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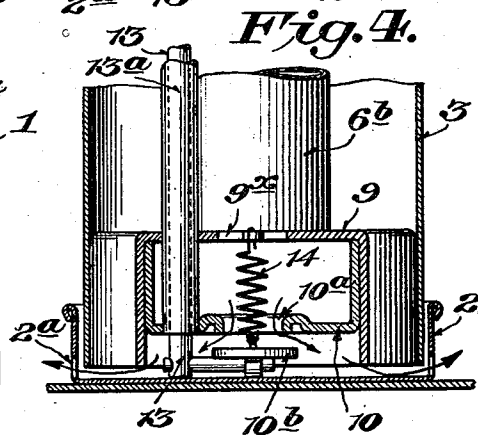
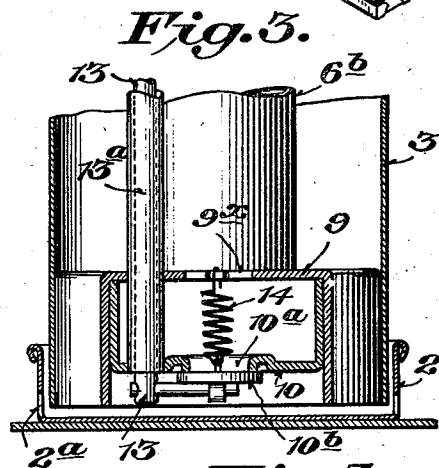
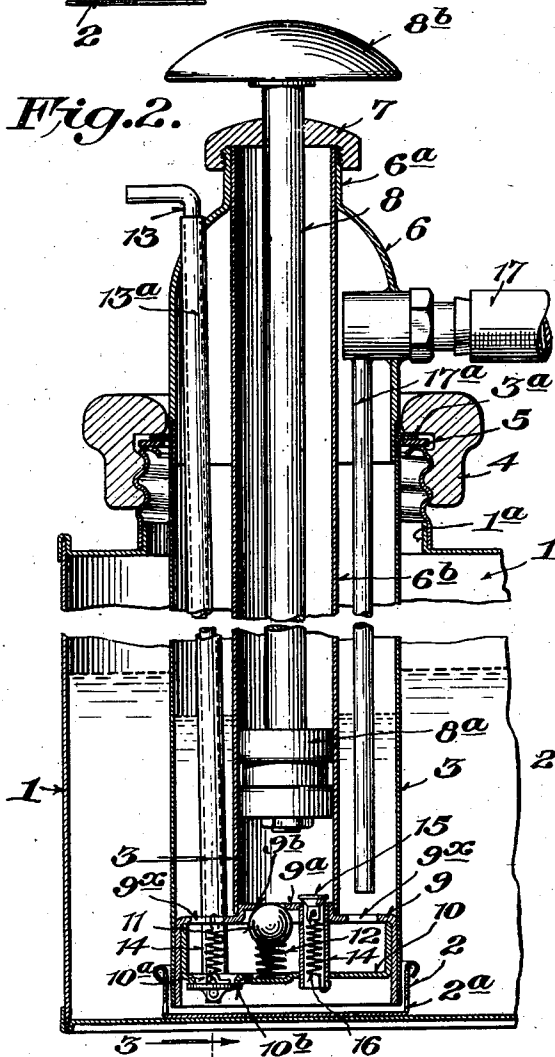
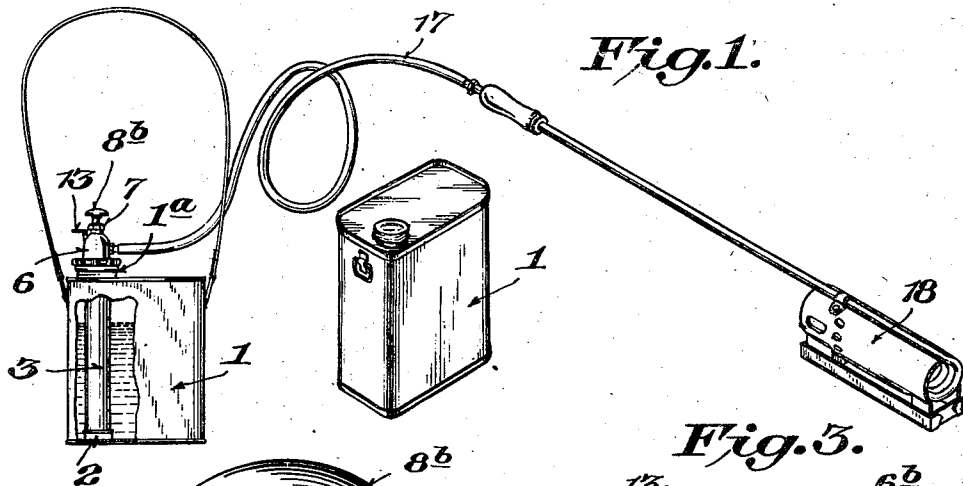
J. P. GLASS

