

(No Model.)

F. L. MACKEY.
CLOCK CONTROLLED SWITCH.

No. 602,706.

Patented Apr. 19, 1898.

FIG. 1.

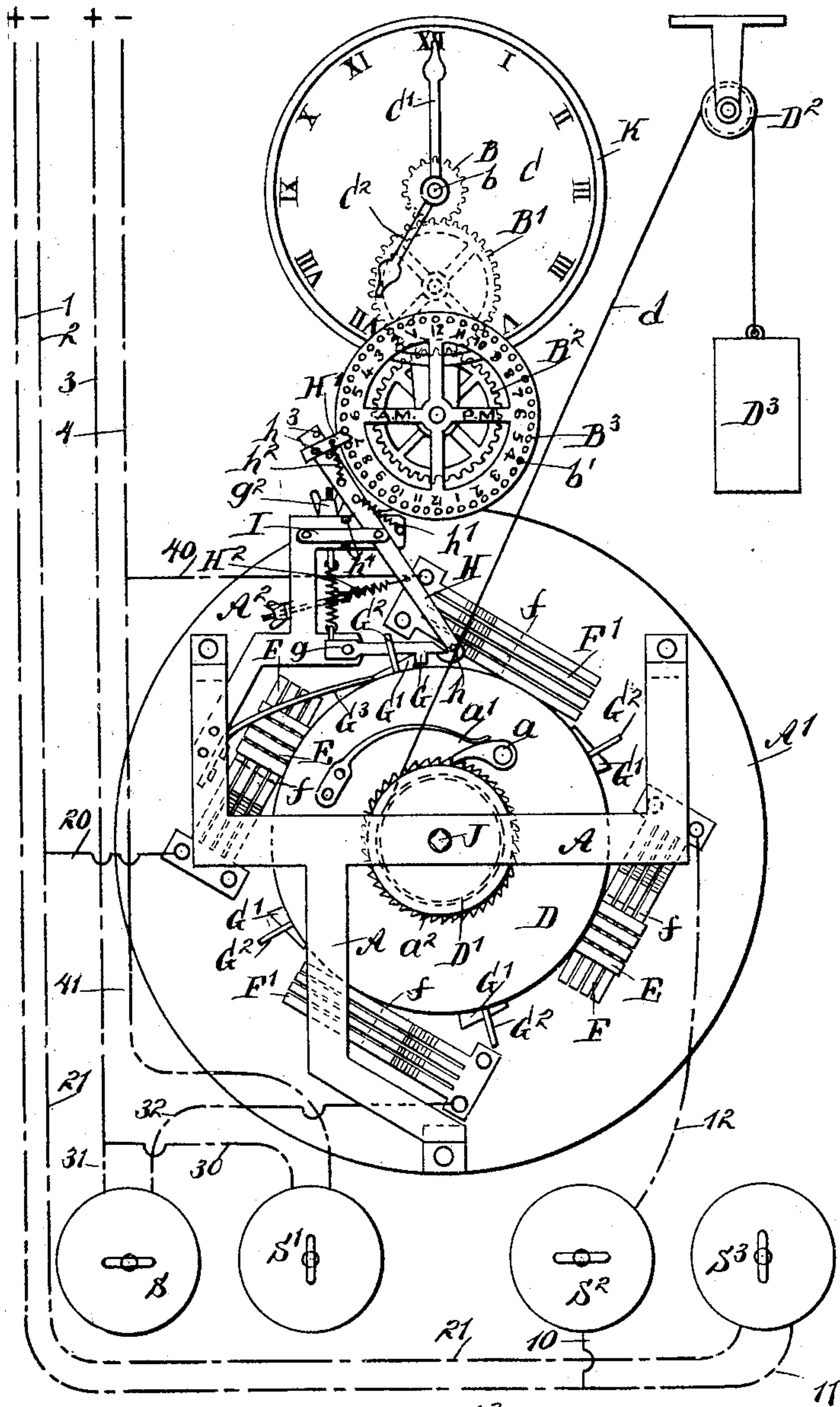


FIG. 2.

