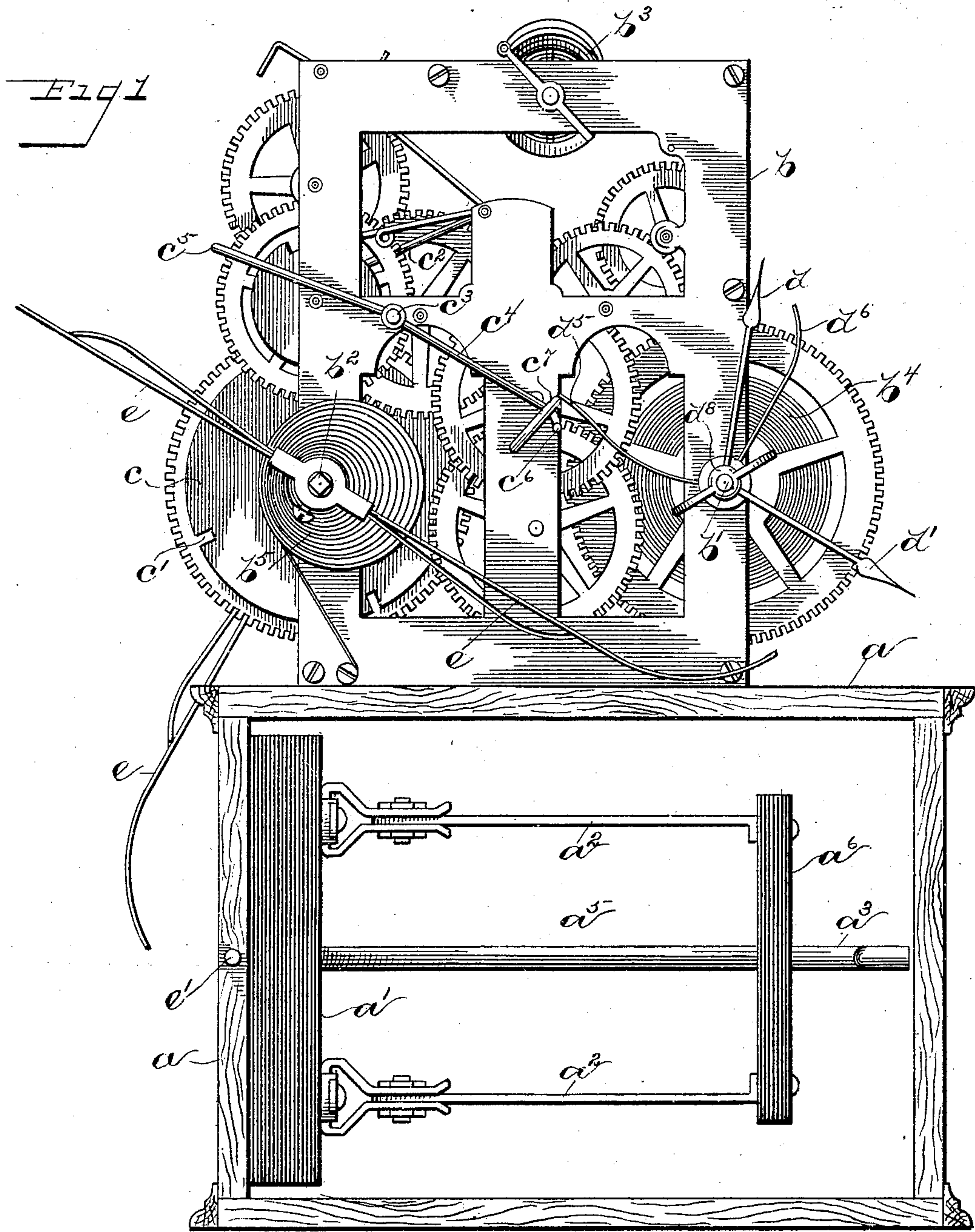


G. R. CLARK.
 AUTOMATIC TIME SWITCH.
 APPLICATION FILED OCT. 29, 1906.

908,073.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 1.



