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D. F. DROW

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THERMOSTATIC CONTROLLED DEVICE

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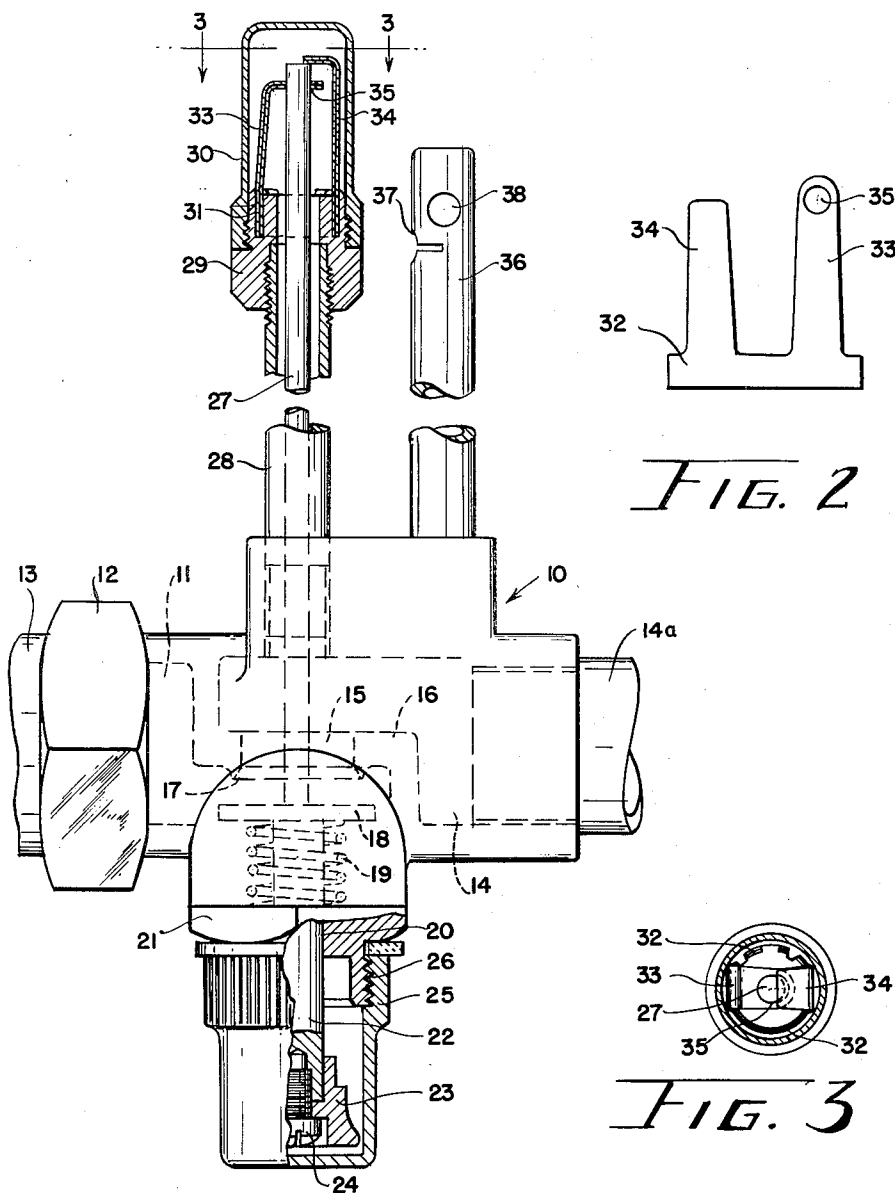


FIG. 1.

FIG. 2

FIG. 3

INVENTOR.
DONALD F. DROW
BY

George H. Fisher
ATTORNEY

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THERMOSTATIC CONTROLLED DEVICE

Donald Frederick Drow, Los Angeles, Calif., assignor to Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., a corporation of Delaware

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This invention relates to control valves and, more particularly, to thermostatically operated control valves that respond to the presence or absence of a flame. It may be considered as an improvement over the design of a thermostatically controlled gas valve illustrated in Jenkins Patent No. 2,322,521.

Prior art devices of the type to which the present invention relates have not been entirely satisfactory from the standpoint of durability and from the standpoint of operability. They have failed to hold up for any appreciable length of time, partly due to the high temperatures to which they have been subjected and partly due to their normal wearing resulting from friction between the elements comprising the device. This wearing has led to non-uniform, inaccurate and unreliable operations. This is particularly true in the latch type of safety control means wherein the control means is latched in its open or operating position by means of a thermostatically operated latch means. The rubbing of the latch means on the cooperating means on the control at the elevated temperatures has resulted in the deforming of the cooperating elements to the extent that their adjustment is not maintained for a satisfactory length of time.

It is therefore a primary object of this invention to provide a control device that will overcome the above-mentioned difficulties with prior art devices of a similar type.

