May 15, 1956 G. A. HUNTER 2,745,574

LIQUID DISPENSING APPARATUS

Filed June 23, 1950

Fig. 1

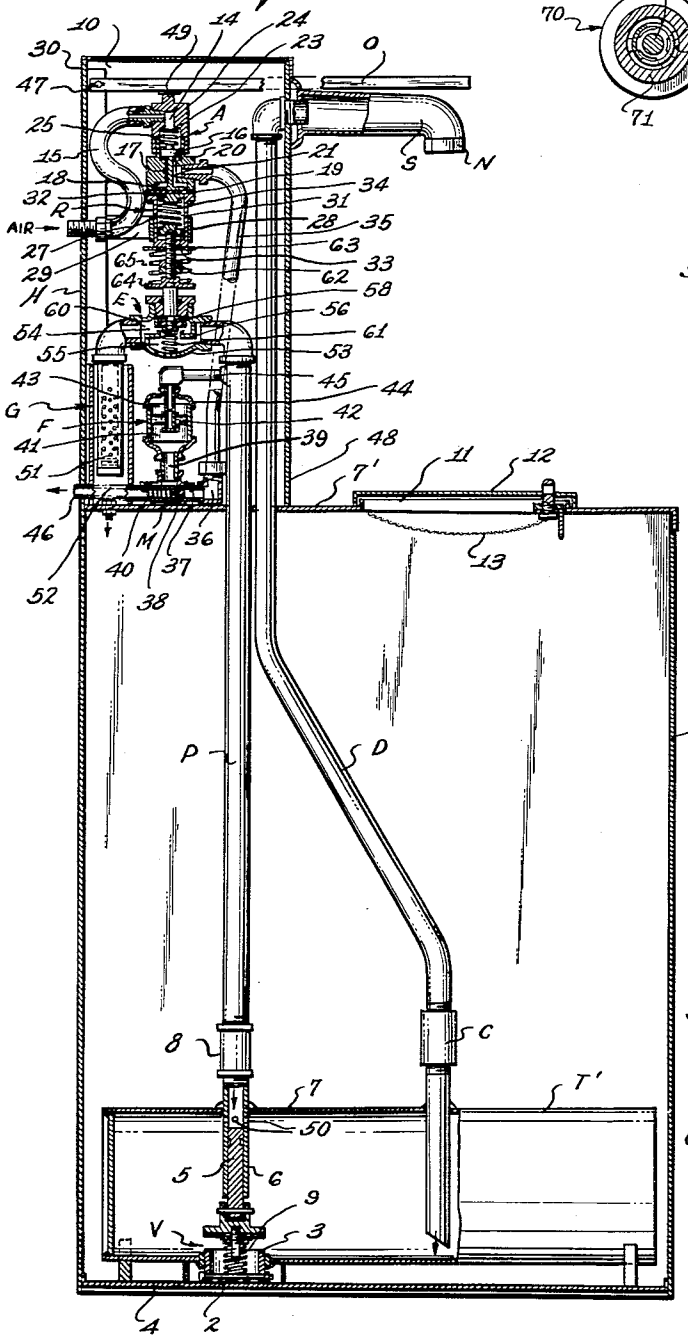


Fig. 4

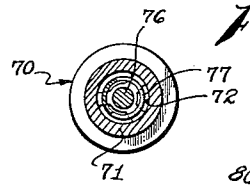


Fig. 3

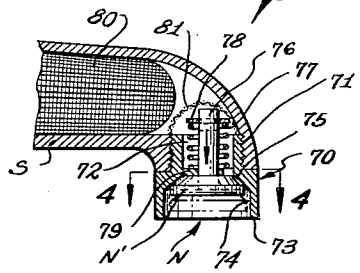
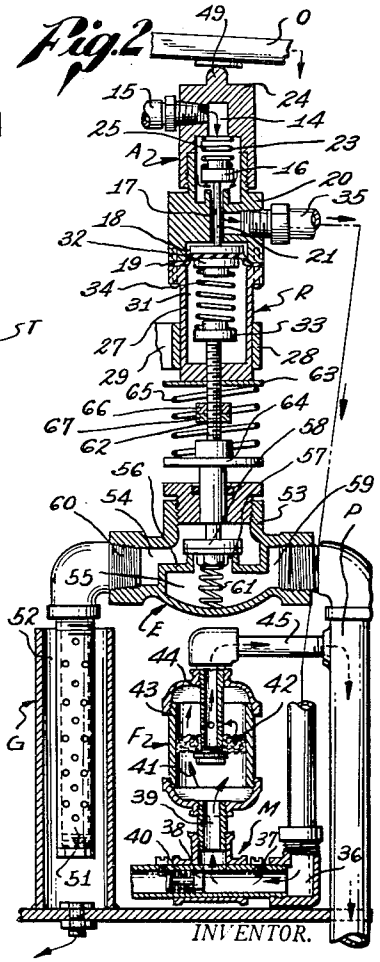


Fig. 2



INVENTOR.

BY GEORGE A. HUNTER

Luther L. Mack

Attorney

United States Patent Office

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LIQUID DISPENSING APPARATUS

George A. Hunter, Los Angeles, Calif.

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9 Claims. (Cl. 222—189)

This invention relates in general to dispensers for liquids of different specific gravity and viscosity but more particularly to and has for an object the provision of an apparatus for dispensing lubricating oils.

More specifically other objects are:

To provide an oil storage tank and a pressurized dispensing receptacle submerged in the oil of the storage tank and arranged to permit normal communication between the tank and receptacle so as to assure an adequate quantity of oil in the receptacle until the level of oil in the tank descends to a predetermined stage, and manually controlled pneumatically effective means for closing communication between the tank and the receptacle while simultaneously applying pressure to and dispensing desired quantities of oil from the receptacle.

To provide combined mechanical and pneumatic means including a series of valves including a pressure applicator unit cooperative upon actuation of a manually operated member for directing a flow of compressed air from a source through channels controlled by said valves preliminary to the direct application of pressure to said receptacle in each dispensing operation.