2,284,316

LIQUID DISPENSER OR THE LIKE

Filed Nov. 24, 1939

2 Sheets-Sheet 1



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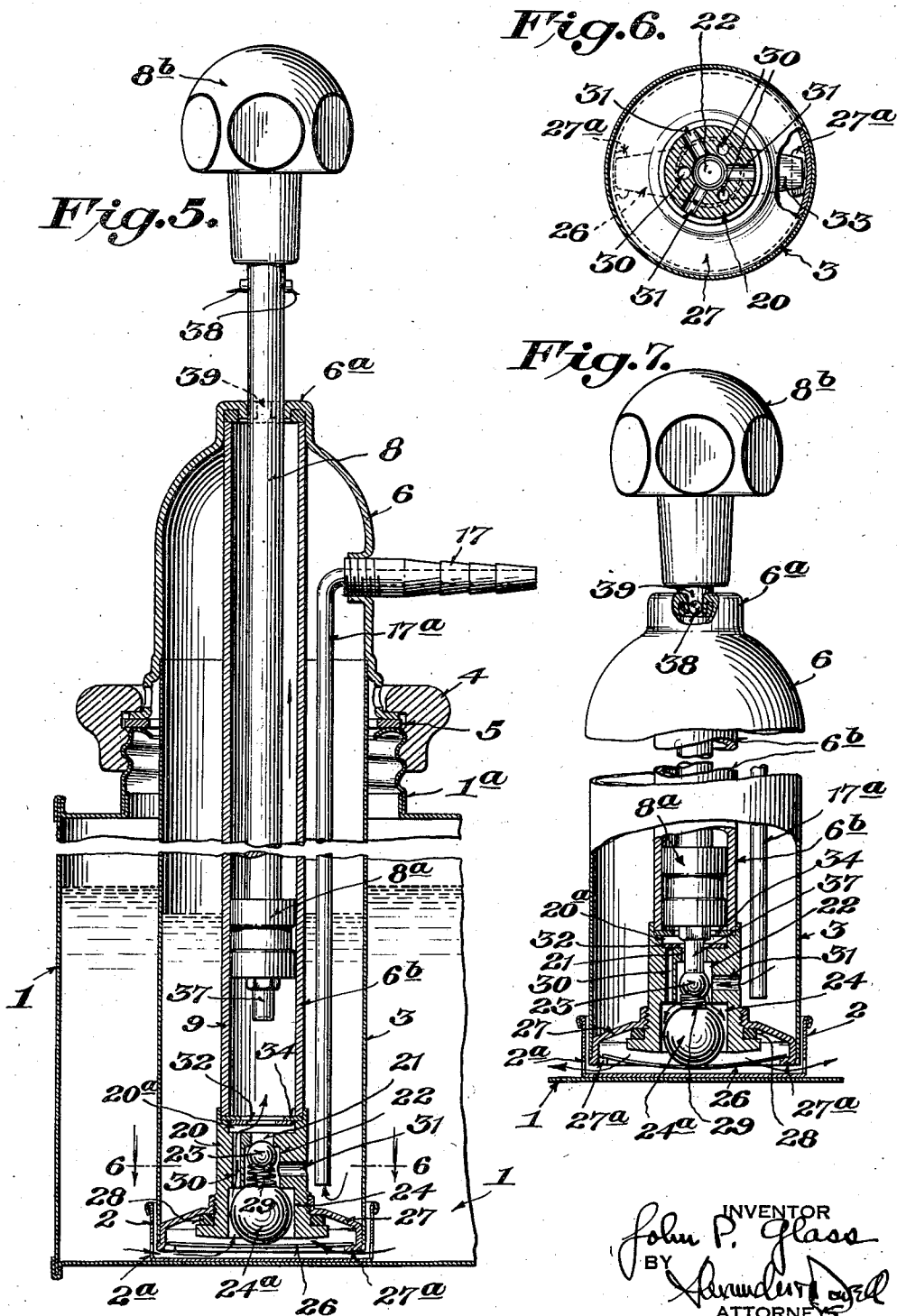
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,284,316

