W. T. ROWELL.

TIME SWITCH FOR ELECTRIC LIGHTS.

APPLICATION FILED DEC. 18, 1915.

1,194,078.

Patented Aug. 8, 1916.

2 SHEETS—SHEET 1.

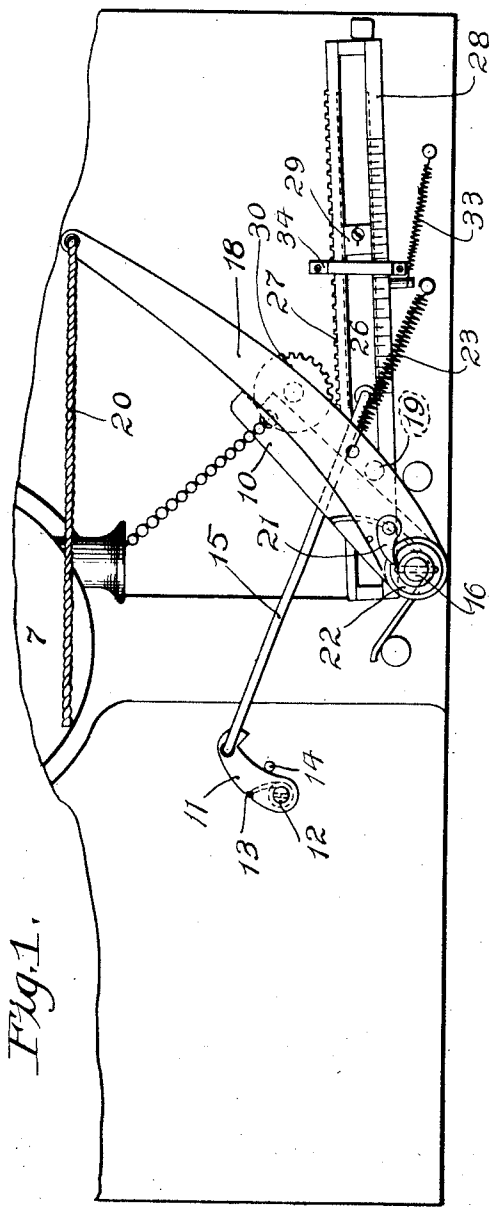


Fig. 1.

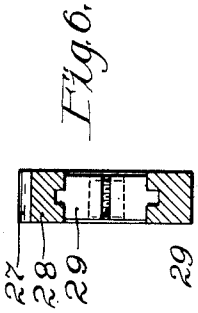


Fig. 6.

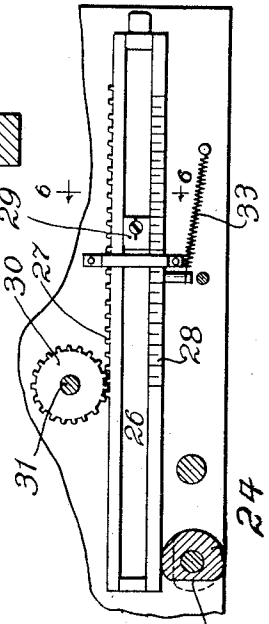


Fig. 5.

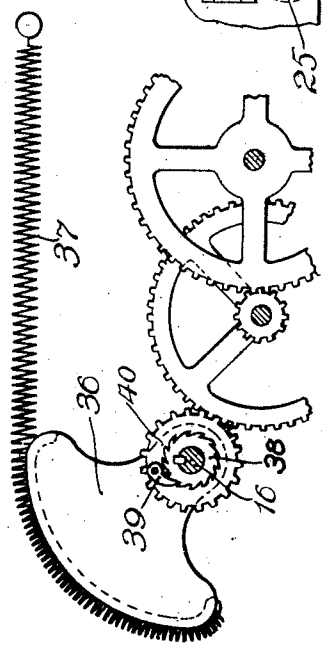


Fig. 4.

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2 SHEETS—SHEET 2.