To provide means under control of one of said valves for exhausting air and any oil resident in the air passages into the storage tank in such a manner as to prevent agitation of the stored oil.

To provide means for scavenging moisture from the air prior to introduction of the air to said receptacle.

To adapt the pressure regulating unit to ready adjustment for limiting the applied pressure to the dispensable oil.

To provide means externally of the dispensing receptacle—either within the storage tank or at the mouth of a suitable dispensing nozzle, or at both locations—for sustaining a column of oil between the receptacle and the nozzle so as to assure the presence of oil at the nozzle at all times preparatory to a dispensing operation.

And to otherwise arrange and connect the several units in such a manner as to reliably operate separately in succession or together as may be required by the operation of a single actuator.

Still other objects may appear as the description progresses.

I have shown a preferred form and arrangement of units and parts of my improved dispenser in the accompanying drawing, in which:

Fig. 1 is a sectional elevation of the assembled dispenser;

Fig. 2 is an enlarged sectional elevation of the pressure control mechanism with parts thereof differently positioned than in Fig. 1;

Fig. 3 is an enlarged sectional view of the dispensing nozzle; and

Fig. 4 is a sectional view of the nozzle in the plane of line 4—4 of Fig. 3.

Briefly described, my dispenser includes an oil storage tank T in the bottom of which I provide a pressurized receptacle T' adapted to be submerged in the oil of tank

T and in normal communication with said tank as by means of orifices or ports 2 in the wall of a neck 3 which is upturned from bottom 4 of the tank and extends into receptacle T' and forms a seat for a foot valve disc V which is normally open.

