Aug. 1, 1944. E. L. MILLS ET AL 2,354,925

APPARATUS FOR AND SYSTEM OF FLUID SUPPLY

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Fig. 1

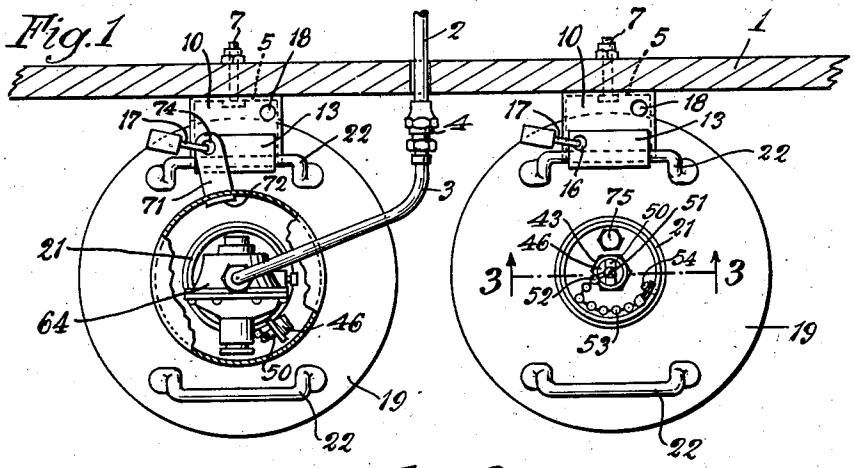

Fig. 2

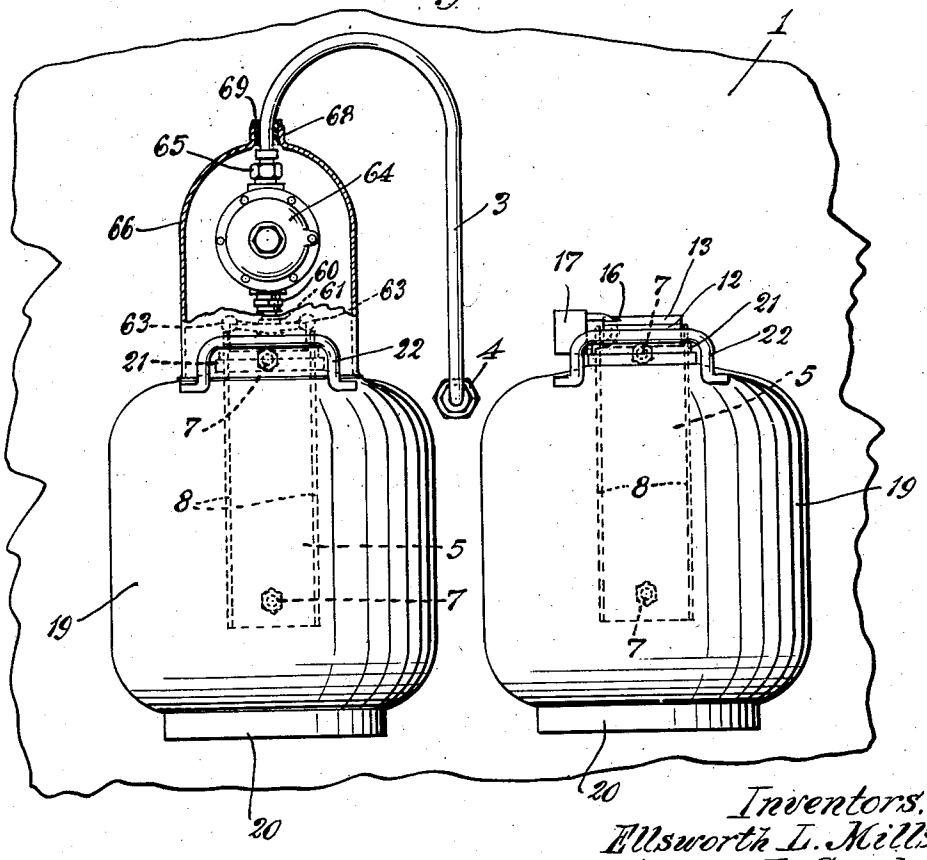

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Fig. 3

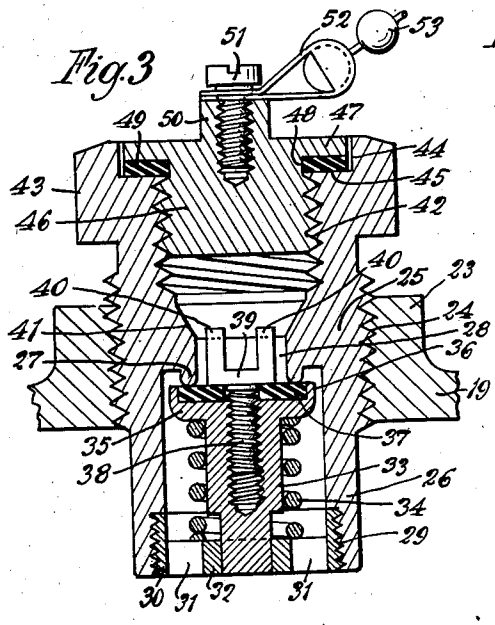


Fig. 5

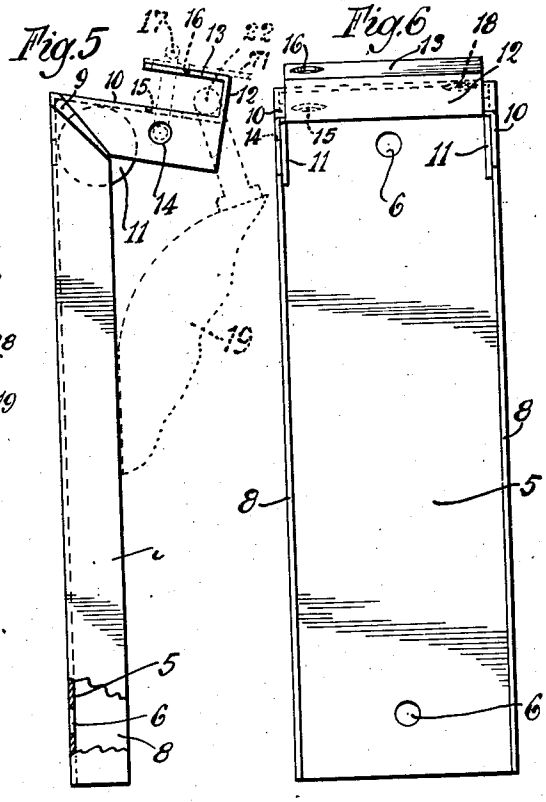


Fig. 6

Fig. 4

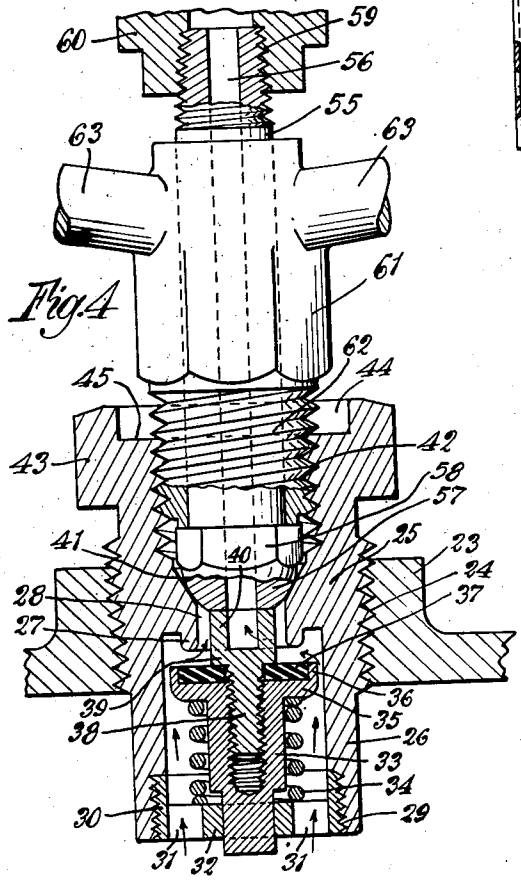
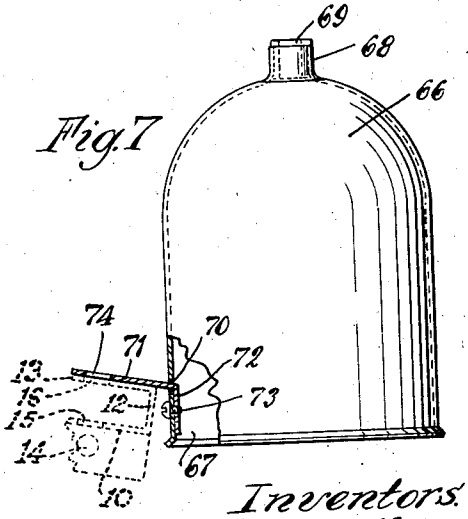


Fig. 7



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2,354,925

APPARATUS FOR AND SYSTEM OF FLUID SUPPLY

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Application October 21, 1939, Serial No. 300,682

6 Claims. (Cl. 62—1)

This invention relates to an apparatus for and a system of supplying fluid. In the particular form here illustrated, it is primarily designed for supplying fuel by means of readily portable tanks. The fuel in the tanks may be liquefied hydrocarbon or any other desirable form of fuel—liquid or gas, or both. One object of the invention is to provide an apparatus for the convenient supply of fluid so arranged that a plurality of sources may be removably mounted adjacent a point of use and so arranged that either source, as desired, may be readily connected to the point of use or to the system where it is to be used. Another object is to provide suitable apparatus and controls whereby the containers are