Oct. 31, 1944. H. L. NORWAY 2,361,866

VALVE CONSTRUCTION

Filed Jan. 18, 1941 3 Sheets-Sheet 1

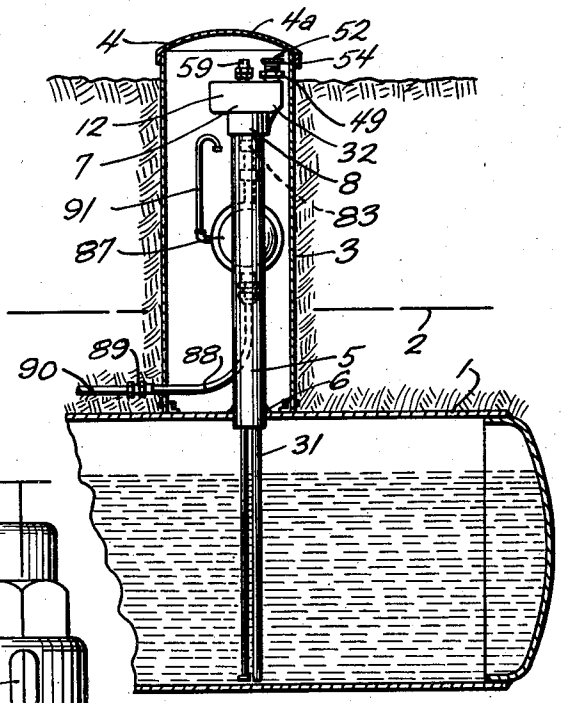


Fig 1.

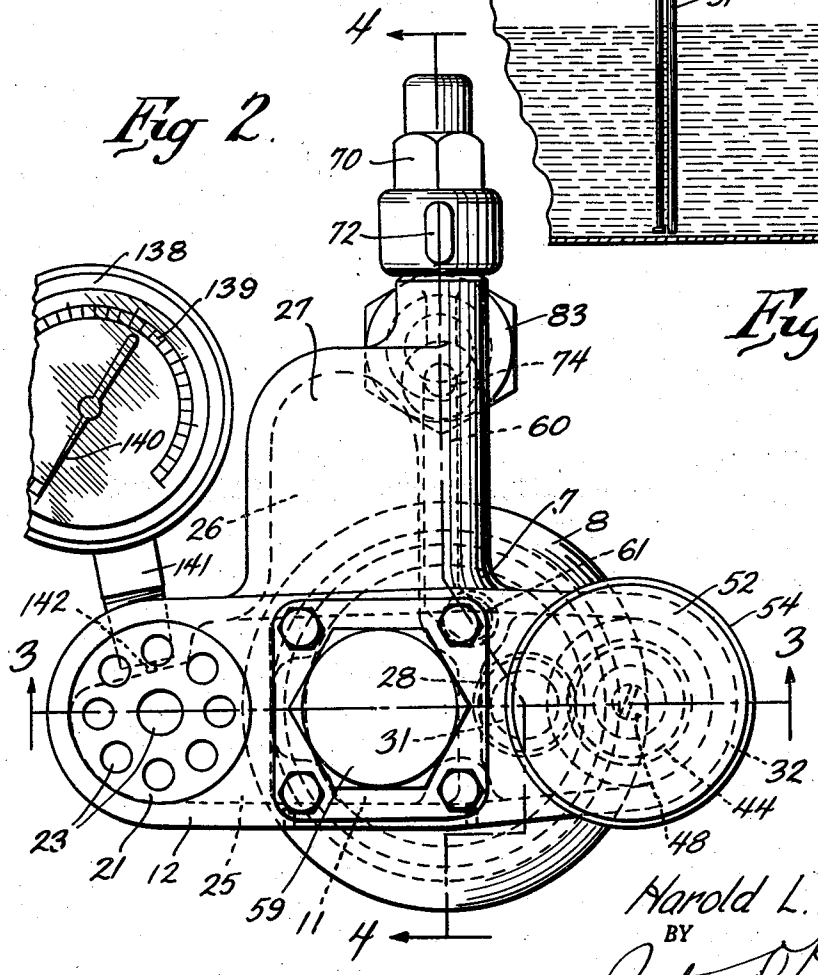


Fig 2.