Valve V has a stem 5 slidable in a cylinder 6 fixed to top wall 7 of receptacle T' and depending into said receptacle in axial alinement with valve V, said cylinder being connected as by means of a coupling 8 with a pressure supply tube P leading to the operating and control mechanism in a superposed housing H at the top of tank T, in the manner and for the purpose hereinafter described: Valve V is urged upwardly by a spring 9 which is compressed between said valve and bottom 4 of tank T.

Tank T is separated from the control chamber 10 of housing H by a top wall 7' having a fitting opening 11 therein forwardly of said housing covered by a removable cap 12 and a screen 13. Within chamber 10 I mount all of the control mechanism except foot valve V, including an air inlet valve A, a pressure applicator unit R, an exhaust valve E, a filter F and a moisture extractor M.

Compressed air from a source is conducted to a chamber 14 of valve A through a flexible tube 15 and from thence under control of a valve disc 16 through a passage 17 into a chamber 18 of applicator R above a diaphragm 19 supported in a body 20. Disc 16 has a stem 21 extended through passage 17, the lower end of which overlies diaphragm 19 in chamber 18 and a spring 23 is compressed between a shoulder in a housing member 24 at the upper end of a sub-chamber 25 and disc 16 so as to constantly urge disc 16 onto its seat at the upper end of passage 17 and at the same time, by pressure of stem 21 on diaphragm 19, maintain said diaphragm normally in a horizontal plane and undistended.

Valve body 24 and body 20 are suitably secured together so that the cylindrical portion 27 is vertically slidable in an annular guide 28 of a bracket 29 extended inwardly from a wall 30 of housing H. Body portion 27 of said applicator R forms a cylinder with a bore 31 in which vertically spaced discs 32 and 33 are slidable and between which a spring 34 is compressed or compressible. Upper disc 32 bears against diaphragm 19 and tends at times to deform and distend the diaphragm upwardly while stem 21 under the influence of air pressure applied to valve disc 16, tends to maintain the diaphragm in a horizontal plane.

Under control of valve disc 16 air is conducted from passage 17 to and through a pressure tube 35 to an air inlet 36 of cylinder 37 of unit M in which a piston 38 is slidable relative to an inlet 39 of the filter F, said piston being urged to retracted position (to the right of inlet 39) by a compression spring 40 so mounted in cylinder 37 as to bear against piston 38. Thus, when valve A is open to the passage of air to tube 35, pressure is applied to and extends piston 38 outwardly beyond inlet 39 against the tension of spring 40 so that air may flow into a lower chamber 41 of unit F and thence through a porous filter 42 into an upper chamber 43 and then through a peripherally perforated tube 44 and a connecting tube 45 into the upper portion of a pressure tube P to and for closing foot valve V in the manner hereinafter described.

It is apparent that as the air is filtered in unit F it is robbed of its moisture and the moisture collected in cylinder 37 ahead of the normally retracted piston 38 is exhausted through an outlet tube 46 to the atmosphere at a point outwardly of housing H at each stroke of the piston.

Valve body 20 of unit R and the connected body 24 of unit A are depressible bodily together by actuation of a suitable operating member O which is hinged at 47

to the rear wall 30 of housing H and extends forwardly through and in front of front wall 48 of said housing and above a dispensing spout S. Within said housing, member O overlies and engages a teat 49 at the top of unit A so that when the forward portion of member O is depressed the units A and R will be correspondingly depressed for the purpose hereinbefore stated.

Thus, as member O is actuated pressure is applied to valve stem 5 in cylinder 6 which closes valve V on its seat at the top of neck 3 and opens a port or ports 50 in cylinder 6 below top 7 of receptacle T' so as to discharge air into the receptacle above the liquid and thereby force oil upwardly through a supply tube D to and outwardly through spout S and nozzle N. Of course oil will continue to flow from nozzle N as long as member O is depressed. A check valve C may be connected to tube D at a point above receptacle T' for always maintaining a column of oil in tube D either apart from or in addition to a suitable discharge valve N' in nozzle N which will be later described herein.