made safe for transportation and are made convenient for attachment to a support and for attachment to a system to which the fluid is to flow. Another object is to provide a means for protecting the parts of the mechanism most liable to damage. A still further object is to provide means for removably locking the containers in place and, if desired, for removably locking a protective means in place.

Other objects will appear from time to time throughout the specification and the claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a plan view with parts broken away and parts in section showing a two-container system;

Figure 2 is a side elevation with parts broken away and parts in section showing the assembly of Figure 1;

Figure 3 is a longitudinal section on a large scale taken at line 3—3 of Figure 1 and showing a seal plug and valve body in the closed or inoperative position;

Figure 4 is a similar view showing the connection plug and body in position after removal of the seal plug;

Figure 5 is a side elevation with parts in section and parts broken away showing the bracket upon which the containers may be supported;

Figure 6 is a front elevation of the bracket of Figure 5;

Figure 7 is a side elevation with parts in section and parts broken away showing the protective hood which may be removably mounted over the regulating and other mechanism.

Like parts are designated by like characters throughout the specification and the drawings.

While the tanks or containers may be supported in almost any desired manner, it is convenient to support them on a member 1 which may be the wall of a house or building within which the material contained in the tanks is to be used. As shown, a pipe 2 is connected with the system and a pipe 3 is connected by a union 4 to the pipe 2. The pipe 3 may be made fairly flexible so that it may be readily moved for attachment to either of the tanks, or, instead of being flexible, it may be provided with a joint to permit this movement.

A bracket is provided for each container. In general, a bracket may comprise a flat portion 5 with one or more perforations 6 through which bolts 7 may pass to fasten the bracket in place. As shown, the bracket may have side flanges 8. The flanges are cut away as at 9 to permit a portion 10 of the bracket to be bent downwardly. Reenforcing pieces 11 are fastened to the flanges 8 by welding or otherwise. A portion of the bracket may have the flanges cut away and be bent upwardly as at 12 and rearwardly as at 13. Each bracket is preferably perforated in one of its flanges as at 14 and is perforated in the portion 10 as at 15 and in the portion 13 as at 16. The perforations 15 and 16 are preferably positioned one above the other and in line with the perforation 14 to permit a padlock 17 to pass through them. They may, also, be perforated as at 18 in the portion 10.