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277. MULTIPLE PATENTS
Search Room
41

Oct. 31, 1944. H. L. NORWAY 2,361,866
VALVE CONSTRUCTION
Filed Jan. 18, 1941 3 Sheets-Sheet 2

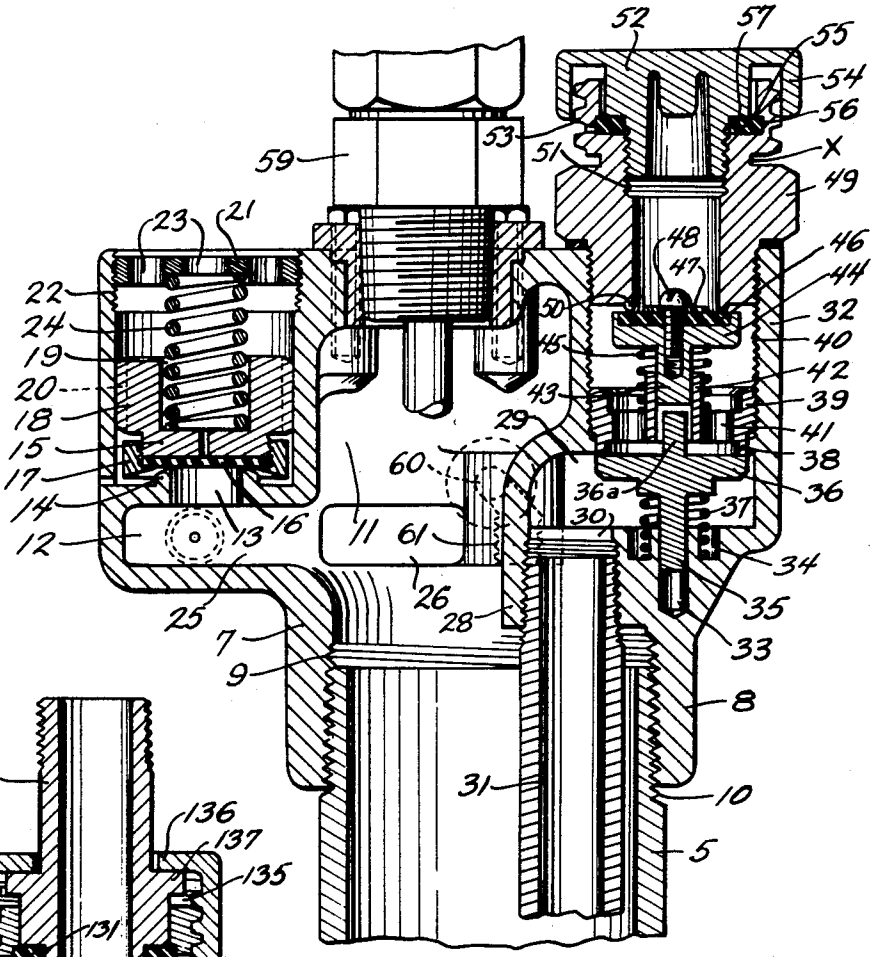


Fig 3.

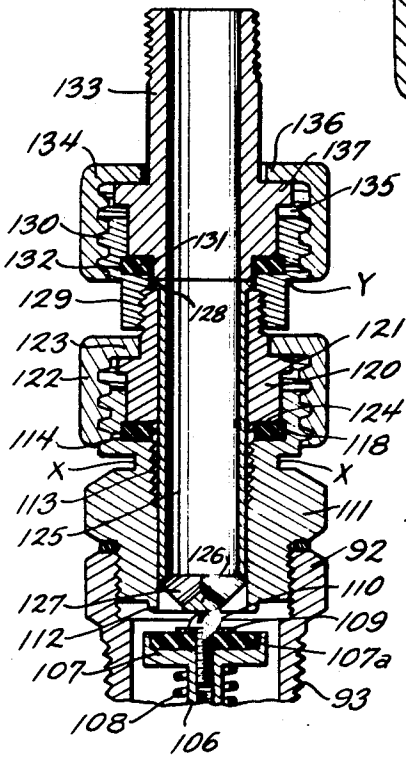


Fig 6.

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VALVE CONSTRUCTION

Filed Jan. 18, 1941 3 Sheets-Sheet 3

Fig 4.

