , contact c^9 , wire 4, and wire a' . With this latter circuit the coil c^7 is shunted out, and as soon as said shunt is closed the armature will be retracted to open the shunt. 80

The operation of the device is as follows: The circuit having been closed, the armature a^2 is attracted, and by it the arm a^5 is raised, lifting the ratchet-wheel a^6 up into engagement with the pawl d . The armature of the 85 electro-magnet c^7 is attracted, which closes the shunt around the coil, and as soon as said shunt is closed the armature c^8 is retracted, opening said shunt, and then again attracted. As the armature is attracted the 90 pawl d will move the ratchet-wheel a^6 in the direction of the arrow thereon, step by step, against the tension of the spring a^7 , until the pin 2 strikes the switch-arm b , and, moving it, opens the circuit at the spring-contact 95 b^2 . If the circuit a' does not remain closed a sufficient length of time for the wheel a^6 to move sufficiently to in turn move the switch-arm, the armature a^2 will be retracted and the ratchet-wheel, removed from its engage- 100 ment with the pawls d and c' , will, by means of the spring a^7 , be restored to its normal position.

I do not desire to limit myself to the use to

which the electro-magnetic device herein shown may be put.

I claim—

1. The combination of the coil *a*, its armature and ratchet-wheel moved by it, a switch governed by said ratchet-wheel, a coil *c*⁷, and its armature and pawl controlled by it, which rotates the said ratchet-wheel, substantially as described.
2. A reciprocating wheel, a switch governed by it, and an electro-magnet and its armature for moving said ratchet-wheel in one direction against the action of its return-spring, combined with a coil and its armature for moving the ratchet-wheel into co-operative relation with the armature which operates it, substantially as described.
3. A circuit-changing device consisting of the combination of the following elements: a switch, a ratchet-wheel governing its operation, a pawl for moving said ratchet-wheel, an electro-magnet for operating said pawl to

advance the ratchet-wheel step by step, and a coil, as *a*, controlling the engagement of said ratchet-wheel and pawl, one with the other, substantially as described.

4. A circuit-changing device consisting of the combination of the following elements: a switch, a reciprocating ratchet-wheel governing its operation, an electro-magnet and its vibrating armature for advancing said ratchet-wheel step by step against the tension of its return-spring, a coil, as *a*, and its armature for controlling the co-operative relation of the ratchet-wheel and its operating member, substantially as described.

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

GEORGE R. LEAN.

Witnesses:

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EDWARD F. ALLEN.