

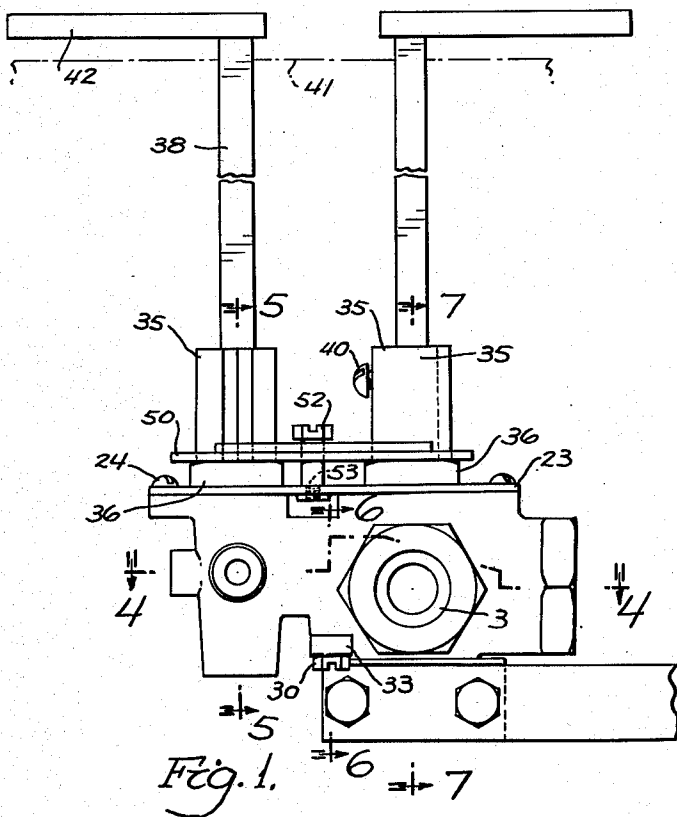
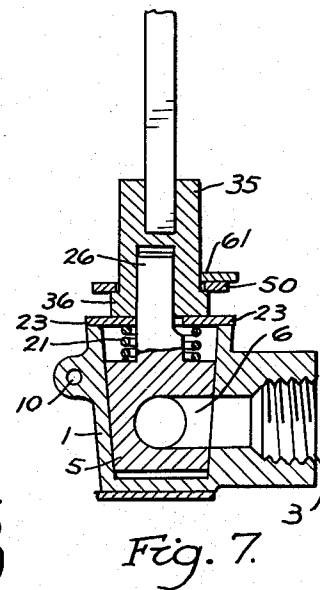
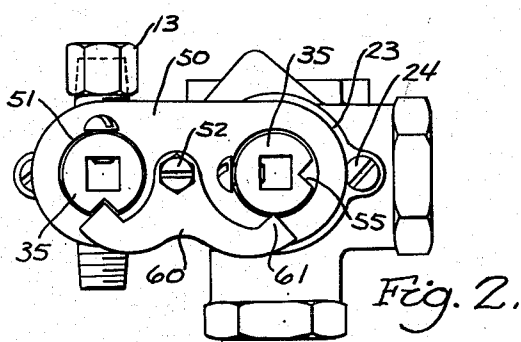
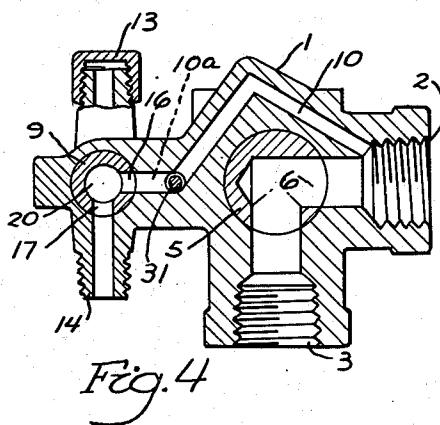
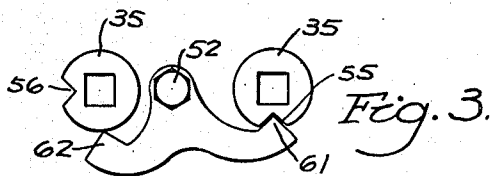
April 7, 1953

E. H. MUELLER
VALVE FOR CONTROLLING FLOW OF GAS
FOR A BURNER AND ITS PILOT

2,633,933

Filed Nov. 21, 1950

2 SHEETS—SHEET 1



INVENTOR.
Ervin H. Mueller
BY
Barnes, Russell, Laughlin & Kusch
Attorneys.

