May 15, 1934. J. V. DURNIN 1,959,265

THERMOSTATIC VALVE DEVICE

Filed Jan. 21, 1933

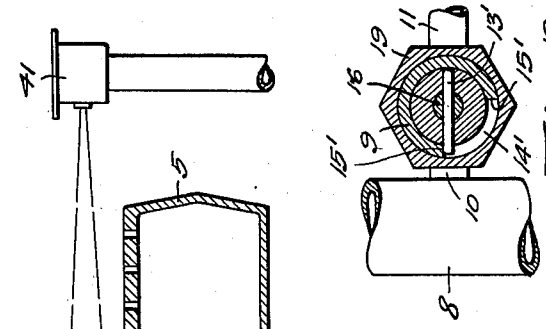


Fig. 3.

Fig. 1.

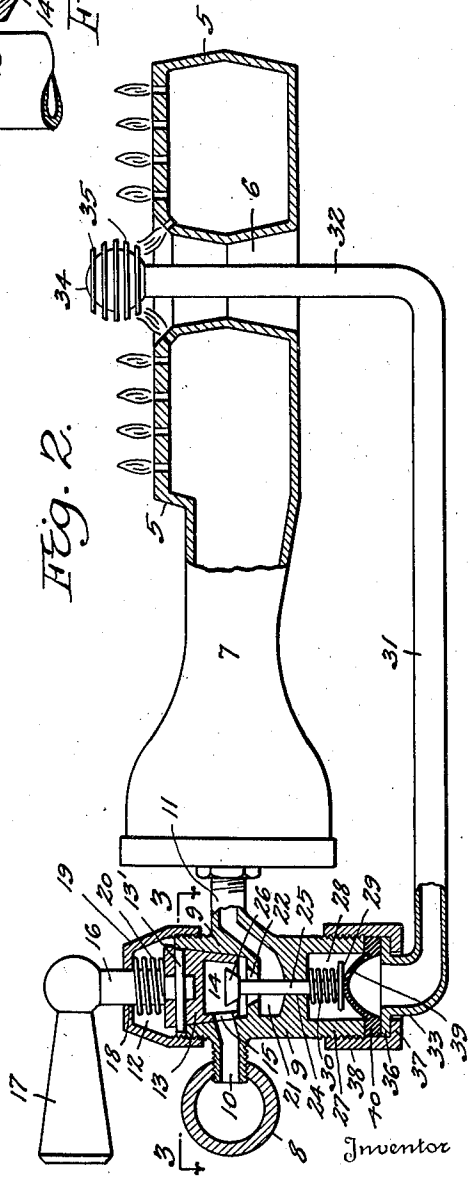


Fig. 2.

Inventor

JOSEPH V. DURNIN

By B. M. Whitmore

Attorney

Patented May 15, 1934 1,959,265

UNITED STATES PATENT OFFICE

1,959,265

THERMOSTATIC VALVE DEVICE

Joseph V. Durnin, Allentown, Pa.

Application January 21, 1933, Serial No. 652,905

2 Claims. (Cl. 158—117.1)

My invention relates to a thermally actuated valve device for use in connection with gas burners.

An important object of the invention is to provide a valve device of the above-mentioned character, which may be readily installed upon the ordinary gas cook stove without altering the construction of such stove.

A further object of the invention is to provide a valve device of the above-mentioned character which is of simple construction, and is extremely compact in the arrangement of its parts.

A further object of the invention is to provide a valve device of the above-mentioned character, which will prevent the flow of gas to the burner until the thermostatic element has been heated, and will automatically cut off the flow of gas to the gas burner when the thermostatic element cools off.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a central vertical section through a valve device embodying my invention, associated elements being shown partly in section and partly in elevation, and the automatic valve element closed.

Figure 2 is a similar view showing the automatic valve element open.

Figure 3 is a detail horizontal section taken on line 3—3 of Figure 2.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a gas burner element, of any well known or preferred construction, and preferably of the annular type for affording a central passage 6. This gas burner element has a gas mixing inlet tube 7. The numeral 8 designates a gas supply pipe extending along the front of the stove (not shown).

My valve device embodies a casing 9, shown as vertically arranged for the purpose of illustration. This casing has an outer exteriorly threaded tubular nipple 10, for engagement within an opening formed in the gas supply pipe 8, and a second exteriorly threaded tubular nipple 11, disposed opposite to the nipple 10, for engagement within an opening formed in the end of the gas mixing tube 7. The nipple 11 is of a substantial length so that the valve device may be applied to different makes of stoves, wherein the distance between the pipe 8 and the gas mixing tube 7 may vary, within limits. The nipple 10 leads into a downwardly tapering chamber 12, the inner wall of which constitutes a seat for a rotary manually operated valve element 13. The valve element 13 also tapers downwardly and is provided in its lower end with a recess 14, in communication with a lateral port 15, adapted to be moved into and out of registration with the bore of the nipple 10. The turning movement of the valve element 13 is limited by a pin 13', carried thereby, operating within a groove 14', formed in the casing 9, and adapted to engage walls 15', constituting stops. The arrangement is such that the turned movement of the valve element in one direction is limited when port 15 is brought into registration with the bore of the nipple 10, and its turning movement is limited in the opposite direction, when the port 15 has been brought out of registration with the bore of this nipple and has moved a short distance therefrom. The manually operated valve element 13 is turned by a stem 16, having a crank or handle 17. This stem passes through an opening 18, in a cap 19, screw threaded upon the top of the casing 9. A compressible coil spring 20 is arranged between the cap 19 and the valve element 13, and serves to retain the valve element upon its seat. The casing 9 is provided with a lower chamber 21, in communication with the upper chamber 12, through a passage 22, formed in a web 23. The casing is provided in its lower end with a vertical opening or passage 24, slidably receiving the stem 25 of an automatic valve element 26. This valve element, when in the raised or open position, projects into the recess 14 of the manually operated valve element 13, and when in the lowered or closed position, it covers the opening or passage 22, engaging the wall of this opening as a valve seat. The lower chamber 21 is in communication with the bore of the nipple 11. At its lower end, the casing 9 has an annular depending flange 27, affording a recess 28. This recess receives a head or disc 29, secured to the lower end of the automatic valve stem 25, by any suitable means. A light compressible coil spring 30 engages above this disc and serves to aid in closing the automatic valve, and preventing the same from sticking in the open position, this automatic valve being normally adapted to close by gravity.