LIQUID DISPENSER OR THE LIKE

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6 Claims. (Cl. 158—79)

This invention is a novel improvement in dispensers particularly adapted to supply liquid under pressure to liquid fuel burners, or spraying devices, or the like; and one object of the invention is to provide a dispenser consisting of a pump adapted to be inserted into a container, the pump comprising a pumping chamber and a pressure chamber having a syphon outlet together with a relief valve manually operable from the exterior of the dispenser adapted to release the pressure in the pressure chamber and divert the liquid therein back into the container, so as to cut off the flow of liquid from the syphon outlet.

Another object of the invention is to provide a dispenser of the above type in which the customary special liquid container is dispensed with, and one or more light weight inexpensive ordinary cans, in which the spraying liquid is sold in the trade, having the usual threaded filling necks may be utilized to serve as the liquid container of the apparatus, said pump proper having a ring nut on its exterior adapted to engage the threads of the filling neck to secure the pump within the container. My invention thus eliminates the usual high pressure tank for the liquid and substitutes therefor one of several light weight tanks which need not be subjected to excess pressures, together with means to keep the burner supplied with fuel while the pump is being transferred from tank to tank, or while the tank is being refilled. This greatly reduces the effort required to carry the apparatus, and eliminates the delay caused by stopping the burner while the tank is being filled.

A further object is to provide means on the interior of the container for steadying the lower end of the pump inserted therein down through the filling neck.

A further object of the invention is to provide a dispenser adapted to be inserted into the container and so arranged that the pump may be disconnected from any empty container and a full container substituted in place thereof without interrupting the flow of liquid from the pump outlet, thereby preventing interruption of the burning or spraying operation, and permitting use of a series of small light weight containers with the pump instead of one large heavy container.

A still further object is to provide a dispenser in which the necessity of using a control or shut-off valve in the connection between the outlet and the burner or spraying device is eliminated, the shut-off being effected in the pump itself,

thus accomplishing better control and quicker cut-off than heretofore obtained.

A still further object of my invention is the reduction of the effort required to supply the fuel which results from pumping the liquid rather than the air to displace it, and makes it possible for the operator to keep pressure by pumping without setting the apparatus down.

Still another object of my invention is the elimination of any possibility of the usual oil hose being left full of liquid under pressure after use, with the resultant rapid and unnecessary deterioration of the hose.

I will explain the invention with reference to the accompanying drawings which illustrate several practical embodiments thereof to enable others familiar with the art to adopt and use the same; and will summarize in the claims the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:

Fig. 1 is an elevation, partly in section, showing my novel dispensing apparatus applied to a liquid fuel burner, and also showing a supplementary replaceable fuel container.

Fig. 2 is an enlarged vertical section through one form of dispensing apparatus.

Fig. 3 is a vertical section on the line 3—3, Fig. 2, showing the relief valve in normal closed position.

Fig. 4 is a view similar to Fig. 3 but showing the relief valve opened, either manually or under the influence of excessive pressure in the pressure chamber.

Fig. 5 is a vertical section similar to Fig. 2 showing a modified form of dispensing apparatus.

Fig. 6 is a horizontal section on the line 6—6, Fig. 5, showing the inlet and outlet ports for the pump and pressure chambers.

