June 14, 1949. V. G. VAUGHAN 2,473,081

THERMOSTATIC SWITCH AND SEALED ADJUSTING CONTROL

Filed Feb. 8, 1946

FIG. 1.

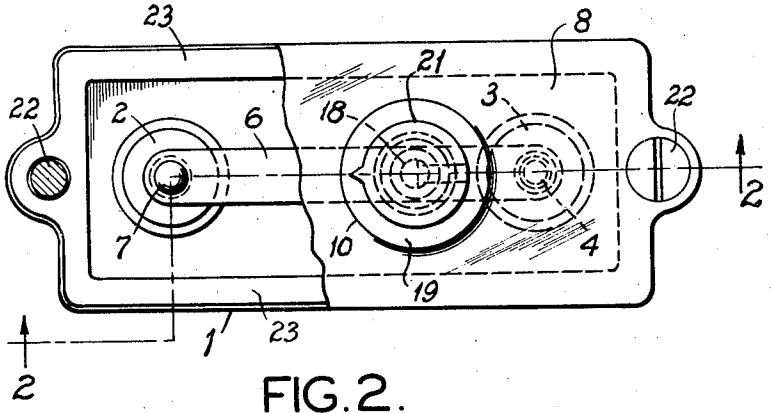


FIG. 2.

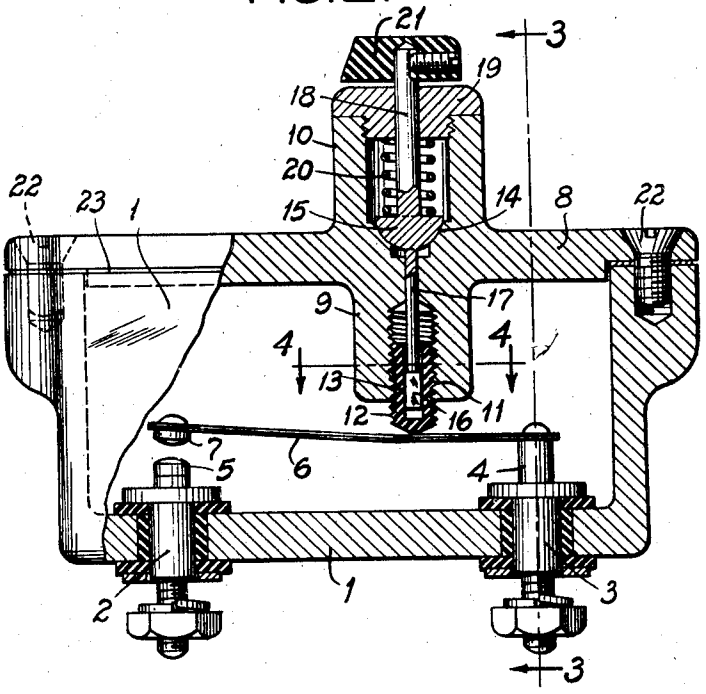


FIG. 3.

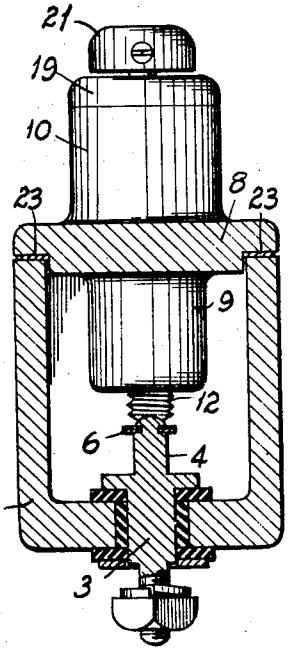
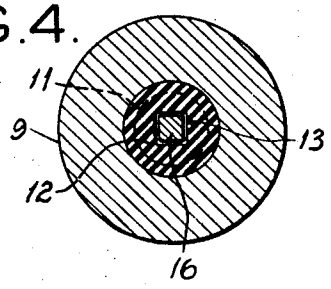


FIG. 4.



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THERMOSTATIC SWITCH AND SEALED ADJUSTING CONTROL

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3 Claims. (Cl. 200—139)

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This invention relates to controls, and with regard to certain more specific features, to a sealed thermostatic or like control.

Among the several objects of the invention may be noted the provision of an outside control for an inside member such as a thermostat located within a compartment which is sealed; the provision of a control of the class described providing for a packless, non-leaking rotary intersecting member for transmitting motion from one side to the other of a wall of the sealed compartment; and the provision of a device of the class described which is relatively simple in form and reliable in operation over long periods of time. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a top plan view illustrating the invention, parts being broken away;

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2; and,

Fig. 4 is an enlarged horizontal detail section taken on line 4—4 of Fig. 2.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Thermostats and like members which require adjustable controls are often mounted in sealed compartments into which leakage should not be allowed to occur. Any control of the inner elements generally needs to be effected by a movable member intersecting the wall of the sealed compartment. Attempts to provide a suitable seal around the adjusting elements, for example, by means of packing and the like, are generally unsatisfactory. Such packings lose their effectiveness with age and when tightened enough for effective sealing often introduce undesirable resistance to the adjusting movement. The present invention provides a simple, packless control for the purpose.

