

[54] **MANUAL RESET FOR A SWITCH DEVICE**
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[58] Field of Search 200/83 Z, 153 H;
337/56, 91, 118, 130, 155, 348, 358; 335/26

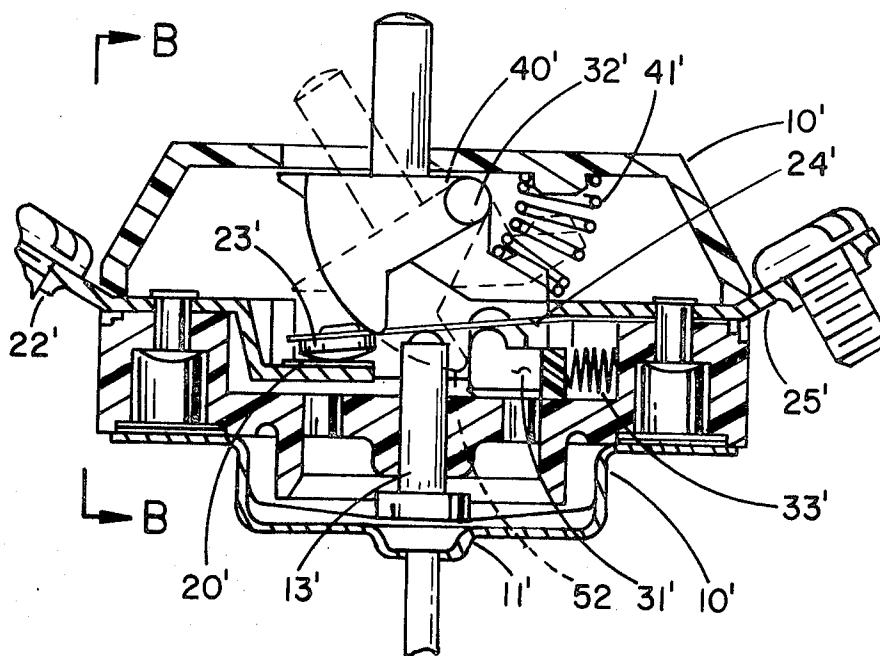
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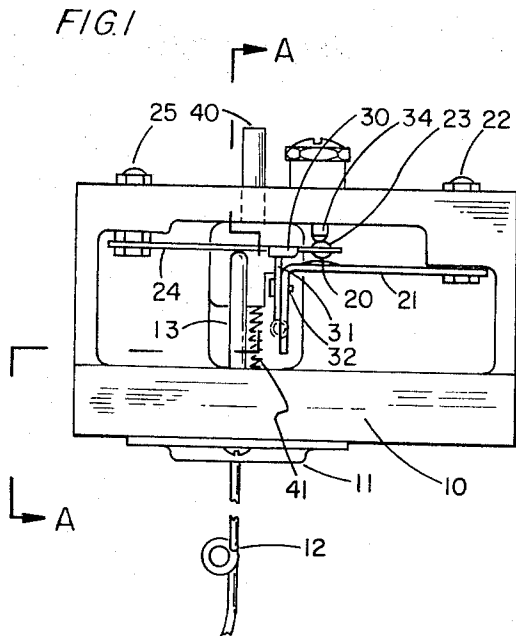
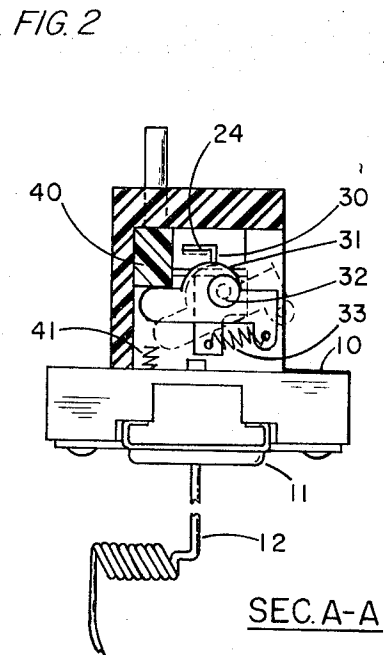
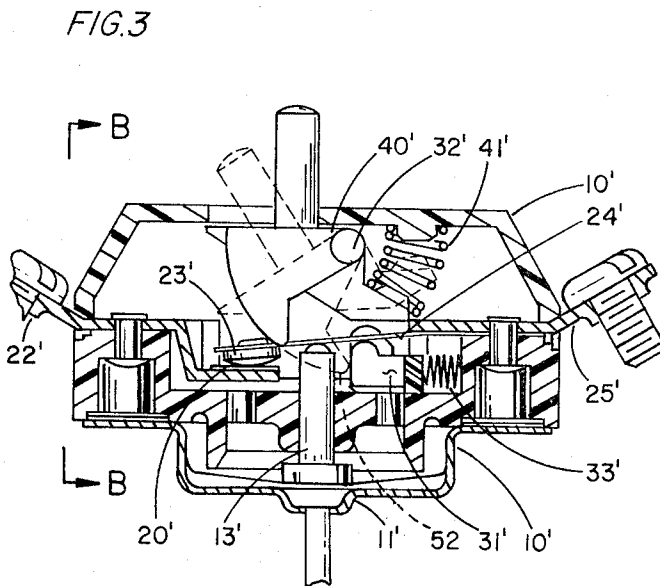
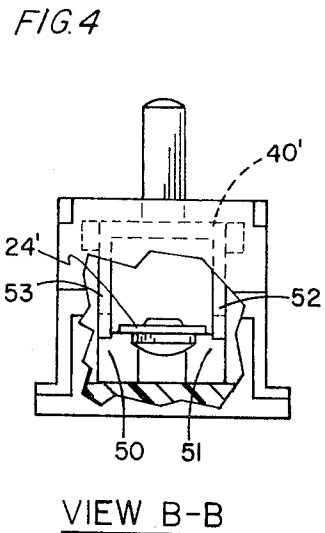
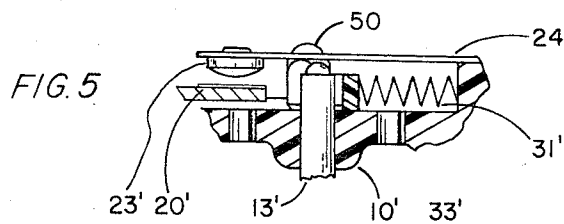
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[57] **ABSTRACT**

