

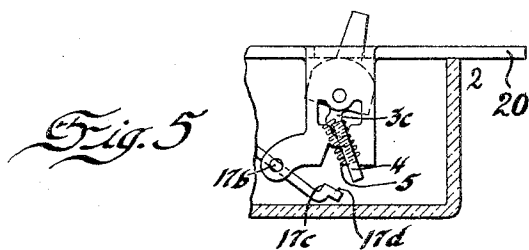
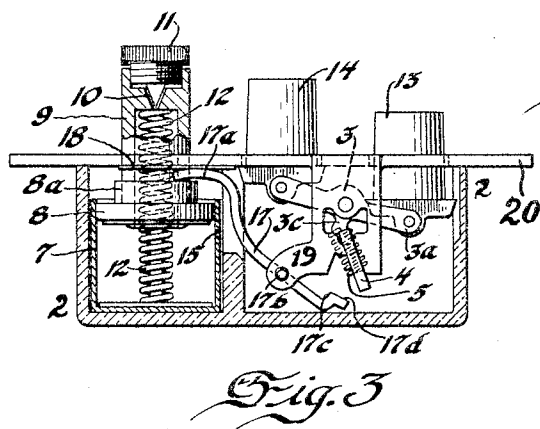
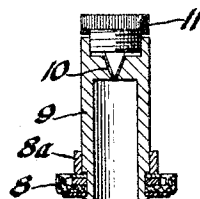
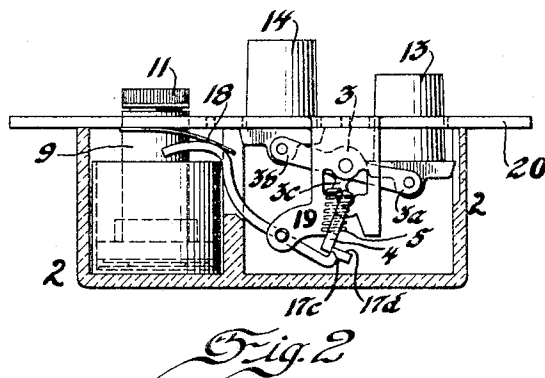
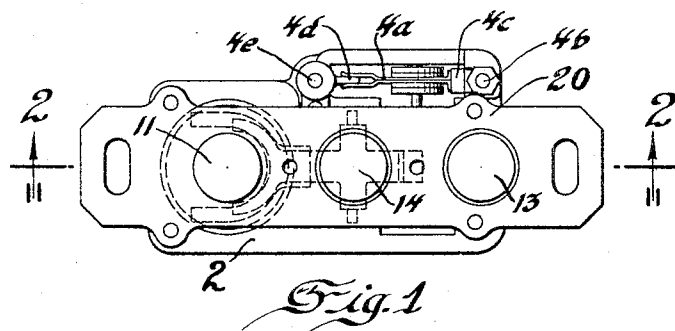
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SWITCH

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2,111,385

SWITCH

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5 Claims. (Cl. 200—34)

My invention relates to an electric switch known as a time-release switch designed primarily for household use in an electric lighting circuit, but equally as well adapted for garages detached from the house, or out buildings such as on farms, and is intended to operate either in the manner of the ordinary push button or toggle type of switch to immediately make or break the circuit in which it is located, or to automatically break the circuit after an interval of time which must elapse between the manual operating of the switch and the actual breaking of the circuit in which the switch is placed.

It is frequently desirable to locate a wall switch at some point in a large room, corridor or hallway, at a point more or less remote from the point of entrance or exit; or it may be desirable to enter one of two inter-connected rooms by one door and later leave by another. In such cases, with the ordinary type of switch one has to proceed in the dark to the point of exit after the lights have been extinguished. This is not only difficult and inconvenient, but at times, may actually be dangerous as, for example, in walking from one's garage at the end of the yard to one's house late at night in a poorly lighted district.

Therefore, the primary object of the present invention is to provide a switch, interchangeable with the present type, which may be actuated in the manner of the ordinary switch to either immediately close or open the circuit, or which, if the circuit be closed, can be actuated to break the circuit but will do so only after a period of time, thereby enabling the person actuating the same to reach the exit before the lights are extinguished.

Another object of the invention is to provide a means by which the time interval during which the circuit will remain closed after the manual operation of the switch can be readily varied from a few seconds to approximately five minutes, after which the circuit is broken automatically.

A further object of this invention is to provide that the switch mechanism which causes the instantaneous make and break shall be a complete unit within itself, and independent in its action of the timing mechanism, so that, if for any reason this mechanism were to fail, the switch could still be operated in the manner of an ordinary switch.

A still further object of this invention is to provide a switch mechanism that with either

instantaneous or delayed action will produce a rapid make and break to prevent arcing.