Following the release of operating member O in each operation there will remain in pressure tube P a residual pressure which is exhausted through unit E, together with any residual oil, into tank T, but indirectly through a cylindrical muffler-like unit G affixed to and encompassing an exhaust pipe 51. Said pipe 51 discharges directly into a chamber 52 in which the oil laden air is expanded and indirectly discharged into tank T without creating turbulence or agitation which would tend to slough the tank contents outwardly of opening 10 when the tank is filled with oil.

Exhaust valve unit E has a body 53 with chambers 54 and 55 separated by a partition 56 having an opening 57 adapted to be closed at times by a disc valve 58, an inlet 59 connecting tube P with chamber 55, an outlet 60 connecting tube 51 with chamber 54, and a spring 61 bearing against valve disc 58 and tending to open said valve.

Valve disc 58 is connected with disc 33 of unit R by a stem 62 so that as pressure is applied through unit A to body 20 of unit R, the initial movement of member O will bodily depress units A and R and through disc 33 also will depress stem 62 and close valve disc 58 on its seat. Valve 16 being always sufficiently unseated as to allow bleeding of air therearound, simultaneously with the closing of the exhaust valve 58, air will be injected into tube 35 and thence through units M and F to tube P to close the foot valve V.

Stem 62 loosely carries two collars 63 and 64 between which a spring 65 is compressed so as to provide a yieldable and resilient connection between units R and E also to restore units A and R to normally uppermost positions after member O has been released. Tension of spring 65 operates to close valve 58 and the downstroke of units A and R may be limited as by lock nuts 66 and 67 adjustable on stem 62.

Spout S is provided with a downwardly turned nozzle N above opening 11 in the tank but sufficiently spaced therefrom to permit insertion of a receptacle on cap 12 or screen 13 to catch the oil as it is discharged from the spout and with the receptacle removed, so that drippings from the spout will fall into the tank through opening 11.

As shown in Fig. 3, a valve as at N', may be inserted in the end of nozzle N and may include a fitting 70 with a nipple 71 threaded into the nozzle and bored at 72 through said nipple, a head 73 abutting the end of the nozzle and counterbored at 74, with the valve N' seated in said counterbore for regulating discharge of oil through an opening 75 affording communication between bore 72 and counterbore 74. Valve N' has a stem 76 extended through opening 75 into the nozzle and carries a spring 77 compressed between a collar 78 fixed to the stem and a wall 79 between bore 72 and counterbore 74.

Thus spring 77 urges the valve to closed position and

is operable to discharge oil from the spout by pressure of the outflowing oil which necessarily overcomes the power of said spring and permits the oil to flow around the valve. Valve N' may be constructed and arranged to serve as a check valve in lieu of valve C, or as hereinbefore stated, one or the other or both valves N' and C may be employed as desired.

I prefer to provide one or more screens 80 and 81 in spout S, preferably of fine and coarser mesh, respectively, and readily removable when the valve assembly N' is removed, for cleaning out the collected particles of relatively fine and coarse matter, lint, dirt and all other foreign substances which may collect inadvertently in the tank T, receptacle T' and their connections.

The invention, therefore, in its broadest aspect consists in the provision of the receptacle T' for holding the liquid to be dispensed, arranged with suitable means for admitting air under pressure to the contained liquid, and means for discharging the liquid for use, all in combination with the disclosed control means for effecting and controlling application and exhaust of air in a dispensing operation.

Additionally, the invention embodies novel structural units and arrangement for filtering and extraction of moisture from the air and straining the dispensed liquid.