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2 SHEETS—SHEET 2

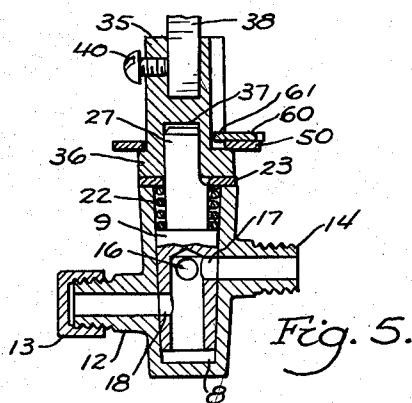


Fig. 5.

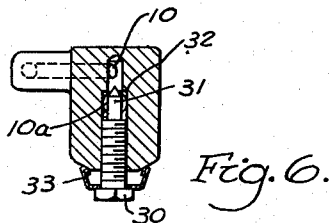


Fig. 6.

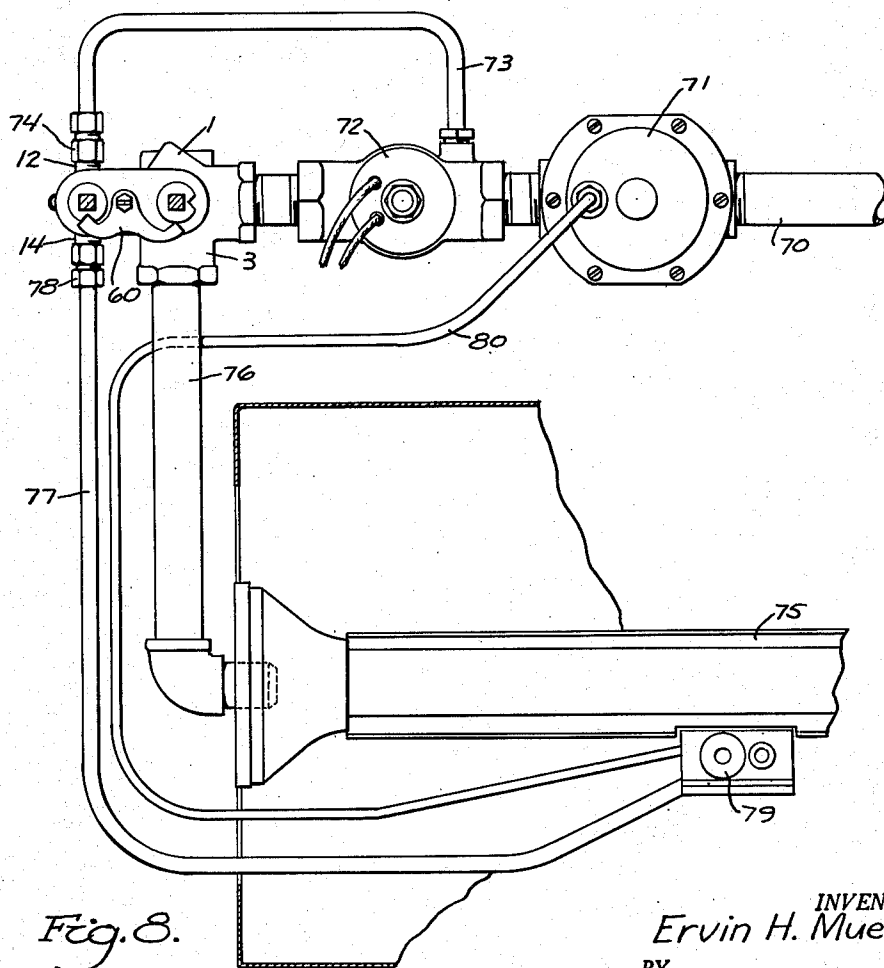


Fig. 8.

