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(54) **An LPG burning appliance**

Flüssiggasverbrennungsvorrichtung

Dispositif pour brûler G.P.L. (gaz de pétrole liquéfié)

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Description

[0001] The present invention relates to LPG (liquefied petroleum gas) burning appliances, and in particular to LPG burning appliances having a safety arrangement.

[0002] It is known from our United Kingdom Patent 2182765 to provide an LPG burning appliance in which fuel from a reservoir is fed through a tube which extends into a flame zone of the appliance, the outlet of the tube being connected to a jet of the appliance. In this way, the fuel is heated before it is expelled through the jet, which ensures that all of the fuel is vaporised before it is burned. This arrangement reduces the likelihood of discharge of unvaporised fuel from the jet of the burner if the apparatus is upset, which might otherwise cause a larger than normal, yellow, sooty flame around the burner.

[0003] Many such appliances are intended to be releasably securable to a canister of fuel by means of a screw-threaded connection. The disconnection of such an appliance from the canister can in itself cause problems. In some cases, a regulating valve is releasably securable directly to the fuel canister and is connected to the burner by means of a tube, either flexible or rigid. When the regulating valve is closed there is thus the possibility that the tube connecting the regulating valve to the burner can be full of fuel which can thereafter make its way out of the burner.

[0004] Alternatively, if the regulating valve is located nearer the burner in order to provide easier adjustment of the flow of fuel, the connection of the tube to the fuel canister is normally by means of a screw-thread arrangement which, upon separation of the tube from the canister causes a self-sealing valve in the canister to close. However, there is the possibility that the tube will be full of fuel which will not make its way to the burner and be burned off, since the regulating valve will be in the closed position.

[0005] Thus, in either case there is the risk of a loss of unburned fuel resulting from the fact that it is possible for a significant length of tube to be full of liquefied gas even after the regulating valve has been closed.

[0006] A burner according to the prior art is also known from US 3 877 458 A.

[0007] It is thus an object of the present invention to provide an LPG burning appliance in which the fuel path is minimised while at the same time permitting the preheating of fuel to prevent discharge of liquefied gas from the burner.

[0008] In accordance with the present invention, an LPG burning appliance comprises a body having connection means for releasably connecting the body to a fuel canister to permit the flow of fuel from the canister, a body fuel inlet to permit the flow of fuel into the body, a burner assembly having an outlet jet secured to and extending from the body and a fuel flow passage between the fuel inlet and the fuel outlet jet for feeding fuel from a canister to the fuel outlet jet, the fuel flow passage including a fuel flow conduit, both ends of which secured to the body and which extends through a flame zone of the burner assembly, thereby providing a fuel flow path which constrains all fuel from the canister to pass from the body inlet to a flame zone of the burner assembly and back to the fuel outlet jet, the body further comprising a control valve located in the fuel flow passage in the body, characterised in that the burner assembly is located above the body and in that the fuel conduit extends upwardly from the body into the flame zone and then downwardly back to the body.

[0009] In such an appliance the maximum amount of unburned fuel within the appliance is essentially the amount of fuel remaining in the fuel flow conduit. In particular, there are no lengths of connecting tube in which fuel may be present when the assembly is removed from the canister.

[0010] The incorporation of the regulating valve, the burner and the gas flow conduit in a single assembly which is connectible directly to a fuel canister results in a compact assembly which is also cheaper to produce.

[0011] Preferably, the valve is located in the fuel flow passage between the body inlet and the inlet to the gas flow conduit.

[0012] This arrangement allows a user to turn off the appliance if the fuel flow conduit is perforated due to damage or corrosion. If the valve were located at the other end of the conduit and the conduit were damaged the burner orifice would not limit the maximum rate of fuel flow and a large quantity of fuel could be released. Also in such an arrangement, if the valve is turned off then the maximum amount of unburned fuel which can remain in the appliance (e.g. if the assembly is overturned when connected to a fuel canister) is the amount of fuel in the fuel flow passage between the fuel inlet and the valve.

[0013] In one embodiment, the connection means comprises a screw-threaded connection to a complimentarily-threaded connection on a fuel canister. In another embodiment, the assembly is provided with means for piercing a wall of a fuel canister and comprises means for releasably holding the assembly in position on the canister.

[0014] By way of example only, specific embodiments of the present invention will now be described, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of a first embodiment of burner assembly in accordance with the present invention, with a burner portion and a casing of the assembly removed;

Fig. 2 is a longitudinal cross-section through the assembly of Fig. 1 with the burner portion and casing in position;

Fig. 3 is a perspective view of a second embodiment of burner assembly in accordance with the present invention with a burner portion and a casing of the assembly removed; and

Fig. 4 is a longitudinal cross-section through the assembly of Fig. 3 with the burner portion and casing in position.