I claim:

1. A liquid dispenser comprising: a frame, a receptacle submerged in a tank of liquid for holding a quantity of liquid and formed with a valve controlled inlet and an outlet for a liquid, a dispensing spout on said frame at a substantial elevation above and connected with the liquid outlet of said receptacle, said receptacle having an air inlet, a control mechanism on said frame including an air intake valve connected with a source of compressed air and with the air inlet of said receptacle, an exhaust valve connected with the air inlet of said receptacle, simultaneously operable air and liquid valves axially alined for regulating the flow of liquid and air respectively to said receptacle, a manually operable member borne by said frame and operatively engageable with and for bodily moving the air intake valve relative to the exhaust valve for opening the air valve of said receptacle to pressurize the liquid and prevent flow of liquid to the receptacle while liquid is being dispensed from said spout at each operation of said manually operable member.

2. A liquid dispenser as characterized in claim 1 having a storage tank for liquid in the bottom of which said receptacle is mounted and submerged in the contents of said tank arranged so that liquid from the tank may normally enter the receptacle through the liquid inlet of the receptacle, and said liquid inlet valve being normally open to the receptacle, and means for closing said liquid inlet valve in response to the opening of said air valve to prevent flow of liquid from said tank to said dispensing receptacle when said air inlet valve is opened.

3. A liquid dispenser comprising a storage tank for liquid, a dispensing receptacle mounted and submerged in the contents of said tank, a liquid inlet valve for regulating flow of liquid from the tank into the receptacle, and a normally open air inlet valve at the air inlet to the receptacle connected with and adapted to close said liquid inlet when said air inlet valve is opened, said air inlet valve including a cylinder in which said valve is slidable and said liquid inlet valve including a member fixed to and movable with said air inlet valve and adapted to seat over and close said liquid inlet upon application of air pressure to the liquid in the receptacle, and means upon release of the air pressure to said stem for opening the liquid valve and closing the air inlet valve.

4. A liquid dispenser as characterized in claim 1 including a pressure unit secured to and bodily moved with said air intake valve and also connected with and adapted to close said exhaust valve on the initial movement of the air intake and pressure unit in a dispensing operation so

as to retain pressure in the connection between the air intake valve and the receptacle.

5. A liquid dispenser as characterized in claim 1 including a pressure unit secured to and bodily moved with said air intake valve and also connected with and adapted to close said exhaust valve on the initial movement of the air intake and pressure unit in a dispensing operation so as to retain pressure in the connection between the air intake valve and the receptacle, the connection between said pressure unit and said exhaust valve including a compression spring operative to restore the elements of said unit and said air intake valve to normal positions upon release of pressure and simultaneous opening of the exhaust valve for relieving pressure in the air connection to the receptacle.

6. In a liquid dispenser of the character described and including a dispensing receptacle and air control means therefor: an air intake valve, a moisture extracting unit directly connected with said air intake valve and with an air chamber for collecting moisture, a cylinder between the air intake valve and said chamber, and a piston slidable in said cylinder relative to a port between said chamber and said cylinder, said cylinder having an outlet for discharging moisture to the atmosphere upon each opening of the air intake valve.

7. In a liquid dispenser of the character described and including a dispensing receptacle and air control means therefor: an air intake valve, a moisture extracting unit directly connected with said air intake valve and with an air chamber for collecting moisture, a cylinder between

the air intake valve and said chamber, and a piston slidable in said cylinder relative to a port between said chamber and said cylinder, said cylinder having an outlet for discharging moisture to the atmosphere upon each opening of the air intake valve, said chamber having an air outlet connected with the air inlet valve of said receptacle, and a pervious filter in said chamber between said chamber outlet and said cylinder.

8. In a liquid dispenser as charactedized in claim 6 an air filter connected with and between said air intake valve and said receptacle.

9. A liquid dispenser as defined in claim 1 including a pressure applicator unit secured to and bodily movable with said air intake valve, said applicator being connected to said exhaust valve for closing the same upon initial movement of said applicator in a dispensing operation so as to retain pressure in the connector between said air intake valve and the receptacle, said applicator being axially aligned with and intreposed between said air intake and exhaust valves and including an actuator for said air intake valve energizable to unseat said air intake valve subsequently to the seating of said exhaust valve.

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