April 10, 1928. 1,665,719

L. W. SCHNEPP

THERMOSTAT

Filed April 11, 1927

Fig. 1.

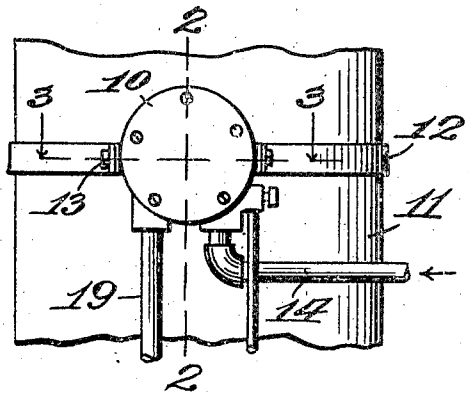


Fig. 2.

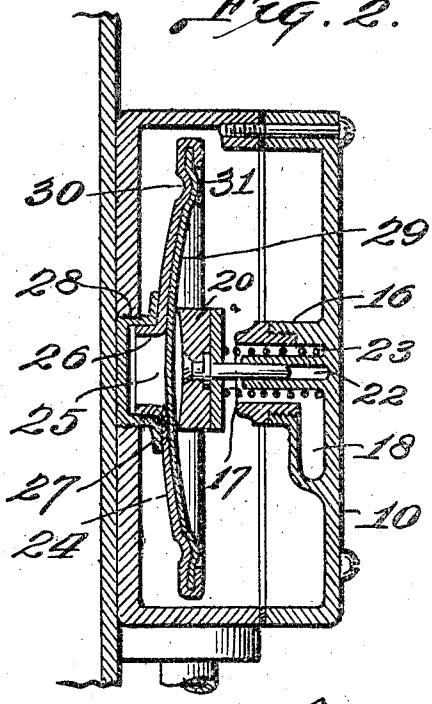
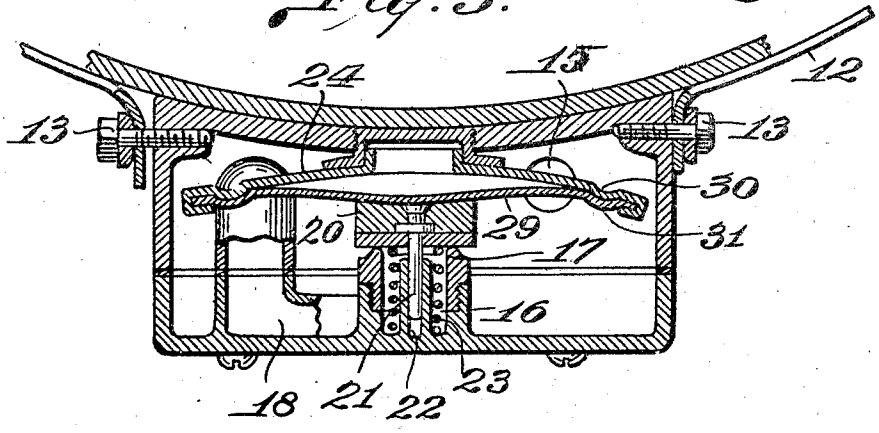


Fig. 3.



INVENTOR:—
Louis W. Schnepp
By Martin & Spaith Atty.

Patented Apr. 10, 1928. 1,665,719

UNITED STATES PATENT OFFICE.

LOUIS W. SCHNEPP, OF SAN BERNARDINO, CALIFORNIA.

THERMOSTAT.

Application filed April 11, 1927. Serial No. 182,775.

My invention relates to a thermostat that is especially designed for use in valves for automatically controlling the passage of fluids therethrough and the principal objects of my invention are to generally improve upon and simplify the construction of the existing forms of thermostats; to provide a device of the character referred to that depends wholly on the flexing movement of one of its members for imparting movement to a valve, or other element that is to be actuated; to provide a thermostat that does not utilize an expansible liquid or gas; and to provide a thermostat that is relatively simple in construction, inexpensive of manufacture and extremely sensitive to temperature changes.

An further object of my invention is to provide a thermostat that is composed of two disks of metal, one of which is formed of metal that is not appreciably acted upon by temperature changes and which is therefore practically rigid and will retain its original shape, and the other disk being formed of a relatively thin piece of metal that is highly sensitive to temperature changes and the edges of the two disks being firmly secured to each other so that under temperature changes the relatively thin flexible disk can only move outwardly away from the rigid disk or the one which is not susceptible to temperature changes.

A thermostatic disk of my improved construction is, by reason of its ability to move or snap quickly from one position to another, especially applicable for use in controlling the flow of gas or liquid hydrocarbon to an automatic heater or burner, and for automatically controlling the flow of air, water and steam in heating systems and the like.

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

Fig. 1 is an elevational view of a gas valve that is equipped with a thermostat of my improved construction and which valve is shown in position on a household water heater.

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

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

Referring by numerals to the accompanying drawings, 10 designates a valve housing that is adapted to be positioned on the tank 11 of a household water heater and said housing being secured to said tank by means of a flexible metal strap 12 that encircles the tank and the ends of which strap are connected to the sides of the valve housing in any suitable manner, preferably by means of screws or bolts 13.

A gas supply pipe 14 leads to an inlet port 15 in the lower portion of the housing 10 and arranged on the inner face of the front wall of the housing is a short tubular member 16 that is provided at its open end with an annular valve seat 17. Leading from the chamber within this tubular member 16 downwardly through the housing 10, is a duct 18 and leading from the lower end of said duct to the gas burner that is arranged in the lower portion of tank 11, is a pipe 19.