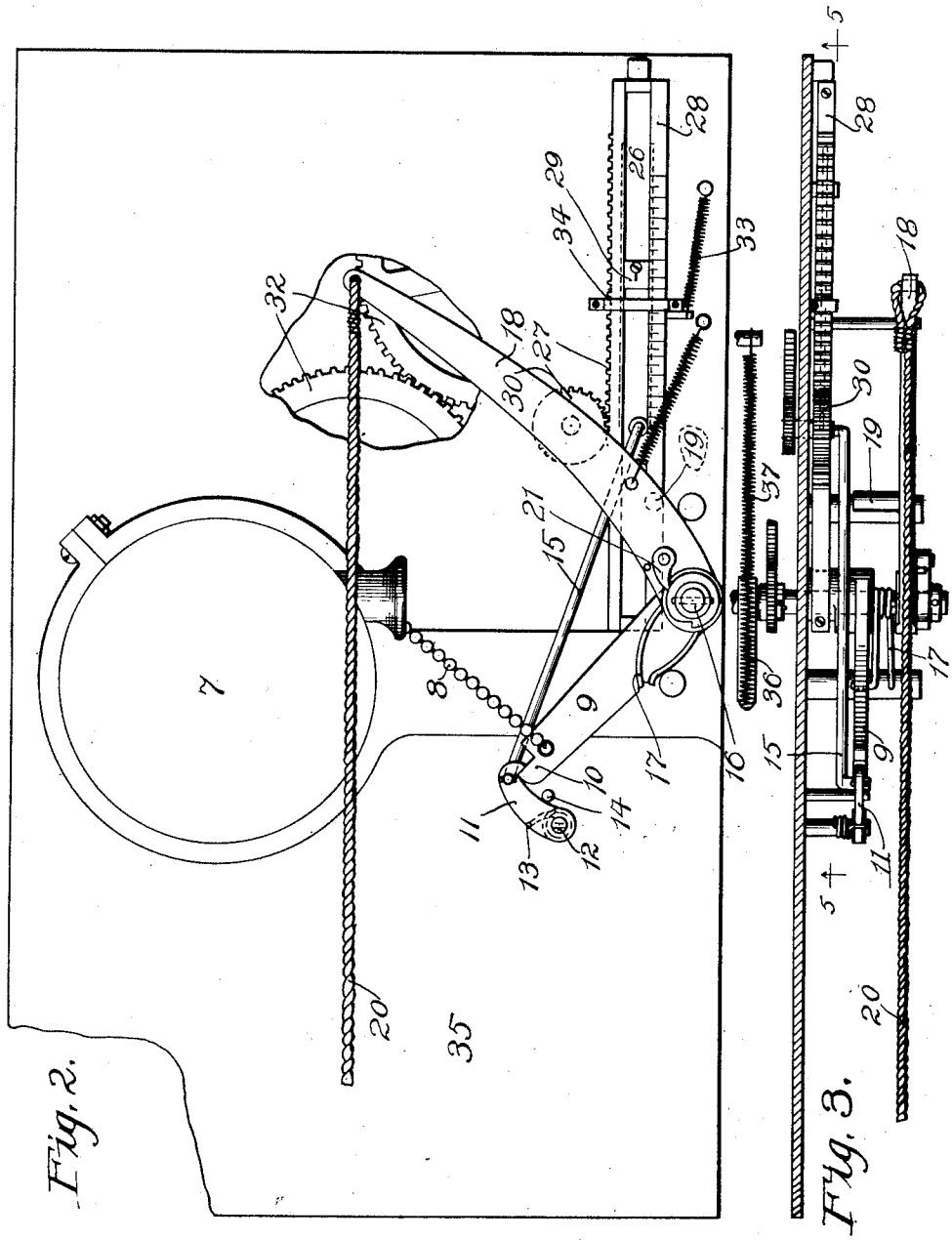


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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TIME-SWITCH FOR ELECTRIC LIGHTS.

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To all whom it may concern:

Be it known that I, WALDEN T. ROWELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Time-Switches for Electric Lights, of which the following is a specification.

This invention is designed primarily for use in connection with an electric lighting switch of the type commonly known in the art as a pull switch.

The object of the invention is to provide automatic means adapted to pull the switch and extinguish the light after a predetermined period and without further attention on the part of an attendant.

The invention is particularly adapted for use in stores, display windows, apartment buildings or the like, where it is desired to keep lights burning until a given hour, irrespective of the presence of an attendant. The present invention is so designed that it may be regulated to meet the conditions mentioned.