Thermostatic means are provided to open the

automatic valve, comprising a generally U-shaped tube 31, having upstanding arms 32 and 33. The upstanding arm 32 extends through the opening 6 of the burner element, and is provided at its upper end with a bulb or enlarged portion 34, preferably provided upon its outer surface with fins 35. The upstanding arm 33 is provided at its free end with an outwardly projecting annular flange 36, for engagement with an inwardly projecting annular flange 37, carried by a coupling 38. This coupling has screw threaded engagement with the depending flange 27. A flexible diaphragm 39 is provided which is preferably formed of rubber, although other material may be used, such as leather, or the like. If the diaphragm is formed of rubber, it will be resilient and expansible. The diaphragm is normally flat and is provided with a thickened marginal portion 40, adapted to be clamped betwen the flanges 36 and 27, and is thereby securely held in place. These marginal edges also serve as packing for the coupling 38, and associated elements.

The numeral 41 designates a pilot light of any well known or preferred construction, arranged to project a flame across the burner element 5, and to impinge upon the bulb 34. Any suitable expansible gas or liquid may be contained within the tube 31, and I have found that highly satisfactory results are obtained by using air as the expansible or thermal medium. However, I may employ any thermal liquid or gas.

The operation of the device is as follows:—

When it is desired to light the burner element 5, the manually operated valve element 13 is first turned to the open position to bring port 15 into registration with the bore of the nipple 10. At this time, the automatic valve element 26 is in the closed position, and the gas cannot now pass to the burner element 5. Before the gas can be passed to the burner element 5, the pilot light 41 must be actuated, and the flame projected upon the bulb 34. This heats the air or thermal medium within the tube 31, producing pressure therein, which pressure is transmitted to the diaphragm and the diaphragm is now bowed upwardly. The upward movement of the diaphragm raises the disc 29, which in turn, will unseat the automatic valve element 26. The gas will now be free to pass to the burner element 5, and will be ignited by the pilot light, as is well known. Should the pilot light be extinguished before the burner element 5 is lit, the bulb 34 will quickly cool off, and the pressure will be reduced in the tube 31, and the diaphragm 39 will automatically descend and the automatic valve element again seated. If the burner element 5 should be lit, heat therefrom will retain the bulb 34 suitably heated, whereby pressure is maintained within the tube 31 for retaining the automatic valve element unseated, so that gas may continue to flow to the burner element, but if the flame of both the burner element and the pilot should be extinguished, the pressure will quickly drop in the tube 31, and the automatic valve again seated, to cut off the flow of gas to the same.

It is to be understood that the form of my invention herewith shown and described, is to be taken as the preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention, or the scope of the subjoined claims.

Having fully described my invention, what I claim is:

1. A valve device comprising an elongated casing having a pair of laterally extending tubular nipples, said casing being provided with a transverse web dividing the same into inlet and outlet chambers, said web having a valve seat forming a passage adapted to place the chambers in communication, the inlet chamber being adapted to communicate with the bore of one nipple and the inlet chamber having communication with the bore of the other nipple, a rotary manually operated valve disposed within the upper chamber and having a recess formed in its lower end and also having a lateral port to be shifted into and out of registration with the bore of the adjacent nipple, an automatic reciprocatory valve element separate from the rotary valve element arranged above the web and adapted to engage the valve seat and cover the passage, said reciprocatory valve element being movable into the recess of the rotary valve, a stem secured to the automatic valve element, a flexible diaphragm to move the stem, and a tube for holding an expansible fluid having one end adjacent to the diaphragm.

2. A valve device comprising a casing provided with a web dividing the same into inlet and outlet chambers, said web having a valve seat constituting a passage adapted to place the chambers into communication, said casing also having an opening adjacent to the outlet chamber, a manually operated rotary valve element mounted within the inlet chamber and having a recess formed in its inner end and a lateral port, inlet means for the inlet chamber adapted to have communication with the same through the inlet port, a reciprocatory automatic valve element arranged within the inlet chamber and adapted to engage the valve seat and cover said passage, the reciprocatory valve element being separate from the rotary valve element and being movable into the recess of the same, a stem secured to the reciprocatory valve element and projecting through the passage and through said opening, a flexible diaphragm arranged to actuate the stem, a tube for holding an expansible fluid having one end engaging the flexible diaphragm, and a coupling adapted to clamp the end of the tube and diaphragm to the casing, the opposite end of the tube being adapted to be arranged near a burner or the like.

JOSEPH V. DURNIN.