Aug. 29, 1950 H. M. HANKS 2,520,398

OIL DISPENSING PUMP

Filed March 21, 1947 2 Sheets-Sheet 1

Fig. 1.

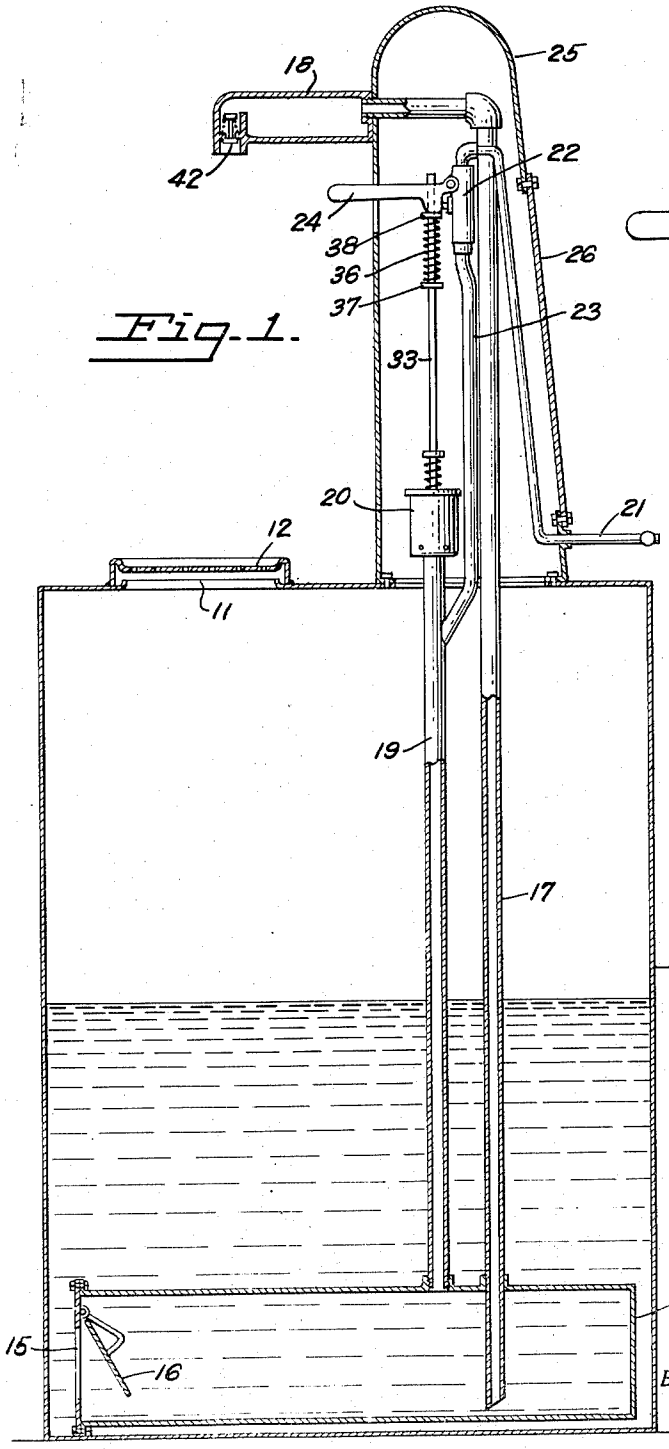
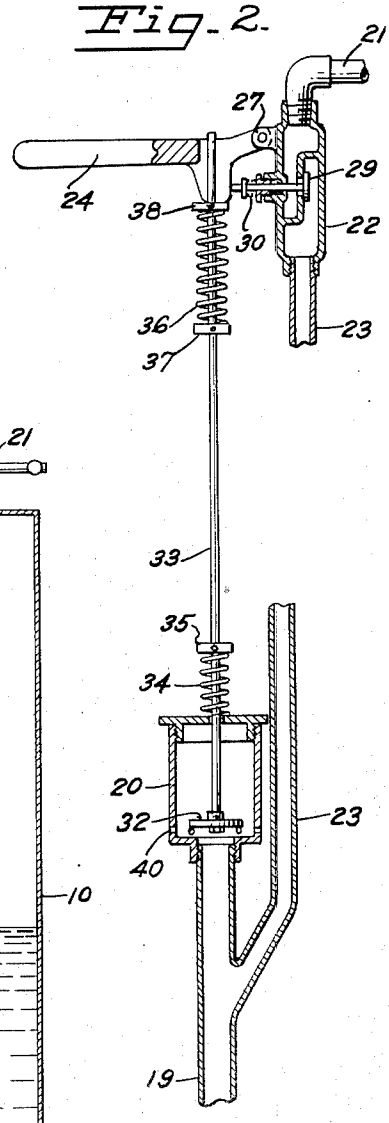


Fig. 2.



