SWITCH WITH A DELAY MECHANISM

Inventors: Cornelis Willem Zwipe; Bernardus Ignatius Maria van Steen, both of Emmas-ingel, Eindhoven, Netherlands

Assignee: U.S. Phillips Corporation, New York, N.Y.

Filed: Feb. 11, 1971

App. No.: 114,459

Foreign Application Priority Data
March 31, 1970 Netherlands......................704569

U.S. Cl. ......................... 200/33 R, 337/2, 337/66, 337/77

Int. Cl. ...................................... H01H 43/00

Field of Search ...................... 200/16 C, 16 F, 33 R, 33 D, 200/41, 18, 34; 337/2, 3, 66, 77

References Cited
UNITED STATES PATENTS
2,438,186 3/1948 Randall................ 337/66 X
2,577,425 12/1951 Marcoz.......................... 337/66
2,958,748 11/1960 Barden et al................ 337/3
3,236,971 2/1966 Cotsworth.................... 337/3
3,361,888 1/1968 Brackett.................... 337/77
3,496,509 2/1970 Metcalf.......................... 337/77
2,821,631 1/1958 Lofton....................... 200/16 F X

Primary Examiner—J. R. Scott
Attorney—Frank R. Trifari

ABSTRACT

A switch assembly having a primary switch which actuates a secondary switch through an intermediate member. After the switches have been switched to the ON position, the intermediate member is set, by a delay mechanism, to a position in which it is no longer operative to maintain the secondary switch in the ON condition.

4 Claims, 4 Drawing Figures
SWITCH WITH A DELAY MECHANISM

The invention relates to a switch having a primary switch and a secondary switch. When in the ON position, the primary switch exerts a force on an actuating member of the secondary switch, which actuating member springs back as soon as the force is removed. A delay mechanism determines the time during which the force is exerted.

Such switches may be used in color television receivers for the purpose of operating a demagnetizing circuit, which is to be switch off after having done its work, through the secondary switch immediately after the receiver has been switched on through the primary switch. It is an object of the present invention to provide such a switch made largely of standard components.

This is accomplished by providing a switch having a primary switch with a projection which is coupled to the moving mechanism of the primary switch so as to be in an initial position when the primary switch has been switch off and in a switching position when the primary switch has been switched on. When in the on position the projection is closer to the actuating member of the secondary switch than it is in the initial position. An intermediate member is provided which is coupled with the delay mechanism and, when the primary switch is switched on, is located in the space between the projection and the actuating member. The intermediate member is caused to be set to an inoperative position by the delay mechanism some time after the switching Operation.

This arrangement enables the assembly to be built from standard components, such as an on-off switch, a microswitch and a bimetal. The intermediate member is the only specially designed component and can simply and cheaply be manufactured.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIG. 1 is a side elevation of a switch assembly with the primary switch in the off position,
FIG. 2 is a rear view of the switch assembly of FIG. 1, and
FIGS. 3 and 4 shown, on an enlarged scale, side elevations of that part of the assembly essential to the invention at different instants after the primary switch has been switched on.

Referencing now to FIG. 1, a switch assembly includes a primary switch 1 having a push-button 3 which is connected to a button rod 5. The button rod 5 has been switch off. A switch rod 9 which carries moving contacts 11 which cooperate with fixed contacts 13. The assembly is secured in a casing 15 which is mounted on a frame 17. This frame further carries a secondary switch 19, which is operative only when its actuating member 21 is maintained in the depressed position, and a bimetal 23, to which a heating element 27 is secured by means of resilient strip 25 formed in broken lines. The heating element can be fed from a voltage source 31 through the secondary switch 19 and connecting leads 29 (see FIG. 2 also). A circuit 32 (such as a demagnetizing circuit—not shown)—may be similarly fed through the secondary switch 19. A projection 33 is formed at the end of button rod 5. The projection 33 cooperates with an intermediate U-shaped leaf spring member 35. Pull rod 37 (see FIG. 3) is connected to member 35 and is pivotally connected to the bimetal 23 at the end thereof which is provided with a bent-over part 39. Pull rod 37 is accommodated with some clearance in an opening 41 formed in the bimetal 23 near the free end thereof.

When the primary switch 1 is in the off position (FIG. 1) one limb 43 of the leaf spring 35 engages the projection 33, which is in its initial position, and the other limb 45 engages the actuating pin 21 without depressing it. This is the inoperative position of the intermediate member 35.

