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March 22, 1949. J. O. ROSCHE 2,464,944

CONDITION RESPONSIVE DEVICE

Filed Dec. 9, 1944

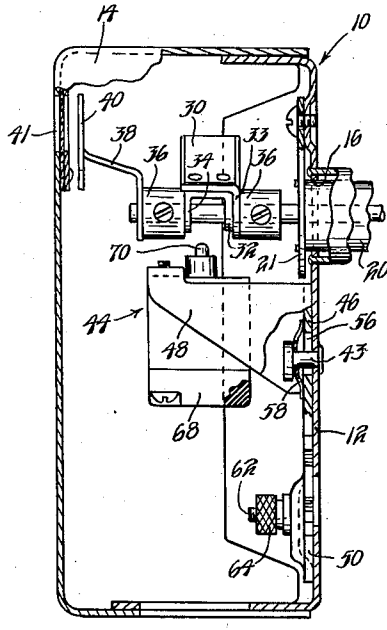



Fig. 1.

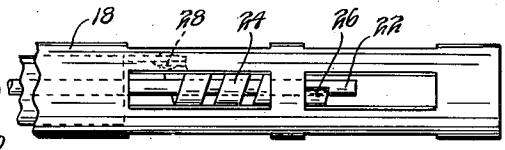



Fig. 3.

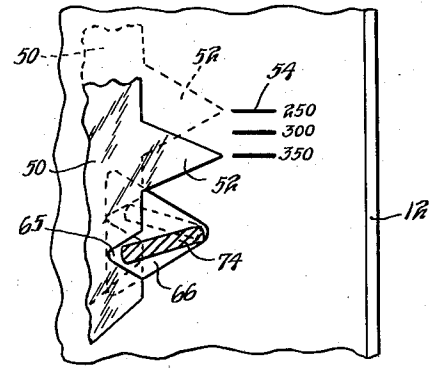
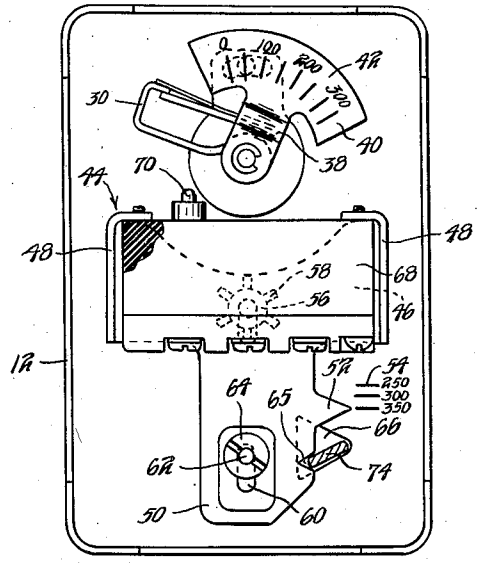



Fig. 2.




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# UNITED STATES PATENT OFFICE

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## CONDITION RESPONSIVE DEVICE

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Application December 9, 1944, Serial No. 567,344

3 Claims. (Cl. 200—138)

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This invention relates generally to a thermostatic switching mechanism and is directed more particularly to the assembly of the various parts of the switch so that various operating conditions may be satisfied.

It is an object of this invention to provide an adjustable support for a snap switch so that the snap switch may be adjusted relative to an actuator element which is moved by a condition responsive element, such as a thermostatic element, upon changes in temperature.

It is a further object of this invention to provide an adjustable support for a snap switch of a switching mechanism so that the value of the condition for operating the snap switch may be varied.

It is still another object of this invention to provide means for securing the adjustable support mounting the snap switch in its several adjusted positions.

It is yet another object of this invention to provide a simple and easily manipulated adjustment means for the support mounting the snap switch so that quick and efficient adjustment of the mechanism may be made.

It is another object of this invention to provide in a thermostatic switching mechanism an adjustable switch mounted independently of the actuating means whereby the switch may be adjusted without damage being done either to the switch or actuating means.

