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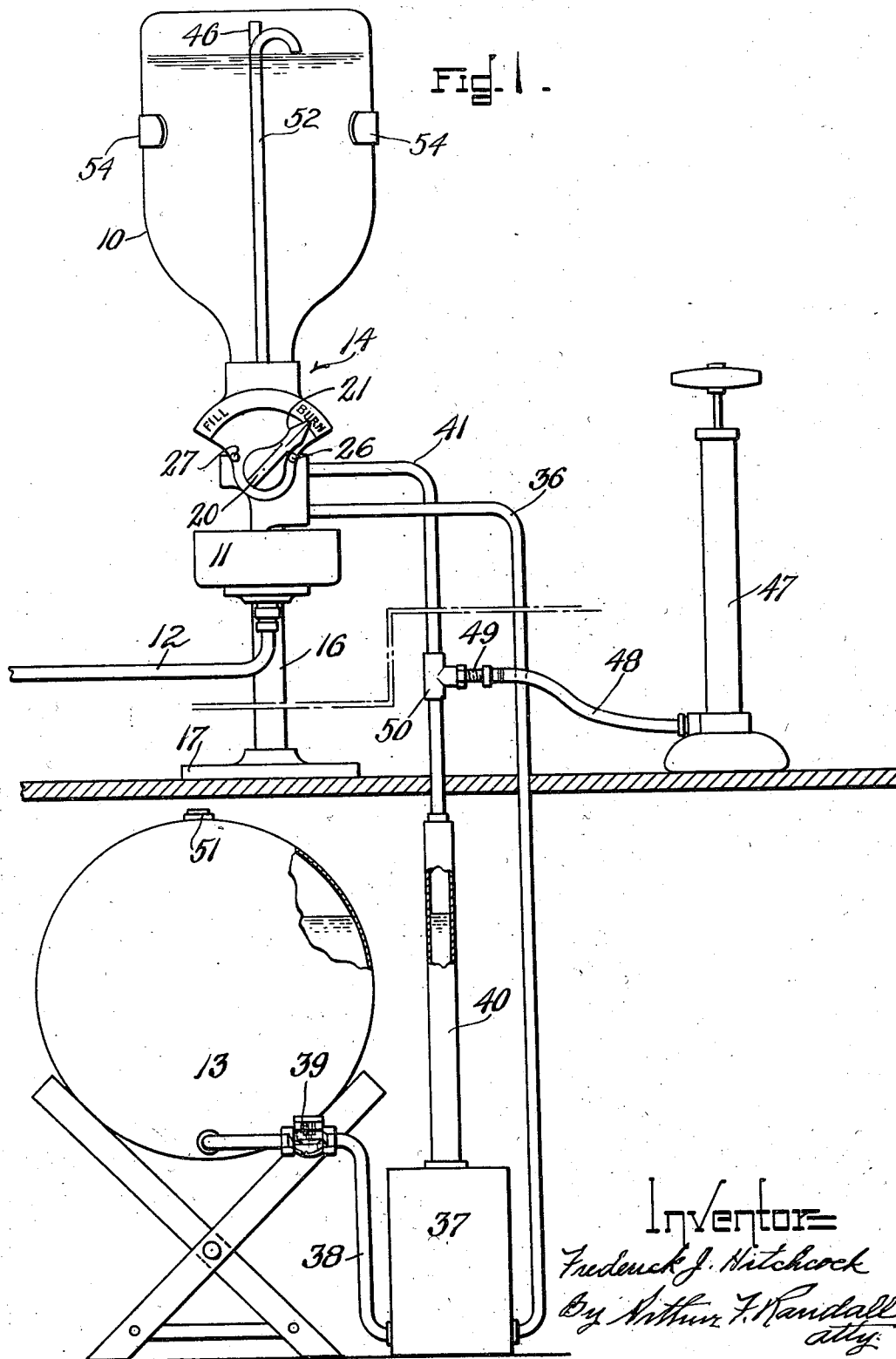
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OIL BURNER APPARATUS AND THE LIKE