Fig. 7 is a vertical section but showing the relief valve, of the form shown in Fig. 5, manually opened.

As shown in Figs. 1 to 4 inclusive, the dispenser pump, per se, is adapted to be utilized in connection with one or more standard containers for liquid fuel or the like to supply liquid under pressure to burners or spraying devices or the like, and the pump is adapted to be inserted down through the threaded filling neck 1a of the container and secured therein. Preferably container 1 has at its bottom a cup-shaped member 2 opposite the filling neck 1a, member 2 receiving the lower end of the pump casing and maintaining the pump in normal upright position. The side walls of member 2 are perforated as at 2a in order

to permit liquid to enter freely within cup 2 for the purpose hereinafter described.

The dispenser pump preferably comprises an outer cylindrical wall 3 of diameter somewhat smaller than that of the filling neck 1a and slightly smaller than the cup 2, which casing is inserted down through the neck 1a as shown in Figs. 1 and 2. The upper end of casing 3 is preferably provided with a flange 3a adapted to seat upon the top of the filling neck, and a ring nut 4 of suitable material is provided on the wall 3 having a threaded portion engaging the threads of the filling neck and having a shoulder overlying the flange 3a, whereby when the ring nut 4 is screwed down, the flange 3a will be urged towards the end of the filling neck 1a. A packing washer 5 of suitable material may be interposed between flange 3a and the filling neck if desired to prevent spillage or evaporation.

Secured to the upper end of wall 3 is a dome-shaped head 6 externally threaded at its upper contracted end 6a and provided with a cap 7 having a central aperture through which the pump rod 8 passes for the purpose hereinafter described, said rod having a knob 8b on its upper end. Extending downwardly through the head 6 and wall 3 is a cylinder 6b in which the piston 8a of rod 8 operates.

At the lower open end of cylinder 6b is a plate 9 having downwardly projecting flanges fitting within the open lower end of the wall 3, and plate 9 has a raised central portion 9a (Fig. 2) fitted within the lower end of the cylinder 6b and securely connected therewith in an airtight manner. Securely fitted within the side flanges of member 9 is a cup-shaped plate 10, the plates 9 and 10 together forming an airtight chamber for the purpose hereinafter described. In the plate 9 opposite the cylinder 6b is a circular valve opening 9b and cooperating with said opening is a downwardly opening ball valve 11 normally urged towards the opening by a spring 12 whereby the opening 9b will be normally closed. Extending through aligned openings in the plates 9 and 10 is a tube 14 entering the lower end of cylinder 6b. At the upper end of the tube 14 is an upwardly opening valve 15, normally held in depressed position by a spring 16. In the plate 9 exteriorly of the cylinder 6b are one or more openings 9c establishing constant communication with the pressure chamber of the pump.

In the head 6 above the nut 4 is an outlet pipe 17 having a branch 17a extending down between the walls 3 and 6b and terminating at a point somewhat above the plate 9, pipe 17 thus operating as a syphon outlet. By the above construction when the piston 8a is being raised in the cylinder 6b by the rod 8, the liquid in the container will be drawn through the openings 2a in the cup 2 and will be drawn upwardly through the tube 14 past the inlet valve 15 and into the cylinder 6b, inlet valve 15 being raised against the action of the spring 16 by the action of the liquid passing through the tube. During this stroke the outlet ball valve 11 will remain closed. When the piston is being depressed, the inlet valve 15 will be maintained closed, and the outlet ball valve 11 will be unseated against the action of spring 12 by the pressure of the liquid within the cylinder 6a and the liquid will pass out of the cylinder and into the chamber between the plates 9 and 10, and will pass upwardly through the opening 9c into the pressure chamber formed between the wall 3 and cylinder 6b, the upper of the chamber forming an air-bell caus-

ing the liquid to be fed under substantially constant pressure through the syphon outlet pipe 17 to the liquid fuel burner 18 or to the liquid spraying device (not shown) attached to the outlet 17.