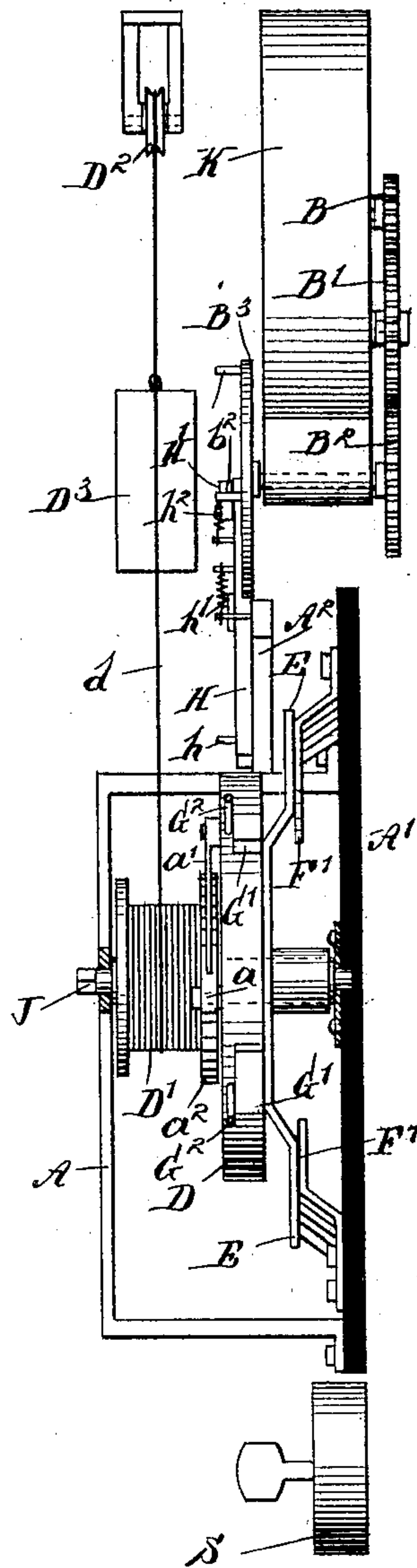
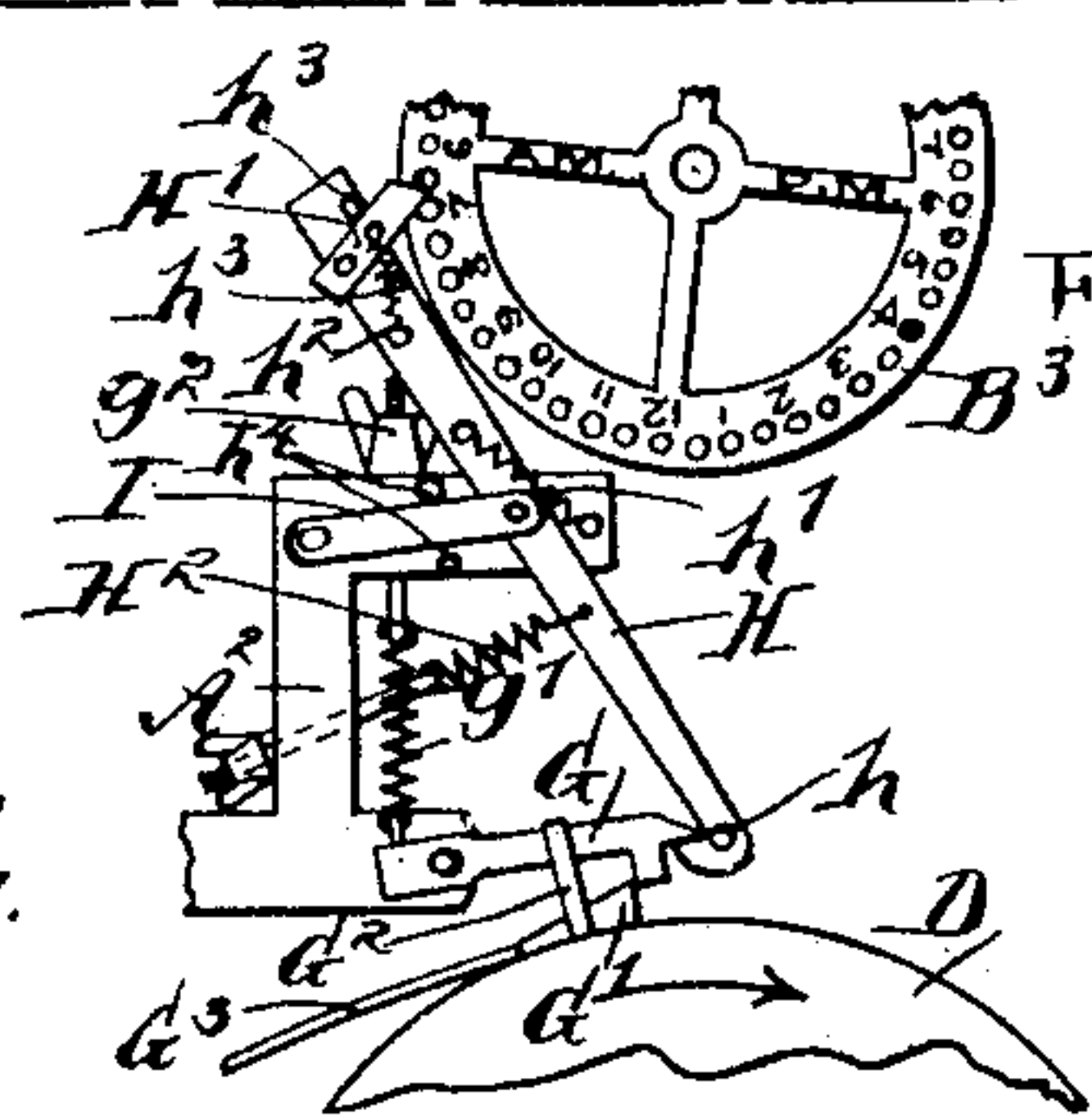


