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PATENTED NOV. 22, 1904.

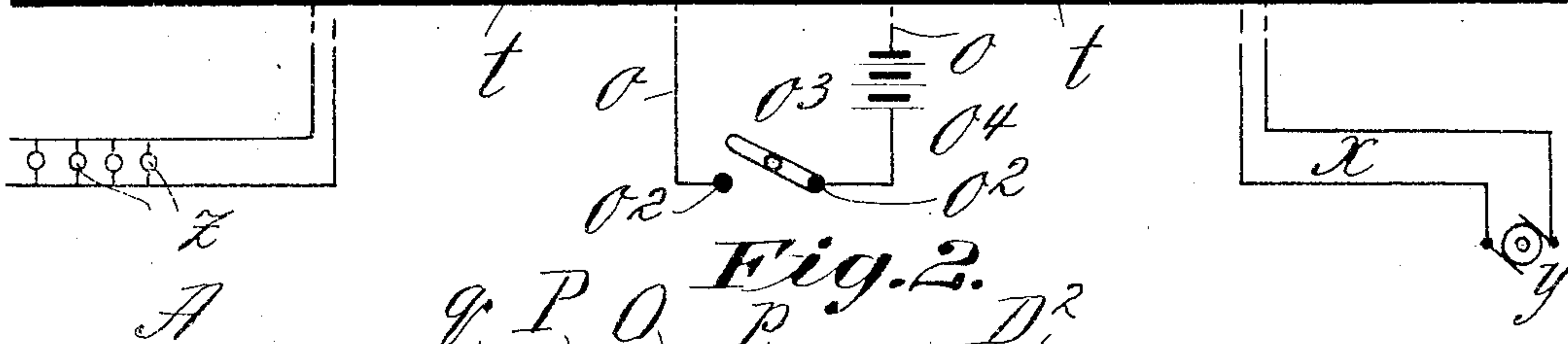
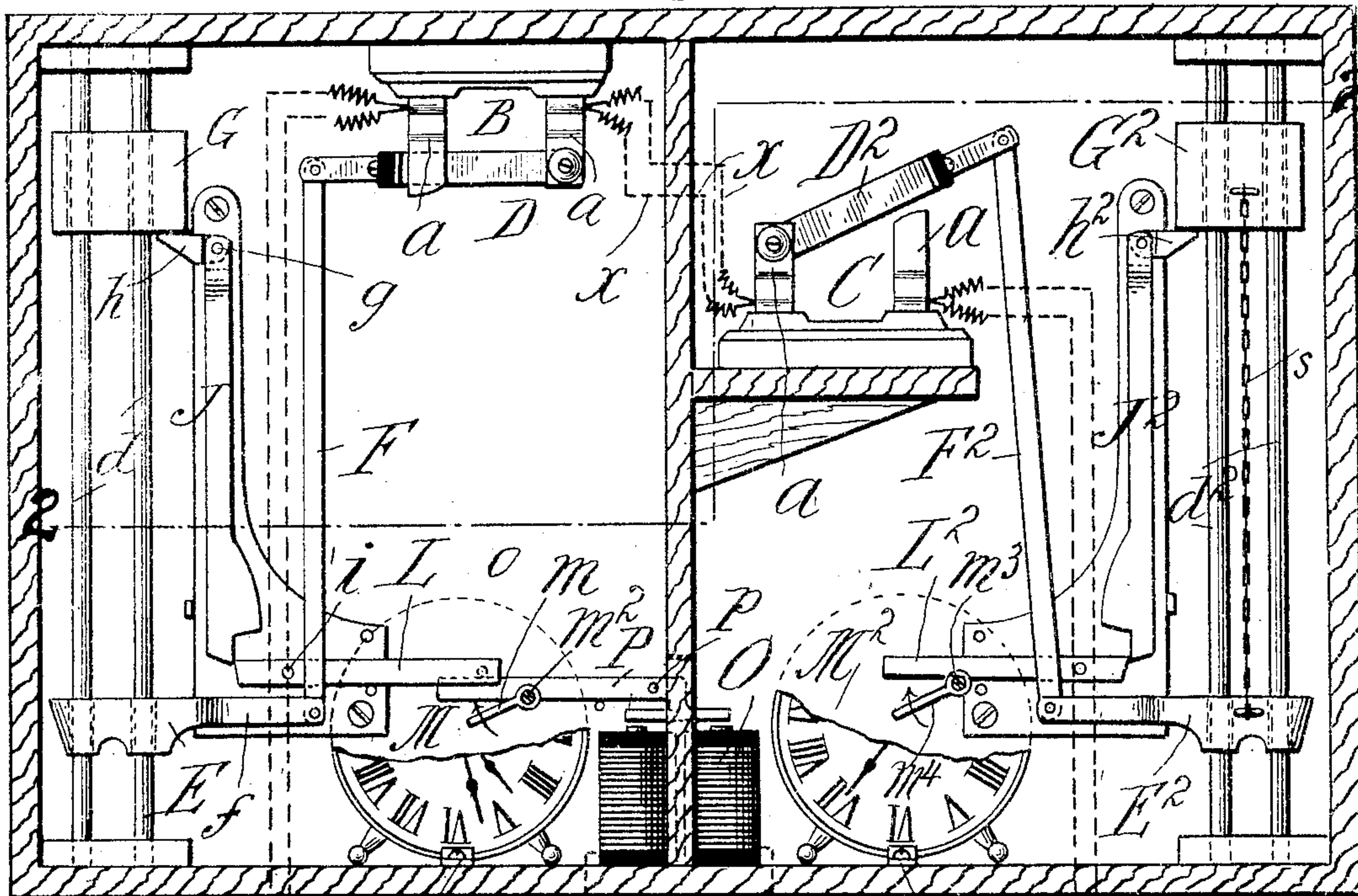
C. S. MOORE.