Another object of the invention is to provide a control device wherein temperature responsive guide means is provided to cooperate with a temperature responsive latch means to hold a control element of the device in its operating position.

Another object of the invention is to provide a combined guide and latch mechanism that is temperature responsive and adapted to assure proper operation of the latch portion thereof in its association with a control means.

A still further object of the invention is to provide a latching mechanism formed of a single sheet of bimetal into a configuration wherein a guide portion thereof cooperates with a latch portion thereof to perform a holding function.

Still another object of the invention is to provide a latch type of safety valve wherein temperature responsive means is provided for guiding and for urging the valve actuating means toward and away from engagement with the latching mechanism.

Still further objects of the invention will become apparent upon reading the following detailed description of the invention in conjunction with the accompanying drawing wherein:

Figure 1 is an elevational view of the control valve with portions thereof in cross section and other portions thereof broken away.

Figure 2 is a plan view of the combined latch and guide temperature sensing element in its blank form; and

Figure 3 is a cross sectional view of the temperature sensing unit of the control device, taken along 3—3 of Figure 1.

Referring now to the drawing, the valve body is gen-

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erally designated by the reference numeral 10. It comprises an inlet 11 that is externally threaded to receive a nut 12 of conventional coupling sleeve 13. An outlet 14 of the valve body is internally threaded to receive a threaded end of an outlet pipe 14a. A passage 15 extends transversely of the axis of said inlet and outlet through a partition wall 16 between said inlet and outlet. A valve seat 17, at the inlet end of said passage 15, is adapted to be closed by a disc valve 18 under the bias of a spring 19.

Extending through an aperture 20 in a closure plug 21, is a manually operable reset stem 22 connected to the disc valve 18. The outer end of the plunger 22 has a manually operable knob 23 secured thereto by means of a bolt 24. A cap 25, which encircles the plunger 22 and knob 23, protects them against damaging blows by being screw threaded onto an externally threaded projection 26 on the plug 21.

Connected at its inner end to the disc valve 18 and extending through the valve passage 15 and an opening in the upper side of the valve body for a substantial distance from said body, is a rod 27. The rod is surrounded by and spaced from a sleeve 28 that is threaded into the valve body 10 at its inner end and into a bottom end portion 29 of a cylinder 30 at its outer end. The sleeve 28, end portion 29 and cup-shaped cylinder portion 30, being screw threaded together, with the inner end of the sleeve 28 threaded into the valve body 10, forms a gas tight enclosure for the stem 27, which loosely extends there-through from the valve disc 18.

The upper end of the member 29 has an annular groove 31 therein that receives a coiled bimetal strip 32 having upwardly extending arms 33 and 34. The upper end of the arm 33 has a bore therethrough of larger diameter than the diameter of the stem 27 and is transversely bent so that the stem 27 passes through said bore 35. The upper end of the arm 34 is likewise bent transversely toward the stem 27 on the opposite side thereof from the arm 33. The bimetal strip 32 is retained in the groove 31 by staking or bending the upper portion of the member 29 over the upper edge of the strip 32.

A burner tube 36 has its inner end screw threaded into the body portion 10 and gas is conducted thereto through passages (not shown) from the upstream side of the partition 16 or from a separate connection to the supply line. The upper end of the burner tube 36 has a burner orifice 37, that is adapted to direct a flame onto the cylinder 30, and an orifice 38, that is adapted to direct a flame over a main burner (not shown) for igniting the gas delivered to said main burner when the valve 18 is off of seat 17.

Operation

The elements of the safety valve are in the positions that they assume when the valve is in operation. That is, the valve 18 is in its open position, the laterally extending portion of the arm 34 is in latching position over the end of the stem 27 and the aperture 35 is engaging the stem 27 so as to urge said stem toward the arm 34. It is thus seen that as long as there is a sufficient flame present at orifice 37 for igniting the main burner, the valve 18 will be retained in its open position. However, should the flame at the orifice 37 become extinguished, the cylinder 30 will cool off causing the bimetal arms 33 and 34 in turn to cool and move away from stem 27. By the opposite side of the aperture 35 bearing against the stem 27, due to the outward movement of the arm 33, it will be assured that the laterally extending latching end of the arm 34 will clear the stem 27, to release the valve, instead of having said stem 27 tend to deflect laterally along with the arm 34. In this way, it is possible to avoid the use of closely fitting guide means for holding the stem 27 coaxial with

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respect to the sleeve 28. Likewise, with the arms 33 and 34 in their heated condition, the arm 33 will prevent the stem 27 from slipping out from under the arm 34, and, particularly, when said outer end and arm have become rounded through wear.

Obviously, to place the valve 18 into operating or open position following a closure thereof, it is necessary to remove the cap 25 and pull outwardly upon the knob 23 to open the valve 18 against the bias of spring 19. Then, if a flame is present at 37, the arm 34 will move into latching position across the end of the stem 27.