FIG. 3.



WITNESSES:

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FRANKLIN L. MACKEY, OF NEW CASTLE, PENNSYLVANIA.

CLOCK-CONTROLLED SWITCH.

SPECIFICATION forming part of Letters Patent No. 602,706, dated April 19, 1898.

Application filed November 10, 1897. Serial No. 658,051. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN L. MACKEY, of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and Improved Clock-Controlled Switch, of which the following is a full, clear, and exact description.

My invention relates to an improvement in devices intended for use in connection with electric circuits, and has for its object to automatically make or break the circuit or to switch from one circuit to another, the same being operated by connection with a clock mechanism, so that it may be said to complete the circuit or break it at any predetermined time.

The invention consists in certain novel features of construction, which will be hereinafter pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of the device. Fig. 2 is a side elevation thereof, and Fig. 3 is a detail front elevation of the releasing mechanism shown in a different position from that in Fig. 1.

My device is intended, primarily, for use in connection with electric-lighting circuits, where it is desired to turn the current upon the circuits and switch it off the circuits at certain times. It is also adapted for use in connection with any electric circuit upon which it is desired to turn the current for any particular length of time, and is consequently applicable to the electric lighting of gas-lamps and similar uses.

A frame A is mounted upon a backing A', composed of an insulating material. In this frame and the backing A' is journaled a shaft J, which carries a spool D', adapted to receive a number of coils of a cord, chain, or similar flexible connector d . This cord d is carried over a pulley D² and is connected to a weight D³, the same being adapted to rotate the spool D' and the switch-disk D, which is connected thereto. Instead of the mechanism above described for securing the rotation of the disk a coiled spring such as is used in clocks

may be substituted. The object of this mechanism is to secure a constantly forward rotation of the disk, sufficient to answer the needs of the device for a certain length of time.

