Aug. 25, 1970 C. J. HIRE 3,525,968

THERMOSTAT

Filed March 21, 1968

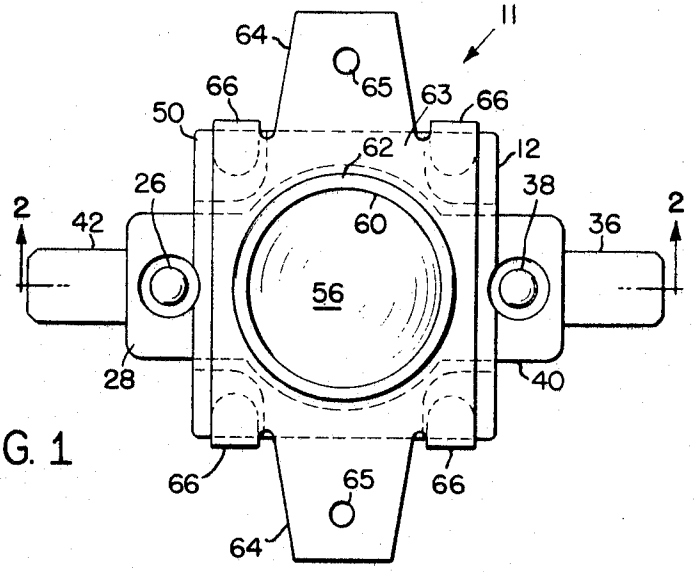


FIG. 1

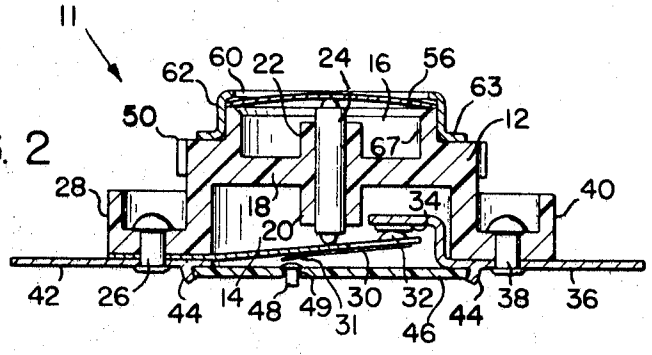


FIG. 2

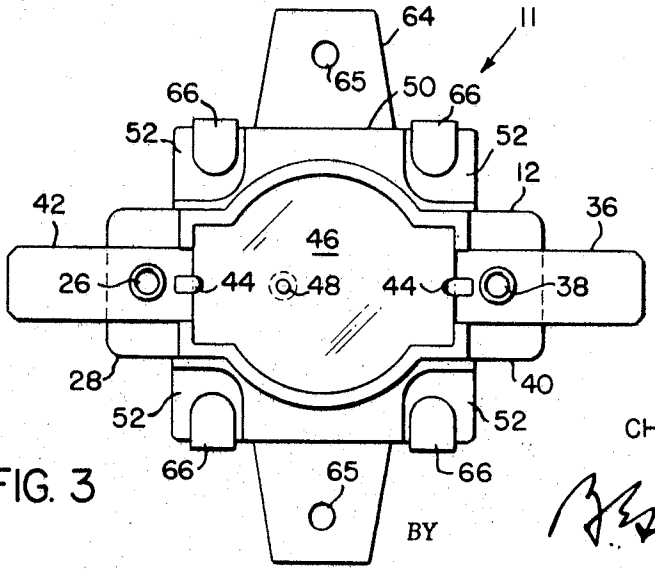


FIG. 3

INVENTOR
CHARLES JOHN HIRE

BY

ATTORNEY

United States Patent Office 3,525,968
Patented Aug. 25, 1970

3,525,968

THERMOSTAT

Charles John Hire, Pittsford, N.Y., assignor to Fasco Industries, Inc., Rochester, N.Y., a corporation of New York

Filed Mar. 21, 1968, Ser. No. 714,854
Int. Cl. H01h 37/54, 37/70, 37/72
U.S. Cl. 337—348 1 Claim

ABSTRACT OF THE DISCLOSURE

Opposite ends of a reciprocable bumper pin engage, respectively, a bimetallic disc, and a flexible switch arm. The switch arm is fixed at one end to a first terminal, and has a free end normally engaged with a second terminal so that the switch is normally closed. A reset button is manually operable to push the switch arm in a direction to return the bumper pin and bimetallic disc to their normal positions, but this reset button is positioned so that when it is depressed it acts as a fulcrum to open the switch so that the bumper pin and disc must return to their normal positions before the switch can be closed. Thus, the switch can be closed only when the temperature of the disc is below a predetermined amount.