Filed March 10, 1932

2 Sheets-Sheet 1



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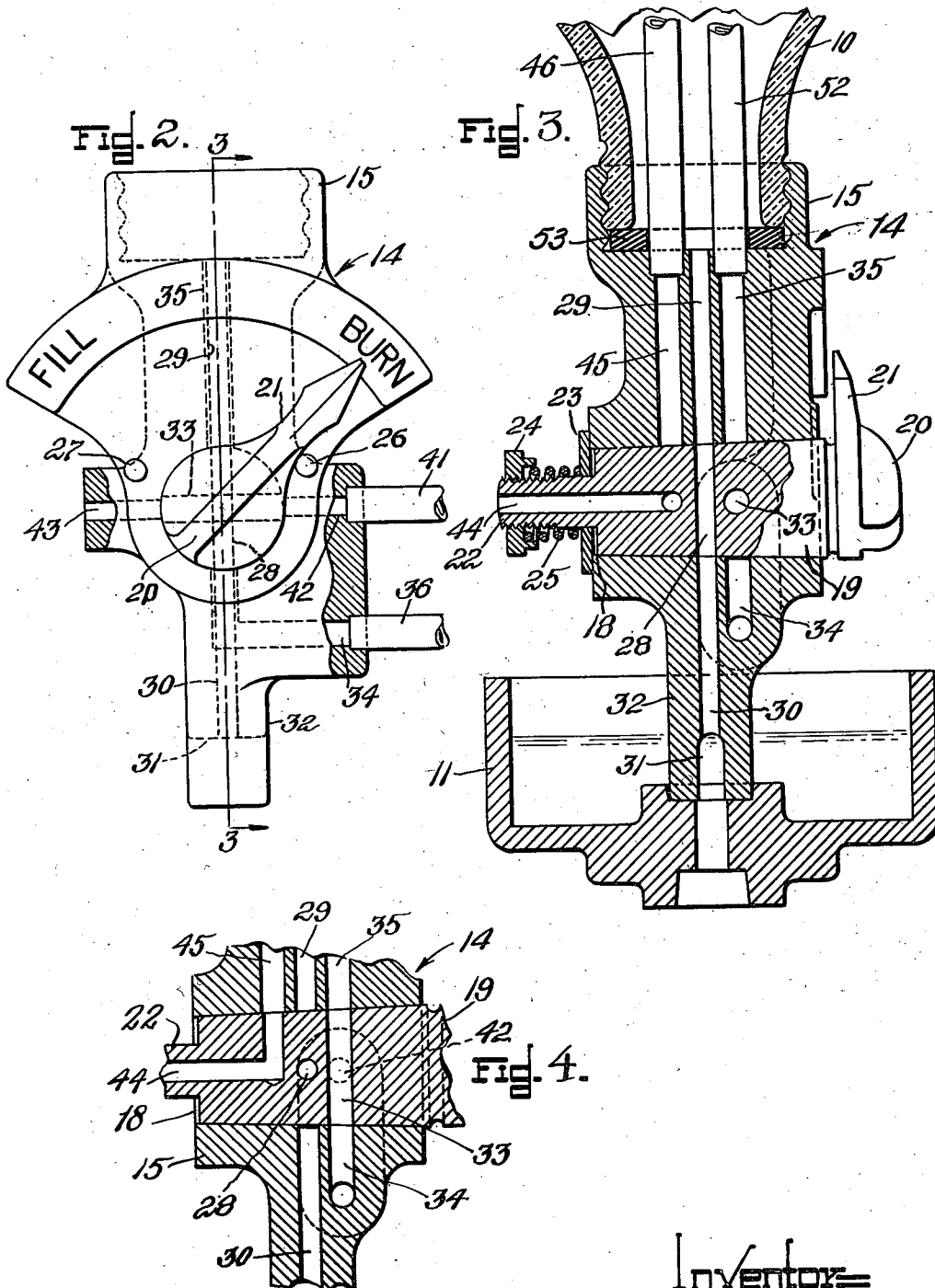
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UNITED STATES PATENT OFFICE

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OIL BURNER APPARATUS AND THE LIKE

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6 Claims. (Cl. 158—40)

My invention relates to oil-burner-apparatus and other apparatus or systems which include a reservoir holding a comparatively small supply of oil or other liquid which is delivered or dispensed therefrom by gravity as it is used and which it is necessary to replenish at intervals, and it has for its object to improve the construction and mode of operation of apparatus of this class.

In the case of oil burner apparatus for domestic use the reservoir referred to is commonly a glass bottle supported in an inverted position with its mouth normally submerged in, and closed to the entrance of air by, a body of oil within a trap or vessel that is connected by a pipe with the burner of the apparatus so that oil is fed by gravity from the trap to the burner as it is consumed by the latter.