The disk D is mounted upon the same shaft as that carrying the spool D', but so that it is free to rotate thereon. The spool D' has a ratchet-wheel a^2 secured to one side thereof, which ratchet-wheel is engaged by a pawl a , mounted upon the disk D and held in engagement with the ratchet-wheel by means of a spring a' , fixed upon the disk. The disk D is provided with switch-points E, extending from opposite sides thereof and adapted to engage the switch-points F and F', which are secured upon the insulating-back A'. The switch-points, as shown, consist in both cases of a series of spring-plates, preferably of copper or similar material. The fixed switch-points F and F' are secured at one end to the backing A, the other end being free and extending in the direction of rotation of the disk D. The fixed switch-points F and F' are connected to the various circuits which the device is intended to control.

The disk D has a series of teeth or lugs G' projecting from the periphery thereof, and also pins G², projecting adjacent to the lugs G'. The disk is held against rotation by the cord d and weight D³ by means of a pawl G, pivoted at g , and which engages the lugs G', the pawl being held in engagement with the lugs by a spring g' , which, as shown in the drawings, is connected to a rod which may be lengthened or shortened by means of a thumb-nut g^2 , so as to regulate the tension of the spring. The pawl is mounted upon an extension A² from the main frame A.

The disk D is held against backward rotation by means of a spring-pawl G³, which is mounted upon the frame and engages the rearend of the lugs G'. A bar H is provided at its lower end with a tooth adapted to engage the undersurface of the outer end of the pawl G. At this end of the bar H is a side projecting pin h , adapted to be engaged, as hereinafter described, by the pins G² upon the disk D. The bar H is pivoted upon one end of a link I, which link is pivoted at its

opposite end to the extension A^2 of the frame A. This link is secured against excessive travel in either direction by pins h^4 upon each side thereof. The lower of these pins prevents the bar from dropping upon the disk D and creating friction. The bar H is normally held toward the disk by means of a spring h' and in engagement with the pawl G by a spring H^2 . Upon its upper end is pivoted an arm H' , which projects to one side and has the outer end thereof preferably formed as a pointed tooth. Two pins h^3 project from one side of the bar H and upon opposite sides of the arm H' , so as to permit a limited swing of said arm. The arm H' is normally held in engagement with one of said pins lying toward the center of the bar by means of the spring h^2 , attached to the arm and bar.

Mounted adjacent to the upper end of the bar H is a wheel or disk B^3 , which has a series of holes b' near its outer edge, said holes being adapted to receive pins b^2 , which will engage the outer end of the arm H' . The wheel or disk B^3 is rotated from a clock mechanism by means of the gears B^2 and B' , the latter of which engages a wheel B, mounted upon the shaft b of the clock. The clock-dial is represented by C, and the hour-hand and minute-hand by C^2 and C' . The wheel B is mounted so as to rotate with the hour-hand and has figures marked thereon corresponding with the hours on the clock-dial. This wheel B should be adjustably secured to its shaft, so that its indications may be made to correspond accurately with the indications of the clock-dial. The wheel B is of half the diameter of the wheel B' , so that the wheel or disk B^3 rotates once every twenty-four hours. The clock K may be of any suitable style, but is preferably an eight-day clock, so as to make it unnecessary to often wind the same.

