Feb. 24, 1953 H. L. GIWOSKY 2,629,394

VALVE STRUCTURE FOR GAS BURNERS

Filed June 30, 1948 2 SHEETS—SHEET 1

Fig. 1

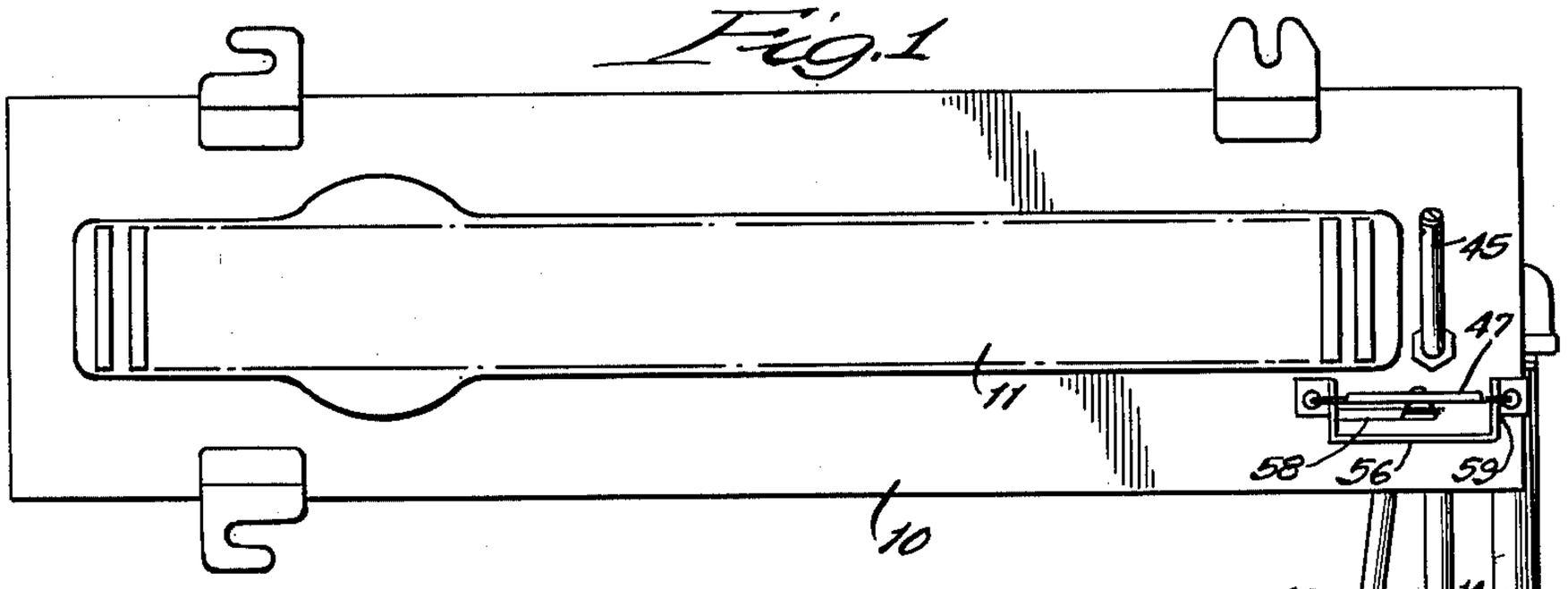