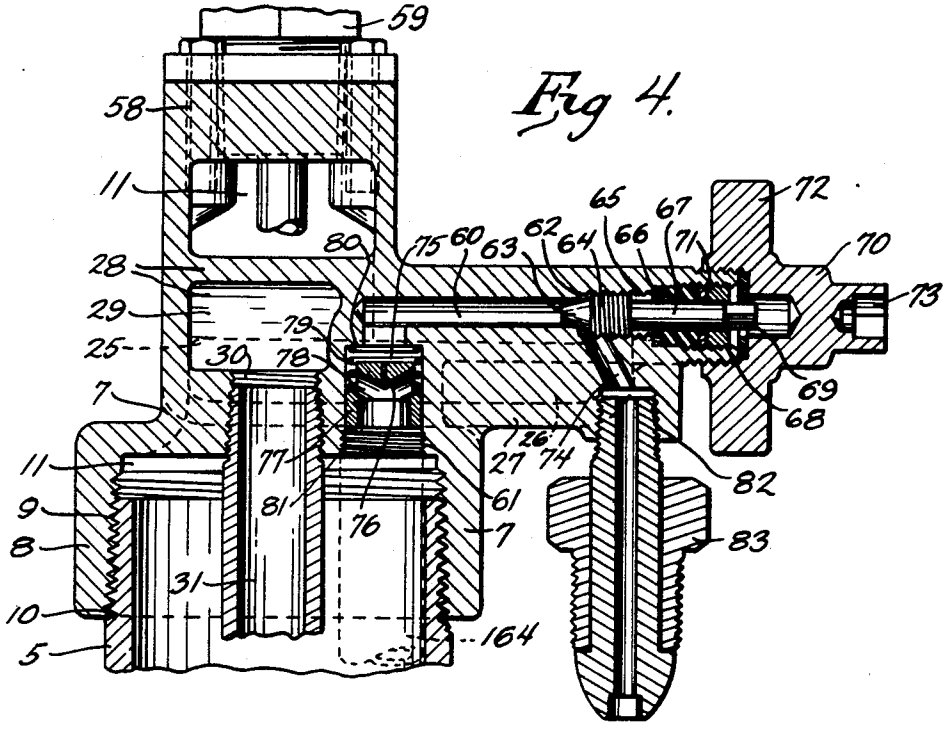


Fig 5.

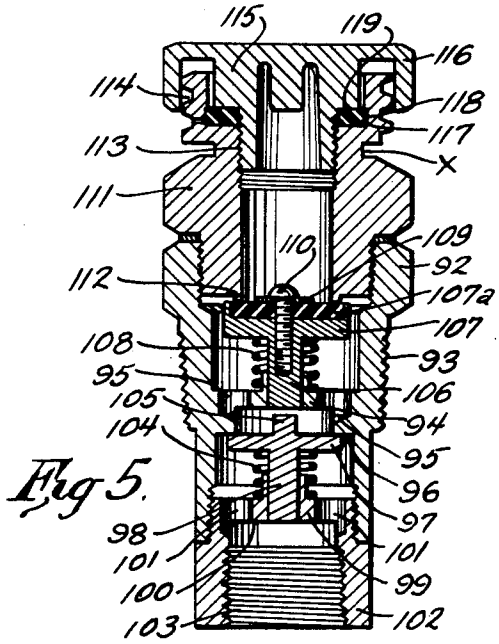
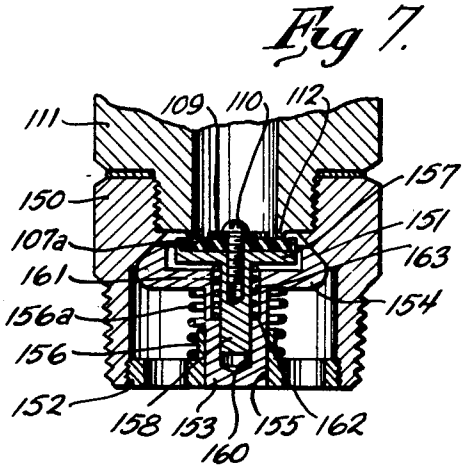


Fig 7.



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2,361,866

UNITED STATES PATENT OFFICE

2,361,866

VALVE CONSTRUCTION

Harold L. Norway, Evanston, Ill., assignor to The Bastian Blessing Co., Chicago, Ill., a corporation of Illinois

Application January 18, 1941, Serial No. 375,079

8 Claims. (Cl. 277—44)

The present invention relates to a system for storing and dispensing liquefied petroleum gas under pressure including a combination and arrangement of elements for filling and unloading the container or tank in which the liquefied petroleum gas is stored.

The present application is a continuation in part of an application for a Valve, Serial No. 308,684, filed by Harold L. Norway, December 11, 1939, reference to which is hereby made.

After a storage tank has been placed in operation and filled with liquefied petroleum gas, it becomes necessary upon occasion to unload or empty the tank for repair, removal or replacement, and also to drain off heavy ends or replace a winter gas with a summer gas for seasonal operating conditions.

With conventional systems it is difficult, if not impossible, to unload the tank rapidly and with safety. Excess flow check valves interfere with rapid withdrawal in wet gas systems and dry gas systems require complicated mechanisms for the purpose.

It is one of the objects of the present invention to provide an improved system and method for filling and unloading tanks under pressure, and further to provide a system in which an unlicensed withdrawal is hampered to such an extent as to discourage the practice.

A further object of the invention is to provide equipment readily convertible to fill or unload a pressure container at will and to accomplish this preferably through one port where elements must be operated in a predetermined relationship for the unloading of the container.

Another purpose of the invention is to utilize equipment conventionally employed to fill the tank, to also empty the tank as using the same fill hose with a reversible pump upon a service truck.