In using my device pins b^2 are inserted in the holes b' in the disk B^3 at the points corresponding with the times when it is desired to open or close the electric circuit. When the disk B^3 is rotated by the clock mechanism so as to engage one of these pins with the arm H' , it will first carry this arm upward until it engages the upper one of the pins h^3 . It will then raise the bar H until the pawl G has been freed from the tooth or lug G' . When this happens, the weight D^3 or the spring which may be substituted therefor rotates the disk D. This swings the switch-point E off of the fixed switch-points F. As the disk rotates, the pin G^2 engages the pin h upon the bar H, so as to free the pawl G from said bar. The spring g' will then cause the pawl G to be engaged with the outer surface of the disk D, and thus to stop the disk when the next tooth G' engages the pawl. The spring-pawl G^3 will be raised by the passage of the tooth or lug G' and will drop behind said tooth, so as to prevent backward rotation of the disk. In this position the switch-points E will be

out of engagement with the fixed switch-points F and the circuit which includes the switch-points will be broken. When the proper time comes for connecting this circuit, a second pin will have been brought to such a position as to engage the arm H' and again lift the pawl G and free the disk D, so that it will be rotated another quarter of a revolution, thus connecting again the switch-points E with the switch-points F.

In the drawings two sets of fixed switch-points are shown. Each set is connected to a different circuit, and the device will break one circuit and connect another at the same time. This in some cases is not desired. In cases where it is desired to use the device on a single circuit the connections from one side of these switch-points to the circuit will be omitted and the other side only will be used.

For convenience in connecting the device series of hand-operated switches S, S' , S^2 , and S^3 are shown. The wires 1 and 2 form the two sides of one circuit. The wire 1 is connected by means of the wire 10 to the switch S^2 and the latter by means of the wire 12 to one of the switch-points F. The side 1 of this circuit is also connected by the wire 11 to the cut-out switch S^3 , which switch is also connected to the other side of the circuit 2 by means of the wire 21. The side 2 of the circuit is connected by the wire 20 with the other fixed switch-point F. The other side 3 of the circuit is similarly connected by a wire 31 to the switch S, and the switch S is connected by a wire 32 to the switch-points F' , the switch S being a switch which will cut out the circuit, so that the device will be inoperative thereupon. The switch S' , which is connected to this circuit by means of the connections 30 and 41, connected, respectively, to the sides 3 and 4 of said circuit, corresponds to the switch S^3 in the other circuit, said switches being used to connect the two sets of circuits at a time when the automatic device has said circuit open. The switches S and S' are connected in the circuit in such a manner that the circuit may be broken and render the automatic device inoperative thereupon. By means of these switches either circuit may be entirely cut out from the automatic device and restored as a closed circuit whether connected to the automatic device or not.

In using my device to connect an electric circuit used for lighting gas or for other purposes where a momentary connection only is desired the fixed switch-points F and F' will be made shorter, the ends thereof being at the point f . By this mechanism the connection of the switch-points E thereto will be made only while passing the same, and thus will be formed for a moment only. This is desirable, as to leave the circuit closed for any length of time would exhaust the battery.

With such a construction the moving switch-points and the fixed switch-points are

not in contact normally, but are in contact only while the switch-points E are passing over the fixed switch-points.

In cases where the device is to be used only in connection with one circuit one set of the fixed switch-points, as those marked F', may be omitted. It is also not essential that the particular form of switch-points shown be used. These are shown as being considered a desirable form. Any suitable form may be used.

By inserting a sufficient number of pins in the disk or wheel B³ the circuit may be broken and closed as many times in a day as desired. The construction, which includes the arm H', renders it impossible that the point which is engaged by the pins on the wheel B³ should on its return strike the same pin. The arm H', having a limited swing and being controlled by a spring, will, when released from the pin, be drawn back so as to entirely clear the pin on its return.

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

1. An automatic switch, comprising a disk having locking-stops spaced thereon and carrying switch-points, means acting on the said disk to rotate it, a pawl engaging the stops to hold the disk, fixed switch-points attachable to the circuit, and means operated by a clock to momentarily lift the locking-pawl, substantially as described.

2. An automatic switch, comprising a disk having locking-stops spaced thereon and carrying switch-points, means acting on said disk to rotate it, a pawl engaging said stops to hold the disk, fixed switch-points attachable to the circuit, a toothed bar or hook engaging said pawl to lift it, a link pivoted to said bar and forming a swinging pivot therefor, a spring attached to the bar to hold the hook thereof beneath the locking-pawl, and means operated by a clock to momentarily lift the locking-pawl, substantially as described.

