No. 719,390. PATENTED JAN. 27, 1903.

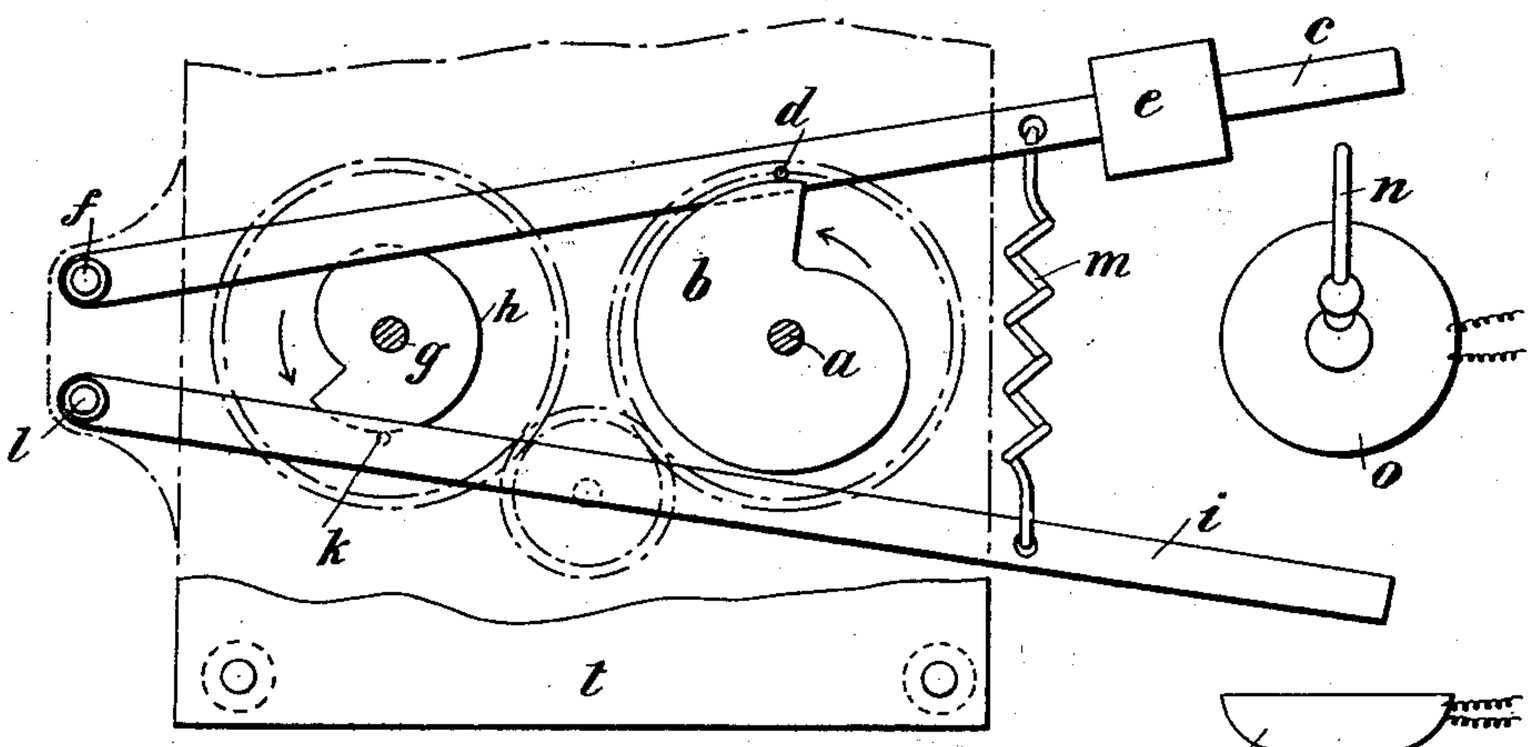
J. J. STOCKALL, JR.

ELECTRIC TIME SWITCH.