A condition responsive switching device has a manual reset provision in which a pressure responsive actuator has a pin for providing an output force to be applied against a movable blade of a switch contact. A movable member is spring biased between a base and the blade so that upon movement of the movable blade to an open switch position, the movable member is moved along with the blade to hold the blade and its contact in an open switch position. After the pressure responsive actuator returns to the normal position, a reset operation is accomplished by a pivoting reset driver which is operated upon pushing a reset button to move the movable member against its biasing spring back to a position to allow the movable blade to move its contact to a switch closed position.

5 Claims, 5 Drawing Figures





MANUAL RESET FOR A SWITCH DEVICE

BACKGROUND AND SUMMARY OF THE INVENTION

While control devices having snap action condition responsive actuators for moving a switch to an open position with means for maintaining a switch in the open position until a manual reset operation takes place are broadly old, a continuous need for a new and an improved device at a lower manufacturing cost has been desired. A device is needed which can be produced with relatively wide tolerances to maintain the production costs relatively low and yet provide a highly reliable control device for opening a switch upon a predetermined condition existing and which can be reset with a relatively simple reset operating mechanism.

The present invention provides for a member which is resiliently biased against a contact blade with a force in a direction to an open switch position so that when the contact blade is moved to an open switch position by a condition responsive actuator, the member moves to a position to hold the contact member in an open switch position. When the actuator returns to its normal position, a pivoted reset lever can be operated to drive the member back to its initial position to allow the switch contact member to close.

FIG. 1 is a partial cross-sectional side view of the switch device showing a member spring biased against the movable contact blade;

FIG. 2 is a partial cross-sectional end view of the device of FIG. 1 with the member holding the switch in an open position;

FIG. 3 is a side view of another embodiment of device with a reset lever to drive a wedging member back to its initial position;

FIG. 4 is an end view of the device as shown in FIG. 3; and

FIG. 5 is a partial view of the switch of FIG. 3 in the open position.

DESCRIPTION OF THE INVENTION

Referring to FIG. 1, the control device has a base 10 to which is connected an actuator means 11 of a pressure responsive snap action type as shown in the M. E. Russell, U. S. Patent No. 2,840,669 issued June 24, 1958. A pressure through a fluid filled tube 12 connected to a remote condition responsive device or bulb provides the pressure to move an output member or pin 13 upward to the position shown upon a condition or the temperature of the remote bulb exceeding some predetermined value. Connected to the base is a fixed switch contact 20 which is connected by a member 21 to a terminal 22. A movable switch contact 23 is connected to a contact support member or resilient blade 24 attached to the base at electrical terminal 25. When contact 20 engages contact 22, an electrical circuit is completed between the terminals. Blade 24 has a shoulder portion 30 formed by a part of the blade intermediate its extremities being bent at right angles to the main part of the blade.

A contact blade holding member 31, pivotally connected off-center at 32 to member 21 and thus the base, is biased against shoulder 30 by bias spring 33. The force of spring 33 is sufficient to maintain member 31 cammed against blade 24; however, the force applied to blade 24 by member 31 is not sufficient to lift the contact 23 off of the fixed contact 20. When pin 13

moves upward, blade 24 moves against adjustable stop 34 to open the switch.