A further object of the invention is to so construct and arrange the controlling mechanism that it will be put under spring tension by the act of switching on the light which insures the operation of the device, and in that it obviates the necessity for a separate winding of the spring motor which is an objection sometimes noted in the operation of clock attachments designed for a similar purpose, and which require a separate winding of the clock mechanism with consequent liability of neglect on the part of the attendant.

In the present invention, the proper operation of the parts is insured, since the light cannot be switched on without winding up the clock mechanism and setting it in motion.

Further objects of the invention pertain to the method of constructing and mounting the parts in order to secure simplicity and compactness which are of importance in fitting the invention to successfully meet the conditions of actual usage.

The invention further consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings: Figure 1 is a side elevation of the mechanism with the parts in tripped or non-acting position as when the light is extinguished; Fig. 2 is a similar view showing the parts in acting or set position as when the light is turned on; Fig. 3 is a plan view of the tripping mechanism and a portion of the spring motor mechanism; Fig. 4 is a detail showing the motor spring and associated parts; Fig. 5 is a detail showing the rack bar and the method of maintaining it in engagement with the driving pinion; and Fig. 6 is a detail in section of the adjustable stop member.

The trip mechanism of the present invention is employed in connection with a pull switch 7 of well known construction which is operable by means of a pull chain 8. One of the peculiarities of this feature lies in the fact that it requires a down pull release of the pull chain to either turn the switch on or off. The present invention is especially designed with reference to the requirements of this operation.

The pull chain 8 is connected to the outer end of a switch operating lever 9 which, at its outer end, is provided with a notch 10 adapted to be engaged by a trip dog 11 mounted upon a pivot 12 and adapted to be maintained in engaging position by means of a spring 13 which serves to force the trip dog against the stop pin 14. The dog is adapted to be thrown back by a thrust imparted to a rod 15 which connects with the outer end of the dog.

The switch operating lever 9 is loosely pivoted upon a motor spring shaft 16 and is acted upon by means of a suitable spring 17 which serves to throw the switch operating lever into the position shown in Fig. 1, when tripped by the dog. It will be further noted that the center of movement of the switch operating lever is substantially in vertical alinement with the point from which the pull chain 8 depends, and that the switch operating lever 9 is movable equally to the right and left of this vertical central position, which arrangement of the parts insures a release and retraction of the chain, and a subsequent pulling of the chain during a single complete movement of the switch operating lever in either direction.

The switch operating chain can be set by means of a setting lever 18 which is likewise loosely pivoted upon the motor spring shaft 16, provided on its inner side with a stud 19 which, as shown in Fig. 1, normally bears against the inner edge of the switch operat-

ing lever. The setting lever can be operated by means of a pull cord 20 which connects with its upper end and extends to a position within easy reach of the attendant or person in charge of the lighting fixtures. The setting lever 18 is also provided with a pawl 21 near its inner end, which engages with a ratchet tooth 22 on the motor spring shaft 16, with the result that, as the setting lever is pulled, it will carry back the switch operating lever into position to be engaged by the trip dog and simultaneously impart a partial rotation to the motor spring shaft 16, on which the ratchet tooth is fixedly mounted. The setting lever 18 is adapted to be drawn back by the tension of the spring 23 or other suitable means.

The switch operating lever 9, which is loosely mounted on the shaft 16 is provided with a cam-shaped hub 24, as shown in Fig. 5, having a flat surface 25. This hub serves as a bearing for the forward end of a time-controlled-operating member 26 which, as shown, is in the form of a slotted bar provided to furnish a rack 27 and a gage 28 which are spaced to afford a runway for an adjustable stop member 29 which can be set to a position to control the operation of the device for any predetermined period from one to twelve hours, as shown. The gage member is divided into spaces indicating the hours and half hours from one to twelve, and the position of the adjustable stop serves to limit the duration of movement of the mechanism. The stop is mounted to engage with the free end of the trip rod 15, when the time-controlled member 26 has been moved to a position to bring the parts into engagement.

The rack 27 is adapted, when lifted by the action of the cam hub 24, to mesh with the teeth of an operating pinion 30 on the driving shaft 31 of a suitable clock-work mechanism 32 which is not described in detail, since it may obviously be of a suitable and well known character. The time-controlled member 26, when released from engagement with the pinion 30, is adapted to be drawn down and back by the tension of a spring 33, or other suitable means, and the time-controlled member is guided and held in position by means of a guide bar 34, or the like. As shown, the time-controlled member is of straight bar-like formation, but it is obvious that it may be of some other shape than that shown, as, for instance, of curved formation, without substantial modification of the remaining portions of the mechanism. As shown, the parts are mounted upon a plate or wall 35 which serves to house in the clock-work mechanism, and also furnishes points of connection for the various movable parts heretofore described.