APPLICATION FILED AUG. 2, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



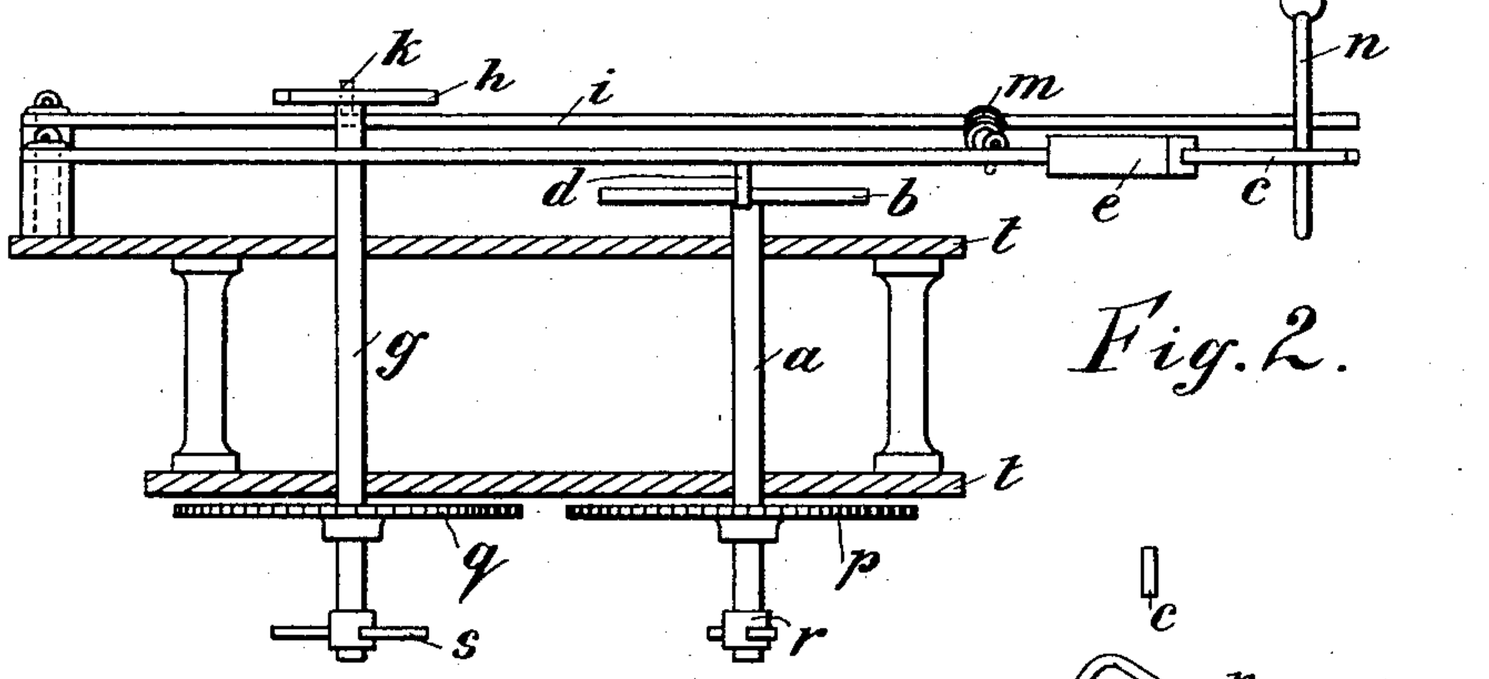


Fig. 2.

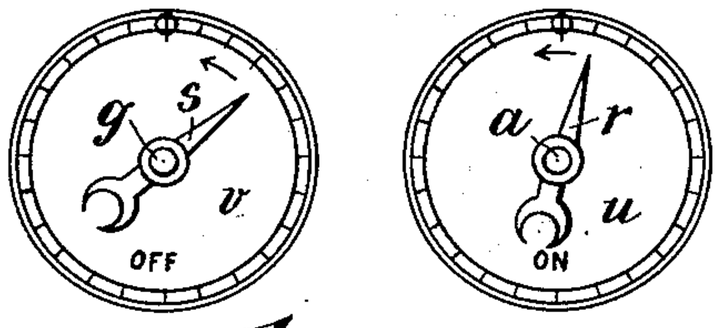


Fig. 3.