In the accompanying drawing:

Figure 1 is a plan view of a switch embodying my invention.

Figure 2 is a sectional elevation with the parts in the position in which the lighting circuit is closed but adapted to be automatically opened after a predetermined interval.

Figure 3 is a view similar to Figure 2; the parts being in the position in which the circuit is broken.

Figure 4 is a detail section of the piston and hollow piston rod.

Figure 5 is a detail section illustrating an alternative construction.

The sections of Figures 2 and 3 are taken substantially on the line 2—2 Figure 1.

2—2 is the switch casing. It has attached to it terminal 4b, brush 4c, contact 4d, and terminal 4e. 3 is a pivoted lever having the oppositely extending arms 3a and 3b, and an arm 3c extending downwardly and at right angles to said arms. 4 is a framework pivoted at its upper edge, and carrying at right angles the switch blade 4a which is completely insulated from the frame 4, but at all times in contact with brush 4c. When the frame 4 is in the position shown in Figure 2, the lighting circuit is complete, the current flowing through terminal 4b and brush 4c, switch blade 4a to contact 4d and terminal 4e, and when in the position of Figure 3, it is broken, switch blade 4a now being separated from contact 4d. 5 is a compression spring, its upper end carried by the lower end of the arm 3c, and its lower end acting upon the lower portion of the frame 4. The oscillation of the lever 3 carries the upper end of the spring 5 from one side to the other of the pivot axis of the frame 4, and forces said frame to one extreme or the other of its oscillation thus closing and opening the switch by the action of switch blade 4a making and breaking contact at point 4d. 13 and 14 are push buttons adapted to oscillate the lever 3, and may be replaced by a toggle, as shown in Figure 5. 7 is a cylinder in the casing 2 in alignment with switch mechanism and buttons 13 and 14, open at its upper end, and closed at its lower, and 8 is a piston closely fitting and reciprocating in said cylinder. 9 is a hollow piston rod opening through the piston 8 at its lower end and closed at its upper end except for a valve port 10. 11 is a screw-cap in the upper end of the piston rod 9 which carries a valve adapted to regulate the opening through the port

10 through which air enters, and serves as a third push button. 12 is a compression spring coaxial with the cylinder 7 and piston rod 8 and acting to force said piston to the upper end of its stroke. 15 is a very small port or opening through the wall of the cylinder 7 somewhat below the piston 8 when the latter is at the upper end of its stroke. 17 is a lever pivoted at 17b in a stationary support 19 attached to plate 20 which serves as a mounting for the entire switch mechanism. The upper end 17a of the lever 17 is forked and extends over a collar 8a fitting piston 8 so as to be engaged by said collar near the upper end of the piston stroke, to turn said lever about its pivot at 17b. 17c is a lug at the lower end of the lever 17 adapted to engage the frame 4 to hold it in the position at which the light circuit is complete as shown in Figure 2. The lower end of lug 17c is beveled as 17d for a purpose that will presently be explained.

18 is a light leaf spring, subordinate to spring 12, acting to force the upper end 17a of the lever 17 downward whenever button 11 is depressed.

The operation of the above described apparatus is as follows:

To instantly complete the circuit, the button 14 is pressed down in the manner of the ordinary switch thereby turning the lever 3 about its pivot and carrying the upper end of the spring 5 to the right of the pivotal axis of the frame 4, and thereby oscillating said frame to carry its lower edge to the left hand end of its travel and closing the circuit by means of the attached switch blade 4a making contact at point 4d.

To instantly break the circuit, the button 13 is pressed down in the manner of the ordinary switch, thereby turning the lever 3 about its pivot in the opposite direction, and carrying the upper end of the spring 5 to the left of the pivotal axis of the frame 4, and thereby oscillating said frame to carry its lower edge in the opposite direction, or to the right hand end of its travel, thereby breaking the circuit by the action of the switch blade 4a becoming separated from contact 4d.

To adapt the switch to open the circuit automatically after a predetermined interval the piston 8 is forced to the lower end of its stroke by pressing upon button 11. This forces the air within the cylinder to escape past the piston 8 leaving a partial vacuum within the cylinder, and permits the lever 17 under the action of spring 18 to engage the frame 4 by the lug 17c as shown in the Figure 2. The button 13 is also pressed down, carrying the upper end of the spring 5 to the left of the axis of the frame 4, as shown in Figure 2, but the frame is now prevented from oscillating with the consequent breaking of the circuit, because of the restraining action of lug 17c.