INVENTOR.
Ervin H. Mueller
BY
Barney Kessel, Laughlin & Kirsch
Attorneys.

UNITED STATES PATENT OFFICE

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VALVE FOR CONTROLLING FLOW OF GAS
FOR A BURNER AND ITS PILOT

Ervin H. Mueller, Grosse Pointe, Mich.

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3 Claims. (Cl. 137-637.1)

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This invention relates to a valve for controlling the operation of gas burning equipment and it has to do particularly with a valve for use with what is commonly known as a floor furnace.

The valve of the present invention is one for controlling the flow of gas to the main burner of a furnace and the flow of gas for a pilot flame for the furnace. Floor furnaces, so called, are used largely where, due to the nature of the country and climate, residential properties ordinarily have no basement, and the furnace is positioned under the ground floor. The controls for the valve project upwardly through the floor so that they are operable from the room above the same.

The general purposes of the invention are to provide an improved valve construction which is safe in operation and which embodies an interlocking arrangement to relatively control the portions of the valve which govern the flow of gas to the main burner and to the pilot. The valve members employed are of the tapered plug type and the novel construction of the valve is such that the controlling stems and handles cannot wedge the tapered valves too tightly into their seats or lift the tapered valves from their seats when forces are applied to the operating means. Moreover, it is an object of the invention to provide a valve construction which may be used with an installation of the hand operated type or an installation of an automatic control type, requiring only a simple adjustment operation to condition the valve for one type of installation or the other. These objects, and advantages of the invention, will be more clearly appreciated and brought out as the detailed description is considered in conjunction with the accompanying drawings:

Fig. 1 is a side elevational view of a valve constructed in accordance with the invention showing the control handles therefor.

Fig. 2 is a top plan view of the valve with the control stems and handles removed.

Fig. 3 is a plan view of the interlocking means showing the same in a different position from that illustrated in Fig. 2.

Fig. 4 is a sectional view taken substantially on line 4-4 of Fig. 1 showing interior valve construction.

Fig. 5 is a cross sectional view taken substantially on line 5-5 of Fig. 1 showing pilot valve construction.

Fig. 6 is a sectional view taken on line 6-6 of Fig. 1 showing a conditioning needle valve.

Fig. 7 is a sectional view taken substantially

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on line 7-7 of Fig. 1 showing the main valve chamber and member.

Fig. 8 is a view largely in plan showing an automatic installation.

The valve of the present invention has a body 1 with an inlet passage 2 internally threaded to receive a conduit. It has an outlet passage 3 internally threaded for receiving a conduit. The body has a tapered plug valve member 5 therein with an angular passageway 6 arranged to connect the inlet and outlet passages as shown in Fig. 4.

The body also has a tapered valve chamber 8 (Fig. 5) with a tapered plug valve member 9 therein. There is an inlet passage 10 and 10a in the body of the valve extending from the inlet passage 2 to the chamber 8 as shown in Fig. 4. The valve body also has a threaded inlet extension 12 which can be closed by a cap 13. An outlet extension 14 leads from the chamber 8. The extensions 12 and 14 have inlet and outlet passages therein as shown. The plug valve member 9 is provided with a port 16, a port 17 and a port 18 all communicating into a central passage 20.

The two valve members 5 and 9 are each held in their seats by springs 21 and 22 and the valve body is provided with a cap 23 which covers both valve chambers. The cap may be in the form of a plate fixedly secured to the body by screws 24 and thus provide means upon which the springs react. The valve member 5 has a projecting stem 26 which extends through the cap and the valve member 9 has a stem 27 which extends through the cap.

In conjunction with the closure cap 13, the valve is provided with an additional conditioning valve for the passage 10. This is shown as in the form of a needle valve 30 screw threaded into the body and having a needle valving portion 31 for engaging a seat 32. For this purpose the two portions 10 and 10a of the passage are offset from each other as illustrated in Fig. 6, and the portion 10a thereof constitutes the direct inlet to the valve chamber 8. A spring element 33 is positioned under the head of the needle valve 30 to hold it in any position of adjustment.

