May 4, 1926. 1,583,760

G. H. RONEY

CLOCK CONTROLLED SWITCH

Filed Dec. 21, 1925

Fig. 1.

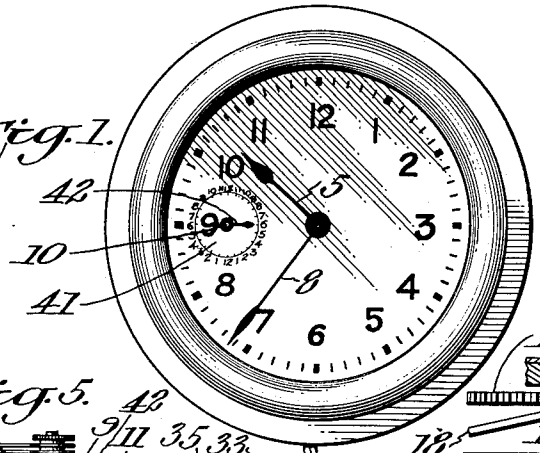


Fig. 7.

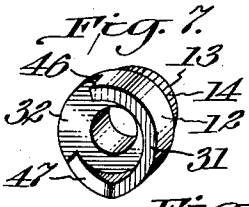


Fig. 6.

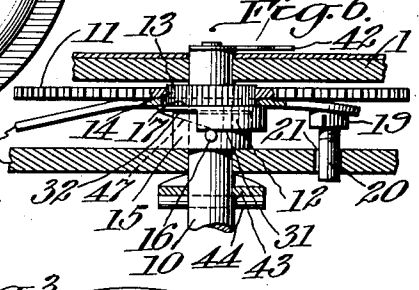


Fig. 5.

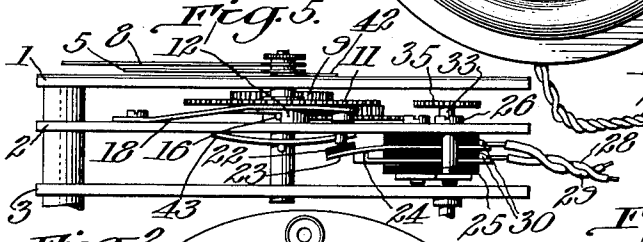


Fig. 2.

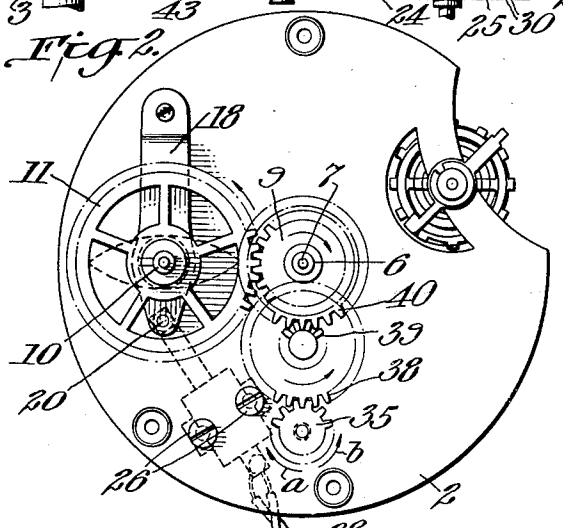


Fig. 3.

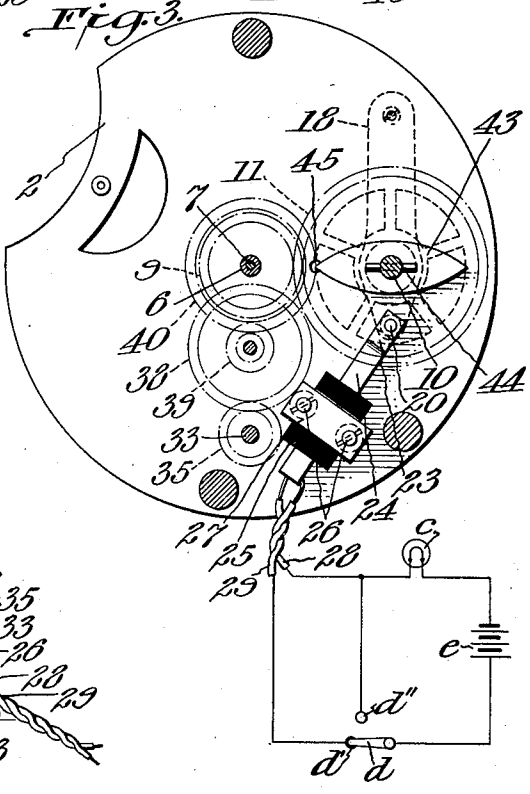
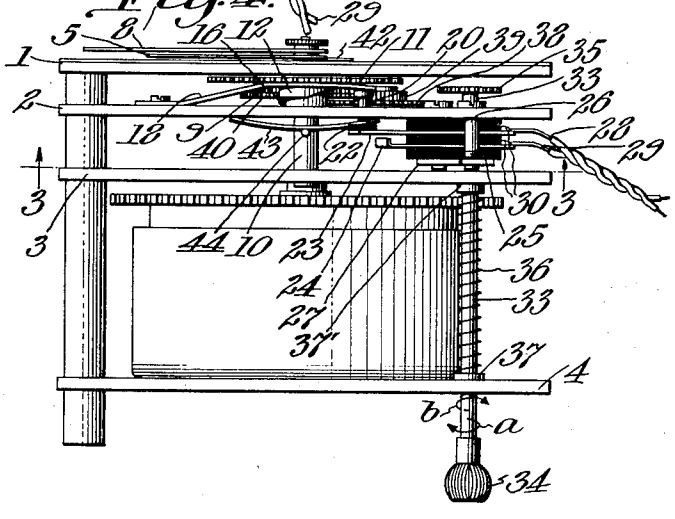