Fig. 2

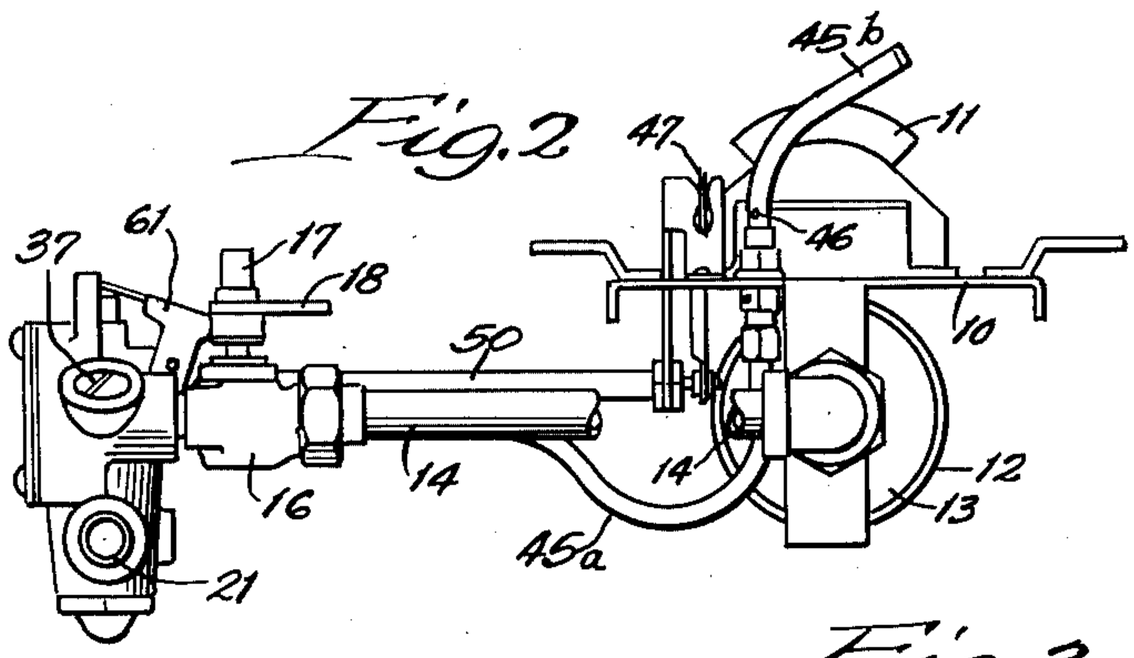


Fig. 3

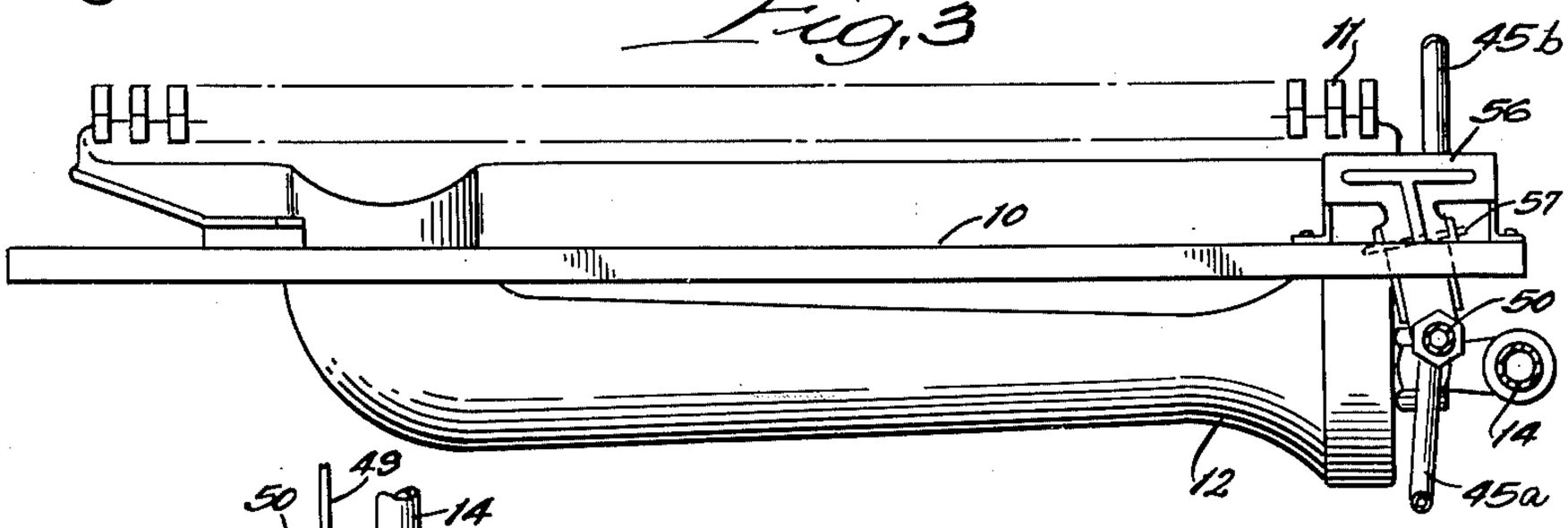
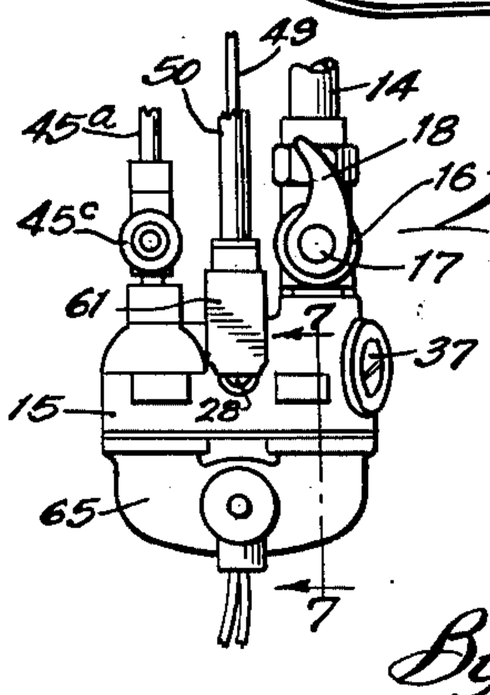