While many forms of containers may be used, those shown herewith are suitable and each comprises a container body 19 to which a base 20 may be secured by welding or otherwise. The container, also, preferably has secured to it by welding or otherwise at its upper end a reenforcing flange-like portion 21. Two handles 22 are secured to each of the containers and one of each of these handles is engaged on a bracket as shown when the containers are in place.

Each container is provided with a service opening through which fluid passes to the point of use. As shown, the service opening may be formed in an integral enlargement 23 which is perforated and threaded as at 24. A valve body 25 is correspondingly threaded and screwed into place as shown particularly in Figures 3 and 4. The valve body comprises a lower or inner section 26 within which a seat portion 27 is formed. An opening 28 leads from the seat outwardly through the valve body. The internal diameter of the lower section 26 is enlarged adjacent its end and threaded as at 29 to receive a spring retainer 30 which, as shown, is perforated as at 31 and provided with a valve stem guiding portion 32 within which the lower end of a valve stem 33 is movably mounted. As shown, a spring 34 is mounted about the valve stem 33 and bears at one end against the spring retainer 30, and at the other it bears against the enlargement 35 which is preferably integral with the valve stem and carries the seating portion. This enlargement has a peripheral flange 36 which retains a seating disc 37. This latter may be made of any suitable material which will give a tight fit when the valve is seated. The valve disc is perforated to receive the threaded shank 38 of a forked disc

retainer 39, the valve stem 33 being hollow to receive the threaded shank 38. The disc retainer is provided with the upwardly extending members or forks 40. Above the opening 28, the valve body is provided with a tapered or inclined seating portion 41, and above this seating portion its internal diameter is somewhat enlarged and threaded as at 42. The threading is preferably such as to give rapid movement of the threaded members received in it when they are rotated. The valve body is preferably enlarged adjacent its upper end as at 43 and is provided with an annular cutout portion 44 which provides a shoulder 45.

As shown in Figure 3, a seal plug 46 is in place in the threaded portion 42 of the outer end of the valve body. The seal plug comprises a main threaded portion and a lateral flange 47 and a cut-back portion 48 within which the inner edge of a seal plug washer 49 is received. When the seal plug is screwed into position, the washer 49 bearing against the shoulder 45 makes a gas-tight fit. If desired, the seal plug may have a hollow, internally threaded upper extension 50 within which a screw 51 is received. The screw 51 holds in place a member 52 to which one end of a retaining chain 53 is fastened. Preferably, the arrangement is such that the member 52 may rotate or swing about the screw 51. The other end of the chain 53 is secured as at 54 by a screw, rivet or otherwise to the container or to the member 21.

The seal plug has been described above and is normally in place when the container is not in use. To connect the container to a system for use, the connector mechanism of Figure 4 is used. This comprises a connector member 55 which is provided with a bore 56 and an enlarged nipple portion 57 rounded as shown. Joined to the nipple portion may be a portion of hexagonal cross section 58. The connector member is threaded at its upper end as at 59 and may be screwed directly into a regulator or into a fitting 60 which is joined to the regulator. Mounted to rotate about the connector 55 is a wing nut including a body portion 61 which is preferably of angular cross section, and including, also, a threaded portion 62 adapted to be received in the threads within the valve body. The wing nut is, also, provided with wings or arms 63 by means of which it is rotated. The purpose of the wing nut is, of course, to provide means for moving the connector into and out of position within the valve body.

In the particular form here shown, a regulator 64 is joined by the member 60 to the connector 55. The regulator is, also, joined by a connection 65 to the tube or pipe 3.

