Feb. 16, 1926. 1,572,969

O. SCHWIMMER

THERMOSTAT CONTROL

Filed April 23, 1924

Fig. 1

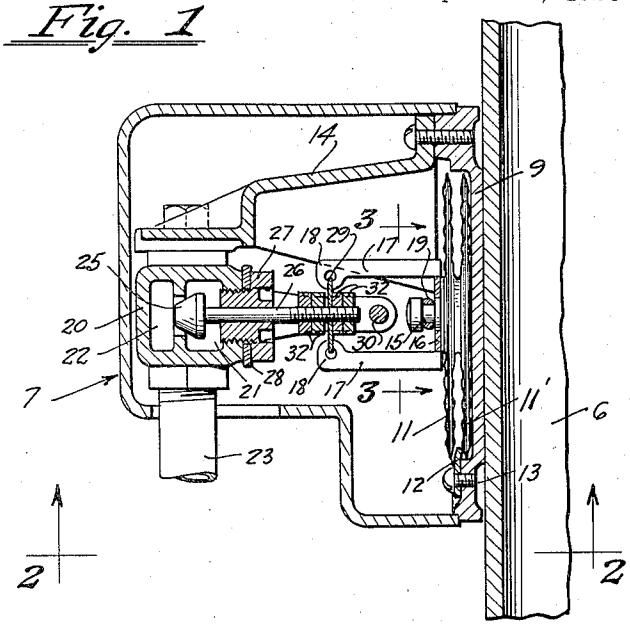


Fig. 3

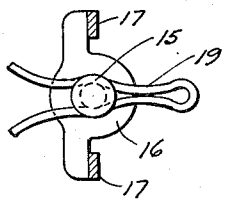


Fig. 2

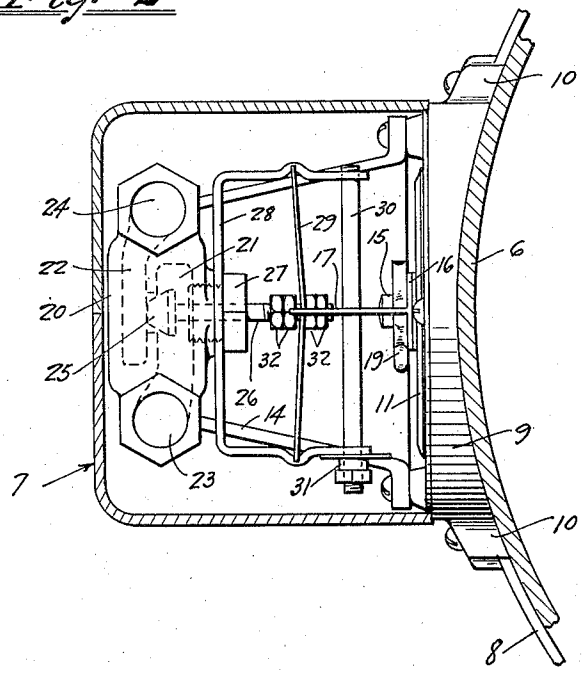
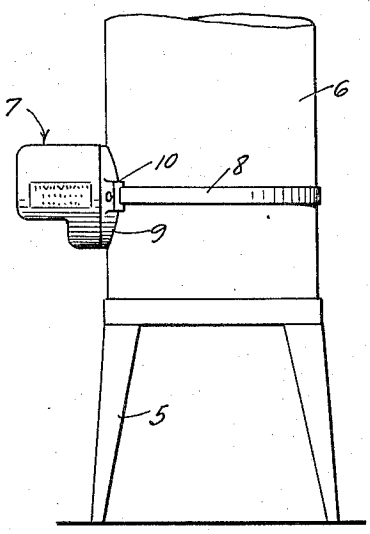


Fig. 4



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UNITED STATES PATENT OFFICE.

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THERMOSTAT CONTROL.

Application filed April 23, 1924. Serial No. 708,420.

To all whom it may concern:

Be it known that I, OSCAR SCHWIMMER, a citizen of the United States, and resident of Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in a Thermostat Control, of which the following is a specification.