3. An automatic switch, comprising a disk having locking-stops spaced thereon and provided with switch-points, means acting on said disk to rotate it, a pawl engaging said stops to hold the disk, fixed switch-points engageable with the moving switch-points, a bar connected to the pawl to lift it, an arm pivoted thereto and projecting from one side as a hook, pins limiting the side swing of said arm, a wheel having pins and mounted to revolve so as to engage said arm to lift the pawl, and a clock mechanism for rotating said disk, substantially as described.

4. An automatic switch, comprising a rotating disk having locking-stops thereon and carrying switch-points, means for rotating said disk, a pawl engaging said stops to hold the disk, fixed switch-points engageable by the moving switch-points, a bar connected to the pawl to lift it, a clock-operated mechanism adapted to engage said bar to lift it and

free the disk, and a pin upon the disk adapted to engage the bar to free the pawl as the disk revolves, substantially as described.

5. An automatic switch, comprising a rotatable disk having locking-stops and switch-points thereon, means acting on said disk to rotate it, a pawl engaging said stops to hold the disk, fixed switch-points adapted to be engaged by the moving switch-points, a bar having a tooth engaging the pawl to lift it, a link pivoted to said bar to form a swinging pivot therefor, a spring acting on said bar to draw it toward the disk and to swing it on its pivot, an arm pivoted to the end thereof opposite the tooth and projecting to the opposite side therefrom, pins upon the bar at opposite sides of the arm limiting its swing, a spring holding said arm normally toward the center, a disk having pins adapted when revolved to engage the swinging end of said arm to raise it and the bar, and a clock mechanism for revolving said disk, substantially as described.

6. An automatic switch, comprising a disk having switch-points thereon, means for rotating the disk, fixed switch-points consisting of spring-bars supported from one end and extending tangentially to the disk, said disk having lugs projecting therefrom, a pawl engaging the lugs to prevent forward rotation of the disk, a spring-pawl engaging the lugs to prevent backward rotation of the disk, and means operated by the clock mechanism to momentarily lift the first pawl, substantially as described.

7. An automatic switch comprising a disk having switch-points thereon, means for rotating the same, fixed switch-points consisting of spring-bars supported from one end and extending tangentially to the disk, said disk having lugs projecting therefrom, a pawl engaging the lugs to prevent forward rotation of the disk, a spring-pawl engaging the lugs to prevent backward rotation of the disk, means operated by a clock mechanism to lift the first pawl, and a pin upon the disk engaging the pawl-lifting means to free the pawl as the disk revolves, substantially as described.

8. An automatic switch, comprising a disk having switch-points thereon, means for rotating the same, fixed switch-points consisting of spring-bars supported from one end, said disk having lugs projecting therefrom, a pawl engaging the lugs to prevent forward rotation of the disk, a spring-pawl engaging the lugs to prevent backward rotation of the disk, a disk or wheel rotated by clock mechanism and having a series of holes therein, pins insertible in the holes, and a bar connected to the holding-pawl and engageable by said pins to free the pawl and permit rotation of the switch-disk, substantially as described.

9. An automatic switch, comprising a switch-disk having a rotating means connected thereto, switch-points attached to the disk, a locking-pawl, stops spaced upon said disk and adapted to be engaged by said pawl, a

wheel or disk connected with a clock to rotate
once for each cycle of time, and having a se-
ries of holes therein subdividing the same,
pins insertible in said holes, a bar having a
5 projection in the path of said pins and en-
gaging the locking-pawl to lift it, and a pin
on the switch-disk adapted to engage said bar

to free it from the locking-pawl, substantially
as described.

FRANKLIN L. MACKEY.

Witnesses:

WYLIE MCCASLIN,
E. V. KURTZ.