This invention relates to thermostats, and more particularly to snap-action thermostats intended to open on temperature rise only, such as are used in clothes driers, heaters, air conditioning and ventilating equipment, etc. In a more specific aspect, the invention relates to thermostats of the type in which the switch is operated by a small plunger or pin mounted for reciprocation between a bimetallic disc, and a flexible switch arm.

To avoid unnecessary waiting or shut-down time, after a thermostat of the type described has opened and begins to cool down, manually operable resetting means are commonly provided for returning the bimetallic disc to its normal position as soon as possible. With prior designs of manually-resettable thermostats, however, there is always the danger that the switch will be reset to operate before it has cooled down to a safe level.

A primary object of the present invention is to provide a thermostat designed to open an electrical circuit on temperature rise beyond a predetermined point, and which is manually resettable, but where the manual resetting device is so constructed that the temperature must return to a safe level before the switch can reoperate.

Another object of the invention is to provide a thermostat of the character described having very simple means for resetting the thermostat.

Another object of this invention is to provide an improved manually-resettable snap-action thermostat, which is substantially easier to manufactuer and install, than prior, such thermostats.

A further object of this invention is to provide an improved snap-action, bimetallic-operated thermostat, which is compact, economical and versatile.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims, particularly when read in conjunction with the accompanying drawing.

In the drawing:

FIG. 1 is a front view of a thermostat made in accordance with one embodiment of this invention;

FIG. 2 is a sectional view taken along the line 2—2 in FIG. 1 looking in the direction of the arrows; and

FIG. 3 is a back view of this thermostat.

Referring now to the drawing by numerals of reference, the thermostat 11 comprises a base 12, having in opposite ends thereof circular recesses 14 and 16, respectively, which are separated by an axially bored, transverse partition 18. The partition 18 is provided with coaxial integral annular bosses 20 and 22 which project into the recesses 14 and 16, respectively. Mounted for reciprocation in these bosses is a switch actuating pin or plunger 24.

Secured at one end thereof by a rivet 26 to the bottom of a lug 28, which projects from one side of base 12 adjacent the lower end thereof, is a flexible, electrically-conductive metallic switch arm 30. Switch arm 30 extends into the recess 14 beneath the pin 24. On the upper side (FIG. 2) of its free inner end arm 30 has a contact 32; and on its lower side it has fixed thereto one end of a leaf spring 31, the opposite end of which extends downwardly and rearwardly of arm 30. The contact 32 is engageable with a contact 34 on the inner end of an electrically-conductive terminal 36. Terminal 36 is secured intermediate its ends by a rivet 38 to a lug 40, which projects from base 12 opposite shoulder 28. A second terminal 42 is secured adjacent its inner end to the outer end of switch arm 30 by the same rivet 26 which secures the switch arm to base 12. Adjacent their inner ends, each terminal 36 and 42 has an integral tang 44 struck up therefrom, which is bent over one of the opposed side edges of a plastic cover 46 to secure the latter over the recess 14.

A headed reset button 48, which is made of any conventional dielectric material, is mounted with its shank slidable in a hole 49 in cover 46, and with its head positioned beneath arm 30, and normally resting on the inner face of cover 46. Button 48 is disposed between pin 24 and the fixed end of arm 30 to be engageable with the free end of spring 31; and arm 31 prevents pin 48 from falling into recess 14.

Adjacent its upper end base 12 is surrounded by an integral, rectangular flange 50 all four sides of which are equal in length, and two opposed side edges of which extend parallel to a median line through the terminals 36 and 42. On its underside flange 50 has recesses 52 (FIG. 3) in its four corners.