Referring now more particularly to the drawings, there is shown at numeral 1 a case composed, for example, of die-cast zinc or molded from

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Bakelite. In the bottom of the case 1 are mounted insulated studs 2 and 3. These constitute line terminals. The stud insulation, in addition to its proper dielectric characteristics, serves as a seal around the studs 2 and 3. On the inside end of the stud 2 is provided a stationary contact 5. On the inside of the stud 3 is provided a stud 4 on which is mounted, either by welding or by riveting, one end of a thermostatic, bimetallic blade 6. The movable outer end of the thermostatic blade 6 carries a movable contact 7 which cooperates with the stationary contact 5.

Over the open end of the case 1 is located a cover 8 which is held down by means of screws 22. A sealing gasket 23 is provided between cover 8 and the case 1. The cover 8 may also be made of die-cast zinc. It carries an inside boss 9 and an outside boss 10. The inside boss 9 is threaded, as shown at 11, for the reception of a screw 12 of Bakelite or other suitable insulating material. The screw 12 is molded with a non-circular (preferably square) hole 13 centrally located therein for the reception of a square head 16 on a control stem 17. Adjustment of the thermostatic blade 6 is made by turning the Bakelite screw 12 so that it advances in or out with respect to the boss 9, thus changing the pressure exerted upon the blade 6. Such change in pressure changes the thermostatic operating characteristics of the blade.

It will be understood that although a square is shown as the polygonal connection at 13, 16, that other polygonal or non-circular forms may be used. Hereinafter in the claims the term splined connection will be used generically to designate a rotary driving connection at this point which will also allow relative longitudinal movements.

The outer boss 10 is interiorly machined to provide a spherical valve seat 14 for seating a hemispherical valve member 15. Preferably, the valve 15 should be ground and lapped to the seat 14. Integrally formed with the valve member 15 is the said lower stem 17 and an outwardly extending stem 18. Stem 17 projects inward through a hole provided in the inner boss 9 so that the square end 16 may be located in the square hole 13. This provides means for rotating the screw 12 while permitting it relative axial movement of the same. This relative axial movement occurs without raising the valve member 15 from the seat 14.

The outer stem 18 extends through a drilled hole in a closure cap 19 threaded to the outer

end of the boss 10. Mounted between the closure element 19 and the valve member 15 is a compression spring 20 which serves to bias the valve member 15 toward the seat 14. An outside adjusting knob 21 is attached to the outer end of the control stem 18. Friction at the spring abutments should be minimized as much as possible by a suitable finish, or anti-friction bearings may be used at these points.

Operation is as follows:

When the adjusting knob 21 is turned, it rotates the assembly 18, 15, 17, 16. This turns the screw 12 which threads inwardly or outwardly, depending on the direction of rotation, thus exerting more or less pressure upon the thermostatic bimetal blade 6. It should be noted that if blade 6 is arranged to open the contacts on rise in temperature, and if greater pressure is exerted upon the blade 6, it requires a higher temperature in order to open the contacts 5, 7. The valve 15 cooperates with the valve seat 14 to provide a gas seal at which relative motion occurs freely when the adjustment is made externally.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a control for adjusting a member within a sealed casing, one of the walls of the casing being formed with aligned inner and outer bosses, a screw adjustably threaded in the inner end of the inner boss with its inner end engaging the member to be adjusted, an adjusting stem rotary in said bosses having its inner end splined to the screw and extending out of the outer boss, an adjusting knob on the outer end of the stem, an outwardly facing valve seat surrounding the stem at the inner end of the outer boss, a valve member fixed on the stem engaging the valve seat, and a spring compressed between a cap on the outer end of the outer boss and the valve member for biasing the stem and valve member inwardly and holding the latter in gastight sealing engagement with the valve seat.

2. A gastight, adjustable, thermostatic switch comprising a sealed casing, a thermostatic element mounted within the casing and having a contact thereon cooperable with a contact fixed on a wall of the casing, a screw adjustably threaded in an opening in a wall of the casing with its inner end engaging the thermostatic element, an adjusting stem rotary in said opening having its inner end splined to the screw and extending out of the opening to the exterior of the casing, an outwardly facing valve seat surrounding the opening exteriorly of the screw, a valve member on the stem engaging the valve seat, and a spring biasing the stem and valve member inwardly for holding the latter in gastight sealing engagement with the valve seat.

3. A gastight, adjustable, thermostatic switch comprising a sealed casing, a thermostatic element mounted within the casing and having a contact thereon cooperable with a contact fixed on the wall of the casing, the opposite wall of the casing being formed with aligned inner and outer bosses, a screw adjustably threaded in the inner end of the inner boss with its inner end engaging the thermostatic element, an adjusting stem rotary in said bosses having its inner end splined to the screw and extending out of the outer boss, an adjusting knob on the outer end of the stem, an outwardly facing valve seat surrounding the stem at the inner end of the outer boss, a valve member on the stem engaging the valve seat, and a spring compressed between a cap on the outer end of the outer boss and the valve member for biasing the stem and the valve member inwardly to hold the latter in gastight sealing engagement with the valve seat.

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