This invention relates to an automatic fuel regulating apparatus, wherein a thermostatically expansible member imparts through suitable instrumentalities movement to a fuel control valve. The device shown herein is capable of being used for other purposes, but a description thereof with relation to regulating the temperature of water in a water heater will be sufficient to indicate the principle of operation.

The objects of this invention are first, to provide the combination of a thermostat and heat control member positively connected without the intervention of multiplying levers and like mechanism and having no neutral points or dead centers; second, to provide a simple, cheap, efficient, self-contained regulating unit, as an article of manufacture which can be readily clamped to the shell of a water tank without disturbance of the piping, mutilation or alteration of the parts.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical sectional view of the fuel control applied to a water tank, a fragment of the latter being shown in section; Fig. 2 is a view looking in the direction of the arrows 2—2 of Fig. 1; Fig. 3 is a section as seen on the line 3—3 of Fig. 1; and Fig. 4 is a side elevation showing my device applied to a water tank, a fragment of the tank being shown.

Referring more particularly to the drawing, and more especially to Fig. 4, a stand for a water tank is indicated by 5. Disposed on said stand is a tank 6, to which the automatic control unit 7 is clamped by means of a strap 8. It is obvious that the tank may be covered with heat insulating lagging, if so desired.

The control unit comprises a base casting 9 provided with a curved rear face having a radius of curvature the same as that of the tank to which it is to be attached and against which it should snugly rest. At the sides of the base are ears 10 to which the flexible strap 8 may be attached and passed around the tank to clamp the base thereto in intimate contact therewith. The front face of the base is recessed for the reception of the thermostatically expansible chamber which is composed of two "wafers" or "disks" 11 and 11'. The disks are composed of two sheets of corrugated metal joined at their edges, and provides between them a liquid chamber to contain a volatile liquid. The chamber may be held in position by clips 12 extending between the wafers and secured to the base by screws 13. Secured to the base 9 is a frame 14.

Extending from the center of the diaphragm is a button 15. Mounted over the button is a yoke comprising a disk like portion 16 having arms 17 extending forwardly and provided with claws 18 to receive a spring later described. The opening in disk 16 is large enough so that it may be slipped over the head of button 15 and is held in position by a cotter pin 19 which embraces the shank of the button, as best shown in Fig. 3. There is a slight amount of play or clearance between the cotter pin, the button and disk.

Secured to the frame 14 is a fuel valve casing 20. This casing is divided by a wall into two chambers 21 and 22 forming respectively inlet and outlet chambers. Chamber 21 communicates with an inlet 23, and chamber 22 with an outlet 24. A port is provided in the wall for communication between chamber 21 and 22. This port is controlled by a valve 25 having a stem 26 extending through the bore of a nut 27 mounted in the casing.

A yoke 28 is clamped between the casing and nut 27. The yoke arms are formed with oppositely disposed indentations to receive a bowed leaf spring 29. The arms of the yoke are connected by means of a tie bar 30 threaded at one end to receive nuts 31 whereby the arms of the yoke may be adjusted to and from each other and the tension of the bowed spring may be adjusted. The valve stem 26 extends through an opening in the spring 29 and nuts 32 are mounted upon opposite sides of the spring 29 so that movement of the spring will cause movement of the valve to and from its seat. The fingers of claws 18 engage the spring 29 so that motion is transmitted from the expansible chamber to the leaf spring.

The structure may be suitably housed in a casing 33 so that it may be sealed to prevent tampering with after proper adjustment. The control is clamped upon the boiler in the manner shown in Fig. 4, heat being transmitted through the base to the expansible chamber. Assume that the tank becomes cold. The expansible chamber will contract, the button head 15 pressing against the cotter pin 19 and transmitting the pressure to the disk 16. This causes a pull upon the arms and the outer fingers of the claws 18 engage the spring 29. With contraction of the expansible chamber the spring is pulled toward its center, whereupon its own tension will cause it to snap over center to the position shown in Fig. 2. Enough resiliency is provided by the walls of the wafers to permit the spring to complete its snap-over movement. Slight clearance at th cotter pin and claws aid. As the spring snaps over, it raises the valve 25 from its seat, and permits fuel to pass from the intake to the outlet, and the outlet in this instance may be connected to a burner for heating the water supplied to the tank. As the temperature in the tank rises, the expansible chamber expands and the reverse action occurs, thereby closing valve 25. Adjustment of the temperature at which the device operates may be made by adjusting the tension upon tie bar 30. This increases or decreases the tension on the spring and bows the latter more or less necessitating more or less pressure from the expansible chamber in order to move the spring. Further adjustment of the valve action may be made by adjusting the position of nuts 32.