[0015] Referring firstly to Figs. 1 and 2, a burner assembly comprises a cast metal valve body 10 and a metal casing 11 covering the upper and side portions of the body 10. A burner 12, a fuel flow conduit 14 and a regulating valve control knob 16 extend from the valve body beyond the casing 11. The burner 12 comprises a tubular conduit 18 and a burner head 20, and the lower portion of the conduit 18 is internally screw-threaded to engage with an externally-threaded boss 22 forming part of the valve body 10 and extending upwardly therefrom. The boss 22 is provided with a threaded fuel exit aperture 24 which screw-threadedly receives a correspondingly-threaded portion of a burner jet 26 which in use extends into the conduit 18 of the burner 12.

[0016] An annular collar 28 extends downwardly from the base of the body 10 and is provided with an internal screw thread 30 which is engageable with a corresponding thread 32 forming part of a conventional sealing cap 34 of an LPG container 36. As seen in Fig. 2, the body 10 is also provided with a downwardly-projecting finger 38 which is adapted to open a self-sealing valve 39 (shown schematically) located in the sealing cap 34 of the canister 36. The valve body is also provided with an external flat rubber sealing ring 40 and an internal sealing O-ring 41 which, in use, sealingly engage an annular shoulder 42 of the canister sealing cap 34 and an upper face of the body of the self-sealing valve 39 respectively.

[0017] The fuel flow conduit 14 is brazed to the body 10 and is in the form of a metal tube which is shaped and dimensioned so that at least a portion of the tube 14 projects into a flame zone of the burner 12. A first, fuel inlet end of the tube is seated in a recess 42 in a side wall of the body 10 and the other end of the tube is seated in a second recess 44 located adjacent to the recess 42. In Fig. 2 the recess 44 is shown, schematically, as being located above the recess 42 but this is shown for clarification only and the actual arrangement is as illustrated in Fig. 1 with the two recesses 42, 44 at the same height on the valve body 10.

[0018] The tube 14 forms part of a fuel flow passage comprising a first bore 46 extending vertically from a fuel inlet 48 in the base of the body 10 leading to a regulating valve 50, a horizontal bore 51 which leads from the valve 50 to the inlet end of the tube 14, the tube 14 and a horizontal bore 53 which leads from the outlet end of the tube 14 to the fuel exit aperture 24 of the hollow boss 22.

[0019] As best seen in Fig. 2, the regulating valve 50 is disposed in the passage means between the valve body fuel inlet 48 and the tube 14. The valve 50 comprises an elongate valve closure member 54 which is positioned in a stepped bore 55 in the valve and to which the valve control knob 16 is attached. The valve closure member 54 is provided with a frusto-conical shoulder 56 at the end remote from the control knob 16, the shoulder 56 being releasably sealingly engageable with a complimentarily-shaped valve seat 58 formed in the valve body 10. An enlarged portion 60 of the valve closure member 52 is screw-threadedly engaged with an internally-threaded portion 62 of the bore 54, thereby enabling the valve closure member 52 to be displaced longitudinally in both directions by rotation of the valve control knob 16 and permitting the frusto-conical shoulder 56 to be engaged with and disengaged from the valve seat 58. The portion of the valve closure member 52 adjacent to the frusto-conical shoulder 56 is provided with two O-rings 64 which are located in grooves in the valve closure member which are defined by circumferential ribs 66.

[0020] In use, the burner assembly is screw-threadedly connected to the sealing cap 34 of an LPG canister 36, whereupon the sealing ring 40 engages the annular shoulder 42 of the cap 34, the sealing O-ring 41 engages the upper face of the body of the self-sealing valve 39 and the finger 38 opens the self-sealing valve 39 in the valve cap 34. This permits vaporised fuel to enter the inlet 48 in the valve body 10. The valve 50 would normally be closed at this stage and thus fuel is able to travel no further than the valve closure member 54. When the valve 50 is opened by turning the knob 16, fuel is allowed to flow along the fuel flow passage, namely along bore 46, through the valve 50, through bore 51, through the tube 14, through horizontal bore 53 and thereby into the jet 26. The gas is then lit at the burner, and subsequent fuel flowing through the fuel flow conduit 14 will be heated since the upper end of the fuel flow conduit 14 is situated in the vicinity of the flame of the burner 12. This ensures that even if the burner is tipped over, any fuel reaching the burner will be vaporised rather than liquefied, thus preventing the discharge of liquefied fuel from the jet 26 and preventing flaring.