Inventor

Witnesses
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 Chas. J. Welch

By

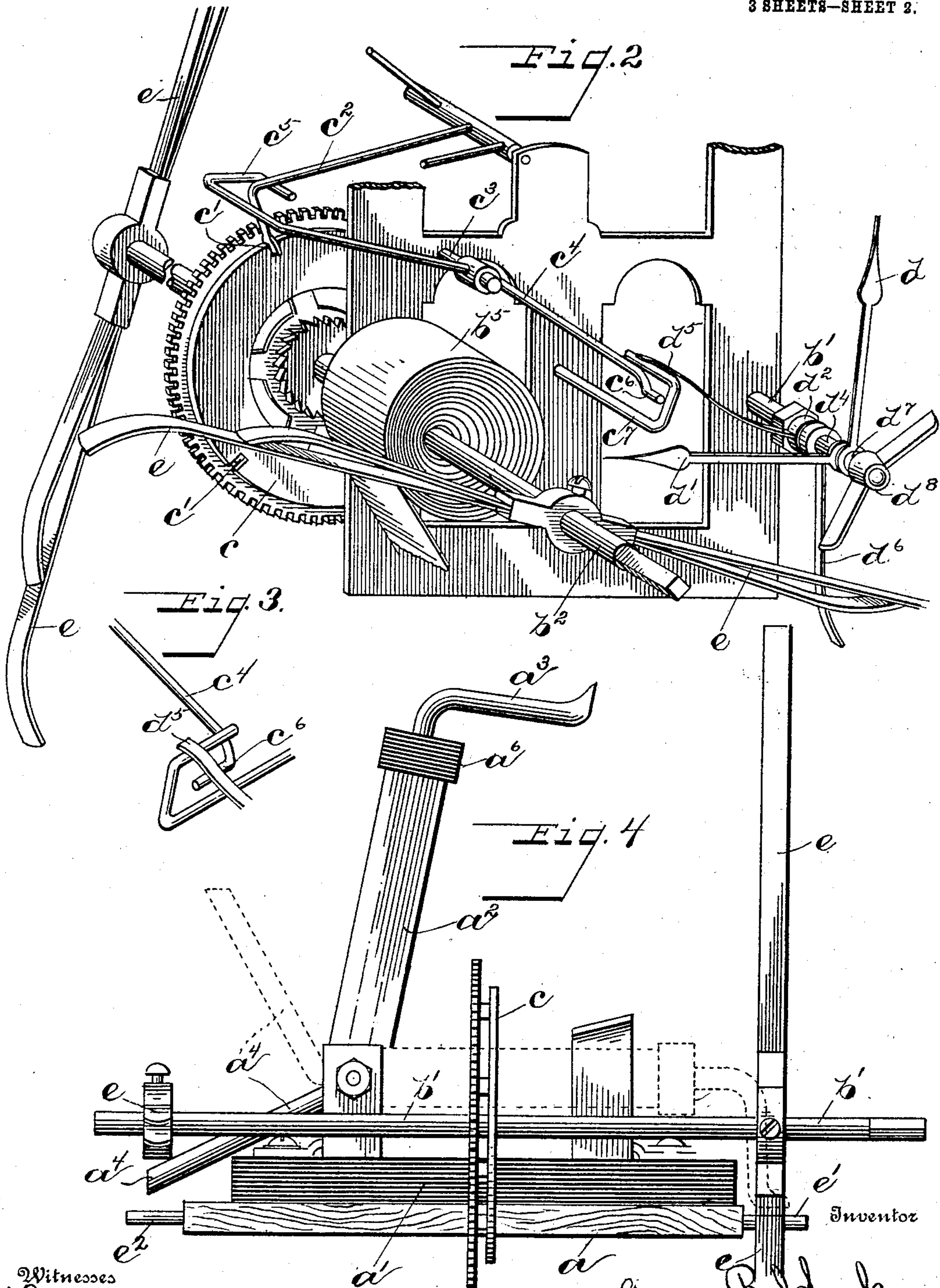
George R. Clark
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 Attorneys

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3 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE R. CLARK, OF DAYTON, OHIO.

AUTOMATIC TIME-SWITCH.

No. 908,073.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed October 29, 1906. Serial No. 341,048.

To all whom it may concern:

Be it known that I, GEORGE R. CLARK, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Automatic Time-Switches, of which the following is a specification.

My invention relates to means for automatically operating electric switches, and particularly to means for operating said switches to both on and off position at predetermined intervals of time.

The object of the invention is to greatly simplify the construction as well as the means and mode of operation of such devices, whereby they are not only cheapened in construction but are rendered more efficient and unlikely to get out of order.

A further object is to construct a device suitable for operating the electric window lights of a store or the illuminating devices of an electric sign whereby said lights will be automatically turned on at a given time and again automatically turned off after a predetermined interval of time.