Seated on the upper end of base 12 over the circular recess 16 is a bimetallic disc 56, which is curved normally to have a downwardly facing concave surface that is engaged by the upper end of pin 24. This disc is held in place over the housing 12 by a circular bezel-like flange 60 formed centrally on the central annular wall 62 of a generally rectangular plate 63. Wall 62 surrounds an annular wall 67 integral with base 12. Projecting from opposite ends, respectively, of plate 63 are two, integral wings 64, each of which has therein an opening 65 for receiving a fastener such as a screw. At opposite sides, respectively, of each wing 64, plate 63 has two spaced ears of tabs 66, which are folded over the edges of flange 50 to engage in its recesses 52, thereby to secure member 61 to base 12.

The ears 66 may be folded over the flange 50 as in FIG. 1 to secure the plate 63 in a direction so that its wings 64 extend substantially transverse to the direction in which the terminals 36 and 42 extend, or they may be folded to secure plate 63 with its wings 64 extending substantially parallel to the terminals 36 and 42. In either case, the wall 62 will be coaxial with the wall 67 of base 12. Thus the thermostat 11 is readily adaptable to different conditions of mounting.

In use, when the ambient temperature of thermostat 11 exceeds the critical value for which disc 56 is designed, the disc snaps downwardly at its center from the position shown in FIG. 2, thus driving plunger 24 downwardly far enough to cause the contact 32 to be disengaged from contact 34, thus breaking the circuit between terminals 36 and 42. Normally as soon as the ambient temperature falls below the critical value, the pin 48 may

be pushed from the exterior of the housing **12** into engagement with arm **31**, thereby causing the latter to urge arm **30** upwardly. The plunger **24** will transmit the upward motion of arm **30** to the disc **56**, so that the disc is popped back to its normal position (FIG. 2), and the contacts **32** and **34** are reengaged.

If the reset button or pin **48** should be held in or for some reason be blocked in its innermost position, the lower end of plunger **24** causes the free end of blade **30** to pivot clockwise (FIG. 2) about the head of pin **48** to disengage contact **32** from contact **34**. This operates as a safety device to open the circuit connected to terminals **36** and **42**.

From the foregoing it will be apparent that applicant has devised a relatively simple and inexpensive thermostat, which can be adjusted readily to different mounting needs, merely, for example, by disengaging the ears **66** from the recesses **52** in the flange **50**, rotating the plate **63** ninety degrees relative to the housing **12**, and then reengaging the ears **66** in the recesses **52**. Also, the reset button **48** provides a very inexpensive and compact means for avoiding unnecessary time spent in waiting for disc **56** to return by itself to its normal position each time its critical temperature is exceeded. Moreover, if button **48** is accidentally blocked in its inner or reset position, plunger **24** will open contacts **32, 34** to prevent undersirable overloading of the associated circuit.

While the invention has been described in connection with a specific embodiment thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention or the limits of the appended claim.

Having thus described my invention, what I claim is:

1. A thermostatic switch, comprising

a base,

a bumper pin reciprocable in a central opening in said base,

a pair of opposed terminals secured to and projecting outwardly from opposite sides of said base,

an electrically-conductive, normally-closed, flexible switch arm electrically connected at one end to one of said terminals, and extending into a recess in said base for engagement intermediate its ends by one end of said pin and for movement by said pin between a closed position in which its free end is engaged with the other of said terminals, and an open position in which its free end is spaced from said other terminal,

a bimetallic element mounted over the opposite end of said pin normally to be bowed outwardly to permit said switch arm to close, but being flexible inwardly upon a predetermined increase in ambient temperature to move said switch arm to its open position,

a rigid cover secured over said recess in said base,

a reset button having a cylindrical shank reciprocable in a hole in said cover along a line parallel to but offset from the axis of said pin, and having on its inner end an enlarged diameter head registering with said arm between said one end thereof and said pin, and

a leaf spring fixed at one end to said arm adjacent the free end of said arm, and itself having a free end projecting between said arm and said head for engagement by said head,

said button being movable manually inwardly against said free end of said spring to cause said arm and said pin to urge said element to its normal position,

said spring being operative, when said button is in its inner position, and said element is in its inward position, to pivot said free end of said arm to said open position.

References Cited

UNITED STATES PATENTS

3,259,720	7/1966	Odson	337—348
3,219,783	11/1965	Odson	337—348
3,187,145	6/1965	Grabinski	337—91 XR
3,164,701	1/1965	Kirchhubel	337—348 XR

BERNARD A. GILHEANY, Primary Examiner

D. M. MORGAN, Assistant Examiner

U.S. Cl. X.R.

337—354, 367