The piston 8 immediately begins to slowly rise under the influence of the spring 12, but is retarded in its movement by the partial vacuum under it, which is being gradually relieved by air entering the valve port 10. The rate at which the air enters the cylinder to relieve the vacuum under the piston, and consequently the rate at which the piston rises, may be conveniently regulated by turning button 11 to the right or left, thereby screwing it up or down to adjust the degree of opening through the valve 10. When the lower edge of the piston 8 rises just above the port 15, the air suddenly enters therethrough and the vacuum is suddenly relieved, and the piston rapidly rises during the remainder of its stroke, the attached collar 8a sharply striking the

fork at the end 17a of the lever 17 turning said lever about its pivot 17b and disengaging the lug 17c from the frame 4, thereby permitting the latter to freely swing under the influence of the spring 5 to the position shown in Figure 3, the lighting circuit thereby being instantly broken.

In the event that button 11 were to be pressed while the lighting circuit was still open, the lever 17 would prevent the return of frame 4, if button 14 were subsequently pressed to close the circuit. For this reason, the end of lever 17 is beveled as 17d so that upon being struck by frame 4 in moving to the left, it will be pushed out of position, thereby permitting frame 4 to execute its movement. If desired, lever 17 could be constructed to purposely restrain said frame, so that the circuit would remain broken for a predetermined interval, after which it would become complete.

From the above description, it will be observed that if button 14 is depressed, the circuit is immediately closed, while if button 13 is depressed, it is immediately broken; but if it is desired to break the circuit not immediately, but after an interval of time which can be regulated from a few seconds to several minutes subsequent to the manual operation of the switch, button 11 is pushed down, immediately followed by pushing button 13 in which case the circuit will remain complete but will be broken automatically at the expiration of the interval of time for which the apparatus is set.

What I claim is:

1. In an apparatus of the kind described, the combination of a casing, a pivoted lever in said casing having arms extending in opposite directions from its pivot, a button adapted to actuate one of said arms, a button adapted to actuate the other of said arms, a movable switch apparatus, a spring interposed between said lever and said switch apparatus to actuate the latter, a cylinder in said casing having a piston adapted to reciprocate therein, a piston rod extending through a wall of said casing adjacent to said buttons, a spring adapted to force said piston to the outer end of its travel, a catch adapted to hold said switch in a position at which the circuit is complete said piston being adapted to engage and actuate said catch to release said switch apparatus at the outer end of its travel, and means for retarding the motion of said piston.

2. In an apparatus of the kind described, the combination of a casing, a pivoted lever in said casing having arms extending in opposite directions from its pivot, a button adapted to actuate one of said arms, a button adapted to actuate the other of said arms, a movable switch apparatus, a spring interposed between said lever and said switch apparatus to actuate the latter, a cylinder in said casing having a piston adapted to reciprocate therein, a piston rod extending through a wall of said casing adjacent to said buttons, a spring adapted to force said piston to the outer end of its travel, a spring-pressed pivoted lever adapted to engage said switch apparatus to hold it in the position in which the circuit is complete, said piston being adapted to engage and actuate said spring-pressed lever to release said switch at the outer end of its travel, and means for retarding the motion of said piston.

3. In an apparatus of the kind described, a casing, a pivoted lever in said casing, a button adapted to oscillate said lever about its pivot, a movable switch apparatus, a spring interposed between said lever and said switch apparatus to

actuate the latter, a cylinder in said casing having a piston adapted to reciprocate therein, a piston rod extending through a wall of said casing adjacent to said button, a spring adapted to force said piston to the outer end of its travel, a catch adapted to hold said switch in a position at which the circuit is complete, said piston being adapted to engage and actuate said catch to release said switch apparatus at the outer end of its travel, and means for retarding the motion of said piston.

4. In an apparatus of the kind described, the combination of a casing, a pivoted lever in said casing, a button adapted to oscillate said lever about its pivot, a movable switch apparatus, a spring interposed between said lever and said switch apparatus to actuate the latter, a cylinder in said casing having a piston adapted to reciprocate therein, a piston rod extending through a wall of said casing adjacent to said button, a spring adapted to force said piston to the outer end of its travel, a pivoted lever adapted to engage said switch apparatus to hold it in the position

in which the circuit is complete, said piston being adapted to engage and actuate said lever to release said switch at the outer end of its travel, and means for retarding the motion of said piston.

5. In an apparatus of the kind described the combination of a casing, a switch apparatus in said casing, a spring adapted to actuate said switch apparatus, a button on said casing adapted to act through said spring to actuate said switch apparatus, a cylinder and piston therein in said casing, a spring adapted to actuate said piston to the outer end of its travel, a catch adapted to engage said switch apparatus to prevent its actuation by the first named spring, said piston being adapted to release said catch at the outer end of its travel, means for retarding the automatic motion of said piston, and a button on said casing adjacent to the first named button adapted to be manipulated to force said piston inward and permit the said engagement of said catch.

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