A further object is to so construct a device of the character mentioned in which the electric switch will be positively operated to both its on and off positions.

With the above primary and other incidental objects in view, the invention consists of the means, mechanism, construction and mode of operation, or their equivalents, hereinafter described and set forth in the claims.

In the drawings herewith Figure 1 is a front elevation of the device with the casing removed. Fig. 2 is a perspective view of a portion of the mechanism showing the means for tripping the parts at the predetermined times. Fig. 3 is a detail perspective view of a portion of the tripping mechanism. Fig. 4 is a plan view showing the electric switch and the arbor carrying the operating sweeps with other parts removed. Fig. 5 is an elevation showing one of the operating sweeps as it is about to operate to throw the switch from closed to open position. Fig. 6 is a detail view showing the arrangement and method of connecting the indicator hands. Fig. 7 is a view of the indicator by means of which the device is set to operate at predetermined times.

Like parts are represented by similar

characters of reference throughout the several views.

Referring by letter to the drawings, *a* represents a base or pedestal within which is located an electric switch, *a*¹, located in the electric circuit to be made and broken at predetermined intervals. The switch, *a*¹, is preferably located within the base, *a*, in such position that its blades, *a*², will swing horizontally when operating from open to closed position and vice versa. Connected with the blades, *a*², by any suitable means and projecting beyond the pivotal point of said blades in both directions are arms *a*³ *a*⁴. In the drawing (Fig. 1 and 4) these arms *a*³ *a*⁴ are shown as the extremities of a continuous rod, *a*⁵, attached to the tie, *a*⁶, which connects the respective blades *a*² *a*². The arm *a*³ is shown bent at right angles and again offset to form a contact for the operating sweep hereinafter mentioned. It is obvious that this bending of the arm is only necessitated through the relation of the parts and by re-arrangement of the operating parts could be obviated. The same is true of the arm *a*⁴, which is shown as extending at an inclination to the switch blades *a*². Mounted upon the base or pedestal, *a*, is a spring motor preferably of the clock-work type, having two principal arbors *b*¹ *b*², the arbor, *b*¹, corresponding to the timing mechanism arbor of an ordinary clock, while the arbor *b*² corresponds to that of the striking mechanism.

The operation of the motor might be controlled by a pendulum but is preferably controlled by means of a balance-wheel *b*³ in the ordinary manner. The motor is driven by spiral or clock springs, *b*⁴, located on the arbor, *b*¹, and one or more springs, *b*⁵, located on the arbor *b*². Motion is imparted to the various parts from said arbors through trains of gears in the ordinary manner. Mounted on the arbor, *b*², is a disk, *c*, having preferably four notches, *c*¹, therein. The disk, *c*, is similar to the striking disk of a clock mechanism and is engaged by a hooked detent *c*². Upon raising the detent, *c*², from engagement with the disk, *c*, the spring, *b*⁵, will operate to revolve the arbor, *b*², until the hooked detent, *c*², engages the next succeeding notch *c*¹. The means for raising the detent is as follows: Pivoted on a projecting stud, *c*³, extending from the main frame of the motor, is a lever, *c*⁴, one end, *c*⁵, of which is so bent as

to extend beneath the hooked detent c^2 . The opposite end of the lever, c^4 , is extended laterally as at c^6 (Fig. 3). Projecting from the frame of the motor is a stop, c^7 , a portion 5 of which extends over the extremity of the lever, c^4 , and above the arm, a^4 ; in the drawing this is shown as a U-shaped member. However, it is obvious that a rod or wire projecting above the arm, a^4 , and not below the 10 same would be sufficient. Secured upon the arbor, b^1 , are indicator hands, d d^1 .