Another object is to provide a combination of tank and fitting construction characterized by safeguards against unsafe removal of gas and other contingencies experienced in unloading pressure containers.

The present invention also provides an improved means for maintaining house service independently of liquid unloading.

Another object of the invention is to provide an improved system in which stratified heavy ends in the tank are stirred up in the filling operation, and withdrawn first from the tank in the unloading operation. In this connection, also to provide a withdrawal system which permits the light ends in the tank to maintain a gauge pressure which assists a suction pump in unloading operations.

A further object is to provide a system and combination of elements of the class described which are easy to fabricate and assemble, and which are rugged in use and simple to operate.

These being among the objects of the invention, other and further objects will become apparent from the drawings, the description relating thereto and the appended claims.

In the drawings;

Fig. 1 is a side elevation of one form of the apparatus mounted in association with the storage tank;

Fig. 2 is a plan view on an enlarged scale of a part of the apparatus shown in Fig. 1;

Fig. 3 is a vertical section taken at line 3—3 of Fig. 2;

Fig. 4 is a vertical section of the apparatus of Fig. 2 taken at line 4—4 of that figure;

Fig. 5 is a longitudinal section through a modified form of the invention in which it is embodied in a single connection, the parts being shown in the closed or inactive position;

Fig. 6 is a view similar to Fig. 5 showing the device of that figure associated with means for withdrawing fluid from the tank; and

Fig. 7 is a section similar to Fig. 5 illustrating another and more compact embodiment of the invention.

By way of illustrating representative conditions relating to the storage and the handling of liquefied petroleum gas, the invention is illustrated in an embodiment where the storage tank is buried in the earth. This refers the invention to another condition which requires unloading, namely, that if the tank were to be raised and exposed to the warmth of sun-light, it would have to be emptied of liquefied petroleum gas such as propane or butane, stored therein.

The system illustrated, preferably has the tank 1 located below the frost line 2 or below the level to which the ground will freeze under the weather conditions prevailing where the tank is installed. A manhole casing 3 may be secured to the tank or mounted adjacent to it to provide a space for the filling, emptying and dispensing connections and parts. The casing 3 will normally be provided with a cover 4 which may be removably secured in any desired manner, and, ordinarily, some means is provided in the cover or the casing to permit circulation of air into and out of the casing and to allow for relief valve venting such as a vent 4a. The invention is not limited to any particular tank or tank assembly of course, but may be used with above or below ground installations.

As shown in the first four figures, a standpipe or dome 5 is welded to the tank at 6 to form an integral extension of the tank and at the top thereof, the pipe is preferably threaded to receive a unitary housing member 7. The interior of the standpipe communicates with the interior of the tank and the housing member 7 may be of almost any desired shape, preferably being provided with a hollow chamber 11 in communication with the tank through the standpipe as shown provided with a round section 8 that is interiorly threaded as at 9 with a tapered thread to engage the threading 10 on the upper end of the standpipe 5 in gas tight relationship. Other appropriate means of securement may be employed.

A hollow branch 12 communicates with the chamber 11 and is provided with an opening 13 about which is formed a valve seat 14. A safety or pressure relief valve 15 is movably mounted adjacent the seat and is provided with a relatively compressible seating portion 16, removably held in position in the valve body in a flanged, threaded retaining member 17.

The safety valve itself is provided with an upwardly extending portion 18 in which is formed a hollow 19. The valve may be generally rounded in cross section or otherwise shaped. As here shown, ducts or passages 20 are formed in its interior to permit passage of fluid past the valve when it is unseated. A spring retaining member 21 is threadingly engaged with the threads 22 formed in the branch 12. This spring retainer is provided with one or more perforations 23, and a spring 24 is seated with one end against the spring retainer, its other end being against the valve 15 and within the cavity or depression 19.

The hollow branch 12 communicates with the main chamber 11 through a passage 25. A second passage 26 communicates with the chamber 11 and with the interior of a second hollow branch or arm 27. As shown, this branch is of use for certain installations, as when it is desirable to have greater pressure relief capacity, in which case the upper wall of the branch 27 will be cut away to provide for the installation of a second or additional pressure relief valve which will be generally like that shown in detail, in Fig. 3 and described above.

It is preferred to fill and empty the tank through the housing member 7 and through a single opening. This is accomplished by forming a hollow boss 28 preferably integral with the housing and providing it with a threaded opening 30 between the interior 29 of the boss and the chamber 11 to receive a pipe 31 which extends to a point close to the bottom of the tank, as shown in Fig. 1, and a liquid connection opening outside of the housing.

