G. F. SCHWARTZ.

THERMOSTATIC VALVE.

APPLICATION FILED OCT. 30, 1915.

1,210,706.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 1.

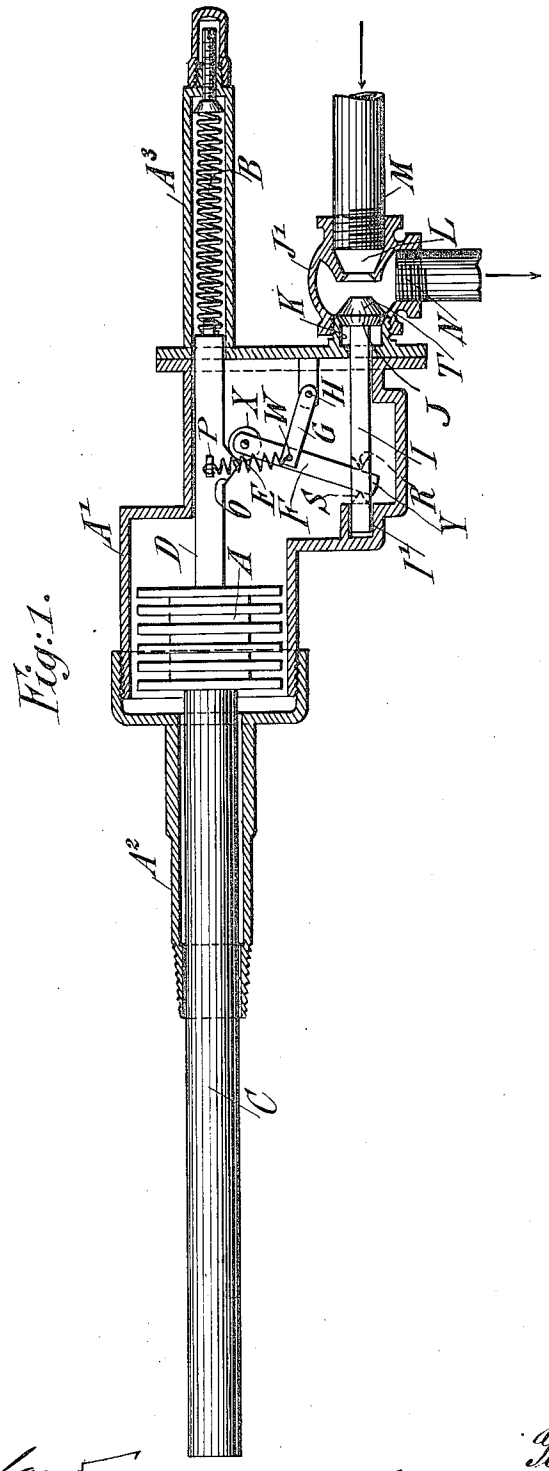


Fig. 1.

Witnesses:

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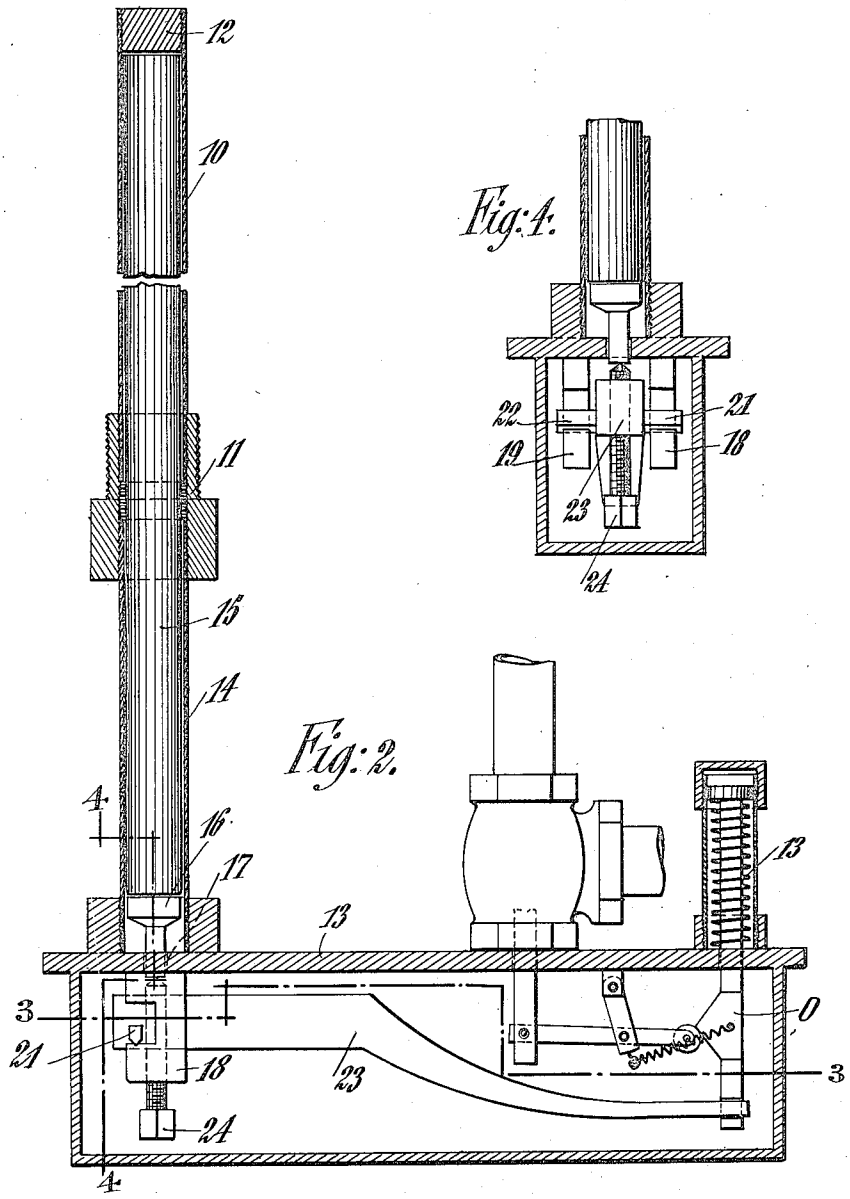
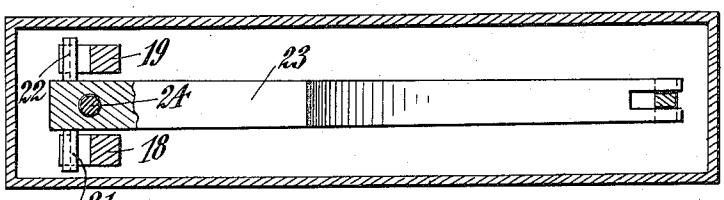


Fig. 4.

Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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THERMOSTATIC VALVE.

1,210,706. Specification of Letters Patent. Patented Jan. 2, 1917.

Application filed October 30, 1915. Serial No. 58,926.

To all whom it may concern:

Be it known that I, GERHARDT F. SCHWARTZ, a citizen of the United States of America, residing in the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Thermostatic Valves, of which the following is a specification.

The object of this invention is to provide a valve for closing or opening the supply of gas to a burner, said valve being controlled by thermostatic means acting automatically and with a snap action, that is to say, a rapid closing movement or opening movement as the case may be, when the temperature arrives at the predetermined points for which the instrument is set to operate. This object is accomplished by providing between the thermostatic member and the valve stem a spring-actuated mechanical movement, comprising a lever adapted to be engaged by a trip on the thermostatic member, whereby the lever is drawn to one side or the other of the trip, such movement taking place under the impulse of the spring, and being rapid and of sufficient extent to completely open or close the valve as the case may be. With these and other objects in view, my invention is shown in the accompanying drawings, and will be hereinafter more fully described with reference thereto, and finally pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view of one form of my device, Fig. 2 is a vertical sectional view of a slightly modified form of construction, Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2, and Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2, and showing the rear of the device.

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

Referring to the drawings, and more particularly to Fig. 1 thereof, the exterior casing A^1 has at the top and bottom, suitable extensions A^2, A^3, in which are guided the upper portion C and the lower portion D of a thermostatic member. Between said portions C and D is located a plurality of expansible devices A forming the thermostatic element, and composed preferably of a porcelain rod and a copper tube. The lower portion D of the thermostatic member is supported by a spring B adjustable within the portion A^3 of the casing. Secured to the casing A^1 is a valve housing J^1 having a lower seat L upon which the valve T may rest and thereby close the passage of gas from the inlet M to the outlet N of the valve casing. An upper seat K is also provided for the valve J, and when the valve is seated thereon, as indicated in the drawing, gas is permitted to flow through the valve casing J^1. The valve has an upwardly-projecting stem I, which is provided with a slot having upper and lower knife edges R, S. The valve stem is guided at its upper end in a suitable socket I^1 of the casing A^1. To the casing A^1 within the same, is pivoted at H a lever G, to the upper end of which is pivoted at W a tilting lever F, one end Y of which enters the slot of the valve stem between the knife edges R, S. At its opposite end said tilting lever F is provided with an antifriction roller X, which is adapted to be engaged by an angular projection or trip O extending laterally from the lower part D of the thermostatic member. A tension spring E is connected with the lever G at its upper end W, and is also connected with the portion D of the thermostatic member at a point P approximately in line with the apex of the trip O as shown in the drawing. A similar spring E is arranged at the opposite side of the device and connected in the same manner.