66 is a hood having an open bottom as at 67 and provided with a narrowed open neck portion 68. When the hood is in use, the tube 3 may pass through the neck. A packing tube or gasket 69 may be positioned within the neck 68 and is preferably of such size, shape and material as to prevent leakage through the neck and, thus, to protect the regulator, the valve body, the wing nut and the associated parts. The hood 66 may be slotted as at 70 to receive a bracket member 71. As shown, the bracket member is formed of a main portion and an angularly disposed portion 72 which passes through the slot 70. It may be secured to it by a screw 73 or otherwise. The bracket 71 is perforated as at 74. As shown in Figure 1, when the hood is in place the perforation 74 overlies the perforation 16 of the main bracket 5 which carries the container then in use and the same padlock which engages the main bracket and holds the container in place also engages the bracket 71 and holds the hood in place.

Each container may be provided with a fuse plug or a safety valve or both, or it may be provided with a composite safety valve arranged to yield under pressure and, also, provided with a fusible member to melt upon the occurrence of a predetermined degree of heat. Such a plug is indicated generally as at 75 in Figure 1. The details of the fuse plug and safety valve are not shown as they form no essential part of the invention, and the plug is mentioned merely to indicate that the present invention may be embodied in a structure which has such a fuse plug or safety valve, or both.

Although there is shown an operative form of the device, it will be understood that many changes in the form, shape and arrangement of parts might be made without departing from the spirit of the invention; and it is wished that this showing be taken as, in a sense, diagrammatic.

The use and operation of this invention are as follows:

When the device is to be set into operation, a suitable system for use will be provided. This may be a house piping system or any other desired arrangement of pipes for conducting the fluid to a point of use. The brackets will be secured to the house or to some other suitable support adjacent the system. Ordinarily, the fluid containers will be furnished from a central source of supply from which the user takes them full to his point of use. He places them upon the main brackets and may lock them in place, if desired. He opens and removes the seal plug from one of the containers. When this seal plug is opened, the valve remains closed both because of internal pressure and because of the pressure of the spring 34. He then puts the connector into place and screws it down by means of the wing nut. The nipple or inner end of the wing nut contacts the disc retainers 40 and depresses them to open the valve. This will occur a short distance before the nipple has been fully seated. Suitable packing means may be provided within the valve body to prevent leakage past the connector. Since the thread is made for rapid in and out movement—both of the plug and the connector—the nipple will be seated immediately after the valve is opened and little or no leakage will occur. After the nipple is properly seated, the hood, which has been previously raised or slipped back along the pipe 3, will be moved again to the position of Figures 1 and 2. The plug 46, which has been removed, will lie within the space covered by the hood and the hood will be arranged so that its bracket 71 may be locked in place by the same lock which locks the container in place on the main bracket.

With the parts as shown in Figures 1 and 2, fluid is withdrawn from the lefthand container as used and when that container has been exhausted the user, in order to use the fluid in the next container, will unlock the hood, raise it out of the way, will remove the connector and, having previously opened the seal plug of the other container, will insert a connector into the valve body of the other container and tighten it in place. He will then move the hood down against the second container to cover the regulator and associated parts and will lock it in place. Either

the flexibility or the connection of the tube 3 permits it thus readily to be moved to make a connection with one or the other of the containers. When one container has been emptied and the other brought into use, the user will ordinarily exchange the empty container for a full one and mount the new full container in place of the empty one where it will be available for immediate use when required.

We claim:

1. In a fuel supply system having a portable pressure tank as a source of supply of fuel under pressure and a base adapted to support the tank in upright position the combination of a fluid conduit mounted upon the base and having a flexible connector joined thereto, a pressure regulator connected rigidly to the free end of said connector, a connection receiving member adapted to be secured to said tank and provided with a frusto-conical metallic seat therein around a small passageway opening upwardly and terminating in a threaded opening, an outwardly moving self closing valve preventing escape of the contents of the tank through the passageway, a member mounted on the valve and disposed in the passageway to terminate at a point proximate to said seat when the valve is closed, and means for connecting said pressure regulator to said connection receiving member including, a tubular member secured rigidly to the regulator and having a shouldered head terminating in a round seating portion for contacting the seat and displacing the member upon the valve to open the valve, and a manually rotated member swivelled upon the tubular member to engage the shouldered head and be received in said threaded opening to exert pressure between said seat and said seating portion.