When the level of the oil within the trap falls below the mouth of the bottle air is admitted to the latter thereby permitting oil to descend from the bottle by gravity into the trap so that the level of the oil contents of the latter is raised again thus closing the mouth of the bottle to the entrance of air and stopping the movement of oil from the bottle to the trap.

In most cases it is necessary to re-fill the bottle reservoir frequently and to accomplish this it has heretofore been necessary to remove the bottle and place it in an upright position upon a floor or other support in order to pour a quantity of oil into the same, after which it was necessary to invert the bottle and restore it to its position in the apparatus. This old method of refilling the bottle reservoir was objectionable for several obvious reasons.

My invention has for its main object to make it possible to conveniently and quickly refill the feeding reservoir without removal thereof from the apparatus of which it forms part and without manually transporting the oil or other liquid to the same. To these ends I have provided an apparatus of the class indicated having the peculiar features of construction and mode of operation set forth in the following description, the several novel features of the invention being separately pointed out and defined in the claims at the close thereof.

In the accompanying drawings:

Figure 1 is a diagrammatic view showing the major portion of an oil burner apparatus embodying one form of my invention.

Figure 2 is a front elevation of the six-way valve hereinafter referred to.

Figure 3 is a section on line 3—3 of Fig. 2 showing

the adjustable valve member, hereinafter referred to, in its normal position.

Figure 4 is a sectional detail showing the adjustable valve member in "fill" position.

My invention is herein illustrated as embodied in an oil burner apparatus for domestic use.

A supply of fuel oil is contained within an inverted glass bottle 10 which usually has a capacity of about two gallons. Oil is delivered automatically and intermittently from this supply bottle 10 into a trap 11 having an outlet at its bottom that is connected by a pipe 12 with the burner of the apparatus. The oil is delivered by gravity from bottle 10 into the trap 11 and flows by gravity from the trap 11 to the burner.

Heretofore when the supply of fuel oil within the bottle 10 became exhausted it was necessary to remove the bottle 10, place it in an upright position upon the floor or other support and refill the same by pouring oil into it, after which the bottle was restored to its inverted position in the apparatus. This mode of replenishing the supply within the bottle 10 was objectionable because of liability of breakage of the bottle; because oil would be spilled upon the floor thereby increasing the fire hazard; because it is customary with users of apparatus of this kind to keep a main storage vessel or tank 13 of great capacity within the cellar of the building or at some other distant point so that it was necessary to manually transport the oil from the main storage tank to the burner apparatus which latter is usually located in the kitchen of the building.

My improved apparatus comprises a six-way valve fixture or unit 14 comprising a body 15 that is fastened securely to the upper end portion of a post 16 provided at its lower end with a pedestal 17 adapted to be fastened to the floor of a kitchen by screws or the like.

The body 15 is made with a conical chamber 18 within which is arranged an adjustable conical valve member 19 that is provided at one end with a finger portion or handle 20 made with a laterally extending pointer arm 21. At its opposite end the adjustable valve member 19 is made with an exteriorly threaded extension 22 of reduced diameter upon which is mounted a washer 23, an adjustable nut 24 and a coiled spring 25. The washer 23 is in abutting engagement with the body 15 and the spring 25 is disposed between said washer and the nut 24 under compression so as to yieldingly urge the valve

member 19 endwise against its seat within the valve chamber 18.

Stops 26 and 27 provided upon the front of body 15 limit the angular movement of arm 21 and valve member 19 to ninety degrees.

Normally the arm 21 of the valve member is against the stop 26. The plug portion of the valve member is made with a straight transverse port 28 while body 15 is constructed with an inlet port 29 whose inner end is in register with one end of the transverse port 28 when arm 21 is against stop 26, and with an outlet port 30 whose inner end is in register with the opposite end of port 28 when arm 21 is against the stop 26.

At its lower end the port 30 communicates with a transverse slot 31 formed across the end of a nose or nozzle 32 provided at the lower end of the body 15. This nozzle 32 occupies a position within the trap 11, and it will be clear that when the level of the oil that is within the trap 11 falls below the lower end of the port 30 air will pass upwardly through ports 30, 28 and 29 into the bottle 10 thus permitting fuel oil to descend by gravity through the ports 29, 28 and 30 into trap 11. When the level of the oil within trap 11 reaches the lower end of the port 30 the flow of oil from the bottle 10 into trap 11 will be stopped. In this way the apparatus functions as usual to maintain a predetermined supply of oil within the trap 11 which is free to flow by gravity through the pipe 12 to the burner.