[0021] When it is desired to extinguish the flame, it is merely necessary to close the valve 50 by turning the knob 16, thereby bringing the shoulder 56 of the valve closure member 54 into sealing engagement with the valve seat 58. The assembly may then if desired be removed from the fuel canister 36 by unscrewing it from the canister. Even if the canister is inverted in this process, the amount of liquefied fuel present cannot exceed the volume of the inlet 48 surrounding the finger 34 and the volume of the passage 46. Thus, the risk involved in removing the burner assembly from the fuel canister is greatly reduced.

[0022] An amount of fuel may remain in the tube 14 but if the burner has recently been in use, the tube 14 will be at a relatively high temperature which will help to ensure that any fuel in the tube 14 will be gaseous and will either be burned before the flame is extinguished or will quickly vent to atmosphere without undue risk.

[0023] The second embodiment, illustrated in Figs. 3 and 4, is very similar to the first embodiment, and similar reference numerals have been used to describe similar features. The only significant difference is the method

of securing the assembly to the fuel canister. In the first embodiment the burner assembly is intended for use with a fuel canister which has a self-sealing valve which is opened by the finger 34 upon connection of the assembly to the canister. In contrast, the assembly of Figs. 3 and 4 is intended for use with a canister 68 which does not have a valve but which has a concave portion 69 which is pierced by the assembly.

[0024] The collar 26 of the first embodiment is replaced with an externally-threaded collar 70 which in turn is screw-threadedly connected to an annular yoke 71 which forms part of a conventional securing cover which covers the upper portion of the canister 68.

[0025] The collar 70 is provided with an internal bore 72 in which a metal piston 74 is slidably disposed, the piston being sealed with respect to the bore 72 by means of O-ring seals 76. The piston 74 is biassed downwardly by means of a compression spring 78 acting on the upper end of the piston. The piston is also provided with a through bore 80 which receives a piercing spike 82 which bears against the upper end of the chamber. The lower end of the piston is also provided with a rubber seal 84 which surrounds the spike 82 and which is shaped complimentarily with the concave portion 69 of the canister 68.

[0026] In use, the piston extends beyond the end of the spike 82 and is brought into engagement with the recess 69 on the upper portion of the fuel canister 68. The assembly is then displaced downwardly which causes the tapered spike 82 to pierce the recessed wall portion 69 of the canister. This permits gas to flow past the spike 82 through the bore 72 of the piston and into the valve body 10, where it reaches the jet via the valve 50 and the tube 14. The assembly is held in position by means of conventional hingedly mounted legs (not shown) which are secured to the cap covering the upper portion of the fuel canister 68 and which are hinged to engage with the base of the canister 68 in the conventional manner.

Claims

1. An LPG burning appliance comprising a body (10) having connection means (30) for releasably connecting the body to a fuel canister (36) to permit the flow of fuel from the canister, a body fuel inlet (46) to permit the flow of fuel into the body, a burner assembly (12) having an outlet jet (26) secured to and extending from the body and a fuel flow passage between the fuel inlet and the fuel outlet jet for feeding fuel from a canister to the fuel outlet jet, the fuel flow passage including a fuel flow conduit (14), both ends of which are secured to the body (10) and which extends through a flame zone of the burner assembly, thereby providing a fuel flow path which constrains all fuel from the canister to pass from the body inlet to a flame zone of the burner assembly and back to the fuel outlet jet, the body further comprising a control valve (50) located in the fuel flow passage in the body (10), characterised in that the burner assembly (12) is located above the body (10) and in that the fuel conduit (14) extends upwardly from the body into the flame zone and then downwardly back to the body.

2. An LPG burning appliance as claimed in claim 1, wherein the control valve (50) is located between the fuel inlet (46) and the inlet to the fuel flow conduit (14).

3. An LPG burning appliance as claimed in any of claim 1 or claim 2, wherein the control valve (50) comprises a valve seat (58) within the valve body and a valve closure member (54) movable between a first, closed position in which it engages the valve seat and a second, open position in which it is displaced from the valve seat.

4. An LPG burning appliance as claimed in claim 3, wherein the valve closure member (54) is screw-threadedly connected to the valve body.

5. An LPG burning appliance as claimed in claim 3 or claim 4, wherein a portion of the valve closure member (54) projects from the valve body and has an actuating handle (16) secured thereto.

6. An LPG burning appliance as claimed in any of claims 1 to 5, wherein the fuel flow conduit (14) is fixedly secured to the valve body.

7. An LPG burning appliance as claimed in claim 6, wherein the fuel flow conduit (14) is brazed to the valve body.

8. An LPG burning apparatus as claimed in any of claims 1 to 7, wherein the fuel flow conduit (14) comprises a tube.

9. An LPG burning apparatus as claimed in any of claims 1 to 8, wherein the connection means (30) comprises a screw-threaded connection to a complementarily-threaded connection (32) on a fuel canister (36) .

