June 28, 1927.

1,633,908

L. W. SCHNEPP

THERMOSTATIC VALVE

Filed May 28, 1925

Fig. 1.

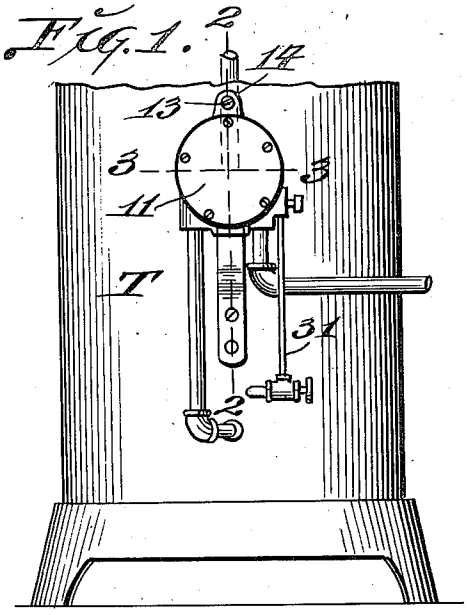


Fig. 2.

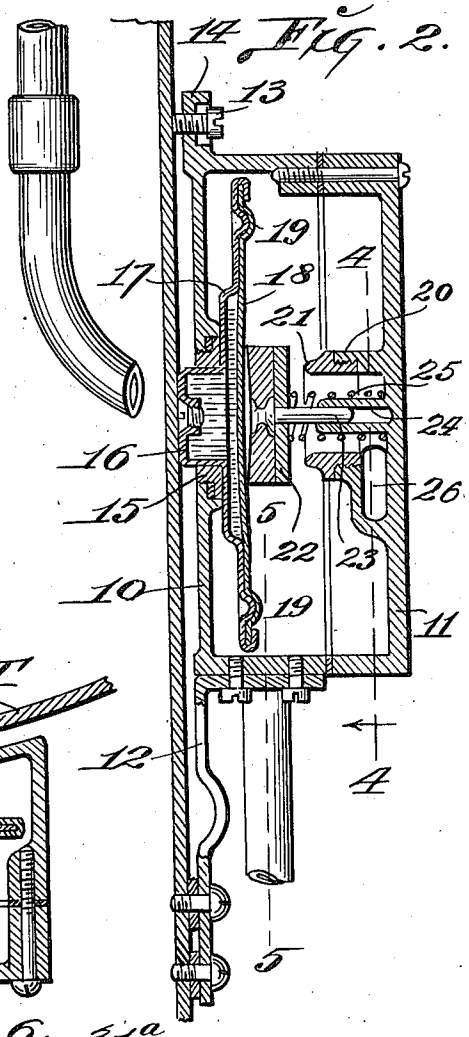


Fig. 3

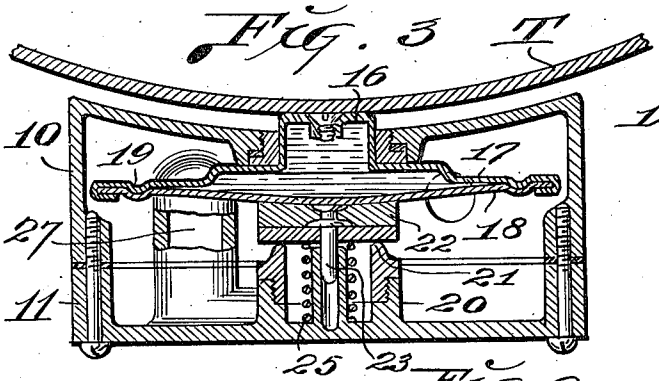


Fig. 6.

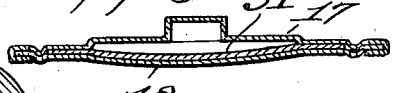


Fig. 4.

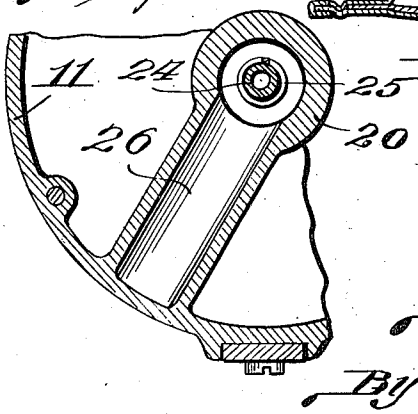
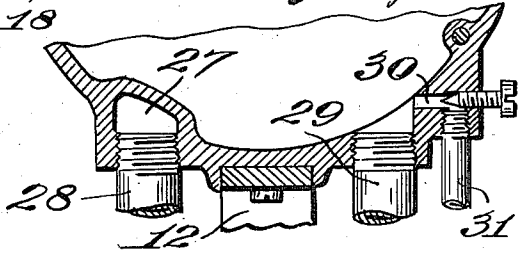


Fig. 5.