As shown in Fig. 1, the pipe 17 may be attached directly to a coil or retort-type liquid fuel burner 18, which type of burner is well known in the art and needs no particular description herein. However, the pipe 17 may be connected to a liquid spray head (not shown) or other suitable liquid dispensing device, instead of to a liquid burner. It is usually customary in such assemblies with liquid burners or sprays of the above type, to insert a valve in the pipe 17 intermediate the pump or dispenser and the burner or sprayer. However, I provide a novel means whereby this valve may be entirely dispensed with. In the plate 10 is an opening 10a, normally closed by a cap 10b loosely mounted upon the lower end of a manually operable relief rod 13 extending down through a pressure retaining sleeve 13a within the casing 3 from a point adjacent the cap 7 of the head 6. Normally the cap 10b is closed by action of spring 14. Figs. 2 and 3 show the normal closed position of the cap 10b. Whenever, however, it is desired to stop the flow of liquid from the pressure chamber to the burner 18 or spray head, it is merely necessary to manually depress the relief rod 13 to unseat cap 10b, as shown in Fig. 4, thereby releasing the pressure in the pressure chamber and permitting the same to pass out into the container 1. Thus the flow of liquid from the syphon outlet 17 will be instantly and automatically cut off.

The operation of the dispenser shown in Figs. 1-4 is as follows: The liquid enters the pump cylinder 6b, through tube 14 past the check valve 15 on the upstroke of piston 8a, and is expelled through the outlet 9b past the ball check valve 11 on the piston downstroke. From thence the liquid flows into the airtight pressure chamber. A few piston strokes is sufficient to build up enough pressure to operate the burner 18. Since the liquid is fed to the burner from the syphon outlet 17, all the air originally in the pressure chamber is trapped at the top of the pressure chamber and forms an air cushion which maintains an approximately uniform pressure of liquid in the pressure chamber. In case the piston is operated too vigorously, the excess liquid in the pressure chamber will escape past the spring pressed release by-pass cap 10b, which will be set for the maximum operating pressure of the burner, and cannot be further adjusted. The piston may be stopped, and the trapped air in the pressure chamber will maintain a gradually diminishing pressure on the liquid fed to the burner for several minutes, so that if the piston is again started within such time limit, the burner will continue to operate without the necessity of relighting, or as has sometimes formerly been the case of even having to re-heat the torch. In addition, means has been provided for manually opening the pressure release by-pass cap 10b utilizing the rod 13 in the tube 13a, which latter serves to give an airtight passage through the pressure chamber to the rod 13, which rod unseats the pressure release cap 10b whenever the rod is depressed. This causes all pressure within the pressure chamber to be released, the liquid flowing back into the container 1. Furthermore, the pressure due to the gases of the heated liquid fuel within the coil or retort

of the burner 18, forces all the fuel out of the burner back through the connecting means into the pressure chamber and thence into the container, thus leaving the burner coil or retort dry, and thus no more gas will be generated and the burner will be extinguished much more quickly than is the case when a fuel shut-off valve in pipe 17 is closed in the conventional arrangement.

Figs. 5 to 7 show a modified form of dispenser apparatus, the same being generally similar to the form shown in Figs. 2 to 4, and like reference characters on parts in both modifications denote like structural parts. In this modification, however, the relief rod for operating the relief cap 10b of Figs. 2-4, inclusive, is omitted, and the piston rod serves also as the relief rod. The lower end of the cylinder 6b is directly connected to a valve body 20 having a vertical bore 21 extending therethrough communicating with the lower end of the cylinder 6b. In the bore 21 is an intermediate enlargement 22 containing a downwardly opening spring-pressed ball valve 23 normally closing the upper end of bore 21. At the lower end of the bore 21 is a further enlargement 24 containing a large ball valve 24a normally closing the lower end of the bore 21, said ball being normally held in place by means of a leaf spring 25 having its ends seated on inwardly projecting ears 27a on an inverted cup-shaped member 27 having a neck connected by screw-threaded engagement with the exterior of the valve body member 20, the outer periphery of member 27 being fitted in an airtight manner within the lower end of wall 3 to close the lower end thereof. Suitable packing 28 may be used to form a watertight connection. Between the balls 23 and 24a is a spring 29 normally holding the ball 23 seated in position to close the upper end of bore 21 while the leaf spring 26 normally holds the ball 24a seated to close the lower end of bore 21.