The liquid outlet and inlet connection as shown in Fig. 3 is formed in a portion 32 which is preferably integral with the main housing 8. A depression 33 is formed in the member 32, and an annular depression 34 is formed about it. A stem 35 of a valve member 36 is slidably positioned in the depression 33. 36a is a projection formed on the upper surface of the valve 36. A spring 37 is positioned about the stem 35; one end rests within the annular depression 34 and the other bears upon the valve 36 and tends to hold it, when free to do so, upon the seat portion 38 of the annular member 39. This member is removably seated in the threaded portion 40 of the housing section 32. It is provided with one or more perforations 41 through which fluid may pass in or out. It is also provided with a cylindrical, outwardly directed section 42 within which a stem 43 of a second valve member 44 is positioned.

A spring 45 is positioned about the cylindrical portion 42 and about the valve stem 43. It bears at one end upon portions of the member 39 and at the other upon the bottom of the valve 44, and tends to hold it closed, when free to do so. A seating portion of compressible material 46 is preferably removably mounted on the upper or outer face of the valve 44 and held in place by a washer 47 and a screw 48. A connection and seating member 49 is removably engaged in the threaded portion of the housing section 32. It is provided on its inner or lower end with a seat portion 50 against which the member 46 of the valve 44 is seated when the valve is closed. Adjacent its upper end, the member 40 is interiorly threaded as at 51 to receive a closure plug 52. The member 49 is also exteriorly threaded as at 53 to receive a filling hose or adapter connection. The closure plug is provided with an overhanging, downwardly disposed peripheral flange 54 which overlies and covers, to some degree at least, the threads 53 when the plug is in the closed position. A gasket 55 may be positioned within a groove or undercut portion 56 formed in the open, upper end of the member 49, and a shoulder 57 of the closure plug seats against, and to some degree compresses this gasket when the plug is in the closed position.

Formed generally within the branch or arm 27 is a passage 60 which communicates at its inner end with the interior of the housing 7, and particularly with the chamber 11 through an enlarged branch passage 75 having a threaded opening 61 at the lower end thereof and a valve seat 80 at the top. Adjacent its outer end, the passage 60 is provided with a valve seat 62 within which a shutoff valve 63 is normally positioned. This valve has a threaded portion 64 seated in corresponding threading 65. Packing 66 surrounds the shaft-like portion 67 which is formed integrally with or attached to the valve 63. A packing gland 68 is mounted to compress the packing 66.

At its outer end, the shaft 67 is squared or given any other angular shape 69 by means of which it may be engaged by a tool for rotation to move it into or out of seating position. A cover or cap 70 is received upon the threaded portion 71, and may have laterally extending wing portions 72 by means of which it may be rotated, and it may have an angular cavity 73 used to rotate the stem 67. An outlet passage 74 branches downwardly from the passage 60 beyond the seat 62 and is threaded as at 82 to receive the nipple portion of a swivel connection and nut 83 by which a pressure regulator 87 is secured in place. The pressure regulator 87 may be of any desired type or capacity. From the regulator 87, a pipe 88 leads through a connection 89 to a second pipe 90 which leads to the point of use of the fluid which passes through the system. 91 is a pressure-vent tube which, if desired, may be attached to the regulator 87.

Within the enlargement 75 is positioned an excess flow check valve member 77, which as shown is provided with drilled passages 78 therethrough to permit a predetermined amount of vapor or liquid to flow therethrough with a spring 79 holding the valve open against the flow of fluid within the limits determined. A retainer 81 holds the valve and spring in position. When the flow is excessive the valve closes against the seat 80. 76 is a small by-pass opening through the

Search Room

excess flow check valve member 77 which permits equalization of pressure so that the excess flow check valve can open, once it has closed.

With this arrangement it is possible to service the valve 63 and packing 68 whenever necessary and rapid withdrawal of liquid is prevented in large quantities if a person seeking to unload the tank removed the valve 63 or the regulator 87 to make connection with an unloading hose at either of these points. The top or upper surface of the housing 7 is provided with an opening 58 to receive a slip tube gauge 59 or the like therein to gauge the level of liquid in the tank.

The valves 36 and 44 preferably have the same port area, allowance being made for the stud 36a on the top of the valve 36 which is contacted by the stem 43 of the valve 44 when the valve 44 is positively displaced downwardly. With this particular arrangement the valves open independently of each other when forced open by incoming fluid pressure and dependently, one upon the other, when the top valve 44 is depressed by a positive force which otherwise is not effective separately for both valves.

The particular arrangement shown is of an advantage upon filling operations where the pressure of the incoming fluid may not be very great in some instances. Once the pressure is sufficient to overcome the spring 37, both being preferably identical where the port areas are the same. However, when it is desirable to unload the tank, mechanical means can be used which is conveniently strong enough to overcome the additive pressure of both springs with little difficulty.