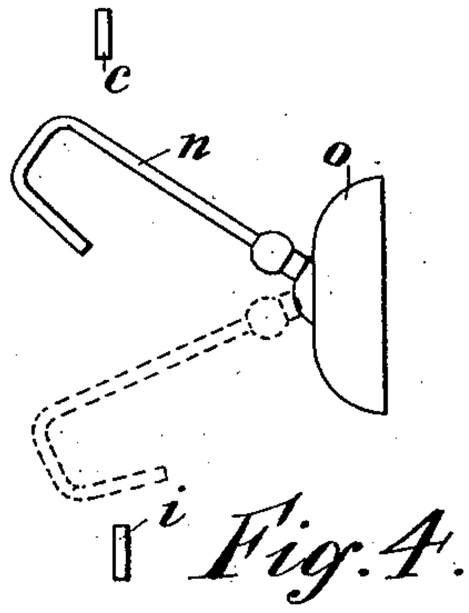


Fig. 4.

WITNESSES.

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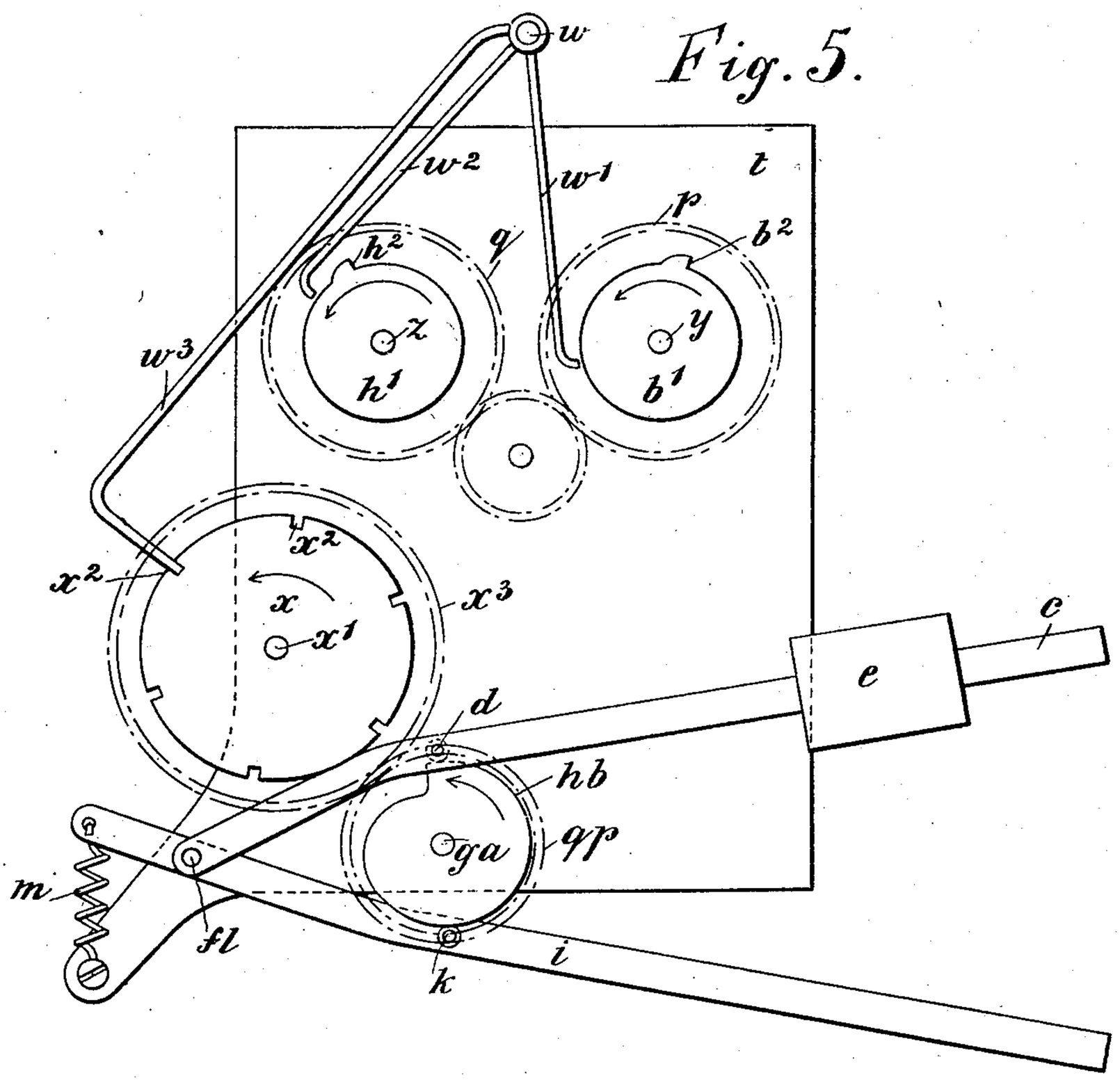
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5.