10. An LPG burning apparatus as claimed in any of claims 1 to 8, further comprising means (82) for piercing a wall of a fuel canister and means for releasably holding the apparatus in position on the canister.

11. An LPG burning apparatus as claimed in any of claims 1 to 10, wherein the outlet jet (26) is releasably secured to the body (10).

12. An LPG burning apparatus as claimed in any of claims 1 to 11, wherein the burner assembly (12) is releasably secured to the valve body (10).

Patentansprüche

1. Flüssiggasverbrennungsvorrichtung umfassend einen Körper (10) mit Verbindungsmitteln (30) zum lösbaren Verbinden des Körpers mit einem Brennstoffkanister (36), um den Fluß von Brennstoff aus dem Kanister zu ermöglichen, einen Körperbrennstoffeinlaß (46) zum Ermöglichen des Flusses von Brennstoff in den Körper, eine Brennerbaugruppe (12) mit einer Auslaßdüse (26), die an dem Körper befestigt ist und sich von demselben erstreckt, und einen Brennstoffströmungsdurchgang zwischen dem Brennstoffeinlaß und der Brennstoffauslaßdüse zum Befördern von Brennstoff aus einem Kanister zu der Brennstoffauslaßdüse, wobei der Brennstoffströmungsdurchgang eine Brennstoffdurchflußleitung (14) umfaßt, deren beide Enden an dem Körper (10) befestigt sind und die sich durch eine Flammenzone der Brennerbaugruppe erstreckt, wodurch ein Brennstoffströmungsweg bereitgestellt wird, der allen Brennstoff aus dem Kanister zwingt, aus dem Körpereinlaß zu einer Flammenzone der Brennerbaugruppe und zurück zu der Brennstoffauslaßdüse zu fließen, wobei der Körper weiter ein Steuerventil (50) aufweist, das in dem Brennstoffströmungsdurchgang in dem Körper (10) angeordnet ist, dadurch gekennzeichnet, daß die Brennerbaugruppe (12) über dem Körper (10) angeordnet ist und daß sich die Brennstoffleitung (14) sich von dem Körper nach oben in die Flammenzone und anschließend nach unten zurück zu dem Körper erstreckt.

2. Flüssiggasverbrennungsvorrichtung nach Anspruch 1, bei der das Steuerventil (50) zwischen dem Brennstoffeinlaß (46) und dem Einlaß zu der Brennstoffdurchflußleitung (14) angeordnet ist.

3. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 oder 2, bei der das Steuerventil (50) einen Ventilsitz (58) innerhalb des Ventilkörpers und ein Ventilverschlußelement (54) aufweist, das zwischen einer ersten, geschlossenen Position, in der es mit dem Ventilsitz in Eingriff steht, und einer zweiten, offenen Position bewegbar ist, in der es von dem Ventilsitz verschoben ist.

4. Flüssiggasverbrennungsvorrichtung nach Anspruch 3, bei der das Ventilverschlußelement (54) durch ein Schraubgewinde mit dem Ventilkörper verbunden ist.

5. Flüssiggasverbrennungsvorrichtung nach Anspruch 3 oder Anspruch 4, bei der ein Teil des Ventilverschlußelements (54) von dem Ventilkörper vorsteht und einen an demselben befestigten Betätigungsgriff (16) aufweist.

6. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 5, bei der die Brennstoffdurchflußleitung (14) fest an dem Ventilkörper angebracht ist.

7. Flüssiggasverbrennungsvorrichtung nach Anspruch 6, bei der die Brennstoffdurchflußleitung (14) an den Ventilkörper hartgelötet ist.

8. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 7, bei der die Brennstoffdurchflußleitung (14) ein Rohr aufweist.

9. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 8, bei der das Verbindungsmittel (30) eine Schraubgewindeverbindung zu einer komplementären Gewindeverbindung (32) an einem Brennstoffkanister (36) aufweist.

10. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 8, die weiter Mittel (82) zum Durchstechen einer Wand eines Brennstoffkanisters und Mittel zum lösbaren Halten der Vorrichtung in Position an dem Kanister aufweist.

11. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 10, bei der die Auslaßdüse (26) lösbar an dem Körper (10) befestigt ist.

12. Flüssiggasverbrennungsvorrichtung nach einem der Ansprüche 1 bis 11, bei der die Brennerbaugruppe (12) lösbar an dem Ventilkörper (10) befestigt ist.