A reset drive member or button 40 slides in base 10 and is spring biased upward by a spring 41 which engages one extremity 42 of the member 31 to move it away from shoulder 30 of blade 24 when reset member 40 is pushed downward for a resetting operation.

OPERATION OF THE INVENTION

Shown in FIG. 1, the control device is in a closed circuit position with contacts 20 and 23 together. Upon an increase in the temperature of the remote bulb (not shown) the expansion of the fluid in the fluid filled system causes actuator 11 to move pin 13 upward to apply a force against blade 24 to open the switch. Simultaneously, member 30 is biased clockwise (as shown in FIG. 2) against shoulder 30 to hold blade 24 against stop 34, even after pin 13 moves downward upon the temperature of the remote bulb returning to normal. To reset the control device, the reset button 40 is pushed to rotate member 31 and allow blade 24 to move to a switch closed position.

In the manufacture of such a control device, the tolerance of the member 31 and the associated parts need not be maintained too tightly as member 31 is free to rotate until it engages blade 24 and with such a cam-shaped member, a relatively loosely holding member can be allowed and still have the normal operation of the tripping and resettable switch.

DESCRIPTION OF A SECOND EMBODIMENT OF THE INVENTION

Shown in FIG. 3 is a second embodiment of the control device having an actuator means 11' for moving a pin upward against a blade 24' carrying a movable contact 23' which normally engages a fixed contact 20'. Contacts 20' and 23' form an electrical switch connected between terminals 22' and 25'.

When blade 24' is moved upward, member 31' which is biased against blade 24' by a spring 33' moves to the left to the position shown in FIG. 5 to hold blade 24' in a raised position to hold open the switch even though actuator 11' causes pin 13' to return to the normal position as shown in FIG. 3. When member 31' moves to the left as shown in FIG. 5, the member, which comprises two portions 50 and 51, as shown in FIG. 4, which straddle pin 13' are continually biased against blade 24 but the force against the blade is insufficient to lift the blade without the additional force of pin 13'. When the blade is raised as shown in FIG. 5 and member 31' moves to the holding position the blade 24' will remain in that position until a resetting operation is accomplished.

Reset driver 40' which is pivoted about the base 10' at pivot 32' has a pair of extremities 52 and 53 which, when the reset driver 40' is moved to the position as shown in dotted lines, engages member 31' to move it to its normal position as shown in FIG. 3 to allow the movable contact 23' to close the switch thereby placing the control device in a normal operating condition.

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows:

1. In a control device, a base, actuator means attached to said base and adapted to be responsive to a change in value of a condition,

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switch means on said base having a movable contact support member for moving a switch contact to open and close an electrical circuit,

connection means operably connecting said actuator means to said switch means for moving said contact support member from a first position to a second position upon a predetermined change in value of the condition,

bias means between said base and said contact support member for engaging said contact support member, said bias means applying a first force to said contact support member in a direction from said first to said second position, said bias means by itself being insufficient to move said contact support member to said second position so that when said contact support member moves under an additional force of said actuator means to said second position, said bias means holds said contact support member in said second position after said additional force of said actuator means is removed, and reset means operably connected to said bias means for moving said bias means so said contact support member will return to said first position from said second position.

2. The invention of claim 1 wherein

said movable contact support member comprises a resilient blade supported at one end to said base and having a switch contact connected to an opposite end,

said bias means comprising a bias member movably supported between said blade and said base to be biased by a spring against an under side of said blade whereby, when said switch contact is in a first position said bias member is held in one position and upon said blade moving to said second position under said additional force said bias member moves to another position to hold said blade in said second position.

3. The invention of claim 1 wherein

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said movable contact support member comprises a resilient blade supported at one end on said base and having a switch contact attached to another end for movement from said first to said second position,

said bias means loading said resilient blade by said first force to bias said blade in a direction from said first position to said second position,

said actuator means having a pin engaging said blade for applying said additional force to said blade for movement from said first to said second position whereby said blade will move to said second position under said additional force of said pin and remain in said second position under said first force of said bias means after said additional force of said pin is removed, and

said reset means counter acting said bias means for removing said first force of said bias means whereby said blade returns to said first position.

4. The invention of claim 1 wherein

said bias means comprises,

a cam-like member pivotally connected to said base, and

spring means operably connected between said base and said cam-like member for moving said member in one direction to cam against said movable contact support member for applying said first force to said contact support member in a direction from said first to said second position.

5. The invention of claim 4 wherein

said reset means comprises

a movably operated member engaging said cam-like member for moving said cam-like member in an opposite direction for removing said first force from said contact support member to allow for movement of said contact support member in a direction from said second to said first position.

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