A modification of this valve arrangement and operation is shown in Figs. 5 and 6 which comprises a hollow housing 92, preferably threaded exteriorly as at 93 to be received into a correresponding threaded opening in a container. The housing is provided with an internal spider 94 which has one or more perforations 95 formed in it. On its lower or inner face, the spider has a valve seat 96 against which a valve 97 may be seated. The valve is provided with a stem 98 mounted for sliding movement in a central portion 99 of a spider 100 which is provided with one or more perforations 101. This spider is formed in a separate or additional section 102 which is threadedly engaged with the main housing section 92. It may be interiorly threaded as at 103 to receive a pipe connection if desired.

A spring 104 is positioned to bear at one end against the valve 97 and at the other end against the spider 99 or the portion 100 of that spider. Upon its upper face, the valve 97 has a raised projection 105 which is adapted to contact the valve stem 106 of the valve 107. This stem is mounted to slide in the spider 94. A spring 108 bears at one end against the spider 94 and at the opposite end against the valve 107. This valve may carry on its seating face a compressible member 107a which is removably held in place by a washer 109 and a screw 110. A connecting and seating member 111 is in threaded engagement with the housing 92, and it has formed on its inner face a valve seat 112 against which the valve portion 107a may be seated.

At its upper end the member 111 is interiorly threaded as at 113. It is also exteriorly threaded as at 114. A closing plug 115 may be removably seated in the threads 113. This plug is provided with a downwardly depending peripheral flange 116 which, when the plug is in the closing position, overlies some, at least, of the threads 114. A gasket 117 may be mounted in a groove 118 within the housing section 111; and a shoulder 119 on the closing plug 115 bears against and to some degree compresses this gasket when the plug is seated.

As shown in Fig. 6, the seating plug 115 has been removed and in its stead positive displacement means have been provided for withdrawing liquid from the tank or container to which the connector assembly is secured. As shown, a connector 120 has been inserted in the place of the closing plug 115. This connecter is exteriorly shouldered as at 121, and a connecting collar 122, having a flange 123, surrounds the member 120 and engages the threads 114 and, thus, the member 122 is held in position upon the threads 114 of the member 111. The gasket 117 is compressed by the shoulder 124 of the member 120. Positioned within the member 120 is a valve operating part 125. As shown the part 125 is hollow. At its lower end it is provided with a contacting point 126 and it has one or more passages or openings 127 formed in its lower end. It is preferably shouldered as at 128 at its upper end. Secured to the upper end of the member 120 is an internally threaded tubular member 129 which is also externally threaded as at 130 to receive a hose coupling. A gasket 131 is received in a groove 132 formed in the member 129. A hose connection 133 may be inserted within and connected to the member 129 and held in place therein by a coupling nut 134 which is interiorly threaded as at 135 and provided with an inwardly directed flange 136 which engages a shoulder 137.

By this means the hose connection is held in place and the valve operating member 125 is depressed to open the valve as shown in Fig. 6. A hose, which is not here shown, may be secured to the upper or free end of the hose connector 133 in any desired manner.

Referring to Fig. 7 another modification is shown which is very compact in form, one valve being receivable within the confines of the other. In this particular embodiment, the housing 111 is threaded into the top of a fitting 150 which fitting has a valve seat 151 proximate to and larger than the valve seat 112 upon the lower end of the housing 111. A spider 152 is threaded into the bottom of the fitting 150 to support the stem 153 of the lower valve 154 for reciprocation in an opening 155 through a central boss 156 upon the spider. A spring 156 urges the lower valve upwardly into contact with the seat 151. The lower valve 154 is hollowed out to receive the upper valve 157 therein which carries a resilient seat 107a into contact with the seat 112. The upper valve is small enough to clear the seat 151 for removal and repair whenever the housing 111 is removed for that purpose.

The stem 158 of the upper valve 157 is reciprocably received in a closed-bottom guide-opening 160 in the stem 153 and is urged into contact with the seat 112 by a spring 161 resting upon the shoulder 162 at the bottom of an enlargement 163 made to receive the spring 161 in the body of the lower valve.

In this particular embodiment the valve areas are of different sizes but operate substantially in the same way as already described.

As shown in Figs. 3 and 4 particularly, the threaded opening 61 may be left open, for some purposes, as where dry gas withdrawal is de-

sired. On the other hand in some systems it is preferable to position a small pipe shown in broken lines 164 in the opening 61 and to have it extend downward into the liquid within the tank. The opening may, thus, be used exactly as shown or with a tube installed.

Ordinarily, a pressure gauge is desirable. One such is shown in Fig. 2 as at 138. It has a dial 139 and a needle or pointer 140. It is connected by means of a tube 141 to the housing branch 12 in the wall of which an opening 142, as shown in Fig. 3, is formed in register with the pipe 141.

Although several forms of the invention are shown and described, it will be understood by those skilled in the art that many changes in the form, relative dimensions, shape and arrangement of parts might be made without departing from the spirit of the invention, the scope of which is commensurate with the appended claims.