The spring motor shaft 16 has fixedly mounted thereon a grooved segment 36 which furnishes a point of connection for a motor spring 37, which is adapted to be put under a twelve hour tension by the movement imparted to the shaft 16 in switching on the light and setting the mechanism in motion. The shaft also has keyed thereon a ratchet 38 which coöperates with the dog 39 on a pinion 40 loosely mounted on the shaft, which pinion is the first in the train of gearing constituting the clock mechanism, which imparts movement to the operating shaft 31, although it is obvious that a spring other than that particularly described may be employed without departing from the spirit of the invention.

The operation of the device is as follows: With the parts in the position shown in Fig. 1, we will assume that it is desirable to switch on the light and set the mechanism to maintain the light for a period of three hours. The attendant moves the adjustable stop 29 to the position marked 3 on the gage, and then pulls the draw cord 20. The pull of the cord serves to swing forward the setting lever 18 which carries with it the switch operating lever 9. As the latter swings to vertical position, it releases the switch chain 8, and its continued forward movement thereafter again pulls down the chain and throws on the light. The final movement of the lever 9 brings it into engagement with the tripping dog 11, which slips over the notched end of the lever 9 and holds it in the position shown in Fig. 2. Movement of the setting lever also serves, through the engagement of the pawl 21 with the ratchet tooth 22, to impart a partial rotation to the motor spring shaft 16 which serves, as shown in Fig. 4, to expand the motor spring 37 and put the latter under sufficient tension to operate the spring motor or clock-work for a period of twelve hours. The setting movement of the switch lever 9 also serves to turn its hub 24 from the position indicated in dotted lines in Fig. 5 to the position indicated in full lines, thereby lifting the time-controlled-gage-rack-member 26 into mesh with the driving pinion 30. Thereafter, the spring motor or clock-work will continue in motion, gradually moving forward the time-controlled member until the adjustable stop is brought into contact with the free end of the trip rod 15 which serves to lift the trip dog and allow the switch lever 9 to fly back to initial position under spring tension, thereby switching out the light, and at the same time permitting the time-controlled-gage-rack-bar to drop out of mesh with the pinion 30 and be drawn back to its initial position.

It will be understood that, in setting the mechanism for operation, a release of the draw cord 20, after the parts are set, will permit the setting lever 18 to return to initial position, as shown in Fig. 2, but with-

out disturbing the position of the switch lever or the motor spring shaft, which latter can only gradually return to initial position as the spring motor or clock-work runs down, and this irrespective of the period of time during which the light returns switched on. The arrangement, however, is one which insures a maximum twelve hour tension on the motor spring every time the light is switched on, since a complete movement of the setting lever will always bring the pawl 21 into engagement with the tooth or notch 22, and thereby insure a partial turning of the spring motor shaft to the extent necessary to put full tension on the spring. Of course, it is not necessary that the spring be designed to afford a twelve hour movement to the clock-work, since any other desirable period may suffice to meet the requirements, but the arrangement is one which always insures a sufficient tension on the spring to provide for the maximum period of time during which it is required that the lights shall burn.

The above arrangement is highly desirable, in that the light cannot be switched on without setting in motion the mechanism which, at the proper time, will operate to switch off the light. The device is intended for use either with individual lights or with a system of lights, depending, of course, upon the nature of the circuit which is controlled by the switch mechanism.

Although the invention has been described with particularity as to details, nevertheless, it is obvious that various changes in the proportioning and the arrangement of parts may be effected without departing from the spirit of the invention.

I claim:

1. In a time-controlled-switch-mechanism, the combination of a switch, setting means for moving and maintaining said switch in an on position, means for tripping and releasing said switch-controlling means, an adjustable stop carried by said last mentioned means for regulating the duration of movement of the latter, a motor for imparting movement to the latter, and a connection between said motor and the switch-operating means for fully winding up the motor in the act of setting the switch, substantially as described.