It is another object of this invention to provide an adjustment means for a switch mechanism which may be made after the switching mechanism has been installed and which means does not necessitate that the switch must be demounted from its operable position.

It is still another object of this invention to provide a scale means associated with the adjustable support mounting the snap switch of this mechanism whereby the temperature at which the snap switch is actuated may be readily ascertained.

The snap switch employed in the switching mechanism of this invention is of the type disclosed in the Patent No. 2,318,734 for Snap action switch, issued May 11, 1943, to Albert E. Baak. The snap switch as employed in this device when actuated is moved from closed to open position.

It is another object of this invention to provide in a thermostatic switch mechanism a bimetallic element integrally connected with an actuator member, a scale associated with the actuator member for indicating the temperature of the medium adjacent the bimetallic element, and an

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adjustable control device mounted on the casing of the mechanism independently of the actuator member and having a scale associated therewith for indicating the temperature at which the control device is actuated. The scale associated with the adjustable control device is correlated with respect to the scale associated with the actuator member so that both scales are adapted to indicate the temperature at which the control device is moved from closed to open position for any adjusted position of the control device.

These and other objects will readily become apparent as the following specification is read in connection with the accompanying drawing.

Figure 1 is a side elevational view partly in section of the switching mechanism of this invention,

Figure 2 is a front elevational view of the switching mechanism as disclosed in Figure 1, the cover of the casing being removed, and

Figure 3 is a fragmentary view on an enlarged scale of a portion of the support for the snap switch of the switching mechanism of this invention.

Like reference numerals refer to like parts throughout the several views of the drawing.

Referring in detail to the drawings, 10 indicates a casing which comprises a back wall portion 12 and a removable cover portion 14. The back wall 12 of the casing is provided with an opening 16. A sleeve member 18 is located outside the back of the casing over opening 16 and is staked to the back of casing 12. There is a plate member 21 secured by appropriate means to the inside of the back wall 12 of casing 10, and a tube 20 located outside the back wall of the casing extends through the opening 16 in the back wall 12 and is staked to the plate 21. The tube 20 extends within the sleeve 18. A rod 22 passes through the opening 16 in the back wall 12 and one end thereof extends through the tube 20 and into the sleeve 18, while the opposite end of the rod 22 passes through an aperture in plate 21 and extends within the casing 10. There is a bimetallic thermostat element 24 which is secured to the outer end of the rod 22 as shown at 26 while the opposite end of the bimetallic element 24 is secured to a portion of the tubing 20 as shown at 28.

There is an arm member 30 located within the casing 10 and mounted on the rod 22. The arm 30 is journaled on the rod 22 by ear members 32, 33, and 34. Adjustable connections 36—36 mounted on the rod 22 maintain the arm 30 in a definite fixed position on the rod 22. There is

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an arm 38 comprising a plate portion 40 which is appropriately secured on the inner end of the rod 22. The plate 40 carries a scale 42 which indicates the temperature of the medium adjacent the bimetallic element 24. There is an appropriate window 41 in the cover 14 with which the scale 42 registers.

A carriage member 44 is spaced below the arm member 30 and is secured to the back wall 12 of the casing by a stud 43 and spring washer 58. Carriage 44 comprises a plate 46 which is parallel with the back wall 12 and is adapted to abut the back wall 12 of the casing 10. The carriage 44 further comprises a portion 50 depending from plate 46 and two angular arm members 48, one at each side of the plate 46. The depending portion 50 is provided with a pointer 52 which cooperates with a scale 54 on the back wall 12 of the casing 10. The plate 46 of the carriage 44 is provided with a slot 56, and the stud 43 appropriately secured to the wall 12 extends through the slot 56. The stud 43 is provided with a head portion at its inner end. The spring washer 58 is spaced between the head portion of the stud 43 and the plate portion 46 and the spring washer 58 maintains the plate portion 46 in abutting relationship with the back wall 12 of the casing. The depending portion 50 of the carriage 44 is provided with a slot 60. A threaded stud 62 extends from the back wall 12 of the casing and passes through the slot 60. A nut 64 is mounted on the threaded stud 62. The depending portion 50 of the carriage 44 is provided with a notch 65 which always registers with some portion of an aperture 66 in the back wall 12 of the casing 10. A snap switch 68 secured to the carriage portion 44 is provided with a pin 70 which actuates the switch upon being moved.