INVENTOR.
HAROLD M. HANKS
BY Charles A. Fryer
ATTORNEY

Aug. 29, 1950 H. M. HANKS 2,520,398

OIL DISPENSING PUMP

Filed March 21, 1947 2 Sheets-Sheet 2

Fig. 3.

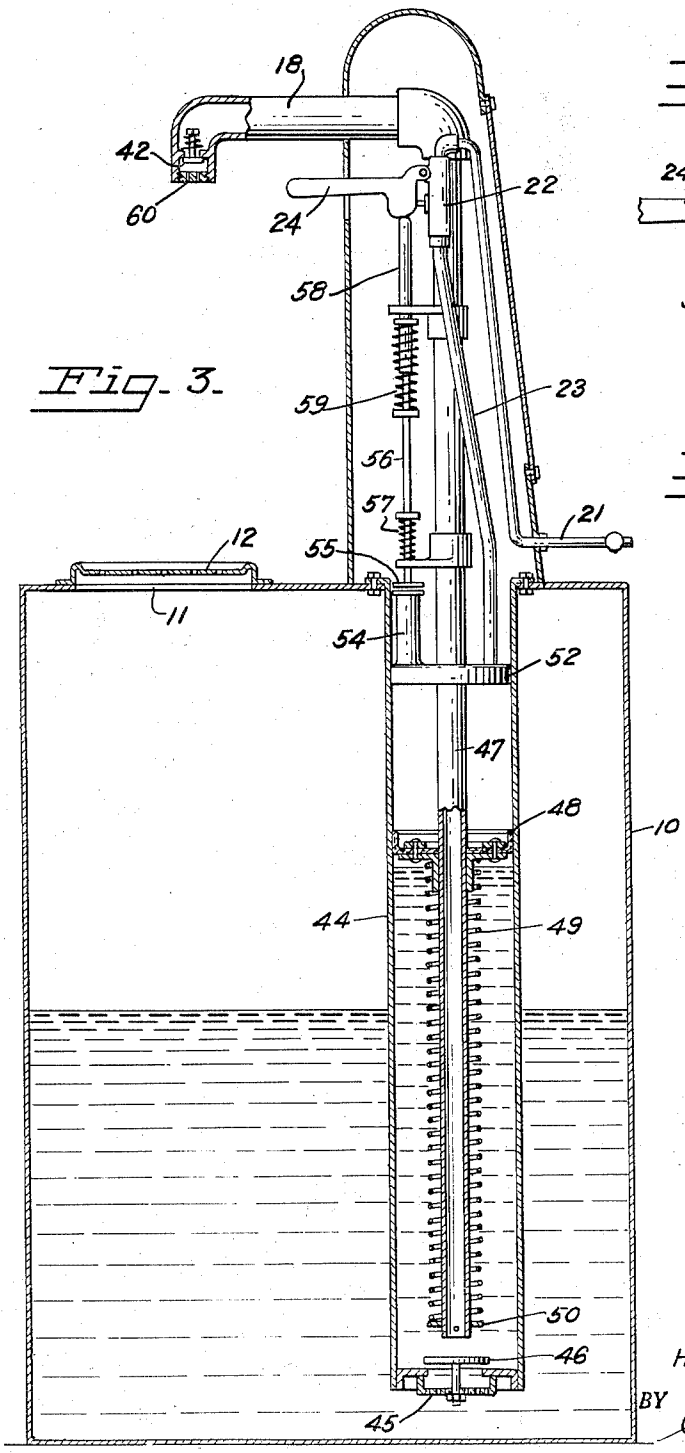


Fig. 4

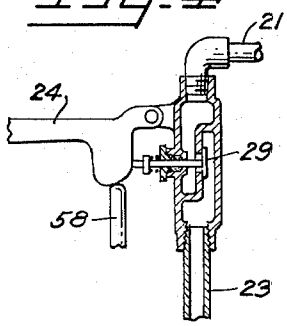
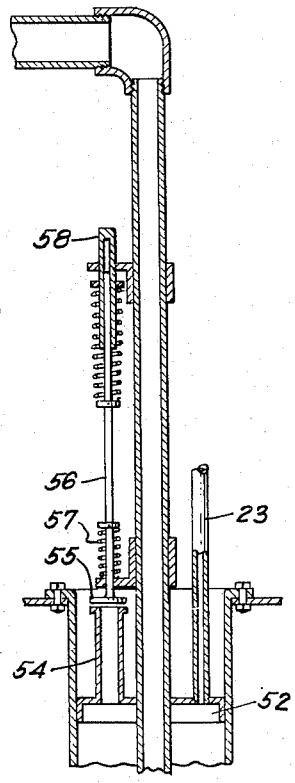


Fig. 5.



INVENTOR.
HAROLD M. HANKS

BY Charles H. Fryer

ATTORNEY

Patented Aug. 29, 1950 2,520,398

UNITED STATES PATENT OFFICE

2,520,398

OIL DISPENSING PUMP

Harold M. Hanks, San Francisco, Calif.

Application March 21, 1947, Serial No. 736,367

4 Claims. (Cl. 222—373)

1

This invention relates to dispensing pumps for oil or other liquids and particularly to pumps wherein dispensing of a liquid is accomplished by pneumatic pressure.

The invention is readily adaptable to many specific uses but has been developed for, and will be disclosed herein in connection with its use as a means for dispensing lubricating oils at an automobile service station, or the like. It is customary to store oils in tanks resting on the floor and to pump oil upwardly from the tank into one or two-quart measures from which it is transferred to the automobile crank case. Pumps usually of the gear type actuated by handcranks have been employed for this purpose, but are unduly slow and tedious to operate and are difficult to control when it is desired to exactly fill a measuring receptacle.

It is an object of this invention to provide an improved dispensing pump actuated by pneumatic pressure, capable of rapid and exact delivery of any desired quantity of liquid. It is also an object of the invention to provide a simple pump mechanism which operates uniformly to dispense liquid from a tank regardless of the quantity of liquid contained by the tank. Further and more specific objects and advantages of the invention and the manner in which the objects are accomplished will appear from an understanding of the following specification wherein reference is made to the accompanying drawings.

In the drawings:

Fig. 1 is a vertical sectional view through an oil supply tank and pump embodying the present invention;

Fig. 2 is an enlarged fragmentary sectional view of a portion of the mechanism illustrated in Fig. 1;

Fig. 3 is a section like Fig. 1 of a modified form of the invention;

Fig. 4 is an enlarged fragmentary sectional view of a portion of the mechanism shown in Fig. 3; and

Fig. 5 is a similar view of another portion of the mechanism shown in Fig. 3.

The invention employs the principle of pumping or displacing liquid in a tank by the admission of air under pressure to the upper portion of the tank to force the liquid through a discharge tube having an open end disposed below the liquid level in the tank. However, as it is undesirable and impractical to make a large tank pressure-tight, a small auxiliary or pressure tank is placed within the large tank with a valved