Fig. 6



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VALVE STRUCTURE FOR GAS BURNERS

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Fig. 4

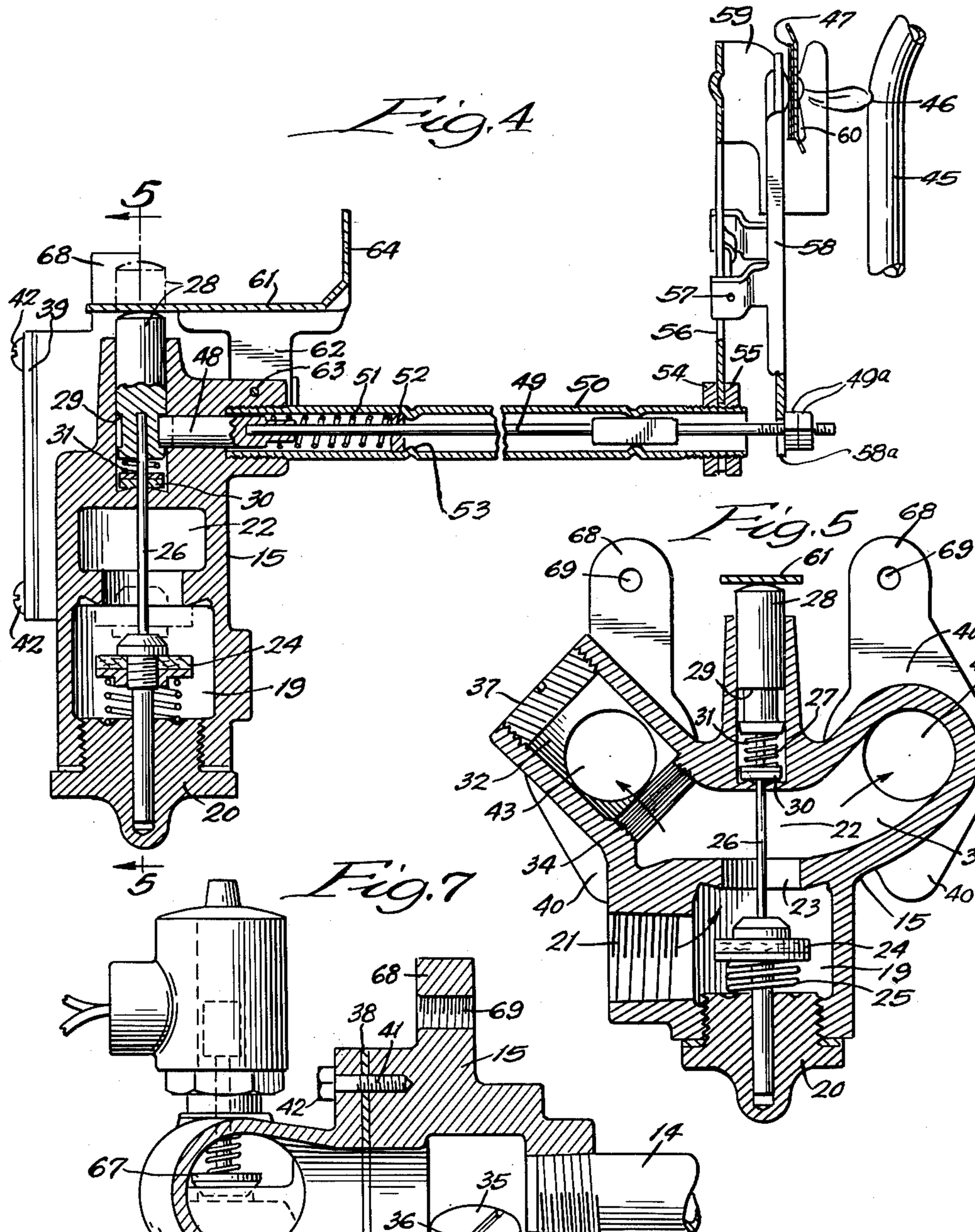

Fig. 5

Fig. 7

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Patented Feb. 24, 1953

2,629,394

UNITED STATES PATENT OFFICE

2,629,394

VALVE STRUCTURE FOR GAS BURNERS

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Application June 30, 1948, Serial No. 36,015

4 Claims. (Cl. 137—269)

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This invention relates to a valve structure for gas burners. The invention is particularly useful in the controlling of gas supplied to the pilot and main burner and in the provision for interchangeable manual and automatic regulating means.

An object of the present invention is to provide a safety pilot structure readily adaptable for automatic control or manual control, while at the same time providing means for insuring that the gas conduit to the main burner is closed when the pilot is lighted. Yet another object is to provide a valve structure equipped with bypasses permitting the ready addition of a solenoid-operated valve to a manually-operated control structure. A still further object is to provide a safety pilot valve structure equipped with means for automatically closing a control valve when the pilot flame ceases burning, while at the same time providing a bypass arrangement by means of which a U-type automatic valve may be readily secured to the structure while permitting closure of the passage employed in connection with manual operation. A still further object is to provide a floating valve packing structure equipped with means for sealing the packing when the shaft is in down position while releasing the packing when the valve stem is moved to a raised position, thus eliminating the possibility of the main valve being held in open position due to friction between the packing and the casing. A further object is to provide a novel valve casing provided with an inlet and outlet chamber communicating through a valve seat, the valve seat being controlled by a spring-urged valve manually movable to open position and normally held in open position by means responsive to heat from the pilot flame, the valve casing being provided with a plurality of outlet ports equipped with removable closure means to permit bypassing of the gas in quickly converting the control structure from a manually-operated structure to an automatically-operated structure. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in a single embodiment, by the accompanying drawings, in which—