ELECTRIC TIME SWITCH.

APPLICATION FILED DEC. 23, 1903.

NO MODEL.

Fig. 1.



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UNITED STATES PATENT OFFICE.

CLIFFORD S. MOORE, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO BURTON C. READ, OF HOLYOKE, MASSACHUSETTS.

ELECTRIC TIME-SWITCH.

SPECIFICATION forming part of Letters Patent No. 775,844, dated November 22, 1904.

Application filed December 23, 1903. Serial No. 186,286. (No model.)

To all whom it may concern:

Be it known that I, CLIFFORD S. MOORE, a citizen of the United States of America, and a resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Time Electric Switches, of which the following is a full, clear, and exact description.

This invention relates to improvements in actuating mechanism for imparting an operating movement to a movable part having for its object, for instance, the opening of an electric switch which may control a series of lamps or the closing of such switch, or both, whereby the lamps lighted may be extinguished or having been extinguished may be lighted, an object being to accomplish the automatic action or actions at any predetermined time or times by virtue of the movement.

It is, furthermore, the object of this invention to provide an automatically-operative mechanism of the character set forth which is extremely simple and positive in action, inexpensive of production, and susceptible of long use, enabling many repetitions of its operations without derangement.

The invention consists in combinations and arrangements of parts and devices and the constructions of certain of the parts, all substantially as hereinafter fully described, and set forth in the claims.

In the drawings, Figure 1 shows, substantially in front elevation, an apparatus embodying a normally closed and normally open electric switch comprised in connection with electric circuit-conductors and having the novel mechanisms operatively combined therewith for opening the one switch at a predetermined time and for closing the other switch at any time desired. Fig. 2 is a horizontal sectional view as taken on the line 2-2, Fig. 1, parts below the line of section being seen in plan view.

Similar characters of reference indicate corresponding parts in both of the views.

In the drawings, A represents a case or cabinet having a hinged or removable front A² and the same having therein two compart-

ments in which are electric switches B and C, having double sets of contacts *a a* and each having a single-throw double-bladed switch-lever D or D² for opening and closing the switches.

w represents circuit-conductors, ordinary electric wires, the same being understood as running from the generator *y* to one rear contact of one switch C, from the other rear contact-switch C to the one of the rear contacts of the switch B, thence from the other rear contact of switch B to and in return connection with a series of electric lamps *z*, the electric wire returning to a connection with one of the contacts of the switch B at the front, continuing from the other front contact of switch B to the front contact of switch C, and thence from the other front contact of switch C, returning back to the generator *y*.

Located in the left-hand portion of the cabinet is the mechanism for automatically opening the normally closed circuit and extinguishing the lights at any predetermined time, and this mechanism will be now described.

E represents a slidable member having an engagement with the pair of vertical runner-rods *d d*, the vertical movement of the member E being guided and constrained by such runner-rods. The said slidable member E has an extension *f*, to the extremity of which the lower end of a link F is pivotally connected, the upper end of said link being pivotally connected with the operating-arm of the double-bladed switch D. Above the slidable member E is a weight G, engaged with and guided in its vertical movements by the said runner-rods *d d*.