Revendications

1. Dispositif pour brûler du G.P.L. comprenant un corps (10) ayant un moyen de connexion (30) pour connecter de manière détachable le corps à une bombonne de carburant (36) en vue de permettre l'écoulement de carburant à partir de la bonbonne, une admission de carburant de corps (46) pour permettre l'écoulement de carburant dans le corps, un ensemble brûleur (12) ayant un jet de sortie (26) fixé au corps et s'étendant à partir de celui-ci et un passage d'écoulement de carburant entre l'admission de carburant et le jet de sortie de carburant pour alimenter le carburant provenant d'une bombonne au jet de sortie de carburant, le passage d'écoulement de carburant comportant un conduit d'écoulement de carburant (14), dont les deux extrémités sont fixées au corps (10) et qui s'étend à

travers une zone de flamme de l'ensemble brûleur, fournissant ainsi un trajet d'écoulement de carburant qui force tout le carburant provenant de la bombonne à passer de l'admission de corps jusqu'à une zone de flamme de l'ensemble brûleur et de retour vers le jet de sortie de carburant, le corps comprenant en outre une soupape de commande (50) située dans le passage d'écoulement de carburant dans le corps (10), caractérisé en ce que l'ensemble brûleur (12) est situé au-dessus du corps (10) et en ce que le conduit de carburant (14) s'étend vers le haut à partir du corps dans la zone de flamme puis vers le bas de retour au corps.

2. Dispositif pour brûler du G.P.L. selon la revendication 1, dans lequel la soupape de commande (50) est située entre l'admission de carburant (46) et l'admission vers le conduit d'écoulement de carburant (14).

3. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 ou 2, dans lequel la soupape de commande (50) comprend un siège de soupape (58) au sein du corps de soupape et un élément de fermeture de soupape (54) pouvant être déplacé entre une première position fermée dans laquelle il engage le siège de soupape et une deuxième position ouverte dans laquelle il est déplacé du siège de soupape.

4. Dispositif pour brûler du G.P.L. selon la revendication 3, dans lequel l'élément de fermeture de soupape (54) est connecté par filetage de vis au corps de soupape.

5. Dispositif pour brûler du G.P.L. selon la revendication 3 ou la revendication 4, dans lequel une partie de l'élément de fermeture de soupape (54) saille du corps de soupape et sur laquelle est fixée une poignée d'actionnement (16).

6. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 5, dans lequel le conduit d'écoulement de carburant (14) est fixé de manière non détachable au corps de soupape.

7. Dispositif pour brûler du G.P.L. selon la revendication 6, dans lequel le conduit d'écoulement de carburant (14) est brasé sur le corps de soupape.

8. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 7, dans lequel le conduit d'écoulement de carburant (14) comprend un tube.

9. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 8, dans lequel le moyen de connexion (30) comprend une connexion à filetage de vis à une connexion à filetage complémentaire (32) sur une bombonne de carburant (36).

10. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 8, comprenant en outre un moyen (82) pour percer une paroi d'une bombonne de carburant et un moyen pour maintenir de manière détachable le dispositif en position sur la bombonne.

11. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 10, dans lequel le jet de sortie (26) est fixé de manière détachable au corps (10).

12. Dispositif pour brûler du G.P.L. selon l'une quelconque des revendications 1 à 11, dans lequel l'ensemble brûleur (12) est fixé de manière détachable au corps de soupape (10).