Figure 1 is a top plan view of apparatus embodying my invention; Fig. 2, a side view in elevation and on a reduced scale; Fig. 3, a broken enlarged view of the burner employed, the view being taken from one side of the burner; Fig. 4, an enlarged sectional detail view, the section being taken as indicated at line 4—4 of Fig. 1; Fig. 5, a transverse sectional view, the section being taken as indicated at line 5—5 of Fig. 4; Fig. 6, a broken top plan view showing the pilot valve control structure equipped with a solenoid valve-controlled fitting; and Fig. 7, an enlarged detail sectional view of the structure shown in Fig. 6, the section being taken as indicated at line 7—7 of Fig. 6.

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In the illustration given in Figs. 1 to 5 inclusive, 10 designates a plate equipped with bracket supports for suspending the same within a heater and supporting a burner 11. Communicating with the burner 11 and extending therebelow is the usual air mixer pipe 12 having an open air intake at 13. Extending into the intake 13 is the main burner gas pipe 14. Since all of such structure is well known, a detailed description is believed unnecessary.

The main burner gas pipe 14 extends laterally from the burner, as shown best in Fig. 1, and communicates with a valve casing 15. Mounted in the gas line 14 is a rotary plug valve structure 16, and the valve stem 17 extends upwardly for manual operation. In a floor-type heater, the manually-operated shaft or stem 17 extends upwardly to an accessible point near the floor so that the operator can conveniently rotate the member 17 to close or open the rotary plug valve. Fixed to the stem 17 is an arcuate arm 18, the purpose of which is to insure the closing of the valve in the line 14 when the safety valve is opened, as will be later described.

The safety valve casing 15 is shown more clearly in Fig. 5. The casing provides an inlet chamber 19 closed at the bottom with a removable closure 20 and equipped with a laterally-extending threaded port 21 for receiving a conduit leading to a source of gas.

The casing provides also an upper outlet chamber 22 which communicates through an aperture 23 with the inlet chamber 19 therebelow. A valve seat is provided about the aperture 23 and a valve 24 is normally urged by spring 25 toward the seat. A valve stem 26 of reduced cross section extends upwardly through the casing into a packing chamber 27 and is fixed to a plunger 28. The plunger 28 is equipped with an annular recess 29 employed for releasably locking the plunger in lower position, as will be later described.