Alongside of the port 28 the adjustable valve member 19 is made with another straight transverse port 33 to co-operate with an inlet port 34 and an outlet port 35 formed in the valve body 15. The inlet port 34 is connected by a pipe 36 with the lower part of an auxiliary storage tank 37 whose capacity is about equivalent to the capacity of the bottle 10. That is, if the bottle 10 has a capacity of two gallons, then the auxiliary storage vessel or tank 37 will have approximately the same capacity.

The auxiliary storage tank 37 is connected by a pipe 38 with the lower portion of the main storage tank 13 which usually has a capacity of about 110 gallons, and in this pipe 38 is arranged a check valve 39 which opens toward the auxiliary storage tank 37 and closes toward the main storage tank 13.

Communicating at its lower end with the top of the auxiliary storage tank 37 is a riser 40 that is connected by a pipe 41 with an outlet port 42 formed in valve body 15. The inner end of this outlet port 42 co-operates with one end of the transverse port 33 of the adjustable valve member 19 while the opposite end of the latter port co-operates with the inner end of an air outlet port 43. When the adjustable valve member 19 occupies its normal position as shown in the drawings, the ports 42 and 43 are connected by the port 33 of the adjustable valve member so as to provide an air vent for the top of the auxiliary storage tank 37 through which air is free to pass from said auxiliary storage tank as the level of the oil within the latter, and within the riser 40 rises. These ports 43, 33 and 42 together with the pipe 41 thus provide a vent for the relief of compressed air as will presently be made plain.

The adjustable valve member 19 is also made with a port 44, one end of which communicates with the outside atmosphere and the inner end of which co-operates with the lower end of a port 45 within the upper end of which is fixed the lower end of a straight vertical pipe section

46 whose upper end is close to the upper end of the bottle 10 and above the level of the fuel oil contained therein. Normally the inner end of the port 44 is out of register with the lower end of the port 45.

When, however, the adjustable valve member 19 is turned so as to throw the pointer arm 21 over against the stop 27, Fig. 2, the ports 33 and 44 then occupy the position shown in Fig. 4 so that the ports 34 and 35 are connected by the port 33, while the lower end of the port 45 communicates with the outside atmosphere through the port 44. It is to be noted that this adjustment of the valve member 19 simultaneously shuts off communication between the ports 29 15 and 30 so that the conduit through which oil is delivered from bottle 10 into trap 11 is closed.

After the valve 19 has been adjusted as just described air under pressure is admitted to the pipe 41 whose port 42 is now closed by the valve member 19. Therefore the air under pressure that is supplied to the pipe 41 will operate to exhaust the oil from the auxiliary storage tank 37 and since said oil cannot pass backwardly through the pipe 38 because of the check valve 39, it will pass upwardly through the pipe 36, ports 34, 33 and 35 into the bottle 10 and as this oil enters the bottle 10, the air within the bottle will be displaced downwardly through the pipe 46, ports 45 and 44 into the atmosphere. Because of the fact that the auxiliary storage tank 37 is of about the same capacity as the bottle 10 the latter cannot be overloaded through carelessness or poor judgment.

As means for conveniently supplying air under pressure to the pipe 41 as described, I may provide an ordinary manually operated air pump 47 equipped with a rubber delivery tube 48 adapted to be separably coupled to a check valve 49 permanently mounted within one of the branches of a tee 50 that forms part of the pipe or conduit 41.

Thus, after adjusting the valve member 19 so that its pointer arm 21 is against the stop 27 the air pump 47 is operated and air is pumped manually into the pipe 41 and operates to discharge the contents of the auxiliary storage tank 37 into the pipe 36 as described.

After the bottle 10 has been re-filled as just described the valve member 19 is turned back to its normal position again where its pointer arm 21 is against the stop 26 and the normal operation of the apparatus is resumed.

It is an important feature of the apparatus constructed and operating as above described that it includes a main storage tank 13 of very great capacity as compared with the bottle 10 and auxiliary storage tank 37 and that the capacity of the auxiliary storage tank 37 is preferably not substantially greater than the capacity of the bottle, but is markedly less than the capacity of the main storage tank 13. As a result of these conditions or peculiarities it is possible to carry out the bottle re-filling operation very quickly and with a minimum amount of labor because it will be appreciated that much greater labor and time would be required to increase the air pressure within the main storage tank 13 sufficiently to raise the oil up to the bottle 10 than is required to discharge the contents of the relatively small auxiliary storage tank 37. Furthermore, it is customary, and sometimes required that a normally opened vent 51 be provided at the top of the main storage tank 13 but even with this vent 51 closed the time and labor required to raise the air pressure within the main storage

tank 13 sufficiently to lift the oil up to the bottle 19 would make that method impractical and undesirable, particularly when the level of the oil within the main storage tank 13 was low.