INVENTOR,
LOUIS W. SCHNEPP.
By Martin P. Smith ATTY

Patented June 28, 1927. 1,633,908

UNITED STATES PATENT OFFICE.

LOUIS W. SCHNEPP, OF HUNTINGTON BEACH, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO FIRST NATIONAL BANK OF ANAHEIM, TRUSTEE FOR SNAP-O-STAT COMPANY, A COPARTNERSHIP, OF ANAHEIM, CALIFORNIA.

THERMOSTATIC VALVE.

Application filed May 28, 1925. Serial No. 33,409.

My invention relates to a thermostatic valve that is particularly designed for automatically controlling the flow of gaseous fuel to the burner of a water heater, or like similar appliance, and the invention herein set forth is an improvement of the thermostatic valve that forms the subject matter of my co-pending application for patent, filed February 19, 1925, Serial No. 10,230.

The principal objects of my invention are, to generally improve upon and simplify the construction of the thermostatic valve disclosed in my aforesaid application, as well as other similar types of valves, to provide a thermostatic valve that is quick acting in controlling the port or duct through which the gas passes to the burner, to provide simple and efficient means whereby the entire valve structure is adjustably supported on the water tank of a heater or the like, and further, to provide a thermostatic valve that is relatively simple in construction, capable of being easily and cheaply produced and which is positive and efficacious in operation.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which:

Fig. 1 is an elevational view of the lower portion of a water heater and showing a thermostatic valve of my improved construction applied thereto.

Fig. 2 is an enlarged vertical section taken approximately on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged horizontal section taken on the line 3—3 of Fig. 1.

Fig. 4 is a detail section taken on the line 4—4 of Fig. 2.

Fig. 5 is a detail section taken on the line 5—5 of Fig. 2.

Fig. 6 is a sectional view of a modified form of the expansible diaphragm.

Referring by numerals to the accompanying drawings, which illustrate a practical embodiment of my invention, 10 designates a shallow cup shaped member that constitutes the valve housing and detachably secured to the front of said housing is a plate 11.

Secured to the lower portion of housing member 10 is the upper end of a resilient arm 12, and when the valve is associated with a water heater and its burner, as illustrated in Fig. 1, the lower portion of arm 12 is secured to the lower portion of the tank T, so that said housing occupies a position immediately adjacent to the wall of the water chamber within the tank.

To adjust the valve housing away from the tank and retain it in such adjusted position, a screw 13 passes through a lug 14 at the top of housing 10 and the point of said screw bears directly on the wall of the tank.

Formed in the central portion of the rear wall of housing 10 is an opening in which is fitted a bushing 15 and carried thereby and projecting rearwardly therefrom is a small cup shaped member 16, that is pressed from the central portion of a disc 17 of sheet metal such as copper and which latter forms the rear wall of the diaphragm.

The front wall 18 of the diaphragm is formed of thin resilient sheet metal such as German silver and the edges of the diaphragm walls 17 and 18 are secured to each other in any suitable manner. Formed in the outer portions of the walls 17 and 18 are corresponding annular ribs 19. The chamber within this diaphragm is filled with a readily expansible fluid, preferably ether.

Projecting rearwardly from the central portion of cap 11 is an annular flange 20, the inner edge of which constitutes a valve seat 21 and adapted to rest upon said seat is a disc valve 22 that is adapted to be engaged by the central portion of diaphragm wall 18. Valve 22 is provided with a centrally arranged stem 23 that is arranged for sliding movement in a tubular member 24 that is formed on cap 11 within the flange 20 and arranged between said cap 11 and the valve 22 is an expansive coil spring 25 that normally retains said valve against the diaphragm wall 18.

A duct 26 leads form the chamber within flange 20 downwardly inside cap 11 to a point near the lower portion thereof and connected to the lower end of said duct is one end of a short horizontally disposed duct 27, that is formed in the lower portion of housing member 10. Connected to housing member 10 and leading from this duct 27 downwardly and thence inwardly through the wall of tank T to the burner within said tank is a pipe 28.

Leading to the lower portion of the hous-

ing formed by members 10 and 11 is a gaseous fuel supply pipe 29 and leading from a valve outlet 30 that is formed in the lower portion of said housing is a pilot light supply pipe 31.

In order to cause my improved thermostatic valve to be especially responsive to temperature changes and to act quickly, the discharge end of the cold water supply pipe that leads downwardly in the tank T is arranged so that the incoming cold water is discharged directly against the tank wall at a point directly opposite the cup shaped member 16 that projects rearwardly from the expansible diaphragm (see Fig. 2).