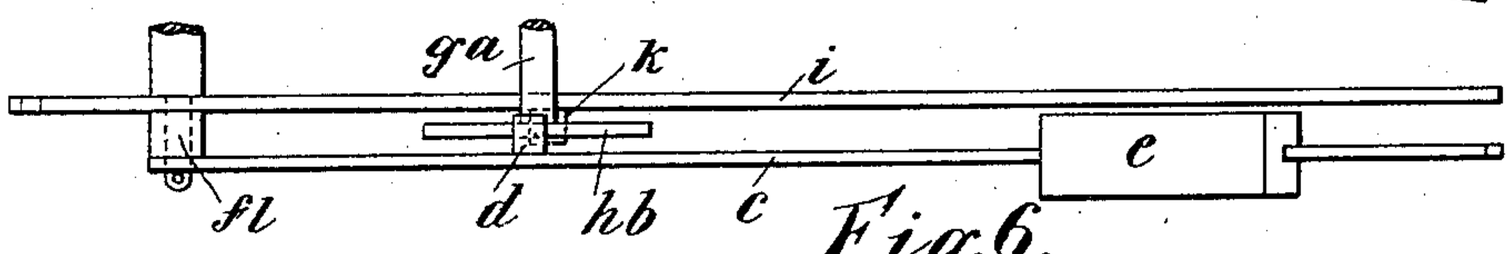


Fig. 6.