As illustrated in the drawings I may provide the upper end of the port 35, Figs. 1 and 3 with a pipe extension 52 extending upwardly within and to near the upper end of, the bottle 10.

As shown in Fig. 3 the upper end of the valve body 15 is formed with an interiorly threaded socket into which is screwed the exteriorly threaded neck of the bottle 10, an annulus 53 of cork or other suitable material being interposed between the neck of the bottle and a seat at the bottom of the threaded socket which closes and seals the joint between the bottle neck and the valve body. In this way the glass bottle 10 is supported by the valve body and the latter is in turn supported by the trap 11 and post 16 as above described. The trap vessel 11 is also fixed as usual in position upon the post 16.

The above described apparatus is of very simple and inexpensive construction which provides for quickly and conveniently re-filling the supply reservoir 10 without requiring the oil or other liquid to be manually transported from the main storage tank to the reservoir 10. Also with my improvements it is unnecessary to remove the reservoir 10.

Normally the pointer arm 21 is against the stop 26 but when it is desired to refill reservoir 10, this arm is thrown over against the stop 27 and then the pump 47 is operated until reservoir 10 has been re-filled. Then the pointer arm 21 is thrown back into position against the stop 26 which restores the apparatus so that it automatically operates to deliver liquid into the pipe line 12 as it is withdrawn from the latter.

When my invention is incorporated in an oil burner apparatus the manual transportation of oil is obviated as is also the spilling of oil on to the floor either in the cellar or in the kitchen where the reservoir 10 is located.

The trap vessel 11 is, as heretofore fastened by means of a clamp, not shown, to the post 16 and the latter is also provided adjacent its upper end with a pair of bottle embracing and holding jaws 54. It will thus be seen that the valve body 15 rests upon, and is supported by, the floor of the trap vessel 11 while the weight of the bottle reservoir 10 is supported by the valve body, the clamping arms 54 serving to hold the bottle in upright position.

The section of tube 52 that is within the bottle reservoir 10 and which is connected at its lower end with the delivery conduit is not an essential feature of the invention and may be dispensed with if desired.

From the above description it will be clear that the pipe 36 and the ports of the valve with which it communicates constitute a delivery conduit that is controlled by the valve member 19. It will also be clear that the pipe 41 and the ports of the valve with which it is associated constitute a vent conduit for the upper end of the auxiliary tank and riser 40, while pipe section 46 and ports 45 and 44 provide a vent conduit for the upper end portion of the interior of the bottle 10. It will also be clear that the ports 29, 28 and 30 provide an outlet conduit at the bottom of the bottle reservoir 10.

What I claim is:

1. In an apparatus of the character described, in combination, a vacuum reservoir for holding a supply of liquid, said reservoir having a nor-

mally open delivery outlet at its bottom; a trap vessel into which said delivery outlet discharges whose contents serves to close the lower end of said delivery outlet to the entrance of air; a storage tank disposed at a lower level than said reservoir; a normally closed delivery conduit connecting said storage tank with said vacuum reservoir through which the contents of the latter is replenished; valve means controlling the delivery outlet of said vacuum reservoir and said delivery conduit, said valve means being operable to close the delivery outlet of the vacuum reservoir and to open the delivery conduit when the contents of said vacuum reservoir is to be replenished; means operable to force the contents of said storage tank upwardly through said delivery conduit and into said vacuum reservoir after said delivery outlet has been closed and said delivery conduit has been opened, and a normally closed air vent for said vacuum reservoir that is effective as an outlet for the air within said vacuum reservoir that is displaced when the supply of liquid within the latter is replenished through said supply conduit.