As other embodiments of this invention may be made without departing from the spirit thereof, it is to be understood that the scope of the invention is to be determined solely from the appended claims.

I claim as my invention:

1. A safety device comprising a housing, a control member normally biased to an inoperating position, manually operable means extending through a wall of said housing and into engagement with said control member for moving said control member to an operating position, abutment means extending outwardly from said housing and engaging said control member for movement therewith between operating and inoperating positions of said control member and being free to move laterally a slight distance, and a bimetal temperature responsive latch means having a guide portion and a latch portion, said latch portion being operable at a first temperature to be out of engagement with said abutment means, to permit said control member to move to its inoperating position and at a second temperature to be in engagement with said abutment means to hold said control member in its operating position, said guide means being operable to urge said abutment means towards and away from said latch portion at said second and first temperatures, respectively.

2. A safety device comprising a body, a control member normally biased to an inoperating position, manually operable means extending through a wall of said body and into engagement with said control member for moving said control member to an operating position, abutment means extending outwardly from said body and engaging said control member for movement therewith between said operating and inoperating positions and being free to move laterally a slight distance, and temperature responsive latch means having a guide portion and a latch portion, said latch portion being operable at a first temperature to be out of engagement with said abutment means to permit said control member to move to said inoperating position and at a second temperature to be in engagement with said abutment means to hold said control member in its operating position, said guide means having an aperture therein through which said abutment means extends and being operable to urge said abutment means towards and away from said latch portion at said second and first temperatures, respectively.

3. In a safety device, the combination comprising a body, a control member normally biased to an inoperating position, manually operable means extending through a wall of said body and into engagement with said control member for moving said control member to operating position, abutment means extending outwardly from said body and engaging said control member for movement therewith between operating and inoperating positions and being free to move laterally a slight distance, and condition responsive means having a guide portion and a holding portion, said holding portion being operable at a first condition to be out of engagement with said abutment means to permit said control member to move to said inoperating position and at a second condition to be in engagement with said abutment means to hold said control member in its open position, said guide means having an aperture therein through which said abutment means extends and being operable to urge said abutment

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means towards and away from said holding portion at said second and first conditions, respectively.

4. A safety control comprising a body, a control member normally biased to an inoperating position, means extending through a wall of said body and into engagement with said control member for moving said control to an operating position, abutment means extending outwardly from said body and engaging said control member for movement therewith between said operating and inoperating positions and being free to move laterally a slight distance, and condition responsive means having a guide portion and a holding portion, said holding portion being operable at a first condition to be out of engagement with said abutment means to permit said control member to move to said inoperating position and at a second condition to be in engagement with said abutment means to hold said control member in its open position, said guide means being operable to urge said abutment means towards and away from said holding portion at said second and first conditions, respectively.

5. In a control device, the combination comprising a control means, an actuating member for said control means for moving it between first and second positions and having slight lateral movement, and bimetallic temperature responsive means for holding said member and control means in said second position when a predetermined temperature exists and for releasing said member and control means for movement to said first position when a different temperature exists, said temperature responsive means having a latch portion for engaging and holding said member only when said predetermined temperature exists and a guide portion located adjacent said member for biasing said member toward said latch portion when said predetermined temperature exists and away from said latch portion when said predetermined temperature does not exist.

6. In a control device, the combination comprising control means, an actuating member for said control means for moving it between first and second positions and having slight lateral movement, said control means being biased toward said first position, and condition responsive means for holding said member and control means in said second position when a predetermined condition exists and for releasing said member and control means for movement to said first position when said condition does not exist, said condition responsive means having a holding portion for engaging and holding said member only when said condition exists and a guide portion for biasing said member toward said holding portion when said condition exists and away from said holding portion when said condition does not exist.

7. A control device comprising control means, an actuating member for said control means for moving it between first and second positions and having slight lateral movement, means for biasing said control means toward said first position, and condition responsive means located adjacent said member and movable into engagement therewith for holding said member and control means in said second position when a predetermined condition exists and for releasing said member and control means for movement to said first position when said condition does not exist, said condition responsive means having a guide portion for biasing said member toward said condition responsive means when said condition exists and away from said condition responsive means when said condition does not exist.

8. A control device comprising control means, an elongated actuating member for said control means for moving it between first and second positions along the longitudinal axis of said actuating member, said member being free to move laterally a slight distance and condition responsive means for holding said member and control means in said second position when a predetermined condition exists and for releasing said member and control means for movement to said first position when said

condition does not exist, said condition responsive means having a holding portion movable laterally of said actuating member for engaging and holding said member only when said condition exists and a guide portion movable laterally of said actuating member for biasing said member toward said holding portion when said condition exists and away from said holding portion when said condition does not exist.

References Cited in the file of this patent

UNITED STATES PATENTS

2,322,521	Jenkins	June 22, 1943
2,524,667	Jenkins et al.	Oct. 3, 1950