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE H. RONEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

CLOCK-CONTROLLED SWITCH.

Application filed December 21, 1925. Serial No. 76,851.

To all whom it may concern:

Be it known that I, GEORGE H. RONEY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new and useful Improvement in Clock-Controlled Switches, of which the following is a full, clear, and exact description.

This invention relates to time-controlled devices for performing various services, such as the switching on and off of electric lights at predetermined intervals, or the operation of visible or audible signals, and the like.

The object of the invention is to provide an electric switch adapted to be controlled for the closing and opening of an electric circuit therethrough by means of a clock mechanism, so that the switch may be closed and opened at predetermined time intervals.

I am aware that devices of this character have been heretofore provided, but I am not aware of any such devices wherein the simplicity in mechanical construction and operation is present to such an extent as in devices constructed in accordance with my invention.

The invention consists broadly in a clock-controlled switch including an ordinary clock mechanism or time train of any approved type, with which is combined an electric switch and means for actuating the same in response to movement imparted by the clock mechanism, and means for setting the hands of the clock and also for setting the switch-operating means, whereby both the clock hands and the switch-operating mechanism may be set by manipulation of a single member normally forming a part of an ordinary clock, as I will proceed now to explain and finally claim.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a plan view of a clock embodying my invention. Fig. 2 is a plan view illustrating the mechanism of my invention, and showing sufficient of the clock mechanism or time train to show its association therewith, the dial and hands and dial-supporting plate of the clock being removed. Fig. 3 is a section taken on the line 3—3 of Fig. 4 and looking in the direction of the arrows. Fig. 4 is a side elevation of the parts shown in Fig. 2, and illustrating the positions assumed thereby when the switch is open. Fig. 5 is a view similar to Fig. 4, but showing the parts in the positions assumed thereby when the switch is closed. Fig. 6 is an enlarged sectional elevation of the switch actuating mechanism. Fig. 7 is an enlarged perspective view of the switch operating cam.

As a particular embodiment of my invention, I have shown the mechanism thereof combined with an automobile clock of ordinary commercial type, for closing and opening an electric circuit at certain predetermined times for the purpose of lighting and extinguishing a parking light or lights on an automobile.

A clock of the type shown comprises an ordinary time mechanism, only parts of which are shown, mounted in a frame comprising a dial-supporting plate 1 and bearing plates 2, 3 and 4.

The hour hand 5 of the clock is carried upon the usual sleeve 6 through which runs a shaft or arbor 7 which carries the minute hand 8 in accordance with common practice. Upon the sleeve 6 is fixed a gear 9, and in the plates 1, 2 and 3 are provided bearings for a shaft 10 upon which is rotatably mounted a gear 11 having fixed to it a cam 12 provided with a hub 13 milled as indicated at 14, Fig. 6, or otherwise prepared for fixed rotative engagement with the gear 11. Fixedly carried by the shaft 10 is a collar 15 carrying a pin 16 upon which pin the cam rides.

Between the gear 11 and a shoulder 17 upon the top of the cam is interposed a flat spring 18 fixed to the plate 2 and arranged to hold the cam 12 in engagement with the pin 16, so that the cam and with it the gear 11 will slide up and down upon the shaft 10 in response to the irregulartities of the face of the cam

The spring 18 carries a split screwthreaded bushing 19 in which is adjustably held a screwthreaded pin 20 extending through an opening 21 in the plate 2. This pin 20 is arranged to press upon an insulating block 22 carried by one contact member 23 of the electric switch. This member 23 and its complemental contact member 24 are mounted in a holder 25 of suitable insulating material secured to the plate 2 as by means of clamping screws 26 and plate 27. Two wires 28 and 29 which connect the switch with the devices to be controlled thereby may be soldered or otherwise suitably attached to

the plates 23 and 24 respectively, as shown at 30. By providing the bushing 19 and pin 20 with complemental screwthreads, it will be apparent that any desired adjustment of the pin with relation to the block 22 may be obtained, the split of the bushing making same of such resiliency as to prevent accidental rotation of the pin within the bushing, and consequent accidental change of adjustment.

