ABSTRACT OF THE DISCLOSURE

A delayed action electric switch of the domestic wall type. It is of standard size and appearance, and replaces the wall type switch commonly found in homes. It is intended as a convenience to keep an area illuminated for a brief period of time after the switch has been turned off, providing time to move from one area to another, such as from garage to house. It employs a small strip of bimetal which bends when heated. A small resistance wire is wrapped around the bimetal. When the toggle is moved to the switch-off position, it does not, in fact, turn the switch off, but, instead, closes another set of switch contacts which causes electric current to flow through the resistance wire. Heat is thereby generated in the wire which causes the bimetal to bend. It is the bending motion of the bimetal which actually operates the switch to the off position. The heating action takes place slowly and provides the delay period after the switch is manually turned off.

An object of the present invention is to provide an electric switch which will maintain an electric light or other electric equipment in operation for an interval of time after it has been manually turned off, and one which has manually operable means for overriding its delayed action to allow the electric light or other electric equipment to which it is connected to be instantly turned off when a delay is not desired.

Another object of the present invention is to provide a delayed action electric switch which has a positive snap action and one which maintains constant contact pressure between switch contacts up to the instant of break.

A further object of this invention is to provide a delayed action electric switch which is of simple structure, one virtually foolproof in construction and operation, and one which is economically feasible.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawings, in which:

FIG. 1 is a view of the switch shown in an OFF position.

FIG. 2 is a view of the switch in ON position.

FIG. 3 shows the switch with the toggle in OFF position but with the contacts held in a delayed ON position.

FIG. 4 shows the switch with the toggle in a position manually over-riding the delay mechanism.

Referring in greater detail to the drawings, in which like numerals indicate like parts throughout the several views, the numeral 9 represents, FIG. 1, a plastic base having raised mounting surfaces 10 to which are riveted electric contacts 1, 2, and 5, a bimetal spring latch 7, and a variable resistor 17. A shaft 14 is an integral part of base 9. A cam 3 is manually rotatable between limits on shaft 14 by a toggle 13.

Contacts 1, 2, and 5 are constructed of flexible leaf spring material, electrically conductive, and are shown to extend in juxtaposition with adjacent contact protrusions 11 and 12 between contacts 1 and 2 and with adjacent contact protrusions 18 and 19 between contacts 2 and 5.

Toggle 13 protrudes through face plate 15 and is manually movable through an arc from the position shown in FIG. 2 to the position shown in FIG. 4. Leaf spring contact 2 in its open circuit position stands against the spherical periphery 16 of cam 3 and is pressed by the irregular shaped periphery 4 of cam 3 into physical contact and closed circuit position with contact 1 when cam 3 is rotated by the movement of toggle 13 from the OFF position shown in FIG. 1 to the ON position shown in FIG. 2.

A flexible bimetal leaf spring latch 7 is shown in FIGS. 1 through 4 with one end secured to base 9. In FIG. 2, latch 7 is shown with its free end in a blocking position with relation to contact 2, locking contacts 1 and 2 in a closed circuit position. Bimetal latch 7 is flexible in response to heat and is shown within a coil of resistance wire 8. One end of coil 8 is connected in series with a variable resistor 17 to a flexible leaf spring contact 5. Contact 5 is in juxtaposition with contact 2 and movable to make electrical connection with contact 2 in response to the rotation of cam 3 to the OFF position. A contoured section 6 of cam 3 is aligned with leaf contact 5 and moves against contact 5 to close contact 5 with contact 2 when cam 3 is rotated to the OFF position shown in FIG. 3. Electrical continuity to coil 8 is thereby completed via contacts 1, 2, 5, and variable resistor 17 and current begins to flow through coil 8. As current flows through coil 8, heat is generated, causing latch 7 to flex away from contact 2 and allowing contact 2 to spring back to its normal open circuit position. When contact between contacts 1 and 2 is broken current ceases to flow through coil 8 and latch 7 begins to cool and return to its unpowered position. Leaf spring contact 2 has in the mean time moved into the return path of latch 7 and now holds latch 7 in a flexed position as shown in FIG. 1. The restraint of contact 2 against latch 7 is maintained until contact 2 is again moved out of the path of movement of latch 7 and into a closed circuit position with contact 1 by the rotation of cam 3 to the ON position.

Latch 7 flexes in a plane perpendicular to the plane of movement of contact 2 and thereby maintains constant pressure of contact 2 against contact 1 through its entire flexing motion and causes a positive snap action release when it moves clear of its blocking position with relation to contact 2. The time required for latch 7 to flex out of the return path of contact 2 and allow contact 2 to open depends on the amount of current flowing through coil 8 and is controllable by the setting of variable resistor 17. Coil 8 is in series with the resistor element of variable resistor 17 and sliding contact 20. Sliding contact 20 is rotatable through the arc of element 21 and changes the total resistance in the series circuit to allow more or less current to flow. Sliding contact 20 is adjustable by screw driver and slot 22.

As is visible in FIG. 3, during the time delay period after toggle 13 has been manually moved to the OFF position, latch 7 lays against the spherical periphery of cam 3. If toggle 13 is now moved to the extreme clockwise position as shown in FIG. 4, the irregular shaped periphery 4 of cam 3 will move against latch 7 and force it out of its blocking position with relation to contact 2 and allow contact 2 to return to its normal circuit position. While only a preferred embodiment of the present invention has been shown and described, other embodiments are contemplated and numerous changes and modifications may be made herein without departing from the spirit of the invention as set forth in the following claims.

What is claimed is:

1. A switch comprising support means, an operator
pivoted on said support means and having cam means on one side thereof, a first contact means secured to said support means, a spring biased contact means engageable with said cam means and pivoted to electrically connect with said first contact means in response to the rotation of said cam means against said spring biased contact means when said operator means is moved to a first position, a thermally responsive latch means pivoted on said support means and spring biased to move into the return path of said spring biased contact means when said cam means presses said spring biased contact means into engagement with said first contact means, heater means located in heat exchange relationship with said latch means, a second contact means on said support means engageable with said spring biased contact means in response to the movement of said operator means to a second position, and means electrically connecting said heater means and said second contact means whereby said heater means is energized upon engagement of said spring biased contact means with said second contact means to cause said latch means to flex out of the return path of said spring biased contact means to permit said spring biased contact means to break connection with said first contact means.

2. The switch according to claim 1 including means attached to said support means, said means being manually operable to displace said latch means out of the return path of said spring biased contact means to permit said spring biased contact means to break connection with said first contact means.

3. The switch according to claim 2 wherein said operator means is movable to a third position, said second position being between said first position and said third position, said manually operable means comprising said cam means, said cam means rotating to displace said latch means upon movement of said operator means to said third position.

4. The switch according to claim 1 further including a variable resistor, said resistor secured to said support means and connected in electrical series with said heater means and said second contact means whereby by varying the resistance of said variable resistor the time required for said latch means to flex out of the return path of said spring biased contact means may be varied.

5. The switch according to claim 1 wherein said second contact means includes a flexible contact blade means and said operator includes a second cam means which urges said blade means into electrical contact with said spring biased contact means upon rotation of said operator means from said first position to said second position.

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