Within the packing chamber 27 is a floating valve packing 30 which may be formed of synthetic rubber or any other suitable material. The packing fits snugly about the shaft 26 so

as to eliminate all possibility of leaks between it and the shaft. A small spring 31 is fixed to the plunger and packing for sliding the packing on the shaft a limited distance when the plunger is moved from its maximum down position to the up position. Since the plunger moves a greater distance than the limited distance referred to, the packing is thus lifted well off the seat. This provision insures a gas-tight joint when the packing is in the down position and free frictionless motion when in the up position, thus eliminating any possibility of the main valve being held in an open position due to friction between the packing and the casting.

The casing 15 provides a laterally-extending outlet passage 32 on one side, and a laterally-extending outlet passage 33 on the other side, both being in full communication with the outlet chamber 22. There is provided, however, between the outlet chamber and the outlet passage 32 a threaded portion 34 adapted to receive a threaded closure plug 35, as shown more clearly in Fig. 7. The plug 35 is preferably equipped with a slot 36 to facilitate the screwing and unscrewing of the plug by means of a screw driver. The outer end of the fitting providing passage 32 is internally threaded to receive a closure plug 37. The plugs 35 and 37 are in alignment, and the inner plug 35 is smaller than the outer plug 37. Thus, ample room is provided for inserting the inner plug 35 when the outer plug 37 is removed.

The casing 15 is provided at its rear side with a flat surface 38 adapted to receive a closure plate 39. To facilitate the uniting of the closure plate readily to the casing 15, I prefer to equip the rear side of the casing with flanges 40 having tapped openings 41 therein for receiving attachment screws 42, as shown more clearly in Figs. 1 and 4. The plate 39 closes a port 43 leading from the outlet passage 32. The plate also closes a similar port 44 leading from the outlet passage 33.

The main gas burner pipe 14 communicates with the outlet passage 32 at a point just about opposite the outlet 43. Similarly, the pilot pipe 45*a* communicates through a reduced opening with the outlet passage 33. The pilot pipe 45 extends upwardly through the plate 10 and has a discharge port adjacent the burner 11 thus forming a pilot burner 45*b*. The pilot tube 45 is also provided with a small aperture 46 for directing a flame rearwardly toward a bimetallic element 47 which will be later described in connection with the controlling of the safety valve 24. If desired, the pilot pipe 45*a* may be provided with a band-operated valve 45*c*.

The plunger 28 controlling the safety valve 24 has an annular locking recess 29 adapted to be engaged by a locking bar 48, as shown more clearly in Fig. 4. Secured to the locking bar 48 is an actuating stem 49 which is guided for longitudinal movement in a tube 50 extending between the valve casing 15 and the mixer tube 12. A spring 51 bears against a washer 52 held in position by the indentations 53 of the tube. The spring bears against the rear surface of the bar 48 and normally urges it toward locking position.

The rear end of tube 50 is threaded, and the nuts 54 and 55 clamp a bracket arm 56 rigidly upon the tube. The bracket arm 56 is provided at an intermediate point with a rearwardly-pressed portion through which extends a pivot

pin 57 pivotally connecting the movable member 58 upon the fixed bracket 56.

At its upper end, the bracket 56 has spaced flanges 59 provided with slots 60. The movable member 58 extends between the flanges 59 and is riveted centrally to the bimetallic member 47. When the bimetallic member 47 bows as a result of the application of heat thereto, the ends of the member movable within slots 60 engage the walls of the bracket flanges 59 and produce a movement of the arm 58 for actuation of the rod 49. The lower end of the member 58 is slotted at 58*a* to receive the rod 49, and the nuts 49*a* secure the member 58 thereon, as shown more clearly in Fig. 4.

For the actuation of the plunger 28, I provide a member 61 having depending legs 62 straddling a portion of the casing 15 and pivotally connected thereto by pin 63, as shown more clearly in Fig. 4. The member 61 has an end portion bearing against the plunger 28, and an upwardly-extending flange 64 adapted to be engaged by the valve stem arm 18.

