Nov. 6, 1956 G. W. FRANZHEIM 2,769,610

FUEL VALVE

Filed Aug. 31, 1951

Fig. 1.

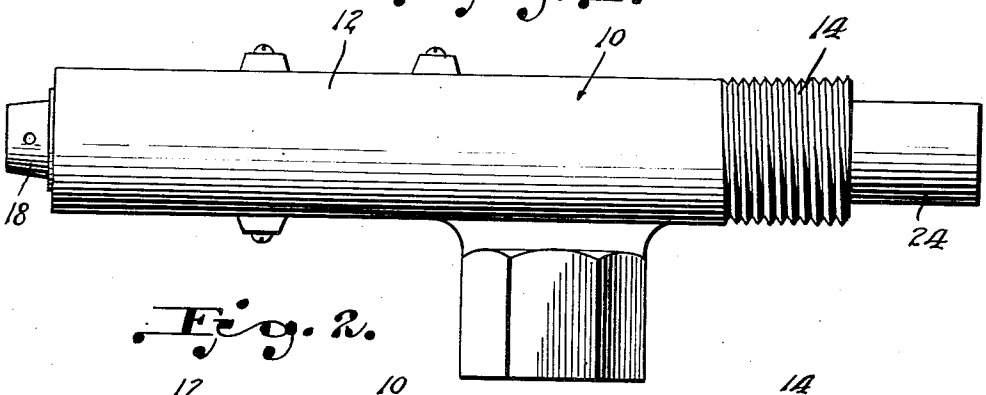


Fig. 2.

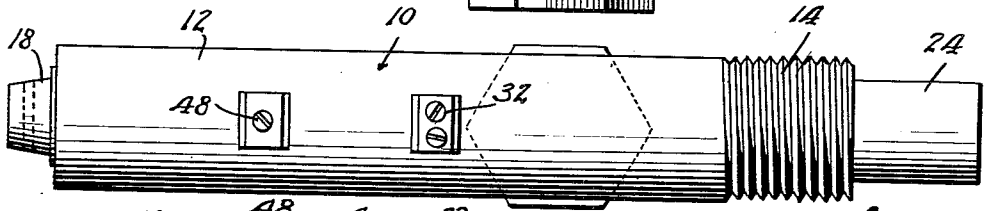


Fig. 3.

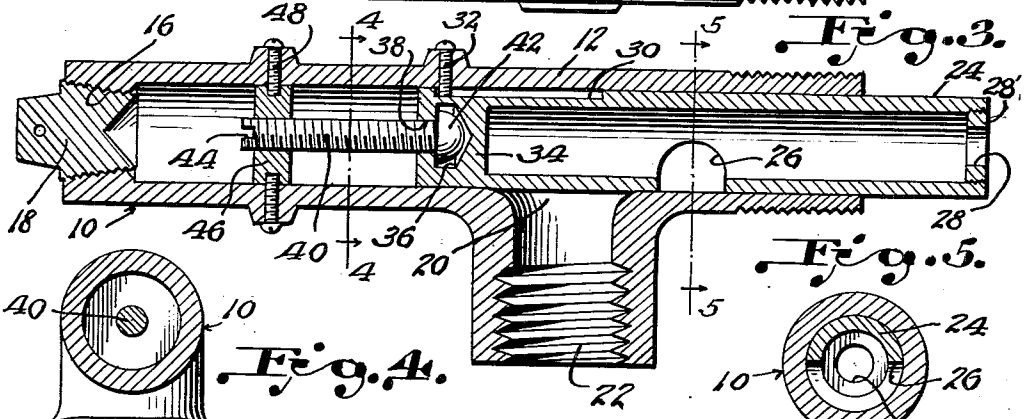


Fig. 5.

Fig. 4.

Fig. 6.

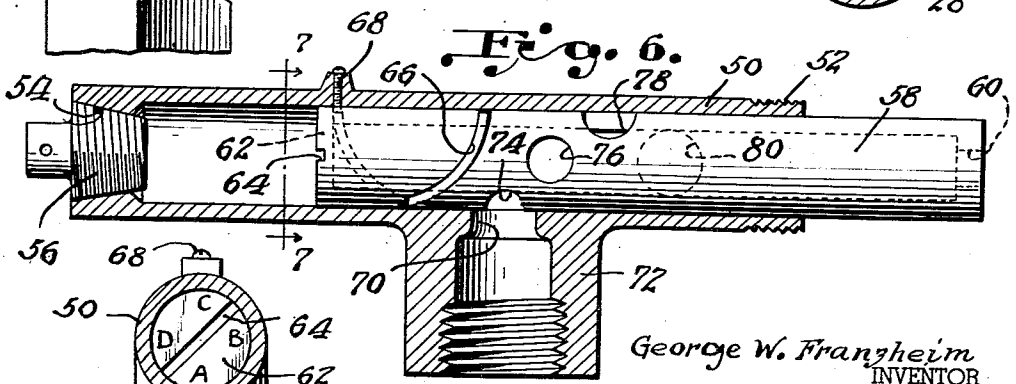


Fig. 7.