In Fig. 2 I have shown a slightly modified form of construction, in which the thermostatic member does not act directly on the member D, but a leverage mechanism is employed for actuating the same, the action being in the nature of a negative or relief action rather than positive. A copper tube 10 is provided, secured into the tank by means of a bushing 11, a plug 12 being provided in the upper end thereof. The said bushing 11 is connected to a housing member 13 by means of a tube 14, and disposed within the said tube there is provided a porcelain rod 15, which rests upon a plunger 16 operating through an aperture 17 in the said housing. Recessed hangers 18 and 19 are provided in the said housing at either side of the aperture 20, and supported within the recesses thereof by means of knife edges 21 and 22, there is provided a lever 23, connected at its outer end to the member D. The said knife edges are arranged slightly behind the said plunger, and a set screw 24 is provided extending through the said lever and engaging the plunger, so that by a small

movement of the thermostatic member a large movement is imparted to the member D for actuating the snap valve, and by regulation of the said set screw this action may be varied as desired. The action of the snap valve is otherwise similar to the first form of construction.

The operation of the apparatus is as follows: The valve being in open position as shown, the temperature of the thermostatic element A is assumed to rise. Thereby the rod D is moved downwardly against the force of the spring B. As soon as the point of the trip O passes the center line of the antifriction roller X, the springs E pull the lever F toward the rod D, the antifriction roller X then riding upon the upper inclined face of the trip. The result of this motion is to throw rapidly downward with a snap action, the outer end Y of the lever F, and thereby move the valve stem I and the valve J downwardly until the valve rests upon the seat L and closes the gas supply. When the temperature of the element A is reduced sufficiently to bring about the return of the rod D, in upward direction, the trip O engages the anti-friction roller X at its lower side, and, the lever F being held in fixed position against upward movement at its roller-carrying end by reason of the fact that its outer end is engaged by the valve stem and pressing downwardly upon the same, the trip O passes upwardly beyond the center line of the antifriction roller X, and when its apex arrives above said center line, the springs E act to rapidly pull backward the lever F, the antifriction roller then passing downwardly along the lower inclined face of the trip O into the position shown in the drawing, such movement of the lever acting to raise the valve stem and valve, so that the flow of the gas is again permitted.

The device described provides a very simple and effective and reliably-acting thermostatic valve closing with a snap action at predetermined points in the travel of the rod D, namely, at predetermined temperatures, according to which the thermostatic member is regulated by means of the balancing spring B. It will be understood that should the spring B become inoperative, as for instance, by crystallization, the mechanism would still work by the operation of the thermostatic member alone.

I have described one embodiment of the invention, but it is obvious that changes may be made therein without departing from the spirit of the invention as defined in the appended claims.

I claim:—

1. A thermostatic valve, comprising a thermostatic member, a valve, a valve stem, a tilting lever engaging said valve stem, a pivoted standard pivotally supporting said tilting lever, the pivot point of said lever being movable, a trip member adapted to be actuated by said thermostatic member, said trip member engaging one end of said tilting lever, the other end of said tilting lever engaging and adapted to actuate said valve stem.

2. A thermostatic valve, comprising a thermostatic member, a valve stem, a tilting lever engaging said valve stem, a pivoted standard pivotally supporting said tilting lever, the pivot point of said lever being movable, a trip member adapted to be reciprocated by said thermostatic member, a roller carried at one end of said tilting lever and engaging said trip, spring means adapted to maintain said roller in engagement with said trip, the other end of said tilting lever engaging and adapted to actuate said valve stem.

3. A thermostatic valve, comprising a thermostatic member, a valve-stem, a tilting lever engaging said valve stem, said valve stem being provided with a slot having upper and lower knife-edges, a pivoted standard pivotally supporting said tilting lever, the pivot point of said lever being movable, a trip member adapted to be actuated by said thermostatic member, said trip member engaging the end of said tilting lever, the other end of said tilting lever engaging said slot of the valve stem and adapted to actuate the valve stem.

4. A thermostatic valve, comprising a thermostatic member, a valve stem, a tilting lever engaging said valve stem, a pivoted standard pivotally supporting said tilting lever, the pivot point of said lever being movable, a trip member carried directly by said thermostatic member, said trip member engaging one end of said tilting lever, the other end of said tilting lever engaging and adapted to actuate said valve stem.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

GERHARDT F. SCHWARTZ.

Witnesses:

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B. FISHER.