The method of securing the hands upon the arbor is best shown in Fig. 6 in which d^2 is a sleeve loosely journaled on the arbor, b^1 , 15 and abutting against the stop d^3 . Mounted on the sleeve, d^2 , is a second sleeve, d^4 . The sleeve, d^4 , has rigidly secured thereto the indicator hand, d , and also preferably at right angles thereto the spring arm d^5 . A similar 20 spring arm d^6 is secured to the sleeve d^2 . The indicator hand, d^1 , is removable and engages the sleeve, d^2 , by a spline or other suitable means of engagement. A collar, d^7 , is provided which bears against the hand, d^1 , and 25 a compression nut, d^8 , on the end of the arbor, b^1 , provides means for securing the parts in any desired relation. It is obvious that by releasing the compression nut, d^8 , the relation of the hands d d^1 with their connecting 30 sleeves, d^4 d^2 , and their respective spring arms d^5 d^6 may be varied to adjust the parts for operating at longer or shorter intervals of time. The length of the spring arms, d^5 d^6 is such that as the spring arms rotate with the 35 arbor, b^1 , the extremity of the arm will come in contact with the stop, c^7 , and as the arbor continues to rotate the spring arm will be placed under tension until upon the continued rotation of the arbor, b^1 , the spring arm 40 will slip from its engagement upon the stop, c^7 , and violently contact the extremity c^6 of the lever c^4 causing the opposite end c^5 of said lever to rise and engage the hooked detent, c^2 , to lift the said detent from its engagement in 45 the notch c^1 of the disk, c , which will permit the arbor, b^2 , to rotate through the influence of the spring, b^5 . The arbor, b^2 , extends in opposite directions beyond the base, a , and carries at each end opposite extending spring 50 arms or operating sweeps e e , the spring arms or sweeps, e e , of the respective ends being arranged at right angles to each other. Projecting from the base, a , into the path of the operating sweeps, e , is a pin, e^1 , which en- 55 gages said sweeps near the extremity thereof. As the arbor, b^2 , continues to rotate through the influence of the spring, b^5 , after the sweep has engaged the pin, e^1 , the sweep will be placed under tension as indicated in 60 Fig. 5, until upon the continued rotation of the arbor, b^2 , the sweep slips from its engagement upon the pin, e^1 , and violently contacts the extremity of the arm, a^3 (as shown in Fig. 5) with a force sufficient to throw the switch 65 blades, a^2 , to their open position. When the

switch, a^2 , is in open position the arm, a^4 , will be in position to be contacted by the operating sweep located at the opposite end of the arbor, b^2 . Upon the corresponding sweep 70 being placed under tension in the manner as before described, and slipping off the pin, e^2 , it will strike the arm, a^4 , and throw the switch blades, a^2 , to closed position, as shown in dotted lines Fig. 4.

The time of the operation is determined 75 by the relation of the indicator hands d d^1 . The hands d d^1 revolve over a dial as shown in Fig. 7. The indicator is divided into units representing hours, there being a total of twenty-four representing one day. The 80 movement of the indicator hands is such that they move in unison and make one complete revolution in the twenty-four hours, moving in a direction contrary to the hands of a clock. The relation of the indicator hands with their 85 respective spring arms d^5 d^6 is such that the spring arm will slip over the stop, c^7 , and contact the end, c^6 , of the lever, c^4 , at the moment the hand reaches the vertical or the point indicated by the arrow in Fig. 7. In set- 90 ting the device, the compression nut, d^8 , is loosened and the first hand, d , is set as many units away from the arrow as there are hours intervening between the time of setting the 95 device and the hour when it is desired that the switch should be thrown to its closed position. The second hand is then set as many units back of the first hand as the 100 hours it is desired the switch shall remain in closed position before being thrown to the off position. Thus if it is desired that the lights in a store-window be turned on at five p. m. and off seven hours later, or at twelve p. m., then at three p. m., or two hours be- 105 fore the switch is thrown to on position, the indicator hands will appear as they are shown in Fig. 7. When the hand, d , reaches the point indicated by the arrow, the spring arm, d^5 , will slip from the stop, c^7 , and con- 110 tact the end, c^6 , of the lever c^4 . The detent, c^2 , will be lifted and the arbor, b^2 , will make a partial revolution; one of the operating sweeps slipping over the pin, e^2 , will contact the arm, a^4 , and throw the switch to its 115 closed position. The detent, c^2 , will then engage the next succeeding notch of the disk, c , and the rotation of the arbor, b^2 , will be stopped. The switch will remain in closed position until the arm, d^1 , reaches the point 120 indicated by the arrow seven hours later, when the operation will be again repeated by the spring arm, d^6 , slipping from the stop, c^7 , again tripping the lever c^4 , to release the detent, c^2 , and permit the arbor, b^2 another 125 partial revolution, whereby one of the sweeps will be brought in contact with the pin, e^1 , and placed under tension, as shown in Fig. 5, and will upon slipping from engagement with the pin, e^1 , contact the arm, a^3 , and throw the switch again to open position. The timing 130

of the various parts of the motor is such that the arbor, b^1 , carrying the indicator hand makes one revolution in twenty-four hours, while the arbor, b^2 , carrying the sweeps will make one revolution in forty-eight hours. It is obvious, however, that instead of carrying double sweeps as shown in the drawing, the arbor, b^1 , may be provided with a single sweep at each end, when it would be necessary for the arbor to make one revolution in twenty-four hours. The motor is adapted to be hand-wound, and is preferably of the eight-day type, that is, adapted to operate for eight consecutive days upon one winding. It is obvious that various modifications may be employed for carrying out the invention; I do not, therefore, limit myself to the exact construction shown and described.