What I claim is:

1. An automatic control comprising a frame, a thermally expansible member secured thereto, a yoke mounted on said frame having arms, an adjustable tie member connecting said arms, a leaf spring interposed between said arms so as to confine said spring in bowed position whereby it may be snapped over center in either direction, motion transmitting means connecting said expansible member and said spring whereby said spring is moved over center in either direction by said member after given points in the expansion and contraction of the latter have been reached, and means to connect said spring to a device to be operated thereby.

2. An automatic control as specified in claim 1 characterized by said motion transmitting means comprising an arm secured to the thermally expansible member and having a claw gripping said spring.

3. An automatic control comprising a frame, a thermally expansible member secured thereto, a yoke mounted on said frame having spring arms extending parallel to one another, said arms being indented at opposite points, an adjustable tie member connecting said arms, a leaf spring interposed between said arms and resting in the indentations so as to confine said spring in bowed position whereby it may be snapped over center in either direction, motion transmitting means connecting said expansible member and said spring, whereby said spring is moved over center in either direction by said member after given points in the expansion and contraction of the latter have been reached, and means to connect said spring to a device to be operated thereby.

4. An automatic control as specified in claim 3 characterized by said motion transmitting means comprising an arm having claws gripping said spring.

5. An automatic control unit comprising a frame, a thermally expansible member secured to the base thereof, a valve structure having a reciprocable valve secured to said frame opposite said member, a yoke secured to said valve structure, a valve stem for said valve structure extending between the arms of said yoke, an adjustable tie member connecting said arms, a leaf spring interposed between said arms so as to confine said spring in bowed position whereby it may be snapped over center in either direction, motion transmitting means connecting said member and said spring whereby said spring is moved over center in either direction from said member after given points in the expansion and contraction of the latter have been reached, and means connecting said valve stem to said spring whereby to operate said valve.

6. An automatic control as specified in claim 5 characterized by said motion transmitting means comprising an arm having claws gripping said spring.

7. An automatic control unit comprising a frame having a heat conducting base with a curved rear wall adapted to rest intimately against a cylindrical tank, a thermally expansible member mounted in said base, a yoke mounted on said frame having arms, an adjustable tie member connecting said arms, a leaf spring interposed between said arms so as to confine said spring in bowed position whereby it may be snapped over center in either direction, motion transmitting means connecting said member and said spring whereby said spring is moved over center in either direction from said member after given points in the expansion and contraction of the latter have been reached, and means to connect said spring to a device to be operated thereby.

8. An automatic control means as specified in claim 7 characterized by said motion transmitting means comprising an arm having claws gripping said spring.

9. An automatic control unit comprising a frame having a heat conducting base with

a curved rear wall adapted to rest intimately against a cylindrical tank, a thermally expansible member mounted in said base, a valve structure secured to said frame opposite said thermally expansible member, said valve structure including a reciprocable valve, a yoke secured to the casing of said valve structure and having arms, an adjustable tie member connecting said arms, a leaf spring interposed between said arms so as to confine said spring in bowed position whereby it may snap over center in either direction, motion transmitting means connecting said member and said spring whereby said spring is moved over center in either direction from said member after given points in the expansion and contraction of the latter have been reached, a valve stem for said valve structure extending between said arms and connected to said spring to be operated thereby.

10. An automatic control unit as specified in claim 9 characterized by said motion transmitting means comprising an arm secured to the thermally expansible member and having claws gripping said spring.

In witness that I claim the foregoing I have hereunto subscribed my name this 9th day of April, 1924.

OSCAR SCHWIMMER.