Oct. 7, 1969 W. R. DUNN 3,470,911

DOUBLE VALVE HEAD

Filed Nov. 17, 1967

FIG. 2

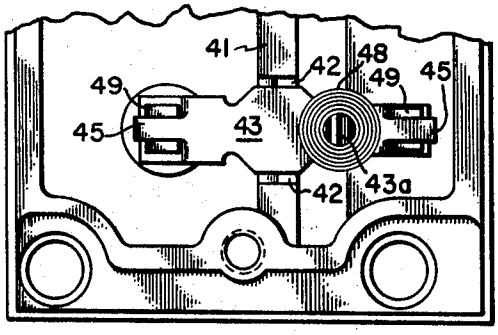


FIG. 3

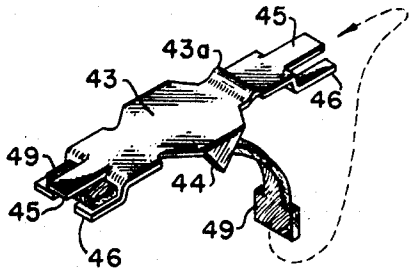


FIG. 4

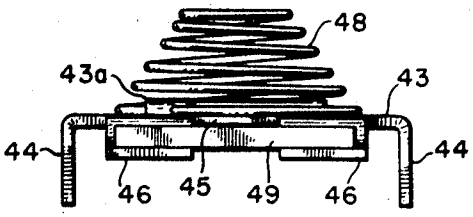
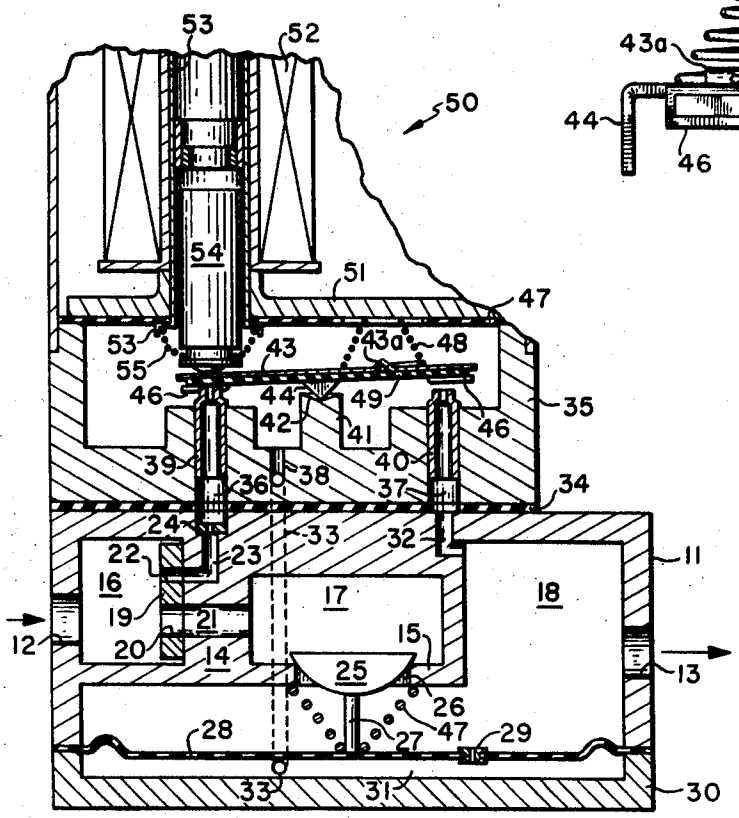


FIG. 1



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DOUBLE VALVE HEAD

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U.S. Cl. 137—625.64 9 Claims

ABSTRACT OF THE DISCLOSURE

A valve head construction for a valve having two spaced valve seats which includes a relatively rigid strip of metal, that is provided with offset tines at each end thereof, and an I-shaped strip of elastic material. The elastic strip is mounted on the rigid strip by first placing one end of the elastic strip between the tines at one end of the rigid strip, then stretching the intermediate portion to position the other end beyond and in a plane between the tines at the other end of the rigid strip, and then releasing the elastic strip for retraction of the extended end to a position between the adjacent tines. Each end of the elastic strip and a backing tine serves as a closure for one only of the valve seats. Power means is provided to selectively rock the valve head into engagement with one or the other of the valve seats.