2. In a fluid supply system for liquefied petroleum gas stored in a pressure tank, the combination of a connector with a regulator secured rigidly thereto and discharge connection therefor comprising a valve housing seated in an opening in said tank, a valve seat formed within said housing, a valve within said housing having a composition seat engaging disc thereon, yielding means within said housing tending, when free to do so, to hold said valve disc seated on said seat, a projection on said valve extending outwardly beyond said valve seat and holding the disc upon the valve to prevent sticking of the valve, a second valve seat positioned outwardly of said first valve seat, said housing being provided on its interior with a thread beyond said second valve seat, said thread being adapted to receive alternately a closing plug and a connector, a connector provided with a spherical seating portion, the length of the projection from said valve being such that it is contacted by the connector and the valve is opened before inward seating movement of the connector is finally terminated.

3. In a fluid supply system for liquefied petroleum gas stored in a pressure tank, the combination of a discharge connection therefor comprising a valve housing seated in an opening in said tank, a valve seat formed within said housing, a valve having a stem reciprocably mounted within said housing, yielding means within said housing tending, when free to do so, to hold said valve seated on said seat, a projection on said valve extending outwardly beyond said valve seat and cooperating therewith to guide the valve into engagement with the seat, a second valve seat positioned outwardly of said first valve seat and having a frusto-conical contour, said projection extending outwardly beyond the inner end of said second valve seat, a shoulder formed adjacent the outer end of said valve housing, said housing being provided on its interior with a thread of sharp pitch outwardly beyond said second valve seat, said thread being adapted to receive alternately a closing plug and a connector, and a connector provided with a rounded seating portion, the length of the projection from said valve being such that it is contacted by the connector and the valve is opened before inward seating movement of the connector is finally terminated.

4. In a fuel supply system including a supply tank and removable service line having a pressure regulator, the combination of a connector for said regulator and tank carried by said regulator, said connector having a rounded head, and a connector-receiving member secured to said tank and including a valve seat, a spring pressed valve, and a frusto-conical surface for receiving said head, said connector being engageable with said valve to open the same when said head is seated on said surface.

5. In a dispensing system for liquefied fuel gas having a container and a pressure regulator connected thereto and feeding a movable service line, the combination of a tap member received in a wall of said container and having an opening for delivery of the container contents, a valve normally closing said opening, a tubular connector member mounted in the inlet of said regulator, a coupling element swivelly mounted upon the connector member and adapted to be received in the tap member to secure said members together, means for sealing the tap member and connector member including a rounded seating portion upon one of the members and a conical seating portion upon the other member which portions are capable of engaging each other in sealing relation in a universal relationship, and means carried by the valve extending outwardly and engaged by the connector member for opening the valve to its open position as the sealing portions are brought into sealing engagement.

6. In a dispensing system having a container for storing liquefied fuel gas under pressure and a service line leading to an appliance including a pressure reducer, the combination of a tap member received in a wall of said container and having an opening for delivery of the container contents, a valve normally closing said opening, a tubular connector member secured to the inlet of said regulator, a threaded element swivelly mounted upon the connector member and adapted to engage the tap member for securing the connector member thereto, means for sealing the tap member and connector member including a rounded seating portion upon one of the members and a conical seating portion upon the other member which portions are capable of engaging each other in self-adjusting relationship, and means castellated at its outer end and carried by the valve to extend outwardly and be engaged by the connector member for displacing the valve as the sealing portions are brought into full pressure engagement by the manual turning of the threaded element.

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