J represents a lever pivotally mounted at *g* for a swinging movement in a vertical plane, the said lever having an angularly-extended toe *h*, which constitutes a weight-supporting abutment, said toe being pivotally engaged with the lever J and having an inclined under side, so that it may yield in an upward direction when the weight is carried to the elevated position shown to allow the weight to pass by the toe, said toe being immovable in a downward direction, and thereby serving to sus-

tain the weight until the lever is bodily swung so far toward the right as to carry the point of the toe clear from under the weight.

L represents a horizontally-arranged lever 5 pivoted at i for a swinging movement in a vertical plane and having its location in coöperative proximity to the depending pivotally-hung lever J and serving as a detent for normally preventing the swinging movement to the rightward of the lever J, which move- 10 ment would occur from the stress in the downward direction of the weight on the abutment-toe h in the absence or disengagement of the detent-lever.

15 Arranged in coöperative proximity to the right-hand portion of the detent-lever is a projection m , forming part of a clockwork mechanism. In the representation here given an ordinary Seth Thomas alarm-clock is utilized, 20 the projection m being provided as a rigid part of the winding-arbor m^2 of the alarm-clock M, no change or addition to the alarm-clock being required beyond the provision of the projection m , it being understood that the 25 clock is provided, in addition to the usual clock-winding and clock-setting provisions, also with the usual alarm-setting means, whereby, as desired, the alarm mechanism may be liberated at any predetermined time for which 30 the alarm mechanism may be set. In this mechanism the bell and striker of the alarm-clock will be generally omitted or removed.

The switch B, having the double switch- 35 blades thereof swung upwardly into the closed position, as shown, through the link, causes the elevation of the slidable member E somewhat above the bottom of the cabinet, the lever J being engaged at its lower end by the 40 detent, and the weight is slid to the upper ends of the runner-rod and sustained on the abutment-toe of the lever J. The circuit controlled by the said switch B will remain closed and the lamps lighted until such time as by the setting of the clockwork mechanism the 45 alarm mechanism will be liberated, whereupon the unwinding of the alarm-winding mechanism will cause the rotation of the arbor m^2 and the revoluble movement of the projection m for impingement against the detent-lever L, 50 raising the right-hand end portion of such detent and depressing the left-hand end thereof, freeing the vertical lever J, so that it may swing to the rightward, the toe-abutment thereof becoming withdrawn from its position 55 of support under the weight, which latter then falling onto the slidable member E will downwardly force the latter and accomplish the opening of the switch and the breaking of the electric current through the lamps.

60 As a provision for emergency use or for securing an operation of the switch at any moment which may be desired and in advance of the time when the switch would be operated by the clockwork, an electromagnet O is

provided, connected in a circuit herein termed 65 the "electromagnet-circuit" and indicated by the wiring o , normally open, having the contacts o^2 o^2 and circuit-closing switch o^3 and having connected therein a battery or generator o^4 . The armature of the electromagnet 70 is comprised in a lever P, indicated as pivotally mounted at p and having the long arm thereof extended under and in proximity to the stud or projection q , laterally extended from the detent-lever L. Hence it is seen 75 that there is coöperatively combined with the detent-lever not only the clock-actuated tripping means, but also the electromagnetic tripping means, the switch for the electromagnetic circuit having its location outside of and at 80 any convenient place adjacent or remote from the cabinet.