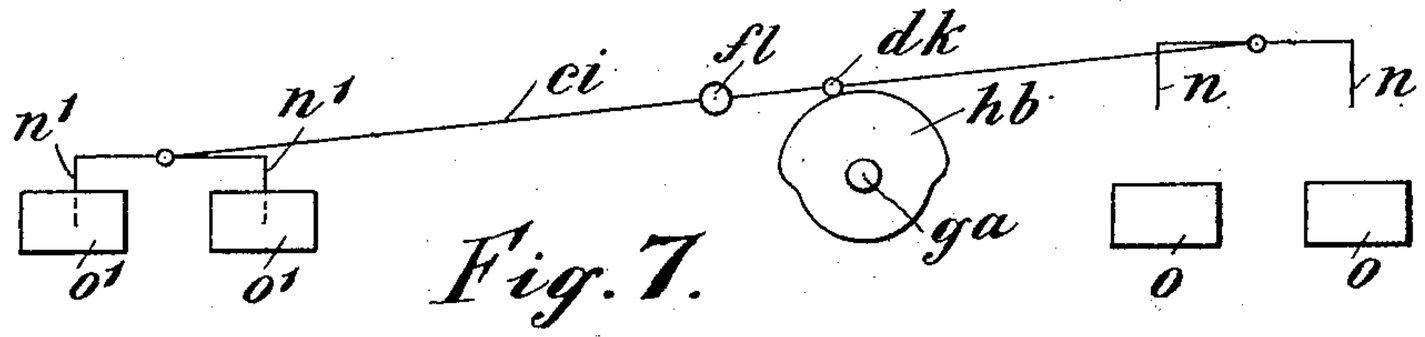


Fig. 7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

JAMES JOHN STOCKALL, JR., OF LONDON, ENGLAND.

ELECTRIC TIME-SWITCH.

SPECIFICATION forming part of Letters Patent No. 719,390, dated January 27, 1903.

Application filed August 2, 1902. Serial No. 118,179. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOHN STOCKALL, Jr., a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in or Relating to Apparatus for Automatically Switching Electric Current On or Off, Turning Gas or Water On or Off, and the Like; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus actuated by an ordinary clock-movement for automatically cutting off the supply of electric current, gas, water, and the like and for automatically renewing the said supply at prearranged intervals of time. The result I seek to attain is the production of a simple device capable of attachment to the movement of an ordinary clock and capable of being actuated by such movement and of being so arranged that a rod attached to an ordinary electric switch or to an ordinary gas or water tap may be so operated thereby as to control the supply of electric current, gas, or water, as the case may be. This I accomplish by attaching a spindle carrying two adjustable snail or other cams to the frame of an ordinary clock-movement. This said spindle is also provided with a cog-wheel, fast or friction-tight thereon, in gear with one of the cog-wheels of the clock-movement. I provide two arms or levers pivoted to a convenient part of the clock-frame, one lever for each cam. Each lever is provided with a pin or projection capable of engagement with its cam. One of these said levers is provided at its extremity with a weight which causes that extremity of the lever to fall when released by the cam. The other lever is provided with a spring or weight for the purpose of causing it to rise when released by the cam. These levers are so pivoted that their extremities are capable of coming in contact with the rod fixed to the switch or tap, so that when the weighted lever is released by its cam it falls and strikes the said rod and forces it downward, switching on the current or opening the tap, and when the spring-controlled lever is released by its cam it swings upward, striking the rod on the under side and forcing it upward to its original position. The cams may be both on the same spindle or they may be each provided with separate spindles. The cams are adjustable in order that the supply of electric current, gas, or water may be intermittently turned on or cut off at prearranged regular or irregular intervals automatically without any further attention after the mechanism has been set, it being then only necessary to wind the clock.

In order that my invention may be better understood, I will now describe the same with reference to the drawings, in which like letters denote like parts.

Figure 1 is a general arrangement in elevation, the ordinary clockwork portion being omitted in order to more clearly exhibit the construction. Fig. 2 is a plan of same, showing the frame of the ordinary clockwork. Fig. 3 is an elevation of the setting hands and dials. Fig. 4 is a side view of an ordinary electric switch, showing my rod attachment for switching on and off. Fig. 5 is an elevation of my invention where a single cam is employed. Fig. 6 is a plan of the arms and cam, and Fig. 7 is a diagrammatic sketch showing a modification wherein one pivoted arm is operated by the single cam arrangement as shown in Figs. 5 and 6.

a and *g* are the cam-spindles.

b is the cam attached to the spindle *a*.

c is an arm or lever provided with lifting-pin *d* and is pivoted to the frame *t* at *f*. The arm *c* is also provided with a weight *e*. The spring *m*, aided by the weight *e*, causes the pin *d* to be always in contact with the cam *b*. The cam *h* is attached to the spindle *g*.

i is an arm provided with the pin *k* and is pivoted at *l* to the clock-frame *t*. The arm *i* is coupled to the arm *c* by the spring *m*, the tendency of the said spring being to draw the free ends of the arms toward each other, causing the pins *d* and *k* to bear upon their respective cams.

n is a rod secured into the button of an ordinary switch *o*.