Extending upwardly through valve body 20 around the bore 21 is a series of vertical inlet ducts 30 of small diameter (three being shown in Fig. 6) for the purpose of permitting free passage of liquid from the enlargement 24 directly into the lower end of the cylinder 6b. Extending laterally of the enlargement 22 of the bore, is a series of outlet ports 31 (three being shown in Fig. 6) for directing liquid under pressure into the pressure chamber situated between the walls 3 and the cylinder 6b. In the upper end of the valve body 20 is a recess 20a containing a valve washer 32 adapted when in lower position to close the intake ports 30; and above the washer 32 is a fixed washer 34 disposed between the lower end of the cylinder 6b and the valve body 20, said washer 34 maintaining the valve 32 in position in recess 20a while permitting axial movement thereof in said recess.

In this modification the lower end of the piston rod 8 is provided below the piston 8a with a projection 37 of diameter sufficiently small to extend down through the bores of washers 34 and 32 and down through the upper end of bore 21 to unseat the ball valve 23 and depress the ball 23 into contact with the ball 24a, thereby unseating ball 24a when the piston rod 8 has been rotated into a certain position and depressed. As shown, the piston rod 8 has adjacent its upper end above the head 6 a pair of lugs 38 or lateral protuberances normally engaging the upper end 6a of head 6 when the piston rod is depressed and preventing the rod from being depressed suffi-

ciently to unseat the ball valve 24a. When however it is desired to unseat the valve 24a the piston rod 8 is rotated until the protuberances 38 are disposed opposite slots 39 in the upper end 6a of head 6, thereby permitting the piston rod to be depressed below its normal pumping range and permitting the extension or projection 37 to unseat valve 24a.

In operating the modification shown in Figs. 5-7, inclusive, when piston 8a is being raised the liquid from container 1 is drawn through the holes 2a in the cup 2 and enters the lower enlargement 24 of the bore 21 in the valve body 20 and passes upwardly through the inlet ports 30 raising the valve washer 32, the liquid thus passing directly into the cylinder 6b below piston 8a. During this time both ball valves 23 and 24a remain seated against their respective shoulders in the bore of valve body 20. As soon as the upward motion of the piston ceases, the valve washer 32 drops covering the intake ports 30. This washer is prevented from rising too high by the sealing washer 34 disposed above it. When the piston is being depressed, the fluid pressure in the cylinder will unseat the smaller ball valve 23 against the action of the spring 29, while the valve washer 32 is seated to close the inlet ports 30, and the liquid passing through the bore 21 will be directed laterally through the outlet ports 31 and directly into the pressure chamber, and the pressure in said chamber will cause the liquid to pass through the syphon outlet 17 to the oil burner 18 or spraying device.

The operation of the fuel burner would be the same as above mentioned with respect to Figs. 1-4 inclusive, but the pressure release by-pass now consists of the ball 24a held on its seat by the leaf spring 26. The method of releasing all pressure in order to shut off the burner is shown in Fig. 7. The protuberances 38 adjacent the upper end of the piston rod 8 normally strike the top 6a of the head 6 so that further downward motion is prohibited, and movement of the piston will be confined within its ordinary working limits.

When the operator desires to shut off the supply of fuel to the burner, he aligns the protuberances 38 with the slots 39 in the head 6 so that the piston can be further pushed down into the position shown in Fig. 7. In this position the extension 37 on the pump rod 8 first unseats the exhaust check ball 23 and then jams it downward against the pressure release check ball 24a, unseating the latter so that all pressure from the pressure chamber is released, and the burner 18 extinguished as before mentioned.

I claim:

1. A dispenser adapted to supply liquid under pressure to liquid fuel burners or spraying devices or the like, comprising a container, a liquid pump in said container consisting of a pumping chamber and a pressure chamber surrounding the pumping chamber and having a syphon outlet, with check valve connections between the pumping chamber and pressure chamber; a normally closed relief valve between the said pressure chamber and container, and means for opening said relief valve to release the liquid from said chamber back into the container to stop the flow of liquid from the outlet, said relief valve comprising a spring-pressed ball in the pressure chamber disposed below the check valve in the lower end of the pump chamber, a piston rod in said pump chamber, and said means comprising a projection on said rod adapted in one

position of the rod when depressed to depress the check valve sufficiently to unseat said ball.