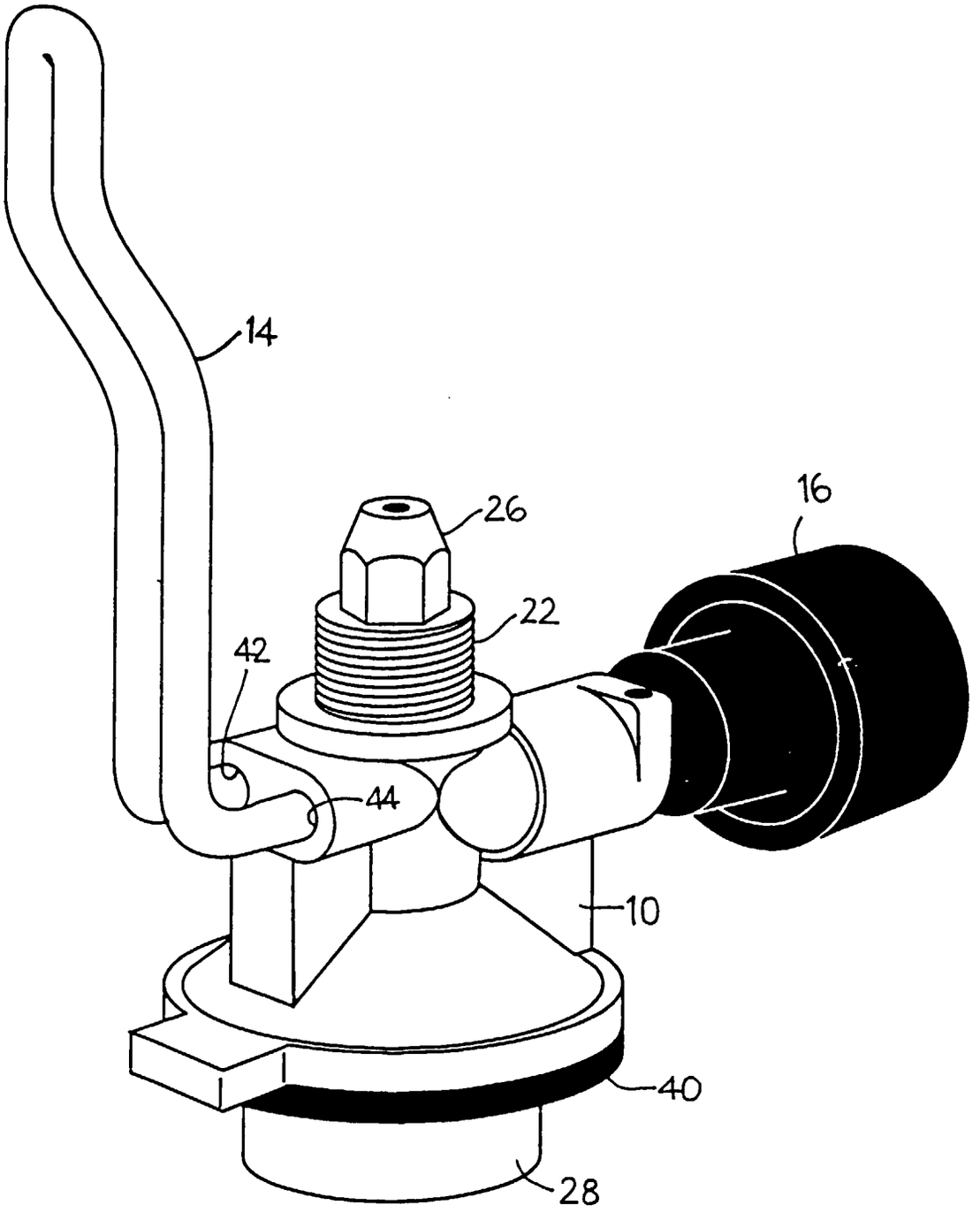

FIG.1

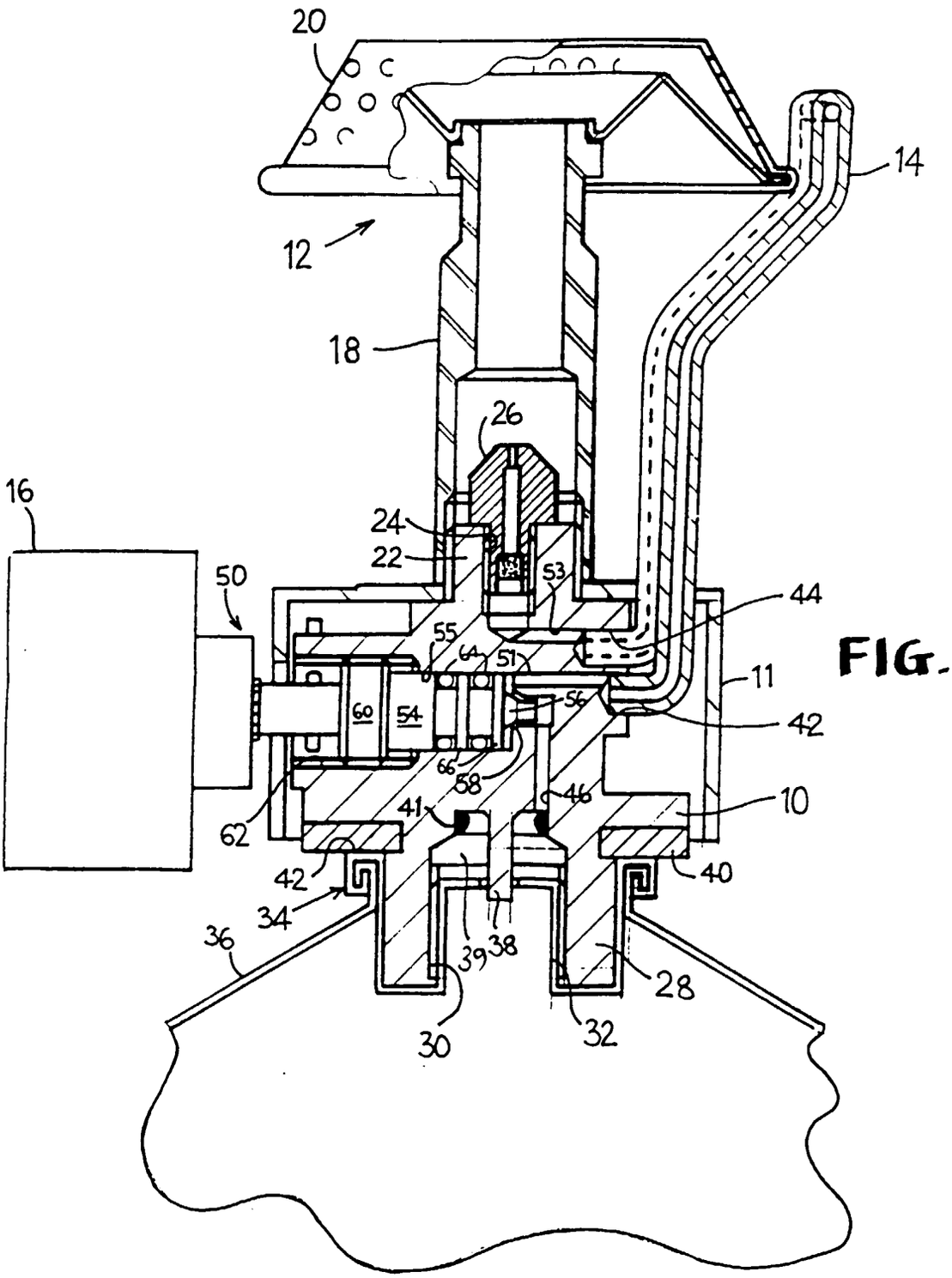
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FIG. 2