The use and operation of this device are as follows:

The closure plug 52 is removed. A hose connection, generally similar to that shown in Fig. 6 is connected. The other end of the hose is connected to a source of liquid; for example, to a tank, truck tank, or tank car. Suitable valves are opened and the liquid flows through the hose and comes against the uppermost valve 44, opening it by compressing the spring 45. The stem of the valve 44 contacts the member 36a of the valve 36 and opens this valve, also, against the resistance of the spring 37, and the liquid flowing past both valves enters the tube 31 and flows to the bottom of the tank. Sometimes the weight of the liquid alone or the pressure of a warm service tank is sufficient to open the valve and to cause the liquid to flow into the tank. Sometimes it is not sufficient, and a pump on the tank truck or elsewhere is used to force the liquid into the tank. Opening of the first valve is followed by the opening of the second valve independently of each other without need for additional pressure. When a sufficient quantity of liquid has been forced into the tank, further flow is stopped, the hose connection is removed, the valves will have been closed, either by vapor pressure within the tank or in response to their respective springs or in response to both of these effects. If the hose has been removed, the closure plug is re-inserted. As a precautionary measure, the fitting 49 is undercut as at X; and should some unexpected breaking occur, the fitting will break at the point X above the valves and they will then automatically close to prevent discharge of liquid or any fluid from the tank.

With the tank now suitably filled with gas, some vapor will be present. Ordinarily, this vapor will pass up the standpipe 5 and outward through the opening 61 and the passage 60. Usually, when the system is first installed, the valve 63 will be seated. After the tank is full and when the system is to be put into use, the valve will be opened, being backed away from the seat 62 and vapor then passes from the passage 60 to the passage 74, moving past the check valve 77, outward through the opening 60 and through the nipple of the swivel connection 83. If a pressure regulator is installed, the fluid moves to it from the nipple of the swivel connection 83 and from the regulator, it moves through the pipes 88 and 90 to the point of use. The invention is not limited to the use of a regulator, and in case one is used, the invention is not limited to any particular type. No regulator may be present, or several regulators may be used if desired.

For some purposes, it is desirable to permit liquid or a mixture of vapor and liquid to leave the system for use. Where that is done, a pipe is inserted in the opening 61 and extends downward into the liquid.

Vapor pressure within the tank will force this liquid upward through the pipe and into the passage 60, and from there it follows the path above described for the vapor alone. Where liquid is, thus, discharged from the tank for using, some means is provided for accomplishing its vaporization before it reaches the point of use. A number of such means are available and the invention is not limited to any particular one.

Should the flow of fluid through the passages 61, 74 be too rapid or otherwise unsatisfactory, the check valve 78 will be moved upward against the spring 79 and will be seated upon the upper surface of the member 80, thus stopping the flow.

Occasionally it is necessary to empty a tank by withdrawing the liquid from it. Where that is necessary, the closure plug 52 is removed, as it would have been for filling, and a member such as the member 125 of Fig. 6 is inserted with the connections there shown, a hose having been previously connected to the member 133. At its other end, the hose is connected to a suitable receptable into which the liquid is to be deposited.

When the member 125 is put into position and the hose connection is tightened upon it, it contacts the screw 48 on the valve 44 and moves that valve open. The stem 43 contacts the projection 36a of the valve 36 and opens it. The two valves are, thus, held open while the member 125 is in place, and liquid may now be pumped out of the tank through the pipe 31 until the tank is wholly or substantially empty. Then the member 125 and the hose connection are removed and the empty tank may be repaired or removed or otherwise treated. It will be noticed that the connector 129 has a relatively narrow section at the point Y; and should side pressure occur on the connections, it will break at that point rather than at the point X on the member 49. When that occurs, there is nothing to hold the member 125 down in the valve opening position, and the valves will thereupon close either in response to their springs or to pressure from within the tank or in response to both.

Installations of the type shown in the first four figures ordinarily require a pressure release or safety valve mechanism. Figs. 3 and 4 show such a mechanism. Excess pressure will be effective on the valve 15 and will cause it to yield outwardly against the resistance of the spring 24, and, thus, pressure is released from the system. As above mentioned, more than one pressure release valve may be installed. This will be done where a greater pressure release capacity is required than could be conveniently furnished by means of a single valve.

Ordinarily, some sort of liquid level gauge is provided. The opening 58 and the pipe 59 merely indicate diagrammatically a suitable location for such a gauge, which may be of any desired type—mechanical, electrical, slip-tube or other type.