The bimetallic element 24, upon expansion due to rise in temperature of the medium adjacent thereto, moves the rod 22 which in turn moves the arm 30 which actuates the snap switch 68 through the medium of the pin 70. It may be desirable and necessary to change the temperature at which operation of the snap switch takes place, and this may be accomplished by adjusting upwardly or downwardly the carriage 44 which mounts the snap switch 68. If the carriage 44 carrying the snap switch 68 is moved upwardly toward arm 30, the temperature at which the snap switch is moved to open position will be lowered while if the carriage 44 mounting the snap switch 68 is moved toward the bottom of the casing the temperature at which the snap switch is actuated to open position is consequently raised. This adjustment may be made after the switch mechanism is in operative position on the bonnet of a furnace or in any other place where it might be employed. It is only necessary to remove the cover 14 of the casing 10 and the adjustment means may be easily reached. There are means for maintaining the carriage 44 and the snap switch 68 in predetermined positions, and these means include the stud 62 and the nut 64. The nut 64 may be loosened and the blade 74 of a screw driver (as seen in Figure 2) positioned so as to engage notch 65 in the depending portion 50 and the aperture 66 in the back wall 12 of the casing 10 and the blade twisted in a clockwise direction thereby sliding the carriage member 44 in an upward direction. As a result of elevating the carriage 44 and the snap switch 68, the pin 70 of the snap switch is moved closer to the arm 30 and consequently the bimetal element 24 will rotate rod 22 and its arm 30 for actuating the snap switch 68 at a lower temperature for opening a circuit (not shown). The slots 60 and 56 in the carriage member 44 which receive the studs 62 and 43, respectively, permit the carriage 44 to be moved upwardly or downwardly with respect to the actuating arm 30 as may be desired. The nut means 64 threaded on stud 62 when tightened against the depending portion 50 of the carriage 44 locks the carriage member in its several adjusted positions.

Figure 3 discloses in an enlarged view a detailed illustration of the means for adjusting the carriage member 44 and utilizing the blade 74 of a screw driver for performing the adjustment of carriage 44. The solid line position of the depending portion 50 of the carriage 44 and the blade 74 of the screw driver discloses one extreme setting of the snap switch 68, and this solid line position of the depending portion 50 corresponds to a relatively high temperature adjacent the bimetallic element 24 for actuating the snap switch 68 to open position through means of bimetallic element 24, rod 22, and arm 30. The dotted line position of the depending portion 50 of the carriage 44 discloses another extreme setting or position of the snap switch 68 and in this dotted line position of the depending portion 50 the snap switch is actuated to open position by actuating arm 30 at a lower temperature adjacent the bimetallic element 24 than the temperature at which the snap switch is actuated to open position, when the depending portion 50 is in the solid line position.

When it is desired to move the snap switch 68 from the top setting of the scale 54 to any of the other positions of the scale 54, the blade 74 of the screw driver is rotated in a counter-clockwise direction from the dotted line position in Figure 3 and the carriage 44 and snap switch 68 are lowered toward the bottom of the casing 10.

The scale 42 on the plate 40 is calibrated in degrees of temperature, and is adapted to cooperate with a pointer on the window 41 for indicating the temperature of the medium adjacent the bimetal element 24. The scale 54 on the back wall 12 of the casing 10 is calibrated in degrees of temperature. The pointer 52 on the depending portion 50 registering with a calibration of scale 54 indicates the temperature at which the arm 30 will actuate the pin 70 of the snap switch 68 for moving the snap switch from closed to open position.