When the primary switch 1 is switched on, the actuating pin 21 is caused to be depressed as shown in FIG. 3. The button rod 5 together with the projection 33 has been displaced towards the actuating pin 21 so that the projection 33 is in the switching position. The actuating pin 21 is depressed by the limb 45 of the slightly compressed and pivoted leaf spring 35. This position is the operative position of the intermediate member 35. To prevent the secondary switch 19 from being damaged by having to switch the comparatively large current required for a demagnetizing circuit, the switch assembly is preferably designed so that first the secondary switch 19 and then the primary switch 1 is switched on. When both switches are on the heating element 27 is switched on, so that the bimetal 23 is heated and deflected. After some time, the situation shown in FIG. 4 is produced. By means of the pull rod 37 the bimetal has pulled the leaf spring 35 from the space between the projection 33 and the actuating pin 21 through a distance such that the limb 43 no longer engages the surface of the projection 33 facing the actuating pin 21, so that the force acting on the actuating pin 21 has been removed. As a result, the actuating pin 21 has sprung back to its initial position, so that the leaf spring 35, the end 47 of the limb 45 of which still bears against the actuating pin 21, has been pivoted from the operative position (FIG. 3, FIG. 4) in which it is inoperative as an intermediate member.

Because the secondary switch 19 has been switched off current is no longer supplied to the heater element 27 of the bimetal 23. The bimetal thus cools down again and is deflected in the direction towards the projection 33. Since after the pivotal movement of the leaf spring 35 the hooked end 49 of the limb 45 of the leaf spring 35 will be located opposite a lateral surface of the projection 33, the leaf spring 35 is prevented from returning to the position between the projection 33 and the actuating pin 21. As a result, the assembly remains locked against a return of the leaf spring 35 to the operative position and prevents the secondary switch 19 from being switched on again, until the space between the projection 33 and the actuating pin 21 has increased as a result of the primary switch 1 being switched off, so that the situation shown in FIG. 1 is reached again.

Obviously the described primary switch provided with a push-button may readily be replaced by a switch of a different type, for example a toggle switch or a rotary switch. Also, if desired, the bimetal may be replaced by another delay mechanism. For example an electronic mechanism may which may withdraw the intermediate member, for example, by electromagnetic means. This may be desirable if the duration of the operation of the secondary switch is to be determined with a higher degree of accuracy than is possible with a bimetal.

The spring 35 may be replaced by a block which is dispensably provided at the free end of the bimetal 23 and which, after having been withdrawn from the space between the actuating pin 21 and the projection 33, is slightly displaced against the direction of depression of the projection 33, for example by a spring.

What is claimed is:

1. A switch with a delay mechanism comprising a frame, a primary switch carried on said frame having a member movable between OFF and ON switching positions, a projection attached to said movable member, means connected to said movable member for causing movement thereof, a secondary switch carried on said frame having a spring load actuating member movable against the action of the spring loading from an OFF to an ON switching position, an intermediate member movable from an operative position when located between said projection of the primary switch and said actuating member of the secondary switch to an inoperative position located partially removed from between said intermediate member and said actuating member, so that when said intermediate member is in its operative position movement of said movable member of the primary switch to the ON position will be transferred by said intermediate member so as to exert a force on said actuating member against the action of said spring loading to cause movement thereof to the ON position, and a delay mechanism connected to said intermediate member for causing movement thereof to the inoperative position a predetermined time after said secondary switch has been switched ON so that the force exerted on said actuating member will be released and said secondary switch switched OFF.
2. The switch according to claim 1 wherein said intermediate member is pivotally connected to said delay mechanism.

3. The switch according to claim 2 wherein said intermediate member is a U-shaped leaf spring, a first leaf thereof being in cooperative engagement with said projection and the second leg thereof being in cooperative engagement with said actuating member when said intermediate member is in the operative position, said first leg being arrested by said projection to prevent return thereof to the operative position after said delay mechanism has caused movement of the intermediate member to the inoperative position.

4. The switch according to claim 3 wherein said delay mechanism comprises a bimetallic element oriented in a plane approximately parallel to the direction of movement of said projection, means connected to said bimetallic element for electrically heating same when said secondary switch has been switched ON, an opening formed at one end of said element, and a pull rod one end thereof passing through said opening and the other end thereof connected to said intermediate member.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3679849 Dated July 25, 1972

Inventor(s) CORNELIS WILLEM ZWEIP and BERNARDUS I. MARIA VAN STEEN

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 5, "first leaf" should be --first leg--

Signed and sealed this 3rd day of July 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. Rene Tegtmeyer
Attesting Officer Acting Commissioner of Patents
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3679849 Dated July 25, 1972

Inventor(s) CORNELIS WILLEM ZWEIP and BERNARDUS I. MARIA VAN STEEN

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 5, "first leaf" should be --first leg--

Signed and sealed this 3rd day of July 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

Rene Tegtmeyer
Acting Commissioner of Patents