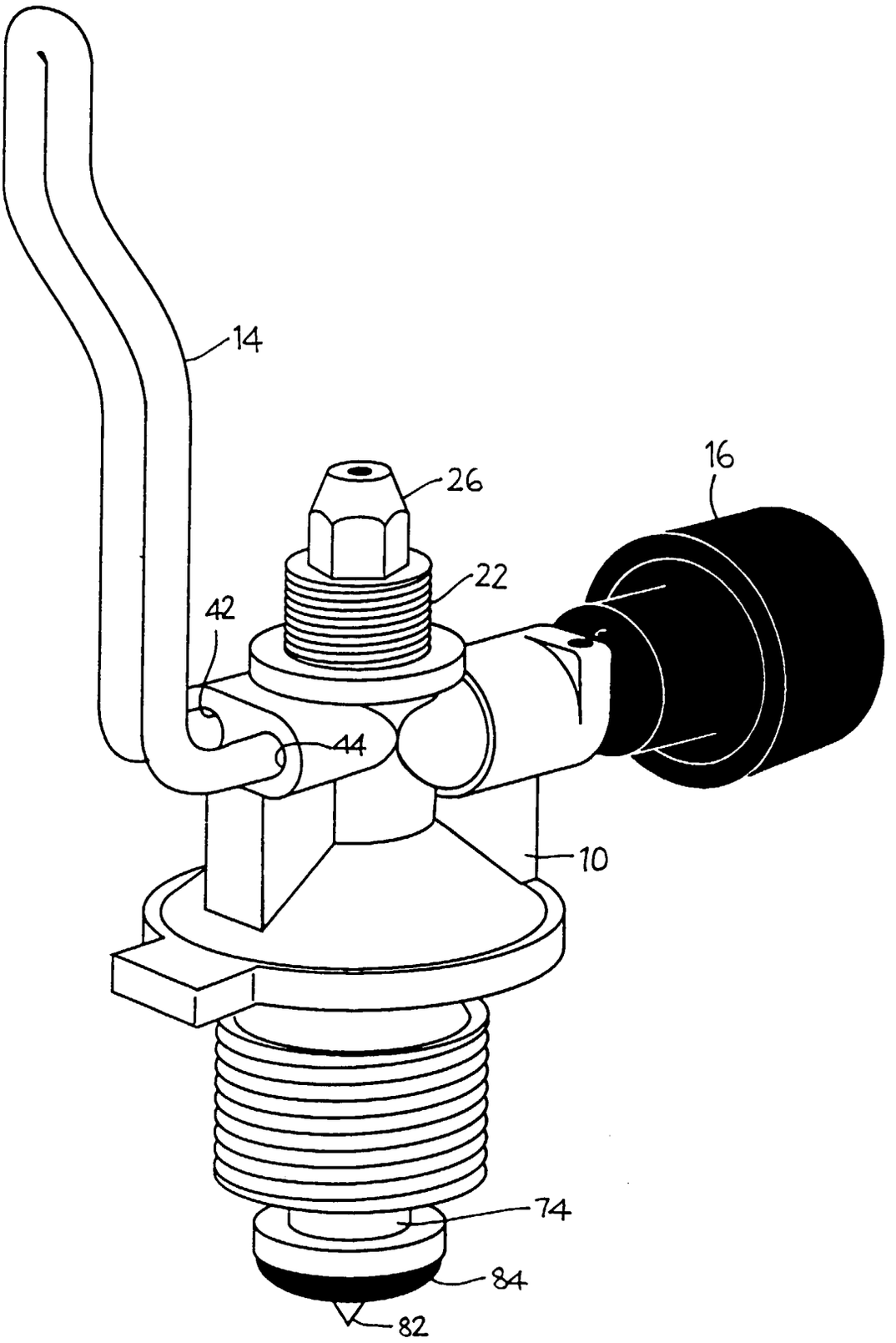

FIG.3

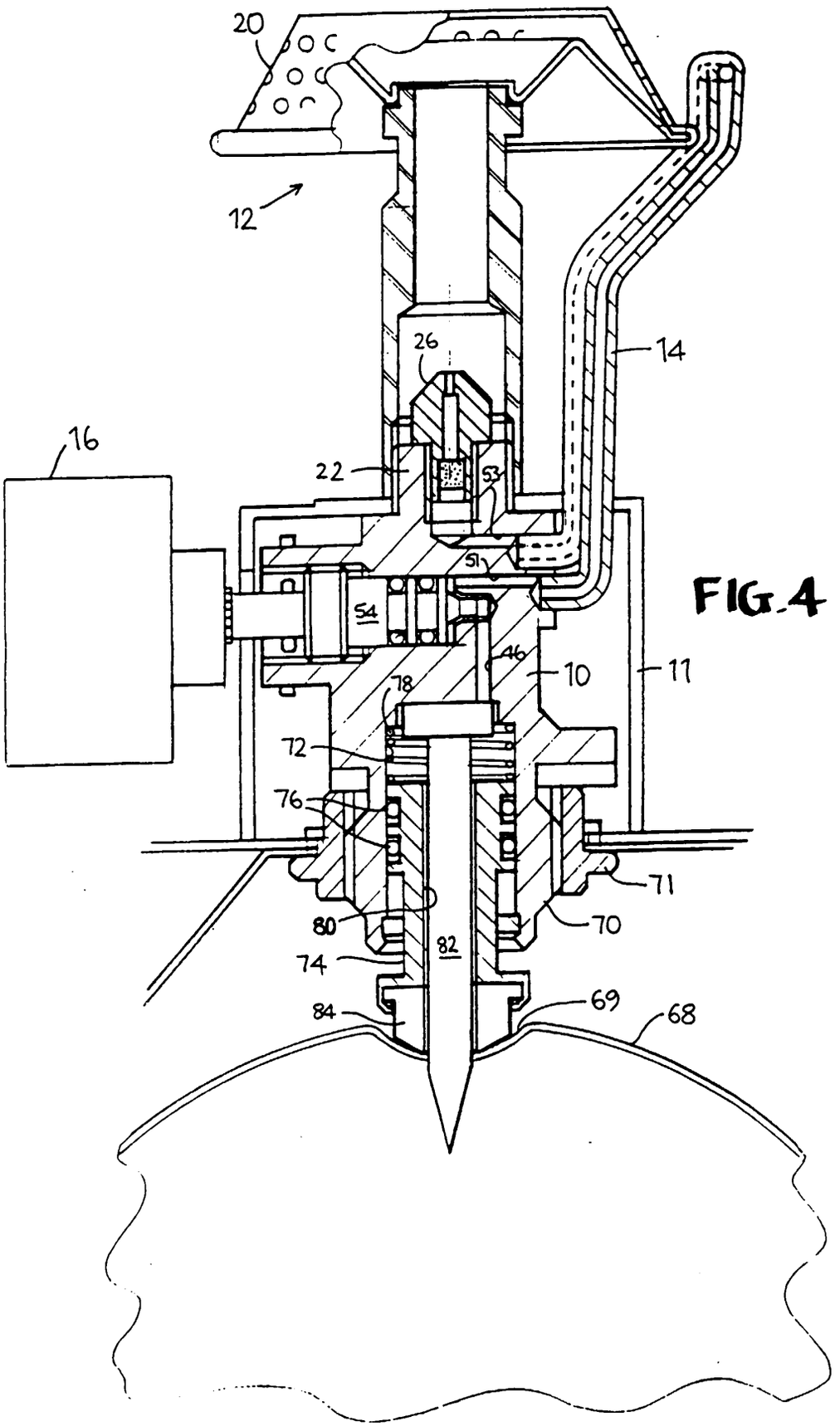

FIG. 4