The present invention embodies in a thermostatic switching mechanism a snap switch comprising means which permits easy and efficient adjustment of the switch mechanism in the field. This adjustment of the switch mechanism may be performed by an unskilled person and the adjustment will be accurate and there is no likelihood of any damage being done to the switch mechanism by the unskilled person adjusting the snap switch from one position to another position. The snap switch 68 can be adjusted by elevating or lowering the carriage 44 and the pointer 52 cooperating with the scale 54 on the inside of the rear wall 12 of the casing then indicates the temperature at which the actuator arm 30 actuates the snap switch from closed to open position. The temperature indicated by scale 42 when the actuating arm 30 actuates the snap switch 68 from closed to open position is always the same temperature as the temperature indicated on scale 54 by pointer 52. If the car-

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riage **44**, which mounts the snap switch **68**, should be adjusted from a first position to a second position, the pointer **52** would be moved from a first calibration to a second calibration on scale **54**, thus changing the temperature value indicated on scale **54** from a first temperature value to a second temperature value. The first temperature value indicated on scale **54** by pointer **52**, which was determined by the first position of a carriage **44** and snap switch **68**, displayed the temperature at which the snap switch **68** would be actuated by actuating arm **30** from closed to open position. This first temperature value indicated on scale **54** by pointer **52** would also be disclosed on scale **42** when the snap switch **68** is actuated by the actuating arm **30** from closed to open position. The second temperature value indicated on scale **54** by pointer **52** which is determined by the second position of the carriage **44** and snap switch **68** signifies the temperature at which the snap switch **68** would be actuated by arm **30** from closed to open position, and this second temperature value indicated on scale **54** also would be indicated on scale **42** when the snap switch **68** is actuated from closed to open position. This correlation of the temperature readings of the two scales whereby the temperature setting of scale **54** is the same as the temperature indicated on scale **42** when the snap switch is moved from closed to open position is obtained by the spaced relationship between the actuating arm **30** and the snap switch **68**.

As various changes and modifications in this invention may occur to those who are skilled in the art, I wish it to be understood that I intend to be limited only by the scope of the appended claims and not by the specific embodiment disclosed herein.

I claim as my invention:

1. In a control device, a support, a condition responsive element carried by said support, a member positioned by said element with respect to said support, a bracket carried by said support and slidable with respect thereto in a direction toward and away from said member, a control element carried by said bracket and having an actuator engageable by said member, said support having a notched portion adjacent said bracket and said bracket having a notched portion adjacent the notch in said support, the operative portions of said notched portions being of similar configuration whereby said bracket may be shifted with respect to said support by



rotation of a screwdriver blade or similarly shaped tool cooperating with both notched portions.

2. In a control device, a support, a condition responsive element carried by said support, a member positioned by said element with respect to said support, a bracket carried by said support and movable therein, a control element carried by said bracket and having an actuator engageable by said member, said support having a notched portion adjacent said bracket and said bracket having a similarly shaped notched portion adjacent the notch in said support whereby said bracket may be shifted with respect to said support by rotation of a tool cooperating with both notched portions.

3. In a control device, a support, a condition responsive element carried by said support, a member positioned by said element with respect to said support, a bracket carried by said support and slidable with respect thereto in a direction toward and away from said member, a pair of posts extending from said support and engaging said bracket for guiding said bracket in its movements with respect to said support, a control element carried by said bracket and having an actuator engageable by said member, said support having a notched portion adjacent said bracket and said bracket having a notched portion adjacent the notch in said support whereby said bracket may be shifted with respect to said support by rotation of a tool cooperating with both notched portions, means carried by one of said posts causing frictional engagement between said bracket and said support, and means carried by the other of said posts for locking said bracket in its adjusted position.

JOHN O. ROSCHE.


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