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FUEL VALVE

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1 Claim. (Cl. 251—205)

This invention relates to a fuel valve and more particularly to a valve of the type employed in supplying gaseous fuel to the venturi of a gaseous fuel burner.

In the installation of gaseous fuel burners it is well known that the amount of gas admitted to the venturi must be regulated in accordance with the type of gaseous fuel being used. As a consequence it is the common practice of gaseous fuel burner manufacturers and distributors to supply with each burner three or more fuel discharge nozzles having different diameter discharge orifices so that through the trial and error method the person installing the burner may select a fuel discharge nozzle which produces the most efficient burner operation. Such methods of installation frequently require the complete dismantling of a burner in order to obtain the correct fuel discharge nozzle having the desired size of fuel discharge orifice with the result that much time and effort is consumed in making such installations.

I have discovered that a factor which is equally important with the volume of fuel supplied to the venturi of a gaseous fuel burner, is the distance between the throat of the venturi and the gaseous fuel discharge orifice, and that the larger the volume of gas that is passing through the discharge orifice, the further the discharge orifice should be from the venturi throat, and the smaller the volume of gas passing through the discharge orifice, the closer the discharge orifice should be to the venturi throat.

A primary object of this invention is to supply to the gaseous fuel discharge orifice of a conventional gaseous fuel burner the correct volume of gaseous fuel in order to obtain the most efficient operation of the burner.

Another object is to alter the position of the gaseous fuel discharge orifice relative to the throat of the venturi of the burner in direct relation to the volume of gaseous fuel fed to the burner so as to obtain the most satisfactory and efficient operation of the burner.

A further object is to facilitate the adjustment of the fuel valve without employing discharge nozzles having discharge orifices of varying size, and thus eliminate the necessity of dismantling a burner once it has been assembled in order to secure the correct discharge of fuel into the venturi of the burner.

A still further object is to eliminate the necessity of supplying a number of discharge nozzles having different sized orifices with each burner and to thus save the expense occasioned by the present practice.

The above and other objects may be attained by employing this invention which embodies among its features an elongated tubular valve body carrying adjacent one end means for coupling it to the venturi of a conventional gaseous fuel burner, an elongated tubular valve entering the valve body through the end carrying the coupling, said valve and valve body having extending through their side walls ports which in registration supply gaseous fuel to the interior of the valve, said valve having in the end thereof which projects beyond the valve body a discharge orifice for the gaseous fuel which enters thereinto, and

for directing said fuel toward the throat of the venturi of the burner, and means carried by the tubular valve and accessible through the end of the valve body remote from the coupling means for moving the valve longitudinally with relation to the body and regulating the registration of the ports so as to enable the volume of gaseous fuel admitted into the valve to be regulated.

Still other features include so arranging the ports in the sides of the valve and valve body that the greater the flow of gaseous fuel into the valve, the closer will the discharge orifice of said valve be to the coupling by which the valve body is connected to the venturi.

Other features include spiral means carried by the valve and cooperating with the valve body for moving said valve longitudinally with relation to the body and means carried by the spiral means and accessible through the end of the valve body remote from the coupling means for rotating said spiral means and adjusting the valve longitudinally within the valve body.

In the drawings,

Figure 1 is a side view in elevation of a valve embodying the features of this invention,

Fig. 2 is a top plan view of the valve illustrated in Fig. 1,

Fig. 3 is a longitudinal sectional view through the valve illustrated in Figs. 1 and 2,

Fig. 4 is a transverse sectional view taken substantially along the line 4—4 of Fig. 3,

Fig. 5 is a transverse sectional view taken substantially along the line 5—5 of Fig. 3,

Fig. 6 is a longitudinal sectional view through a valve body embodying the features of this invention but showing the modified form of valve therein, and

Fig. 7 is a transverse sectional view taken substantially along the line 7—7 of Fig. 6.

Referring to the drawings in detail a valve body 10 comprises an elongated tubular member 12 carrying adjacent one end external screw threads 14 by means of which the valve body may be coupled to a conventional venturi of a conventional gaseous fuel burner. The end of the body 12 remote from the threaded end 14 thereof is provided with internal screw threads 16 for engagement by the threads of a threaded closure plug 18. Formed intermediate the ends of the body 12 and extending through the side wall thereof is a port 20 which is surrounded by a nipple having internal screw threads 22 by means of which the valve body may be coupled to a conventional gaseous fuel supply line (not shown).

Entering the end of the tubular body 12 remote from the plug 18 is an elongated tubular valve 24 which slides longitudinally within the body 12 and is provided in its side with a port 26 which is adapted to align with the port 20 when the valve is fully open to receive the gaseous fuel fed therethrough. The outer end of the tubular valve 24 is provided with a gaseous fuel discharge orifice 28 which when the valve is assembled with a gaseous fuel burner is disposed toward the throat of a conventional venturi so that the fuel issuing through the orifice 28 will be mixed with air as it approaches the throat of the venturi to produce a combustible mixture.