In order that the cams may be rotated with the clock-movement and yet be capable of adjustment, I fix the cog-wheel *p* friction-tight upon the spindle *a* and the cog-wheel *q* friction-tight upon the spindle *g*. The cog-wheels *p* and *q* are in gear with a convenient

wheel of the ordinary clockwork-train. In Fig. 1 they are geared to the hour-wheel, which revolves once in twelve hours and has sixty teeth, whereas the cog-wheels p and q each have one hundred and twenty teeth and will therefore rotate the cams at the rate of one revolution in twenty-four hours. The cam-spindles a and g are provided each with an indicating or setting hand, by which the cams may be so adjusted as to release their respective arms at the prearranged times.

r is the setting-hand attached to the spindle a and is therefore capable of adjusting the cam b.

s is the setting-hand attached to the spindle g and is therefore capable of adjusting the cam h.

The setting-dials are situated upon the ordinary clock-dial. The dials as here shown are marked into twenty-four divisions, one such division representing one hour, and the cams, as hereinbefore stated, will release their respective arms once every twenty-four hours—that is, when the setting-hands point to zero. It is assumed in this instance that the hands of the ordinary clock read twelve o'clock and that it is desired to switch on the current at one o'clock and switch off at half-past three. The hand r is turned against the arrow until it points, as shown in Fig. 3, to the first division, or one hour after twelve, and the setting-hand s is turned to point, as shown, to three and one-half divisions, or three and one-half hours after twelve o'clock. The hand r will therefore take one hour to return to zero. The arm c will then drop and switch on. The hand s will take three and one-half hours to return to zero, when the current will be switched off. The operation is briefly as follows: As soon as the prearranged time arrives the cam b releases the pin d, leaving the arm c unsupported, which under the influence of the weight or spring falls, the extremity of the arm strikes the switch-rod n, forcing the same in a downward direction to the position shown in dotted lines in Fig. 4, thus switching on the current, and as the cam b continues to revolve the arm c is again raised to the striking position, and as soon as the prearranged time arrives the cam h releases the pin k. The arm i flies upward under the influence of the spring m and strikes up the switch-rod n to its original position. The ordinary clock having been wound up and the setting-hands having been set so that their respective cams shall operate at the prearranged times as indicated on the setting-dials, no further attention is necessary until the clock has run down, and in order to enable one double-acting cam to operate the arms and to admit of such cam being set from the going-train I employ the devices shown in Figs. 5 and 6, consisting in the spindles y and z, pivoted to the clock-frame t. The cam b' is fixed to spindle y, and the cam h' is fixed to spindle z. Each spindle is provided with a twenty-four-hour cog-wheel p and q, friction-tight thereon. These said twenty-four-hour wheels are in gear with a twelve-hour wheel of the clock-train and also with the setting-hands, as shown in Fig. 3. The cams b' and h', also called "releasing-cams," are provided with the projections b^2 and h^2, respectively.

To a convenient part of the frame t I pivot, by means of a cock or otherwise, the rocking spindle w. This rocking spindle is pierced to receive the two releasing-rods w' and w^2 and also the releasing-pawl w^3, which are securely fixed therein.