2. A dispenser adapted to supply liquid under pressure to liquid fuel burners or spraying devices or the like, comprising a container, a liquid pump in said container consisting of a pumping chamber and a pressure chamber surrounding the pumping chamber and having a syphon outlet, with check valve connections between the pumping chamber and pressure chamber; a normally closed relief valve between the said pressure chamber and container, and means for opening said relief valve to release the liquid from said chamber back into the container to stop the flow of liquid from the outlet, said relief valve comprising a spring-pressed ball in the pressure chamber disposed below the check valve in the lower end of the pump chamber, a piston rod in said pump chamber, and said means comprising a projection on said rod adapted in one position of the rod when depressed to depress the check valve sufficiently to unseat said ball; and limiting means on the piston rod normally confining the piston rod movement to the limits of the pumping stroke except when in the one position of the said rod.

3. A liquid dispenser adapted to supply liquid under pressure to liquid fuel burners or spraying devices or the like, comprising a container having a filling neck, a liquid pump inserted down through the filling neck, and consisting of a pumping chamber and a pressure chamber surrounding the pumping chamber and having a syphon outlet, with check valve connections between the pumping chamber and pressure chamber; means interconnecting the pump and filling neck for retaining the pump in the container; a normally closed relief valve between the said pressure chamber and container; and means for opening said relief valve to release the liquid from said chamber back into the container to stop the flow of liquid from the outlet, said relief valve comprising a spring-pressed ball in the pressure chamber disposed below the check valve in the lower end of the pump chamber, a piston rod in said pump chamber, and said means comprising a projection on said rod adapted in one position of the rod when depressed to depress the check valve sufficiently to unseat said ball.

4. A liquid dispenser adapted to supply liquid under pressure to liquid fuel burners or spraying devices or the like, comprising a container having a filling neck, a liquid pump inserted down through the filling neck, and consisting of a pumping chamber and a pressure chamber sur-

rounding the pumping chamber and having a syphon outlet, with check valve connections between the pumping chamber and pressure chamber; means interconnecting the pump and filling neck for retaining the pump in the container; a normally closed relief valve between the said pressure chamber and container; and means for opening said relief valve to release the liquid from said chamber back into the container to stop the flow of liquid from the outlet, said relief valve comprising a spring-pressed ball in the pressure chamber disposed below the check valve in the lower end of the pump chamber, a piston rod in said pump chamber, and said means comprising a projection on said rod adapted in one position of the rod when depressed to depress the check valve sufficiently to unseat said ball; and limiting means on the piston rod normally confining the piston rod movement to the limits of the pumping stroke except when in the one position of the said rod.

5. A dispenser adapted to supply liquid under pressure to liquid fuel burners or spraying devices or the like, comprising a container, a liquid pump in said container consisting of a pumping chamber having a piston rod and piston; a pressure chamber surrounding the pumping chamber and having a syphon outlet; a valve body closing the lower ends of both the said chambers and having inlet means for the pump chamber, and having outlet means discharging from the pumping chamber into the pressure chamber; a downwardly opening check valve for normally closing the outlet ports; an upwardly opening check valve normally closing the inlet port; a downwardly opening spring-pressed relief valve in the valve body below the outlet port check valve; and a projection on the piston rod adapted in one position of the rod when depressed to depress the outlet port check valve sufficiently to unseat the relief valve and release the pressure from the pressure chamber back into the container to stop the flow of liquid from the outlet.

6. In a dispenser as set forth in claim 5, said inlet means comprising ports arranged in an annular series around the outlet means; and said upwardly opening check valve comprising a washer having a central opening in way of the outlet means, said washer being confined for vertical movement within a recess in the upper end of the valve body, below the connection of the valve body with the lower end of the pumping chamber.

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