March 23, 1954 H. H. HOBBS 2,673,269

THERMOSTATIC SWITCH

Filed May 29, 1950

FIG. 1

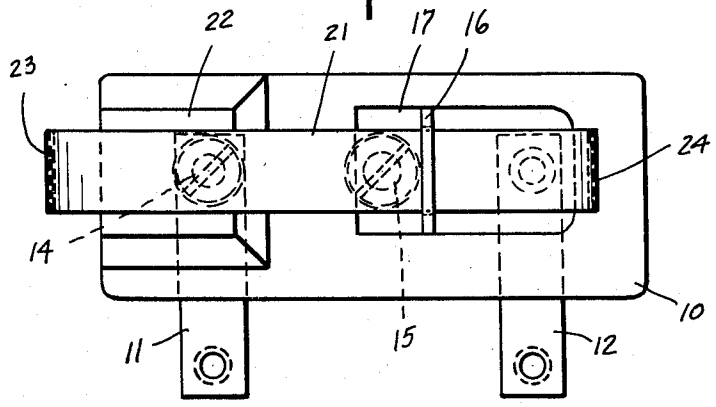
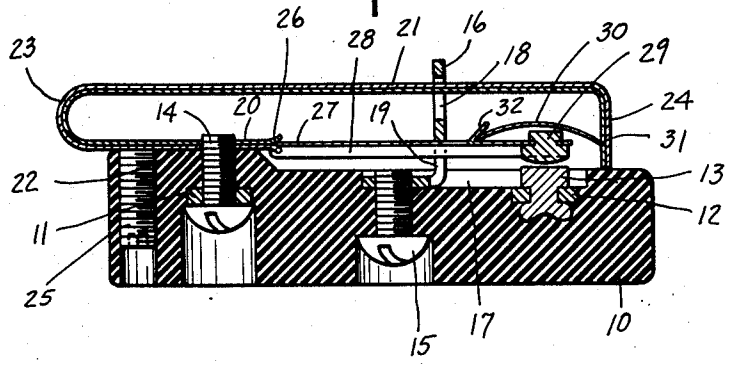


FIG. 2



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THERMOSTATIC SWITCH

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2 Claims. (Cl. 200—138)

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This invention relates to a thermostatic switch of the bimetal type for automatic operation according to temperature variations, and in which there is incorporated a snap action of the character disclosed in Letters Patent No. 2,157,156, granted May 9, 1939, to Elmer T. Abendroth.

The principal purpose of the invention is to provide a switch of the general character of that disclosed in the above-entitled Letters Patent, but which is self-contained in that the structure includes a bimetal lever for automatically making and breaking a circuit without mechanical outside force, but which retains the snap action of the above-mentioned patent. This invention, therefore, comprises an improvement in respect to the form and mounting of a bimetal switch lever, such as to eliminate association therewith of an outside thermostatic element, such as a bellows, and wherein a contact tongue is pivotally associated with said lever in the manner hereinafter more specifically set forth and claimed.

Although useful for many purposes in thermostatic control of a circuit, said switch is primarily applicable to and useful in controlling a circuit in incubators and brooders.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

Fig. 1 is a plan view of the switch.

Fig. 2 is a central longitudinal section therethrough showing it in circuit breaking position.

In the drawings there is shown a switch block 10 of any suitable insulating material, such as Bakelite or the like, which serves as a supporting base for the switch structure. Extending from the block and molded therein there is a pair of terminal bars 11 and 12 for connection into the electric circuit to be controlled. Molded in the block there is a stationary contact element 13 having contact seating engagement with the terminal contact bar 12. Spaced therefrom and adjacent the other end of the block 10 there is provided a recess on the underside thereof through which an anchor screw 14 extends through and in electrical contact with the terminal bar 11. Intermediate the contact bars the block is raised on its lower side to receive a supporting screw 15 having threaded engagement with the base of an L-shaped stop member 16. The base of said stop member is seated in a recess 17 formed in the upper surface of the base from which the shank of the stop member extends vertically upward. Said member is provided with spaced apertures 18 and 19 for providing upper and lower stop bars, respectively.

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The anchor screw 14 is threaded into locking engagement with the base portion 20 of a bimetal lever 21. Said base portion is rigidly secured by the screw 14 to the surface of a raised seat 22 formed on the upper surface of the block 10. Said bimetal lever is looped 180 degrees on itself from the base portion 20 to the forwardly-extending portion to provide a flexing fold therein indicated at 23. The upper free portion of the lever extends from its flexing fold 23 longitudinally over the block and in spaced relation thereto through the aperture 18 in the stop member 16, terminating in a down turned finger 24. The free end of the down turned finger 24 is engageable with the upper surface of the block 10 to limit the downward flexing of the lever, the upper flexing thereof being limited by the top bar of the stop member 16.