The means for operating the valve takes the form of a coupling member associated with each valve stem. These coupling members are practically identical so a description of one will suffice. The coupling member 35 has a flange 36 for resting upon the cap plate 23. This coupling member has a recess 37 for slidably and non-rotatably fitting on the stem 27. For this purpose, the stem

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and recess are non-circular in shape and conveniently may be of D-shape. There is sufficient clearance between the end of the recess and the end of the stem so that the coupling may sit upon the cover plate 23 without transmitting forces to the valve member. There is an operating rod 38 fitted into a recess in the coupling member 35 and it may be held by a set screw 40. The rod extends upwardly and may pass through a floor or other partition or means as shown at 41 and is provided with a suitable handle 42. Thus, it will be observed that the weight of the coupling and operating rod and handle is transmitted downwardly directly to the body of the valve and the weight or other forces which may be applied thereto do not affect the tapered plug 9. In other words, such forces do not wedge the tapered valve member 9 into its seat. The coupling and operating rod for the main valve member are identical and have the same reference characters applied thereto.

Positioned over the flanges 36 of the couplings is a hold-down plate 50. This plate has openings therein as shown at 51 for freely passing over the couplings. The hold-down plate is held securely to the body of the valve but in a relatively loose manner by a headed screw 52 which passes through the hold-down plate and is threaded into the cap plate 23 as at 53.

The interlocking means resides in a pivoted interlocking member mounted on the screw 52 with end portions for engaging the coupling members. Each coupling member has a V-shape notch therein extending axially in its side wall and as shown at 55 and 56. The pivoted interlocking member is illustrated at 60, the same being pivotally mounted on the screw 52 in its intermediate portion and this pivoted member has an end portion 61 for cooperation with the V-groove 55 and an end portion 62 for cooperation with the V-groove 56. It will be appreciated now why the screw 52, while tightly secured to the body, provides a relatively loose assembly as shown in Fig. 1 since the interlocking member 60 must freely rock thereon. It will also be appreciated that if the operating rods or their handles are pulled upwardly that the flanges 36 prevent detachment as the couplings are held down by the hold-down plate 50. Since the screw 52 does not clamp these parts in position tightly, an upward force may cause a slight upward movement, but this movement is insufficient to disengage the couplings from the stems of the valves. Accordingly, axial forces on the operating rods or couplings do not affect the valve members in the sense that such forces neither wedge the valve members in their seats nor pull them off their seats.

In the position of the parts as shown in Figs. 1, 2 and 4, the valve is set for operation of the heating furnaces. In other words, incoming gas may flow through the passages 10 and 10a through the valve member 9 and through the outlet 14 to a pilot flame. Gas may also flow from the inlet passage 2 through the valve 5, through the outlet 3 to the heating burner. With the parts in this position it will be noted that a V-slot 55 is disaligned from the engaging element 61 and the engaging element 61 substantially rides upon or engages the circular surface of the couplings 35. This holds the locking element 62 in the V-groove 56 of the pilot valve. Thus, the pilot valve cannot be turned off as long as the valve for the heating burner is turned on. With the parts thus

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conditioned, the heating burner can be turned on and off as desired.

In the long period of the year when it is desired to have the gas completely shut off from the furnace, the main valve 5 may be turned off thus aligning slot 55 with the element 61 and then the pilot valve may be turned off and the parts are in a position as shown in Fig. 3. Now, it will be noted that the main valve is locked in closed position because the element 62 engages the peripheral surface of the pilot valve coupling. In order to put the furnace into operation again, the pilot valve must first be turned on before it is possible to turn the main valve on. When the valve is so used with a manual operation as above described, the needle valve 30 is open as shown in Fig. 6 and the cap 13 is applied as shown in Figs. 2 and 4.