The thickness of the gear 9 is such that it will at all times be in mesh with the gear 11, whether the latter is in the position shown in Fig. 4 or in the position shown in Fig. 5 or in any intermediate position, consequently the gear 11 will always be driven by the gear 9 in response to the movement of the hour hand 5 by the clock train.

As will be seen, the gear 11 is twice the diameter of the gear 9, or in other words, there is a two to one gear ratio between the two, whereby the gear 11 will make one complete revolution in each twenty-four hours. The cam 12 being carried by the gear 11 will therefore also make one complete revolution in each twenty-four hours.

Referring now particularly to Fig. 7, it will be seen that the high surface 31 of the cam is approximately thirteen-twenty-fourths of the cam circumference, whereas the low portion 32 of the cam is approximately eleven-twenty-fourths of the circumference, and inasmuch as the contact members 23 and 24 of the switch are in position to close the circuit when the low portion 32 of the cam is in engagement with the pin 16, and these contacts are separated and the circuit open when the high portion 31 of the cam is in contact with the pin 16, the parking light, in the particular instance mentioned, will be lighted during a period of eleven hours, or say from 6 p. m. to 5 a. m. and will be extinguished, for a period of thirteen hours, or from 5 a. m. until 6 p. m.

The mechanism for setting the hands of the clock comprises a spindle 33 passing through the plates 2, 3 and 4 and finding bearings therein and extending to the outside of the clock case in the manner usual in setting devices of this character, and is provided with a turn-button 34. This spindle carries at its opposite end a pinion 35 normally held out of mesh with the other gears of the setting train by means of a spring 36 having one of its ends bearing against a fixed bushing 37 in the plate 4, and its other end bearing against a collar 37' carried by the spindle. In order to set the clock hands the spindle 33 is moved against the tension of the spring 36 so that the pinion 35 is brought into mesh with a gear 38 carrying a pinion 39 which meshes with a gear 40 fixed to the sleeve 6. Appropriate rotation of the spindle 33 by means of the turnbutton 34 will, in the ordinary clock mechanism set the clock hands no matter whether they are turned in clockwise or contra-clockwise direction, and the same is true in clocks provided with my switch mechanism, inasmuch as no change is made in this mechanism for setting the hands of the clock. However, in setting a clock, one ordinarily operates the setting mechanism so as to move the hands in clockwise direction, and I take advantage of this fact by employing rotation of the setting mechanism in contra-clockwise direction to set my switch operating train.

It will be noted by reference to Fig. 1 that I provide upon the clock dial a small dial 41 bearing two sets of numerals from 1 to 12 respectively, those upon the left hand side of the dial being a. m. time and those upon the right hand side of the dial being p. m. time. With this dial cooperates a hand 42 mounted upon the end of the shaft 10 and turning in response to movement of said shaft.

It will be noted, that, as hereinbefore described, the cam 12 and the gear 11 carried thereby are arranged to rotate freely upon the shaft 10, hence the rotation of these parts imparts no movement to the shaft 10. To guard against any possible rotation of the shaft 10 in response to rotation of the cam 12 thereon, I provide a friction clutch comprising a spring 43 bearing against the plate 2 and against a pin 44 fixed in the shaft 10. As shown, the spring 43 may be pointed at its ends, and the plate 2 may be provided with a recess or hole 45 with which one of the points of the spring may engage to prevent its rotation. The provision of this recess or hole 45 although desirable is not essential for the reason that the pointed ends of the spring 43 will generally bite into the plate 2 sufficiently to prevent rotation of the spring.

Referring now to Figs. 2, 5 and 6, it will be seen that when the turn-button 34 is rotated in clockwise direction (in the direction of the arrow *a*, Figs. 2 and 4), the gears 35, 38, 39 and 40 will be turned in the directions indicated by the arrows thereon, and consequently the hands of the clock will be turned in clockwise direction, and the gear 11 will be turned in the direction of the arrow adjacent thereto and the cam 12 consequently so turned that its notch 46 will ride over the pin 16 and drop past same as many times as the gear 11 is turned through a complete revolution, without in any way affecting the position of the shaft 10 or the hand 42. If, however, the turn-button 34 is so rotated as to turn the spindle 33 and gear 35 in contra-clockwise direction (in the direction of the arrow *b*, Figs. 2 and 4) then the direction of rotation of the gears 38, 39, 40, 9 and 11 will be reversed, and when the notch 46 of the cam 12 engages

with the pin 16, the shaft 10 will be turned and consequently the hand 42 will turn therewith and may be set to any hour either a. m. or p. m. indicated upon the dial 41.