When the thermostatic diaphragm is contracted, as illustrated in Fig. 2, spring 25 forces valve 22 away from seat 21, into engagement with the central portion of disc 18 and with the valve thus unseated gaseous fuel passes freely from supply pipe 29 into the interior of housing comprising parts 10 and 11 and said gaseous fuel passes through the annular member 20, duct 26, duct 27 and pipe 28 to the burner that is located in the lower portion of tank T. When the temperature of the water heated in the tank by the burner reaches a predetermined degree, the expansible fluid within the diaphragm will expand, thereby forcing the dished wall 18 outwardly with a quick snapping action, with the result that valve 22 is seated and the further flow of gaseous fuel through the device to the burner is cut off.

Obviously when the temperature in the tank lowers to such a degree as to cause the fluid within the diaphragm to contract and the wall 18 of said diaphragm returns to its normal position, valve 22 will follow the diaphragm wall 18 under the influence of spring 25, thereby permitting gas to again flow to the burner where it will be ignited by the flame at the end of pilot light tube 31.

In order to cause the diaphragm to act quickly or practically instantaneous, so as to permit valve 22 to leave its seat, the cup shaped member 16 of diaphragm wall 17 is extended outward from the housing so that it normally contacts with the tank wall and the cold water discharging from supply pipe into the tank is directed on to the surface of the tank wall immediately adjacent to said member 16, with the result that the temperature of the expansible fluid will be very quickly lowered and consequently permitting the diaphragm to contract so that valve 22 that controls the inflow of gas may leave its seat.

Thus as a result of my improved construction of thermostatic valve, the gaseous fuel flow control valve is caused to open and close practically instantaneously and which action is very much desired in water heaters particularly of the household variety.

In the modified form of diaphragm illustrated in Fig. 6 a disk or disks 31^a that are highly sensitive to temperature changes are arranged between the disks 17 and 18, such disk or disks 31^a taking the place of the fluid within the diaphragm.

In producing my improved thermostatic valve I have endeavored to produce a thermostat that will act practically instantaneously after the manner of the bottom of an oil can which as will be readily understood snaps from one position to another when pressure is applied to the central portion thereof. This quick action is highly desirable in thermostatic valves that are utilized for certain purposes, for instance in a household water heater as herein shown and described.

The use of my improved thermostatic valve provides for a continuous supply of hot water and the valve may be readily associated with any of the well known makes of water heaters now on the market. The valve is not affected by changes in gas or water pressure and is particularly effective due to the fact that the cold water entering the tank to replace the hot water that is drawn off discharges directly against the point where the extension member 16 of the diaphragm makes contact with the tank.

Thus it will be seen that I have provided a quick acting thermostatic valve that is relatively simple in structure, capable of being easily and cheaply produced, readily adjusted to suit different conditions and which is very effective in performing its intended functions.

It will be understood that minor changes in the size, form and construction of the various parts of my improved thermostatic valve may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a thermostatic valve, a housing having a port, an expansible fluid containing diaphragm arranged within said housing, said diaphragm comprising a pair of disks, one of which is normally dished against the other, a valve adapted to be engaged by said diaphragm when the same is expanded and moved into position to close said port, a bushing in the rear wall of the housing and a hollow cup-shaped member projecting from one of the walls of the diaphragm through said bushing so as to make direct contact with the tank to which the valve is applied.

2. In a thermostatic valve, a housing having a port, an expansible fluid containing diaphragm arranged within said housing, said diaphragm comprising a pair of disks, one of which is normally dished against the other, a valve adapted to be engaged by said diaphragm when the same is expanded and

moved into position to close said port, a bushing seated in the rear wall of the housing, a hollow cup-shaped member projecting from one of the walls of the diaphragm through said bushing, the outer portion of which cup-shaped member is exposed for direct contact with the tank to which the valve is applied and a spring associated with said valve for unseating same.

3. The combination with a water heating tank and its water supply pipe, of a valve housing provided with an opening, said housing being mounted on the tank so that the opening in said housing is disposed adjacent to the discharge end of said water supply pipe, an expansive diaphragm comprising a pair of resilient disks, one of which is normally dished against the other and a spring held valve within said housing, which valve is forced onto its seat by said diaphragm when the latter is expanded.

4. The combination with a water heating tank and its water supply pipe, of a thermostatic valve mounted on said tank, an expansive diaphragm forming a part of said thermostatic valve and positioned so as to be directly affected by the temperature of the water that discharges from said water supply pipe and which diaphragm comprises a pair of resilient disks, one of which is normally dished against the other and the other disk having a centrally arranged outwardly projecting portion.

5. The combination with a water heating tank of a thermostatic valve housing adjustably mounted on said tank, said housing having an opening, an expansible diaphragm arranged within said housing for actuating the valve therein, which diaphragm comprises a pair of resilient disks, one of which is normally dished against the other and the other one of which disks is provided with a portion that projects through the opening in the housing and occupies a position immediately adjacent to the wall of the tank to which the housing is applied.

In testimony whereof I affix my signature.

LOUIS W. SCHNEPP.