Having thus described my invention, I claim:

1. In a device such as described, a motor, a spring arm connected with said motor, a detent normally preventing the movement of said motor, a timing device for releasing said detent at predetermined times to permit said motor to move said spring arm together with means for causing said detent to arrest the movement of said motor after the same has moved said arm a predetermined distance, means for placing said spring arm under tension during its movement and releasing same, an electric switch, and a projection on said switch lying in the path of movement of said spring arm, substantially as specified.

2. In a device such as described, an operating motor, a spring arm connected to said operating motor, a detent normally preventing the movement of said operating motor, a timing motor for releasing said detent at predetermined times to permit said operating motor to move said spring arm through a certain path of movement together with means for causing said detent to arrest the movement of said motor, means for placing said spring arm under tension during its movement and releasing same, an electric switch, and arms on said switch projecting into the path of movement of said spring arm, substantially as specified.

3. In a device as described, a revoluble arbor, a motor actuating said arbor at predetermined intervals, arms carried by said arbor, an electric switch, arms on said switch projecting on opposite sides of the pivotal point of the switch and into the paths of the arms carried on said arbor, substantially as specified.

4. In a device as described, an electric switch, arms projecting on opposite sides of the pivotal point of said switch, means for delivering a blow to said projecting arms, alternately on opposite sides of the pivotal point of said switch.

5. In a device as described, a revoluble ar-

bor, means for intermittently operating said arbor at predetermined intervals, an electric switch, sweeps carried by said arbor, projections on opposite sides of the pivotal point of said switch, arms on said switch projecting into the paths of said sweeps, substantially as specified.

6. In a device as described, an electric switch, arms projecting from said switch on opposite sides of the pivotal connection thereof, spring arms adapted to engage said projecting switch arms, means for placing said spring arms under tension and suddenly releasing same prior to their engagement with the projecting switch arms, substantially as specified.

7. In a device as described, a pivoted electric switch, arms projecting on opposite sides of the pivotal connection thereof, sweeps adapted to alternately engage said arms and move said switch alternately to on and off positions at predetermined intervals, substantially as specified.

8. In a device as described, a pivoted electric switch, arms projecting from said switch on opposite sides of the pivotal connection thereof, spring sweeps adapted to engage said projecting arms at predetermined intervals, a stationary projection adjacent to the projecting switch arms engaged by said sweeps prior to the engagement of said switch arms, whereby said sweeps are placed under tension, substantially as specified.

9. In a device as described, an electric switch, a motor, switch-operating mechanism actuated by said motor comprising a spring arm with means for placing same under tension, a detent normally retaining said motor inoperative, a timing device, a revoluble arbor in said timing device, a spring arm carried by said arbor, and means for placing said last-mentioned spring arm under tension, said spring arm being adapted when released to engage said detent to release said motor, substantially as and for the purpose specified.

10. In a device as described, an electric switch, a motor, switch-operating mechanism actuated by said motor, a detent normally holding said motor inoperative, a timing device, a revoluble arbor, an indicator hand adjustably mounted on said arbor, a spring arm fixed in its relation with said indicator hand, means for placing said spring arm under tension whereby said spring arm will be released and will engage the detent to release the motor when said indicator hand reaches a predetermined position, substantially as specified.

11. In a device as described, an electric switch, a motor, switch-operating mechanism actuated by said motor, a timing device, a revoluble arbor in said timing device, two indicator hands independently adjustable

upon said revoluble arbor, spring arms fixed
in their relation with each of the respective
indicator hands, a projection in the path of
said spring arms against which said spring
5 arms will be placed under tension, a detent
normally holding said motor inoperative and
projecting into the path of said spring arms
whereby said spring arms when released from
the engagement of said projection will en-

gage the detent and release the motor, sub- 10
stantially as specified.

In testimony whereof, I have hereunto set
my hand this twenty-fifth day of October A.
D. 1906.

GEORGE R. CLARK.

Witnesses:

SAML. B. RICKETTS,
W. A. RICKETTS.