Should it be desired to use this valve in an automatic installation, as indicated in Fig. 8, it is only necessary for the person making the installation to close the needle valve 30 thus closing the passage 10 and 10a. The cap 13 is removed and is coupled into the system for supplying gas for the pilot flame. An automatic system is illustrated in Fig. 8 wherein the gas supply line is shown at 70, a regulator at 71, and an automatic solenoid type of valve 72. A conduit 73 is connected into the gas supply line upstream from the valve 72 and is connected as shown at 74 with the inlet extension 12. The burner is generally illustrated at 75 with a gas conduit 76 leading from the valve of the present invention to the burner and with a conduit 77 connected to the outlet 14 as at 78 extending to a pilot burner 79. There is a bleed line 80 leading from the regulator 71 to the pilot housing.

With this installation, and with the valve of the present invention conditioned as shown in Fig. 8, gas is supplied to and is cut off from the burner 75 by the solenoid valve 72 which may be thermostatically controlled. Gas to the pilot flame continues at all times through the line 73 and line 77. For a "shut down" period the valve of the present invention may be conditioned by turning the main valve off and then by turning the pilot valve off thus conditioning the parts as shown in Fig. 3 in the manner above described. The important point is that the valve of the present invention may be used in a manually operated manner or with an automatic installation, as shown in Fig. 8, with no structural changes whatever and only requiring the conditioning of the needle valve and the selective use of the inlet 12.

I claim:

1. In a valve for controlling the flow of gas having a body with two valve chambers therein, each chamber having an inlet and an outlet, a valve member rotatably seated in each chamber and each operable rotatably for selectively opening and closing connections between the respective inlets and outlets, closure means for closing the chambers, the valve members having operating stems projecting through the closure means and being substantially parallel to each other, a coupling member slidably and non-rotatably mounted on each valve stem and each having a hub portion and a shoulder portion, each coupling member being adapted to receive operating means and arranged to thrust against the closure means so that forces on the operating means are transferred to the closure means, a hold down plate having openings therein through which said hub portions project with the hold

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down plate overlying said shoulders, means securing the hold down plate to the body to maintain the hold down plate in the position overlying and in non-binding relationship with the shoulders to hold the coupling members on the valve stems in a freely rotatable manner.

2. In a valve for controlling the flow of gas having a body with two valve chambers therein, each chamber having an inlet and an outlet, a valve member rotatably seated in each chamber and each operable rotatably for selectively opening and closing connections between the respective inlets and outlets, closure means for closing the chambers, the valve members having operating stems projecting through the closure means and being substantially parallel to each other, a coupling member slidably and non-rotatably mounted on each valve stem and each having a hub portion and a shoulder portion, each coupling member being adapted to receive operating means and arranged to thrust against the closure means so that forces on the operating means are transferred to the closure means, a hold down plate having openings therein through which said hub portions project with the hold down plate overlying said shoulders, means securing the hold down plate to the body to maintain the hold down plate in the position overlying and in non-binding relationship with the shoulders to hold the coupling members on the valve stems in a freely rotatable manner, the hub portion of each coupling member having a recess therein, and an interlocking member pivotally mounted on the body in a position between the chambers and having opposite end portions one of which engages in a recess in one coupling member to lock the same against rotary movement when the other end portion engages the peripheral surface of the hub portion of the other coupling member and vice versa.

3. In a valve for controlling the flow of gas having a body with two valve chambers therein, each chamber having an inlet and an outlet, a valve member rotatably seated in each chamber and each operable rotatably for selectively open-

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ing and closing connections between the respective inlets and outlets, closure means for closing the chambers, the valve members having operating stems projecting through the closure means and being substantially parallel to each other, a coupling member slidably and non-rotatably mounted on each valve stem and each having a hub portion and a shoulder portion, each coupling member being adapted to receive operating means and arranged to thrust against the closure means so that forces on the operating means are transferred to the closure means, a hold down plate having openings therein through which said hub portions project with the hold down plate overlying said shoulders, a single screw mounted in the body between the valve chambers for loosely holding the hold down plate in a position overlying and in non-binding relationship with the shoulders to hold the coupling members on the valve stems in a freely rotatable manner, each coupling member having a V-shaped recess in its hub portion, and an interlocking member pivotally mounted on said screw and having opposite end portions, one of which engages in the V-shaped recess in one coupling member to lock the same against rotary movement when the other end portion engages the peripheral surface of the hub portion of the other coupling member and vice versa.

ERVIN H. MUELLER.

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