In the form of the invention illustrated in Figs. 1 through 5 inclusive the tubular body 24 is provided in its side diametrically opposite the port 26 with an elongated longitudinal groove 30, and threaded through the body 12 and entering the groove 30 is a guide screw 32 which holds the tubular valve 24 against rotation relative to the body 12. The end of the tubular valve 24 remote from that having the orifice 28 therein is closed by an end wall 34 having formed therein a chamber 36 and extending through said wall 34 is an axial opening 38 which communicates with the chamber 36 and accommodates the threaded shank of a screw 40 having

its head 42 located within the chamber 36. The end of the shank 40 of the screw remote from the head 42 is provided with a transversely extending groove 44 which is disposed toward the closure plug 18 so that when the plug is removed from engagement with the screw thread 16, access to the cross slot or groove 44 may be had. Threadedly engaging the shank 40 of the screw intermediate its ends is a nut 46 which is secured in the tubular body 12 and held against rotation therein by suitable radially extending screws 48. It will thus be seen that by removing the plug 18 and engaging the walls of the slot or groove 44 with a screw driver, the screw may be rotated in order to advance or retract the tubular valve 24 within the valve body 12 and move the port 26 into registration with the port 20 so that fuel introduced into the port 20 through the fuel pipe not shown may be admitted to the interior of the valve 24 and discharged therefrom into the venturi of the burner with which the valve is coupled through a jet member or plug 28' having an orifice 28.

In the modified form of the invention illustrated in Figs. 6 and 7, a tubular valve body 50 like the valve body 12 is provided adjacent one end with external screw threads 52 by means of which it may be threadedly coupled with a conventional gaseous fuel burner, and the end of the body 50 remote from the threaded coupling 52 is provided with an internally screw threaded access opening 54 which is normally closed by a suitable plug 56.

Entering the end of the valve body 50 adjacent the screw threads 52 thereon is a tubular valve 58 having in its outer end a gaseous fuel discharge orifice 60. The inner end of the body 58 is closed by an end wall 62 having a transverse slot or groove 64 extending therethrough and which is accessible through the access opening 54 so that upon the introduction of a screw driver into the interior of the body 50 to the access opening 54, the screw driver bit may be brought into engagement with the walls of the groove 64 thereby enabling the body 58 to be rotated. Formed in the body 58 adjacent the end thereof closed by the end wall 62 is a spiral groove 66 which opens outwardly through the periphery of the tubular body 58 and receives the inner end of a screw 68 which extends through the side of the valve body 50 as will be readily understood upon reference to Fig. 6. Opening through the side of the valve body 50 intermediate the ends thereof is a gaseous fuel intake port 70 which opens into an internally screw threaded nipple 72 which may be coupled to the gaseous fuel supply (not shown). Formed in the tubular body 58 intermediate its ends are peripherally spaced ports 74, 76, 78 and 80 which are spirally arranged so that their axes follow the curvature of the spiral groove 66. It will therefore be seen that as the tubular valve 58 is rotated within the valve body 50 it will advance or retract longitudinally relative to said body and when in its fullest retracted position, the smaller port 74 registers with the port 70 in the valve body 50, thus supplying the smallest volume of gaseous fuel to the interior of the valve 58. It is also to be noted that when the smaller port 74 aligns with the port 70, the discharge orifice 60 is relatively close to the throat of the venturi to which the valve is coupled, and as the larger ports 76, 78 and 80 are moved into registration with the port 70, the orifice 60 will be retracted relative to the throat of the venturi to which the valve is coupled to thereby improve the efficiency of the burner.

In use with either of the valves illustrated in Figs. 1 or 6 connected to a source of fuel supply, it will be evident that as the discharge orifices 28 and 60 are moved away from the throat of the venturi with which the valve is coupled, the greater will be the flow of fuel through the valve, and as the flow of fuel is reduced, the discharge orifice 60 will be advanced toward the throat of the venturi of the burner. In this way a proper balance is maintained between the volume of fuel entering the burner and the position of the discharge orifice relative to the throat of the venturi so as to preserve maximum efficiency in the mixing of the gas with the air to produce the combustible mixture. Also owing to the fact that the volume of gaseous fuel admitted to the burner may be regulated by the simple rotation of a screw driver entered through the access openings of the bodies 12 and 50, it will be evident that rapid and satisfactory operation of the burner may be achieved without employing the trial and error method heretofore used.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What is claimed is:

In a fuel valve, a T-shaped body formed with a tubular head and a threaded stem, external threads on one end of said head, a closure plug threaded into the opposite end of said head, an elongated tubular plug slidable in said head and having an intake port between the ends thereof adapted to communicate with said stem, an end wall on one end of said tubular plug, a jet member threaded in the other end of said plug, said plug having a longitudinal channel therein adjacent the inner or rear end thereof, a screw threaded through said head loosely engaging in said channel for holding said tubular plug against rotation while permitting sliding movement thereof, a headed plug adjusting screw swivelly engaging said end wall, a nut fixed in said head between the ends thereof, said adjusting screw threadedly engaging through said nut and having a kerf in the outer end thereof, removal of said closure plug and adjustment of said screw effecting endwise movement of said tubular plug to open or closed position.

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