2. In a time-controlled-switch-mechanism, the combination of a pull switch, means for moving said switch to an on position, a trip mechanism for engaging said switch-controlling means, a time-controlled member for releasing said trip mechanism, a motor for operating said time-controlled mechanism, an independently adjustable member on said time-controlled mechanism for regulating the period of its movement, and a connection between said switch-controlling means and said motor for winding up the latter by the same movement which serves to set the former, substantially as described.

3. In a time-controlled-switch-mechanism, the combination of a pull switch having a pull chain depending therefrom, a lever to which the chain is connected, a trip member for holding the lever in on position, a time-controlled member for actuating the trip member after a predetermined period of time, a motor for operating the time-controlled member, and means for simultaneously setting the switch-operating lever and winding up the motor, and throwing the time-controlled-member into train with the motor, substantially as described.

4. In a time-controlled-switch-mechanism, the combination of a switch, means for throwing the switch into on position, trip means for holding said switch in on position, time-controlled means for releasing the trip member after a predetermined period of movement, a motor for imparting movement to the time-controlled means, and a draw lever adapted when drawn forward to throw the trip-controlling means into on position, to wind up the motor, and to throw the time-controlled means into train with the motor, and adapted when released to return to normal position without disturbing the adjustment of the parts mentioned, substantially as described.

5. In a time-controlled-switch-mechanism, the combination of a pull switch operable by a pull chain, a switch-operating lever to which the chain is connected, a trip member adapted to engage said lever when the latter is moved to on position, releasing means for said trip member, a movable time-operated member adapted to engage said trip releasing member after a predetermined period of time, a motor for moving said time-controlled member, and a setting lever adapted to move the switch-operating lever to on position, to wind up the motor, to throw the time-controlled member into train with the motor, and to return to initial position without disturbing the arrangement of the members mentioned, substantially as described.

6. In a time-controlled-switch-mechanism, the combination of a pull switch having a switch chain depending therefrom, a lever to which said chain is connected, a trip member for engaging said lever, a trip releasing member connected with said trip member, a movable time-controlled member adapted to actuate said trip releasing member after a predetermined period of time, a motor adapted to actuate said time-controlled member, and a setting lever adapted when moved in one direction to throw the switch-controlling lever to on position, and to throw the time-controlled member in train with the motor, and adapted to return to normal position without disturbing the

condition of the members mentioned, substantially as described.

7. In a time-controlled-switch-mechanism, the combination of a pull switch having a chain depending therefrom, a switch-operating lever to which said chain is connected, a trip member for holding said switch-operating lever in on position, means for releasing said trip member to permit the switch-operating lever to move to off position, a time-controlled member consisting of a rack bar and a gage bar, an adjustable stop movable upon said time-controlled member to regulate the duration of its movements, a motor adapted when in train to actuate the time-controlled member, and means for simultaneously moving the switch operating lever to on position, and for lifting the time-controlled means into train with the motor, substantially as described.

8. In a time-controlled-switch-mechanism, the combination of a pull switch having a chain depending therefrom, a switch-operating lever to which said chain is connected, a trip member for holding said switch-operating lever in on position, means for releasing said trip member to permit the switch-operating lever to move to off position, a time-controlled member consisting of a rack bar and a gage bar, an adjustable stop movable upon said time-controlled member to regulate the duration of its movements, a motor adapted when in train to actuate the time-controlled member, and means for simultaneously moving the switch-operating lever to on position, and for lifting the time-controlled means into train with the motor, and for winding up the motor, substantially as described.

9. In a time-controlled-switch-mechanism, the combination of a pull switch having a chain depending therefrom, a switch-operating lever with which the chain connects, a trip dog for engaging said switch-operating lever and holding the same in on position, means for returning said lever to off position when released by the trip dog, means for moving the trip dog to releasing position, a movable time-controlled gage bar provided with an adjustable stop adapted to contact with the trip releasing means, a motor adapted to impart movement to the gage rack bar, means connected with the switch-controlling lever for lifting the gage rack bar into train with the motor when the gage rack bar is moved to on position, and a motor shaft upon which the switch-operating lever is pivoted, a setting lever loosely mounted upon the motor shaft, a pawl and ratchet connection between the setting lever and the motor shaft for turning the latter by a movement of the former, and a stop on the setting lever for engaging the switch-operating lever and moving the same to on position, and permitting the setting lever to return to initial position, substantially as described.

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