As a concrete example of the operation of a clock embodying the device of my invention, we will say that sunset is at six o'clock p. m., and that therefore to comply with the ordinary police ordinances, an automobile must show a light at that time. It will be necessary, therefore, for the operator to set the hand 42 at the 6 p. m. indication of dial 41, as shown in Fig. 1. This is done in the manner hereinabove just described by contra-clockwise rotation of the turn-button 34 and consequently of the hands of the clock. After the hand 42 is thus set at 6 p. m., the hands of the clock may be reset to the proper hour, say 10:36, as indicated in Fig. 1 by clockwise rotation of the turn-button 34 without in any way affecting the setting of the hand 42 and consequently of the pin 16. Now the clock may operate in its normal manner throughout the day, the gear 9 rotating the gear 11 and consequently the cam 12 at half speed with the high portion 31 of the cam riding upon the pin 16 and the parts in the positions shown in Fig. 4, the switch therefore being open. As soon, however, as the hour 6 p. m. is reached, the notch 46 of the cam will drop down past the pin 16, under the influence of the spring 18, and the pin 20 pushing downward upon the block 22 of contact member 23 will cause contact member 23 to engage contact member 24 as shown in Fig. 5 to close the circuit and light the parking light. Obviously the clock continues to run, and when the hour 5 a. m. approaches the inclined portion 47 will start to ride upon the pin 16 and the cam 12, gear 11, and pin 20 will gradually be raised, until at five o'clock they are raised sufficiently to break the contact between contact members 23 and 24 and consequently open the circuit through the lamp. As long as this setting of the hand 42 is maintained, the parking light will be lighted at 6 p. m. and extinguished at 5 a. m.

As the days grow shorter, and consequently the hour of sunset is earlier, the setting of the hand 42, and consequently of the pin 16 may be changed to correspond, but in any event, the lights will go on at the hour at which the hand 42 is set and will be extinguished eleven hours later.

I speak of the lamp remaining lighted for eleven hours, for the reason that the cam shown is designed, as hereinbefore described, for a period of that length, but it is obvious that by changing the proportion of high surface 31 to low surface 32 of the cam the relative lengths of time during which the lamp will be lighted and extinguished may be varied.

It is desirable in all automatically controlled devices of this character to have means whereby the effect of the automatic switch may be eliminated, and the light manually controlled, and I have indicated diagrammatically an arrangement of this nature in Fig. 3, wherein *c* is the parking light, *d* a manually operable switch arm and *d'* and *d''* contacts with which the switch arm *d* may be engaged, and *e* a source of electric current such as a storage or other battery. With this arrangement, it will be seen that with the switch arm *d* in the position shown, the clock-controlled switch will light and extinguish the lamp *c* automatically. With the switch arm *d* in engagement with the contact *d''* the lamp *c* will be manually lighted and the automatic clock-controlled switch will have no effect upon the lamp. With the switch arm *d* so positioned as to engage neither of the contacts *d'*, *d''* the lamp will be completely cut off from the battery *e*.

It will thus be seen that I provide a clock-controlled switch which is of exceedingly simple construction as compared with known devices of this character, and which has few parts, all of which are of relatively sturdy construction and not apt to become broken or inoperative due to vibration or other causes. It will be evident, moreover, that the device of my invention may be installed in any ordinary clock without in any way changing the mechanism thereof but by merely adding the parts comprising the switch mechanism.

I have shown and described my invention, as hereinbefore pointed out, in connection with an ordinary automobile clock for the purpose of lighting and extinguishing a parking or other light or lights at predetermined time intervals, but as indicated, the invention is adapted to other uses, such as the lighting and extinguishing of night lights in a store, or of the lights in show windows and cases, or for operating visible and audible signals, switches and other devices or apparatus which require periodic operation.

Moreover, it will be understood that I contemplate the making of various changes in the construction and operation of the device as within the spirit of the invention and the scope of the following claim.

What I claim is:—

In a clock-controlled switch, a clock mechanism, a switch, means including a cam driven by said clock mechanism for opening and closing said switch at predetermined time intervals, a shaft upon which said cam rotates, means for normally holding said shaft against rotation, an indicator hand carried by said shaft and visible upon the clock face, a pin carried by said shaft and upon which the face of said cam rides, the adjustment of said pin determining the

times of opening and closing of said switch under the influence of said cam, and means for setting the clock hands and for adjusting said shaft, said means inoperative to rotate said shaft upon clockwise rotation of the hands, but causing said cam to engage said pin to turn the shaft and set said indicator hand upon contra-clockwise rotation of the clock hands.

In testimony whereof I have hereunto set my hand this 21st day of December A. D. 1925.

GEORGE H. RONEY.