The arrangements comprised in the right-hand compartments of the cabinet are substantially duplications of those in the left-hand 85 compartment, the same relative combination of slidable member E^2 , runner-rods d^2 , detent-lever L^2 , clock mechanism M^2 , m^3 , and m^4 , vertical lever J^2 , having abutment-toe h^2 , and weight G^2 being observed, as well also as the 90 link F^2 , which, however, has its upper end pivoted to the lever-arm of the double-bladed switch reversely arranged from the arrangement of the switch B, so that under the same 95 conditions and manner of operation the descent of the weight G^2 by causing the down-swinging of the lever-like switch-blades D^2 will close instead of opening the main circuit. Hence the apparatus may be depended upon to turn 100 on the lighting or other current at any desired time and thereafter to turn off the current, and explanation of the operativeness of the apparatus for this result will be given as follows: The apparatus viewed in its entirety 105 is seen to comprise a circuit having connected therein the generator and the lamps with provisions for two breaks or openings therein constituted by the switches B and C, the one, B, being shown closed and the one, C, open. Assume, as an example, that it is desired to 110 turn on the lights at eight p. m. and to turn off the lights at one a. m. Therefore the clock mechanism M^2 and M will be set for the members m^4 and m to have their movements at those times, and hence at the first predetermined time, the devices L^2 , J^2 , G^2 , E^2 , and F^2 115 will have their operations given to them to close the switch C, making the circuit complete or "closed," which will so remain, the lamps continuing lighted until the later predetermined time, when the devices L, J, G, E, and F will have their operations given to them 120 to open the switch B, and consequently again establish a break in the circuit to extinguish the lights. Of course the switch C might be 125 permanently closed and the clockworks M^2 removed from the cabinet or allowed to remain "run down," in which case the appara-

tus would only have the capability of automatically opening the circuit, or, on the other hand, the switch B might be permanently closed and the clock M removed or rendered inoperative, whereupon the apparatus would only have the capacity for automatically closing the circuit.

After the operation or operations of the mechanism, usually once a day, the cabinet will be opened, the clockworks rewound, and the switches and conjunctive switch-operating devices reset. The clocks are retained in their proper coöperative relations with the detent-levers $L L^2$, removable, however, by angular clips t , so that for conveniently rewinding or setting them they may be taken out from the cabinet and thereafter replaced.

Inasmuch as the friction in the pivotal joint of the switch-blades D^2 may not be sufficient to sustain the weight of the slidable member E^2 such member is connected by a chain or other flexible connection s with the weight G^2 , so that the same support for the weight sustains the part E^2 and relieves the normally open switch from any undue force thereon having the tendency to close it.

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

1. In a device of the character described, in combination, a movable actuating member of a switch, a slidable member connected to said movable member, a weight arranged to coöperate with said slidable member, a swinging lever having a weight-supporting abutment, a detent for said lever, and a clock-actuated part, arranged to trip the detent at a predetermined time.

2. In a device of the character described, in combination, a movable actuating member of a switch, a slidable member connected to said movable member, a weight arranged to coöperate with said slidable member, a swinging lever having a pivoted toe constituting a weight-supporting abutment adapted to yield in an upward direction relatively to the lever, a detent for said lever, and a clock-actuated part, arranged to trip the detent at a predetermined time.

3. In a device of the character described, in combination, an electric switch having a pivoted circuit opening and closing lever, a slidable member, and a link connected thereto and to said switch-lever, a weight arranged to coöperate with said slidable member, a lever pivotally mounted and adapted to swing in a vertical plane having a weight-supporting

abutment, a pivoted detent for said lever, and a clock-actuated part, arranged to periodically trip the detent.

4. In a device of the character described, in combination, a movable actuating member of a switch, one or more vertical runner-rods, a member connected to said movable member, and arranged for a sliding movement on and guided by said rods, a weight also having a sliding engagement with said rods and arranged to coöperate with said slidable member, a swinging lever having a toe constituting a weight-supporting abutment, a detent for said lever, and a clock-actuated part, arranged to trip the detent at a predetermined time.

5. In a device of the character described, in combination, two electric switches having respectively a normally open and a normally closed switch-lever, and electric-circuit conductors in which the contacts of said switches and a generator are connected, duplicated slidable members connected to said switch-levers, weights arranged to coöperate with said slidable members, swinging levers having weight-supporting abutments, detents for said levers, and duplicated clock-actuated parts arranged to trip the detents at different predetermined times to close the one switch, and thereafter open the other switch.

6. In a device of the character described, in combination, an electric switch having a swinging switch opening and closing lever, and electric-circuit conductors connected with the contacts of the switch, and having therein connected a generator and a series of electric lamps, a slidable member linked to said switch-lever, a weight arranged to coöperate with said slidable member, a swinging lever having a weight-supporting abutment, a detent for said lever, and a clock-actuated part, arranged to trip the detent at a predetermined time.

7. In a device of the character described, in combination, a movable actuating member of a switch, a slidable member connected to said movable member, a weight arranged to coöperate with said slidable member, a swinging lever having a weight-supporting abutment, and a detent having a detachable engagement with said lever.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

CLIFFORD S. MOORE.

Witnesses:

A. V. LEAHY,
WM. S. BELLOWS.