The controlling-disk x is fixed upon the arbor x' of the striking-train of the clock or its equivalent. The disk x is provided with notches x^2 x^2 upon its periphery, into which notches the extremity of the releasing-pawl w^3 falls. The disk x is always under the influence of the striking-spring of the clock, and thus revolves in the direction shown by the arrow thereon when the pawl w^3 is not engaged in one of the notches x^2. The snail or operating-cam $h\,b$ is fixed to the spindle $g\,a$, pivoted to the clock-frame t. The cog-wheel $q\,p$ is fixed friction-tight to the spindle $g\,a$, and the cog-wheel x^3 is fixed friction-tight to the spindle x'. The cog-wheels x^3 and $q\,p$ are in gear with each other, so that when the disk x revolves the cam $h\,b$ will also revolve. The arms c and i are both pivoted on the pivot $f\,l$, provided with a distance-piece for retaining the pivoted arms the correct distance apart. The arm c falls under the influence of the weight e or of a spring when released by the cam $h\,b$, the roller pivot or pin d resting on the cam, and the arm i flies upward under the influence of the spring m when released by the cams $h\,b$, the roller pivot or pin k thereof being pressed upwardly by the action of the spring m against the cam $h\,b$.

Briefly the action is as follows: The prearranged time for striking on and off having been set by turning the setting-hands mounted on the spindles y and z, as described with reference to Fig. 1 and the time and striking trains of the clock having been wound up and the clockwork set going, the releasing-cams commence to revolve. When the time arrives, the projection h^2, as shown in Fig. 5, lifts the releasing-rod w^2, which lifts the extremity of the releasing-pawl w^3 out of one of the notches x^2 of the controlling-disk x, which disk is now free to revolve until the releasing-rod w^2 is free of the projection h^2. The releasing-rod is then free to fall to its normal position, the pawl w^3 resting upon the periphery of the disk x until one of the notches x^2 comes under the pawl, into which it falls and arrests the rotation of the disk, the result being that the cam $h\,b$ has released the pin d, permitting the arm c to fall, and as the releasing-cam b' revolves the projection b^2 thereon comes in contact with the releasing-rod w', the releasing-pawl w^3 is again lifted out of the notch x^2, permitting the disk x to again revolve—that is to say, the first time the disk w was released it

rotated sufficiently to revolve the cam *h b*, so as to permit the downward movement of the arm *c*, and the second time sufficiently to permit the upward movement of the arm *i*. The releasing-cams *b'* and *h'* may be provided with more than one projection each, according to the number of times per revolution it is intended that the mechanism shall operate. When only one cam is employed to operate the arms, I fix thereon an indicating-hand provided with a dial on which the words "On" and "Off" are marked to show which arm is about to act or for setting purposes.

As a modification of this invention as shown in Fig. 7 I may employ one arm *c i*, pivoted at *f l* and provided with a pin *d k*, which rests on and is retained in contact with the cam *h b* by the agency of springs or weights. The ends of the arm are provided with metallic bridges *n n* and *n' n'*. *o o* and *o' o'* are mercurial contacts. The cam *h b* is of varying diameter in order to impart a see-saw motion to the arm *c i* and is fixed to the spindle *g a* of a movement, as described with reference to Fig. 5. The action is: when the pin *d k* is lifted by the larger diameter of the cam, the bridge *n n* is lifted out of the contacts *o o*, the bridge *n' n'* being thus lowered into the contacts *o' o'*, and as soon as the lesser diameter of the cam comes in contact with the pin *d k* the arm is free to tip up in the opposite direction, the bridge *n n* then coming into the boxes *o o* and the bridge *n' n'* being lifted out of the boxes *o' o'*.

I claim—

In combination with a switch, two arms, one of which operates the switch one way and the other operates the same the other way, a spring for operating the arms when released and cam means controlling the arms, said cam means comprising a pair of cams, two separate spindles therefor upon which the cams are set and a dial and setting-hand for each cam whereby each may be adjusted to cause the actuation of the arms at the proper moment and connections between said cams and the arms comprising a controlling-disk *x*, a cam *h b* arranged between the arms, gearing between the cam *h b* and said disk, releasing-rods operated by the pair of cams and a pawl controlled by the releasing-rods and controlling the operation of the disk, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JAMES JOHN STOCKALL, JNR.

Witnesses:
CHARLES SEPTIMUS BERTHON,
JOSEPH LAKE.