2

opening adjacent to the bottom of the large tank. The auxiliary tank in the present case is automatically sealed, opened and vented in proper relationship to the pneumatic dispensing operation.

In Fig. 1 of the drawings the conventional oil supply tank is illustrated at 10. An opening 11 is provided in the top of the tank for the admission of oil thereto and is covered by a conventional perforated drain tray 12 which supports the measuring receptacle to be filled with oil from the tank 10. Within the supply tank and preferably adjacent to the bottom thereof is an auxiliary or pressure tank 14 with an opening 15 communicating with the interior of the larger tank and normally closed by a hinged check valve or foot valve 16. A discharge pipe 17 extends from a point adjacent the bottom of the pressure tank 14 upwardly through the top of the larger tank and terminates in a discharge spout 18, the delivery end of which is disposed directly above the drain tray 12 which supports a receptacle (not shown) to be filled. A vent pipe 19 also communicates with the pressure tank 14 at its top and extends upwardly through the large tank where it terminates in a vent valve contained in a housing 20. Compressed air from a suitable source of supply (not shown) is introduced through a pipe 21 leading to an air-control valve 22, and this valve is connected by means of a pipe 23 with the vent pipe 19 at a point below the vent valve housing 20. The air control valve 22 has an operating lever 24 extending forwardly through a housing 25 supported on top of the tank 10 and serving to enclose the valves and pipes described. An access plate 26 may be provided on the housing to facilitate servicing of the mechanism contained thereby. The lever 24 is pivoted with respect to valve 22, as shown at 27 in Fig. 2, and bears against a valve stem 28 of a valve disk 29 which normally closes the valve under influence of a spring 30. Depression or downward swinging of the lever 24 therefore effects opening of the air valve admitting air under pressure through the pipe 23 and vent pipe 19 to the interior of the pressure tank 14. Pressure within the tank insures tight closing of the foot valve 16 and causes oil contained by the tank to be delivered through the discharge pipe 17 and spout 18. As best shown in Fig. 2 depression of the lever 24 closes a vent valve 32 contained in the housing 20 by engagement with the upper end of a vent valve stem 33. A vent valve opening spring 34 is under compression between the top of the