What is claimed is:

1. A valve construction for handling liquefied petroleum gas comprising a housing having a passageway therethrough, a plurality of valve seats one of which is integral with the housing, valve supporting means received in one end of the passageway, a plurality of valves movably mounted on said valve supporting means to close

277. MULTIPLE VALVES.
44
Search Room

in a direction away from said end of the passage, means for each valve tending to seat it when free to do so, said valve being provided with portions which when one valve is opened will transmit opening movement from the one valve to the other valve to open the latter.

2. A valve construction comprising a housing made up of a plurality of connecting sections having a communicating passageway therethrough, a plurality of valve seats in said passageway, said seats each being integral with a separate one of said housing sections, valve guide means in said housing, a plurality of valve heads for cooperation with said seats, each having a stem on the side opposite to the seat engaging portion of the valve head, said valve guide means for the valve heads being carried by one of the sections, means engaging each valve head and reacting against said valve guide means tending to seat the valve heads when free to do so, one of said valve heads being accessible upon its seat engaging portion for positive displacement through said passageway and being provided with a portion which, when that one of the valve heads is moved to open position in the direction of another valve head, operates to move said other valve head to open position.

3. In a valve housing having a passageway therethrough, valve supporting means in the passageway, a valve seat in the passageway facing said supporting means, a valve member supported on said supporting means and cooperating with said valve seat, a second valve member carried by the first valve, a removable element received in said passageway having a valve seat integral therewith to cooperate with said second valve, means for each valve member tending to seat it when free to do so, said valves being proximate to each other and provided with portions which, when the second valve member is positively opened, will contact each other and transmit opening movement to the first valve member to open it.

4. A valve construction for handling liquefied gases comprising a housing having a passage therethrough, a plurality of valve seats one of which is integral with the housing, a second valve seat in the passageway spaced from the first, a plurality of valve heads in said passageway for cooperation with said seats, each having a stem on the side opposite the seat engaging portion of the valve head, guide means supporting the stems to guide said valve heads, springs around each of said stems and acting between the respective guide means and valve heads to urge the latter into engagement with their seats, said valve heads and passage being coaxially arranged and one of the stems which is disposed between said valve heads being of such length that upon positive displacement from its seat of the valve head carrying the stem, the stem will engage the adjacent valve head and move it from its seat, said valve carrying the stem being accessible upon its seat engaging portion for positive displacement through said passage and said valve heads opening independently of each other under the influence of fluid pressure exerted against the seat engaging portion of the valve heads sufficient to overcome said springs.

5. A valve construction for handling liquefied petroleum gas comprising a valve housing having a passageway therethrough, a member mounted in sealed relation on said housing at one end of the passageway and having a passage therethrough terminating inside the housing in an inwardly facing valve seat, a second valve seat disposed inwardly of and facing in the same direction as the first valve seat, a valve head cooperating with the first valve seat, a second valve head cooperating with the second valve seat, each valve head having a stem on the side opposite to the seat engaging portion of the valve head, valve guide means in said housing, spring means around each of said stems and acting against its respective head to urge the latter into engagement with its respective seat, said valve heads being coaxially arranged in said housing with the first valve head accessible through said passage for positive displacement, and said heads being provided with portions which when the first valve head is positively displaced will transmit opening movement to the second valve head to open it.

6. A valve construction comprising a valve housing having a passageway therethrough, a member mounted in sealed relation on said housing at one end of the passageway and having a passage therethrough terminating in an inwardly facing valve seat in communication with the passageway, a valve head cooperating with said valve seat, means in said passageway for supporting the valve head in guided relation and terminating inwardly in a second valve seat facing in the same direction as the first valve seat, a second valve head cooperating with the second valve seat, a second means carried by said housing for supporting the second valve head in guided relation, means carried by said first and second means for urging the valve heads into closing contact with their respective valve seats when free to do so, said valve heads being provided with portions which when the first valve head is positively displaced will transmit opening movement to the second valve head.

7. A valve construction for handling liquefied petroleum gas comprising a valve housing having a passageway therethrough, a member mounted in sealed relationship on the housing at one end of the passageway and having a passage therethrough ending in an inwardly facing valve seat in communication with said passageway, a valve head cooperating with said valve seat and having a replaceable valve disc thereon for engaging the valve seat, said valve disc being available for replacement when said member is removed and said valve head being accessible through said passage for positive displacement, guide means for supporting the valve head, a second valve seat disposed in said passageway, a second valve head cooperating with said second valve seat, means for each valve head tending to seat it when free to do so, cooperating elements on said valve heads which when the first valve head is positively displaced will transmit opening movement to the second valve head to open it, and means for supporting the said second valve head in guided relation.

8. A fitting comprising a body portion having a space therein defined in part by a wall, a passage through the wall of the fitting, a safety check valve in said passageway closing against a seat, a second safety check valve carried by the first valve and closing against a second seat and removable through the first seat when the second seat is removed, the area of one valve being greater than the area of the other valve.

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