For calibrating the thermostatic reaction of the bimetal lever 21 there is provided a calibrating screw 25 having threaded engagement with the recess extending from the bottom of the block 10 positioned to engage the under side of the base portion 20 of said lever intermediate its anchor screw 14 and its flexing fold 23. Thus, the calibration of the switch may be controlled by screwing the screw 25 upwardly, tending to force the finger 24 in a downward direction and increasing the resistance to its upward movement.

The free end of the base portion 20 of said lever is bifurcated at 26 to receive the pivotal end of a contact tongue 27. Said tongue is reinforced to render it rigid by the depending flanges 28 formed on each side thereof. The free end of said tongue carries a movable contact element 29 positioned for electric contact engagement with the stationary contact element 13. Thus, the downward movement of the tongue brings the contact elements into engagement while the upward movement of said tongue limited by the lower bar of the stop member 16 carries the movable contact element into spaced circuit-breaking relation to the stationary element.

To provide a snap action of the tongue 27 and its element 29 to and from contacting engagement there is provided an arched leaf spring 30. Said spring arches over the free end of the tongue 27 and element 29, one end of said spring seating in a recess formed in the finger 24, as indicated at 31. The other end of said spring seats in a recess formed by the ear 32 cut and bent upwardly from the tongue 27.

In the manner disclosed in the above-mentioned Letters Patent the spring 30 provides a snap action switch by reason of the relation of

the line of force through its seated ends at 31, 32, to the pivot and flexing points of the lever and tongue. When the bimetal lever is at its lowermost position, the opposing forces exerted by the spring 30 on its seats 31, 32, urges the tongue 27 upwardly which snaps it to its open position against the lower bar of the stop member 16, as shown in Fig. 2. Upon the tongue 24 being raised through the thermo action of the bimetal lever, it throws the line of force through the seats 31, 32, in the opposite direction, such as to force the free end of the tongue 27 downwardly into contact position.

Whereas the tongue and lever extend generally in the same direction from their adjacent pivotal mountings, the structure and arrangement thereof effects certain advantages over the form disclosed in the above-mentioned patent. The structure involved in simplified from a production and assembly standpoint by forming the seat 22 to receive the base portion 20 of the lever, secured by the simple expedient of the anchor screw 14. Through the flexing fold 23 a more sensitive thermostatic action is obtained, both due to the increased length of the lever and its flexing characteristic. This arrangement of the adjacent pivotal mountings also permits of convenient calibration of the lever for thermostatic control by the screw 25.

A further and perhaps more important advantage of the bimetal structure of the lever over said patent lies in the fact that the switch of the present invention is self-contained and requires no mechanical outside force, such as a bellows or the like, to thermostatically control its operation.

The invention claimed is:

1. A thermostatic switch having a supporting base of insulating material provided with a raised seating portion and a reduced contact portion, a bimetal lever having a base portion seated upon and fixedly secured to said raised seating portion by a terminal bar screw, said lever being formed with a flexing fold to provide a reverse extension over said base portion in spaced relation thereto, the free end of said lever bridging said reduced contact tension and having a down turned finger engageable with said base to limit its movement in one direction, a stop member secured to said base embracing said lever to limit its movement in the opposite direction, a rigid tongue pivotally seated in the free end of the base portion of said lever to extend over the reduced contact portion of said base in aligned and spaced relation with said lever with its free end terminating short of said finger, a

pair of electric contacts, one of said contacts being connected to a second terminal bar in the reduced contact portion of said base and the other being normally spaced therefrom secured to the free end of said tongue, and a bowed leaf spring having one end seatable against the down turned finger of said lever and the other end fixedly seated on said tongue in bridging relation to the contact thereon to provide a snap action tending to force said tongue downwardly to engage said contacts upon said lever being raised, and disengage said contacts upon said lever being lowered through the thermo flexing thereof.

2. In a thermostatic switch, a support of insulating material, a bimetal lever bent upon itself near one end to provide a base portion in spaced parallelism with said lever, the end of said base portion being bifurcated, a terminal bar screw securing said base portion to said support with said lever disposed across and longitudinally of the latter, a finger depending from the free end of said lever to engage said support and to limit the flexing of said lever in the direction of said support, a rigid tongue having one end engaged in the said bifurcated end of said base portion and projecting in substantial alignment with the latter and in spaced parallel relationship with said support and said lever, a contact element secured to the free end of said tongue, a second terminal bar secured in said base immediately adjacent to said contact element, the said finger provided with a recess in substantial alignment with said lever, a seat on said lever disposed between said contact element and said base portion, a leaf spring interposed in bowed relationship between said finger and said seat with one end engaged in said recess and its other end with said seat and bridging said contact element and operable to effect making and breaking contacts between said contact member and said second bar terminal upon movement of said lever relative to its base portion.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,928,484	Gatchell	Sept. 26, 1933
2,068,374	Carlson	Jan. 19, 1937
2,085,557	Uhl	June 29, 1937
2,170,748	Eaton	Aug. 22, 1939
2,279,060	Rimbach	Apr. 7, 1942
2,508,040	Ransome	May 16, 1950
2,558,219	Kohl	June 26, 1951