vent valve housing 20 and a collar 35 fixed to the stem 33 so that the vent valve is normally held in its open position. A pressure relief spring 36 is interposed between a fixed collar 37 on the vent valve stem and a sliding collar 38. The valve-actuating lever 24 actually contacts and depresses the valve stem 33 through the sliding collar 38 and pressure relief spring 36, which spring is somewhat stiffer than the spring 34. Therefore, if pressure within the pressure tank 14 is excessive, it will raise the valve 32 against the action of the spring 36 and provide a vent to atmosphere through ports 40 disposed in the lower portion of the vent housing 20.

In operation, as the vent valve 32 is normally open, oil within the main tank 10 is free to enter the pressure tank 14 through the foot valve 16 and a sufficient supply of oil is contained by the pressure tank to more than fill the largest measuring receptacle ordinarily used. When the receptacle to be filled is disposed on the drain tray 12, under spout 18, the air valve lever 24 is depressed to at once open the air valve and close the vent. Thus, compressed air entering the top of the pressure tank 14 effects discharge of oil upwardly through the pipe 17 and out through the spout 18. If because of any stoppage or obstruction at any point in the system, pressure in tank 14 becomes excessive, the vent valve is automatically opened upon collapsing of the pressure release spring 36. When the receptacle is filled and the valve lever 24 is released, the vent valve is automatically opened by its spring 34 permitting escape of air from the tank 14 and refilling of the tank through the foot valve 16.

In order to prevent any possibility of dripping from the spout 18 after the receptacle has been filled, a spring-closed check valve 42 is preferably arranged in the discharge end of the spout and will be opened only upon the delivery of oil under pressure into the spout.

A modified form of the invention is shown in Fig. 2 wherein the same oil tank 10 is provided with a vertically arranged pressure tank 44 corresponding to the tank 14 shown in Fig. 1, and having an opening in its lower end covered by a strainer 45 and normally closed by a foot valve 46. This vertically disposed pressure tank 44 has the advantage that it may readily be arranged within a supply tank 10 that has already been in service and may be installed within the tank by insertion through a relatively small opening in the top of the tank through which other types of pump mechanism have extended. However, due to the vertical disposition of the pressure tank 44, it will not be filled by gravity when the oil level in the supply tank 10 is low. Consequently, a spring-actuated plunger is disposed within the tank to insure the entry through its lower end of an adequate quantity of oil for filling the largest measuring receptacle that may be used.

In Fig. 3 a discharge pipe 47 corresponding to discharge pipe 17 in Fig. 1 is illustrated as arranged coaxially within the pressure tank 44 and as supporting a sliding plunger 48 capable of reciprocal movement in the tank 44 in the manner of a piston within a cylinder. A spring 49 seated at its upper end on the plunger 48 and at its lower end on a fixed collar 50 normally urges the plunger 48 upwardly to forcibly draw oil in through the foot valve 46. The compressed air inlet pipe 21 and valve 22 are similar in construction and operation to the same parts illustrated in Fig. 1. However, the air pipe 23 communicates directly with a head 52 of the cylinder-like pressure tank 44, as shown in Fig. 5. A separate vent pipe 54 is provided in the head 52 and a vent valve 55 therefor has an upwardly extending stem 56. A spring 57 corresponding to the spring 34 in Fig. 1 normally holds the vent valve open. A telescoping end piece 58 on the upper end of the valve stem 56 is held in an extended position by a pressure relief spring 59 which corresponds in function to the spring 36 in Fig. 1. The air valve actuating lever 24 may be depressed to open the valve disk 29 (see Fig. 4) in the same manner as previously described and will also engage the extension 58 of the vent valve stem 56 to effect closing of the vent valve at the same time that air is admitted to the pressure tank.