BACKGROUND OF THE INVENTION

Valves similar to the one disclosed in this application are not new in the valve art. The closest one known to the applicant is the one illustrated in Patent No. 3,263,693. In order to control a relatively large valve with a minimum of energy, it is customary to use a so-called three-way valve to control the pressure in the chamber of a pressure actuated valve, usually of the diaphragm type.

BRIEF SUMMARY OF THE INVENTION

This invention lies in a valve head construction of inexpensive parts which may be assembled at low cost by a simple placing of one end of an I-shaped elastic strip of material between tines at one end of a rigid strip of material, stretching the intermediate portion of the elastic strip to position the other end thereof beyond similar tines at the other end of the rigid strip, and then permitting said other end to be retracted between the adjacent tines of the rigid strip. The two enlarged ends of the elastic strip, each backed by a rigid tine, provide two spaced valve heads for cooperation with spaced valve seats.

DESCRIPTION OF DRAWINGS

FIGURE 1 is a vertical, fragmentary and sectional view of a valve embodying the invention, with most of the elements thereof shown schematically;

FIGURE 2 is a fragmentary plan view of the valve showing the top side of the invention;

FIGURE 3 is a perspective view of the invention, partially assembled; and

FIGURE 4 is an end view of the invention with a spring attached thereto.

DETAILED DESCRIPTION

Referring to FIGURE 1 of the drawing, the valve embodying the invention has a main valve body portion **11** with an inlet **12** and an outlet **13**. Partition walls **14** and **15** are positioned between the inlet and outlet to divide the valve body **11** into an inlet chamber **16**, intermediate chamber **17** and an outlet chamber **18**. A manually operable rotary disc valve **19** is positioned in chamber **16** and against wall **14** to control main gas flow through a passageway **21**, extending between the chambers **16** and

17, by means of an aperture **20** through the disc valve. A second aperture **22** controls control gas from the chamber **16** to a passageway **23** leading from the chamber **16** to the top side of the body portion **11** for a purpose to be presently described. An orifice member **24** is located in an enlarged diameter portion of the passageway **23** near the upper end thereof. The disc valve **19** is also adapted to control the flow of gas from the chamber **16** to a pilot burner (not shown) through another aperture (not shown) through the disc valve.

Positioned to control flow of main gas from the chamber **17** to the chamber **18**, is a main valve **25** positioned over an aperture **26** through the wall **15**. It is connected by a stem **27** to a diaphragm **28**. The diaphragm has an orifice member **29** extending therethrough and the peripheral edge thereof is clamped against the bottom edge of the valve portion **11** by a cup-shaped lower body portion **30**. A pressure chamber **31** is provided between the lower body portion and the diaphragm. A passageway **32** extends from the chamber **18** to the upper surface of the body portion **11** for a purpose to be described hereinafter. A passageway **33** extends from the chamber **31** through the walls of the lower body portion **30**, through the diaphragm **28**, through the walls of the body portion **11** to the top surface of the body portion **11** for a purpose to be presently described.

Mounted on the top surface of the body portion **11**, with a gasket **34** therebetween, is a controller valve body **35** having an inlet control gas passageway **36** extending through the bottom wall thereof from passageway **23**, an outlet gas passageway **37** extending through the lower wall thereof to register with passageway **32**, and a passageway **38** extending through the lower wall thereof with the lower end thereof registering with the upper end of passageway **33**. Positioned in the passageway **36** is a tubular valve seat member **39**. A similar tubular valve seat member **40** is positioned in the passageway **37**. Two spaced bosses **41** are provided on the inner surface of the control valve body **35** and are notched at **42** to provide spaced pivot sockets.

A valve head, formed from a rigid sheet metal strip **43**, has two V-shaped downwardly struck projections **44** that provide two knife edge pivots positioned in the sockets **42**. The metal strip has a tine or extension **45** at each end thereof and two laterally offset tines **46** at each end thereof, with a steeply inclined portion at the base of tine **45**. Intermediate the pivots and one end thereof, the metal strip has an upwardly struck, transversely extending, V-shaped portion **48** that receives one end of a compression spring **49**. An I-shaped elastic strip, preferably made of rubber or similar material, has one of the end head portions positioned over the tines **46** and under the tine **45**. The other end head portion of the elastic strip is similarly positioned between the tines **46** and **45** by stretching the intermediately portion of the rubber strip beyond the other end of the metal strip and then permitting the stretched head portion to return to a position between the adjacent tines. The distances between the head portions is slightly less than the distance between the bases of tines **45** so that the head portions first engage the inclined portions of the tines **46** farthest from the tine **45**. Therefore, the slight pressure between the heads and inclined portions tend to pivot the heads against tines **45**. The two ends of the elastic strip, with the tines **45** serving as backing means therefor, are positioned over the upper ends of the valve seat members **39** and **40**. The elements of the metal strip or lever are so arranged that when one of the ends of the rubber strip is in engagement with one of the valve seats, the other is spaced from its cooperating valve seat. The spring **49** normally biases the righthand end of the valve head as viewed in FIGURE 1, against the valve seat **40**.