A disk valve 20 is adapted to rest on seat 17 and projecting axially from said disk valve is a stem 21 that is arranged for sliding movement in a recess 22 that is formed in the center of tubular member 16. Interposed between the front wall of the valve housing and the rear side of valve 20, is a relatively light coil spring 23 that normally holds valve 20 away from its seat 17.

My improved thermostat comprises a dished or concavo-convex disk 24 that is preferably formed of steel or similar metal that is not affected by temperature changes within a normal range and formed at the center of this disk, is a circular opening 25 that is surrounded by a short flange 26 that projects outwardly from the convex side of said disk.

Secured in any suitable manner to the flange 26 and enclosing the same is a metal cap 27, the external face of the cylindrical portion of which is threaded in order that it may be screw-seated in a threaded aperture 28 that is formed in the rear wall of the valve housing 10, and which rear wall, it will be understood, makes direct contact with the wall of tank 11. When cap 27 is properly seated in the rear wall of the housing, the outer face of said cap lies flush with

the outer face of said rear wall and thus when the valve housing is applied to the tank, the outer wall of the cap is in direct contact with the wall of said tank.

The resilient member of my improved thermostat comprises a disk 29 of metal that is highly responsive to temperature changes, for instance, copper or an alloy in which copper predominates, and the edge of this resilient disk is firmly secured in any suitable manner to the edge of the rigid disk 24. I prefer to secure the edges of the two disks to each other by bending the edge of the rigid disk 24 over the edge of the resilient disk 29 and, in order to reinforce the rigid disk adjacent to its edge, there is formed in said disk adjacent to its turned-over edge, a concentric rib or bead 30 that projects outwardly from the concave surface of said disk.

The resilient disk 29 is constructed so that, under normal conditions, it occupies a dished position with its inner face bearing directly against the inner face of the rigid disk 24 and thus the entire inner surfaces of the two disks are normally in contact with each other. A rib or bead 31 is formed adjacent to the edge of the resilient disk 29 and which rib or bead actuates the rib or bead 30 on the rigid disk 24.

Under normal conditions, the resilient disk 29 lies directly against the concavo-convex rigid disk 24 and the disk valve 20 bears against the central portion of said resilient disk, which valve is forced into contact with said disk by spring 23. As long as the valve 20 is held away from its seat, gas or the like may flow from supply pipe 14 through port 15 to the interior of the housing and said gas passes through tubular member 16 and thence through duct 18 to pipe 19 that leads to the burner. The operation of the burner that is supplied by pipe 19 heats the water within tank 11 and as the cap 27 is in direct contact with the wall of the tank, said cap and the thermostat comprising the disks 24 and 29 will absorb heat from said tank and when a predetermined temperature has been reached, the resilient disk 29 will flex outwardly with a quick snapping action and, as a result, valve 20 will be instantly moved onto its seat, thereby cutting off the further flow of gas through housing 10.

Upon a lowering of the temperature, the resilient disk 29 will return to its normal dished position against the rigid disk 24, whereupon spring 23 will act to unseat valve 20 and consequently permit gas to flow through the housing to the burner of the tank.

A thermostat of my improved construction is comparatively simple, may be easily and cheaply produced, does not require a fluid that is highly sensitive to temperature changes, and is very accurate and sensitive in operation, due to the fact that one of the disks is at all times and under all conditions practically rigid and the resilient disk which normally occupies a dished position against the rigid disk can only flex or move in one direction under rising temperatures and which movement is necessarily in an outward direction away from the rigid disk and the edge of which latter firmly supports the edge of the resilient disk.

An especially advantageous feature of my improved thermostat is the quick snapping action of the resilient disk as it moves from one position to the other, such quick action being especially desirable in order to bring about a quick opening or closing of a valve or like fluid control member. Obviously the thermostat may be utilized for opening and closing an electric circuit and, likewise, it may be advantageously employed in controlling the supply of steam and heated air or water in heating systems.

It will be understood that minor changes in the size, form and construction of the various parts of my improved thermostat 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. A thermostat comprising a dished rigid disk, a disk of resilient metal having its edge firmly secured to the edge of the rigid disk, which resilient disk is normally dished against said rgid disk and a hollow member projecting outwardly from the central portion of the rigid disk on the convex surface thereof.

2. In a thermostat, a rigid dished metal disk, a resilient disk of metal that is highly responsive to temperature changes, which resilient disk is normally dished against the rigid disk, the edges of the two disks being rigidly connected and a hollow member projecting outwardly from the central portion of the rigid disk on the convex surface thereof.

3. In a thermostat, a rigid dished metal disk, a resilient disk of metal that is highly responsive to temperature changes, which resilient disk is normally dished against the rigid disk, the edges of the two disks being rigidly connected, a hollow member projecting outwardly from the central portion of the rigid disk on the convex surface thereof and which hollow member includes an externally threaded circular wall.

4. In a thermostat, the combination with a gas valve housing provided in its rear wall with a threaded aperture, of a thermostat arranged within said housing and comprising a pair of dished disks, one of which is rigid and the other being formed of resilient metal that is highly sensitive to temperature changes and an externally threaded hollow

member projecting outwardly from the convex surface of the rigid disk, which hollow member is screw-seated in the threaded aperture in said housing.

5. In a thermostat, a pair of dished disks, one of which is rigid, the other disk being formed of resilient metal that is highly responsive to temperature changes, the edge of the rigid disk being bent over and clamped to the edge of the resilient disk, the center of the rigid disk being provided with a flanged opening and an externally threaded cap secured to said rigid disk and closing said flanged opening.

In testimony whereof I affix my signature.

LOUIS W. SCHNEPP.