In operation of the form of invention shown in Fig. 3, when air is admitted to the upper end of the pressure tank 44 with the vent valve closed, the plunger 48 is depressed against the action of the spring 49 displacing the oil below the plunger and thereby dispensing it through the discharge pipe 47 and spout 18. When the air valve is closed and the vent valve opened, the spring 49 returns the plunger 48 upwardly to draw a new supply of oil from adjacent the bottom of the tank 10 into the pressure tank 44. The spout 18 of Fig. 3 is provided with the same spring loaded check valve 42 disclosed in Fig. 1. However, in order to prevent dripping of even that small quantity of oil which may adhere to the interior of the spout at its very end and beyond the closed check valve 42, the end of the spout is illustrated as having a plug 60 provided with a plurality of small perforations through which oil under pressure will flow freely. The cross-sectional diameter of the individual perforations is however so small that a capillary effect will prevent the dropping of any oil from the spout when the pressure behind it is relieved.

With the invention herein disclosed, the filling of a measuring receptacle of one or two quart capacity is easily accomplished by simply depressing the air valve actuating lever 24 and as the receptacle is filled to its capacity the flow of oil through the discharge spout is instantly interrupted by releasing the lever which effects immediate cutting off of air pressure from the source of supply and simultaneously venting of any pressure existing within the pressure tank, as well as closing of the vent valve disposed within the discharge spout.

I claim:

1. Apparatus for dispensing liquid from a supply tank comprising a pressure tank disposed within the supply tank, a check valve for admitting fluid to the pressure tank from the supply tank, a discharge tube communicating with the pressure tank, valve controlled means for introducing compressed air to the pressure tank, a valve controlled vent on the pressure tank, means for simultaneously opening the air valve and closing the vent valve, and a pressure relief spring associated with the vent valve closing means to permit the vent valve to open for the relief of excessive pressure in the pressure tank.

2. Apparatus for dispensing liquid from a supply tank comprising a vertically disposed pressure-tight cylinder disposed within and extending to a point adjacent the bottom of the supply tank, a foot valve adjacent the lower end of the cylinder to admit liquid thereto, a plunger in the cylinder, means resiliently urging the plunger upwardly to draw liquid into the cylinder through the foot valve, a discharge tube communicating with the lower end of the cylin-

der, and means for directing compressed air into the upper end of the cylinder to depress the plunger therein and force liquid out through the discharge tube.

3. Apparatus for dispensing liquid from a supply tank comprising a vertically disposed pressure-tight cylinder disposed within and extending to a point adjacent the bottom of the supply tank, a foot valve adjacent the lower end of the cylinder to admit liquid thereto, a plunger in the cylinder, means resiliently urging the plunger upwardly to draw liquid into the cylinder through the foot valve, a discharge tube communicating with the lower end of the cylinder, means for directing compressed air into the upper end of the cylinder to depress the plunger therein and force liquid out through the discharge tube, said discharge tube being disposed coaxially of the cylinder and the plunger being slidable thereon.

4. Apparatus for dispensing liquid from a supply tank comprising a vertically disposed pressure-tight cylinder disposed within and extending to a point adjacent the bottom of the supply tank, a foot valve adjacent the lower end of the cylinder to admit liquid thereto, a plunger

in the cylinder, means resiliently urging the plunger upwardly to draw liquid into the cylinder through the foot valve, a discharge tube communicating with the lower end of the cylinder, means for directing compressed air into the upper end of the cylinder to depress the plunger therein and force liquid out through the discharge tube, a vent with a normally open valve communicating with the upper end of the cylinder, and means for closing the vent valve automatically upon introduction of compressed air to the cylinder.

HAROLD M. HANKS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,241,889	Schauweker	Oct. 2, 1917
1,804,449	Woodruff	May 12, 1931
1,819,381	Palmer	Aug. 18, 1931
2,026,226	Entrop	Dec. 31, 1935
2,159,656	Focht	May 23, 1939
2,204,838	Walstrom	June 18, 1940