Mounted on the upper edge of the control valve **35**, with a gasket **47** therebetween, is a solenoid actuator, generally designated by the reference numeral **50**. It has a base portion **51** that rests on the peripheral upper edge of the body of valve **35** and carries thereon a solenoid coil **52** surrounding a solenoid tube **53**. Positioned in the tube **53**, is a solenoid plunger **54** that is biased against the metal strip **43** by a light spring **55**. This spring, plus the weight of the plunger, is sufficient to overpower spring **59** and rock the valve head counterclockwise to position the left-hand end of the rubber strip against valve seat member **39**.

OPERATION

The valve elements are shown in the positions they assume when the solenoid is de-energized, indicating that there is no call for the main valve to be open. With the main valve installed in a gas heating system and the solenoid connected to a room thermostat, upon a call for heat, the solenoid coil is energized causing the plunger **54** to be pulled into the solenoid tube and permitting coil spring **49** to pivot the lever or metal strip clockwise. This movement of the lever opens valve seat **39** and closes valve seat **40**. Gas will then flow from the inlet through the manual valve, passageway **23**, orifice **24**, valve seat **39** and passageways **38** and **33** to the pressure chamber **31**. The orifice in member **29**, in diaphragm **28**, is smaller than the orifice in orifice member **24** so pressure will build up in chamber **31** to open the valve **25**. The valve will remain in this position as long as the solenoid is energized. Upon the room thermostat being satisfied, the solenoid is de-energized, spring **55** forces the plunger downwardly to pivot the control valve counterclockwise to close valve seat **39** and open valve seat **40**. This permits gas to bleed from the pressure chamber **31** through the valve seat **40** to the outlet **18** and to permit the valve **25** to be closed by spring **47**.

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows:

1. A valve head for a valve having first and second valve seats therein comprising; a first strip of rigid material of such a shape that when it is positioned in such a valve, a first end portion thereof may be moved into a position over the first of said valve seats or a second end portion thereof may be moved into a position over the second valve seat, selectively; a second strip of elastic material having a valve seat engageable head portion at each end thereof that releasably engages each of said end portions, respectively; one of said end portions being so shaped that one of said head portions may be pulled away from said one end portion, by stretching the elastic strip portion between said head portions and then permitting it to retract said one head portion into engagement with said one end portion, to assemble said first and second strips in a side-by-side relationship.

2. A valve head as defined in claim **1** wherein said one of said end portions has transversely spaced tines for the reception of one of said head portions.

3. The valve head construction of claim **1** with both end portions of the first strip having substantially the same construction and both heads on the second strip having substantially the same construction.

4. A valve head as defined in claim **1** wherein said second strip including its head portions is of I-shape.

5. The valve head construction of claim **2** wherein said tines include a central tine in the plane of said first strip and two side ones lying in a plane substantially parallel to the plane of the central tine and spaced therefrom a distance slightly greater than the thickness of the head portion positionable therebetween.

6. The valve head construction of claim **5** wherein each of the side tines is connected to the first strip by a steeply inclined portion of the tine so that the adjacent head portion engages the inclined portion farthest from the central tine first.

7. A valve head as defined in claim **4** wherein the distance between said head portions is slightly less than the distance between the end portions of said first strip that are engaged by said head portions.

8. A valve head as defined in claim **1** in combination with a vave body having an inlet and an outlet and two spaced valve seats therebetween; means on said first strip pivotally mounting said first strip on said valve body; spring means on said first strip and engaging said body so as to bias said pivot means against said body and one of said head portions into engagement with one of said valve seats; and power means on said valve body positioned to move said first strip about said pivot means to move the other head portion against the other seat against the bias of said spring means and to move said one head portion away from said one valve seat.

9. The combination defined in claim **8** wherein said pivot means for said first strip is a pair of transversely extending knife edge wings integral with said first strip and said first strip is shaped to receive and hold one end of said spring means.

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