The structure so far described is that employed for manual operation of the burner. When automatic operation is desired, the plate 39 on the rear side of casing 15 is removed, and the U-type valve fitting 65, as shown in Figs. 6 and 7, is attached to the casing. The fitting 65 has flanges 66 which are readily secured by the screws 42 to the casing 15, as shown more clearly in Fig. 7. The fitting provides a manifold or U-shaped passage providing direct communication between the ports 44 and 43 of the casing 15. A solenoid-controlled valve 67 controls the flow of gas from port 44 through the manifold passage to the chamber 32 and from thence through the main gas pipe 14 to the gas burner. The solenoid is in turn controlled by a thermostat as in the usual practice. Since such valve is of well-known construction, a detailed description is believed unnecessary. In order to cause the flow of gas from the inlet chamber 19 to pass rearwardly through the port 44, the inner screw plug 35 is placed in position, as illustrated best in Fig. 7, and the plug 37 is replaced so as to seal the outer end of passage 32. Gas now flows through the outlet port into fitting 65, past the valve 67, and thence, as shown best in Fig. 7, from the fitting passage into passage 32 which is closed on two sides by plugs 35 and 37 but which communicates on another side with pipe 14 leading to the main burner.

For supporting the valve casing 15, I prefer to extend the flanges 40 so as to provide the supporting straps 68 which may be provided with tapped openings 69 for receiving screws extending through a supporting structure (not shown).

Operation

In the operation of the apparatus, the closure plate 39 is bolted in position so as to seal the ports 43 and 44, and the control of gas is effected by manual operation. To light the burner, the operator rotates the valve 16 stem 17 to move the rotary valve to closed position. This movement brings arm 18 against the vertical flange 64 of the member 61 so that the end thereof adjacent the plunger 28 tips downwardly and depresses the plunger. The downward movement of plunger 28 forces the valve 24 away from its seat, as illustrated in Figs. 4 and 5. At the same time, the spring 51 seeks to urge the locking bar 48 toward the position shown best in Fig. 4. The lighting of the pilot causes the flame

from opening 46 to be directed against the bimetallic member 47 which bows centrally toward the burner and allows the spring to press the bar 49 into locking position. The actuating stem 17 may then be rotated in the opposite direction to open the rotary valve 16 so as to permit the flow of gas through the main pipe 14 to the gas burner.

As long as the flame is maintained in the pilot burner, the valve 24 is thus held in open position. Should the pilot came, however, fail, the bimetallic plate 47 immediately cools and moves the actuating bar to the left so as to withdraw the locking bar 48 from engagement with the plunger 28. Spring 25 is thus freed to bring the safety valve 24 against its seat to close off the flow of gas into the outlet chamber 22.

Should it be desired to use an automatic control rather than a manual control, the closure plate 39 may be removed and the U-fitting 65 substituted, as shown best in Figs. 6 and 7. At the same time, the inner plug 35, which is not employed in the manual operation just described, is inserted through the passage 32 and screwed into closing position, as illustrated in Fig. 7. The outer end of the passage 32 is likewise sealed by screwing plug 37 into position. The gas now flows through the port 21, inlet chamber 19, aperture 23, outlet chamber 22, outlet passage 33, outlet port 44, and into the U-shaped passage of the fitting 65. Flow through the fitting is controlled by the solenoid-operated valve 67. The gas passing through the manifold enters passage 32 which is now sealed from the inlet chamber 19 by the plug 35 and closed at the other end by plug 37. From the passage 32, gas passes through the pipe 14 to the main burner, as in the former operation.

Should it be desired at any time to remove the automatically-operated valve fitting, this may be accomplished readily by reversing the steps just described. The screws 42 are removed to permit the removal of fitting 65. and the closure plate 39 is again locked in position by the screws 42. At the same time, the inner plug 35 is removed and the outer plug 37 replaced to seal the outer passage 32. The operation may now be manually controlled by rotating stem 17 to feed the desired amount of gas to the burner and the gas passes through port 21 into chamber 19 and thence through aperture 23 into chamber 22. From chamber 22, a portion of the gas goes laterally through outlet passage 33 to the pilot conduit 45*a*. Another portion of the gas passes through the opening formerly occupied by the plug 35 and into the outlet passage 32, from which it flows into the main gas pipe 14.

In prior installations, considerable expense and difficulty have been involved in changing the control structure from a manual control to an automatic control. The gas lines have had to be broken and the gas valve inserted and connected again. Extensive piping connections have had to be made. With the present structure, the change is accomplished readily by the use of the inner threaded plug and by the flange-port structure, closed in one instance by a closure plate and in another instance connected by a U-fitting to provide automatic operation. By the use of the safety arm 18, the hazard involved by allowing the main burner to come on before the pilot is lighted is avoided and the operator is obliged to close the main burner line before opening the safety pilot valve. The floating valve packing employed with the safety valve stem

insures a gas-tight joint when the stem is in down position while providing free frictionless motion when the stem is in up position.

While in the foregoing specification, I have set out certain structures in considerable detail for the purpose of illustrating an embodiment of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a structure for controlling the gas supplied to the pilot burner and main burner of a heating appliance, the combination comprising a valve casing providing an inlet chamber and an outlet chamber communicating with each other through a valve seat, a stem-equipped valve, a spring urging said valve toward said seat, means for actuating said stem for opening said valve, said casing providing an outlet passage communicating with said outlet chamber on one side and an outlet passage communicating with said outlet chamber on the other side, said casing providing a threaded portion between one of said outlet passages and said outlet chamber adapted to receive a closure member, a threaded plug closing the outer end of said last-mentioned outlet passage, a main burner conduit communicating with said last-mentioned outlet passage, a pilot conduit communicating with the other outlet passage, each of said outlet passages having ports extending rearwardly therefrom, and a closure plate releasably secured to said casing for closing said last-mentioned ports, whereby said structure can be easily converted from manual to automatic operation by substituting a fitting having a conduit therein for said closure plate, removing said threaded plug, inserting a closure member in said threaded casing portion, and replacing said threaded plug.

2. In a structure for controlling the gas supplied to the pilot burner and main burner of a heating appliance, the combination comprising a valve casing providing an inlet chamber and an outlet chamber communicating with each other through a valve seat, a spring-urged valve controlling said seat, said casing providing an outlet passage leading from said outlet chamber, said casing having an annular portion equipped with internal threads between said outlet chamber and said passage, an outer plug of larger diameter threadedly engaging the casing to close the outer portion of said passage, a main burner conduit communicating with said outlet passage, said casing providing also a second outlet passage from said outlet chamber, a pilot conduit communicating with said second outlet passage, ports opening into said outlet passages through the rear wall of said casing, and a removable plate closing said ports, whereby said structure can be easily converted from manual to automatic operation by substituting a fitting having a conduit therein for said closure plate, removing said outer plug, inserting a threaded closure plug in said thread-equipped annular casing portion, and replacing said outer plug.

3. In a structure for controlling the gas supplied to the pilot burner and the main burner of a heating appliance, the combination comprising a valve casing providing an inlet chamber and an outlet chamber communicating with each other through a control valve, said casing providing an outlet passage leading from said outlet chamber, said casing having a restricted portion between said outlet chamber and said

passage for receiving a plug to close said passage, a removable outer plug of larger diameter than asid restricted passage portion closing the outer portion of said passage, a main burner conduit communicating with said outlet passage, said casing providing also a second outlet passage from said outlet chamber, a pilot conduit communicating with said second outlet passage, ports opening into said outlet passages through the rear wall of said casing, and a removable plate closing said ports, whereby said structure can be easily converted from manual to automatic operation by substituting a fitting having a conduit therein for said closure plate, removing said outer plug, inserting a closure plug in said restricted passage portion, and replacing said outer plug.

4. In a structure for controlling the gas supplied to the pilot burner and the main burner of a heating appliance, the combination comprising a valve casing providing an inlet chamber and an outlet chamber communicating with each other through a control valve, said casing providing an outlet passage leading from said outlet chamber, said casing having a restricted portion between said outlet chamber and said passage for receiving a plug to close said passage, a main burner conduit communicating with said outlet passage, said casing providing also a second outlet passage from said outlet chamber, a pilot conduit communicating with said second outlet passage, ports opening into said outlet passages through the rear wall of said casing, and a removable plate closing said ports, whereby said structure can be easily converted from manual to automatic operation by steps including substituting a fitting having a conduit therein for said closure plate and inserting a closure plug in said restricted passage portion.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,666,243	Manning	Apr. 17, 1928
1,914,133	Kerr	June 13, 1933
1,966,735	Sackett	July 17, 1934
1,977,150	Schmidt	Oct. 16, 1934
2,257,024	Ray	Sept. 23, 1941
2,387,164	McCarty	Oct. 16, 1945

FOREIGN PATENTS

Number	Country	Date
541,310	Germany	of 1939