2. In an apparatus of the character described, in combination, a vacuum reservoir for holding a supply of liquid, said reservoir having a normally open delivery outlet at its bottom; a trap vessel into which said delivery outlet discharges and whose contents serves to close the lower end of said delivery outlet to the entrance of air; a storage vessel disposed at a lower level than said reservoir; a normally closed delivery conduit connecting said storage vessel with said vacuum reservoir through which the contents of the latter is replenished; valve means controlling the delivery outlet of said vacuum reservoir and said delivery conduit, said valve means being operable to close the delivery outlet of the vacuum reservoir and to open the delivery conduit when the contents of said vacuum reservoir is to be replenished; means operable to force the contents of said storage vessel upwardly through said delivery conduit and into said vacuum reservoir after said delivery outlet has been closed and said delivery conduit has been opened by said valve means; a normally closed air vent for said vacuum reservoir that is effective as an outlet for the air within said vacuum reservoir that is displaced when the supply of liquid within the latter is replenished through said delivery conduit, and means for automatically replenishing the contents of said storage vessel after each reservoir-refilling operation of the apparatus.

3. In an apparatus of the character described, in combination, a vacuum reservoir for holding a supply of liquid, said reservoir having a normally open delivery outlet at its bottom; a trap vessel into which said delivery outlet discharges and whose contents serves to close the lower end of said delivery outlet to the entrance of air; a relatively small auxiliary storage vessel disposed at a lower level than said reservoir; a relatively large main storage vessel also disposed at a lower level than said vacuum reservoir but at a higher level than said auxiliary storage vessel; a conduit connecting said main storage vessel with said auxiliary storage vessel through which the contents of the former flows by gravity into the latter; a check valve controlling said conduit which closes toward said main storage vessel; a normally closed delivery conduit connecting said auxiliary storage vessel with said vacuum reservoir through which the contents of the latter is replenished; valve means controlling the delivery outlet of said

vacuum reservoir and said delivery conduit, said valve means being operable to close the delivery outlet of the vacuum reservoir and to open the delivery conduit when the contents of said vacuum reservoir is to be replenished; means operable to force the contents of said auxiliary storage vessel upwardly through said delivery conduit and into said vacuum reservoir after said delivery outlet has been closed and said delivery conduit has been opened by said valve means, and a normally closed air vent for said vacuum reservoir that is effective as an outlet for the air within said vacuum reservoir that is displaced when the supply of liquid within the latter is replenished through said supply conduit.

4. In an apparatus of the character described the combination of an inverted vacuum bottle for holding a supply of liquid, said bottle having a normally open outlet at its bottom; a trap vessel for holding a body of liquid that is delivered by gravity into said vessel from said bottle through said outlet and which serves to normally close said outlet to the escape of liquid and to the entrance of air; a main storage vessel of relatively large capacity disposed below the level of said bottle; an auxiliary storage vessel of relatively small capacity disposed below the level of said main storage vessel; a conduit connecting said two storage vessels through which liquid flows by gravity from the larger storage vessel to the smaller storage vessel; a check valve in said conduit which closes toward said larger main storage vessel; a normally open air vent conduit extending upwardly from the upper portion of the interior of said smaller storage vessel; a normally closed delivery conduit having its upper end communicating with said bottle and its lower end communicating with said auxiliary storage vessel adjacent to the bottom thereof; valve means that is adjustable to close the outlet of said bottle, to close said normally open air vent conduit, to open said delivery conduit, and to vent the upper portion of the interior of said bottle while the latter is being refilled, and means for supplying air under pressure to said auxiliary storage vessel after such adjustment of said valve means thereby to force the contents of the said auxiliary storage vessel upwardly through said delivery conduit and into said bottle.

5. In an apparatus of the character described, in combination, a vacuum reservoir for holding a supply of liquid, said reservoir having a normally open delivery outlet at its bottom; a trap vessel into which said delivery outlet discharges and whose contents serves to close the lower end

of said delivery outlet to the entrance of air, a normally closed air vent conduit communicating at its one end with the upper portion of the interior of said vacuum reservoir and communicating at its opposite end with the outside atmosphere; a storage vessel disposed at a lower level than said reservoir; a normally closed delivery conduit having its lower end connected with said storage vessel and communicating at its upper end with the interior of said reservoir; an adjustable valve controlling said reservoir outlet, said air vent and said delivery conduit, and means for forcing the contents of said storage vessel upwardly through said delivery conduit and into said reservoir when said valve is adjusted to open said air vent and delivery conduits and to close said reservoir outlet.

6. In an apparatus of the character described the combination of an inverted vacuum reservoir for holding a supply of liquid, said reservoir having a normally open outlet at its bottom; a trap vessel for holding a body of liquid that is delivered by gravity into said vessel from said reservoir through said outlet and which serves to normally close said outlet to the escape of liquid and to the entrance of air; a main storage vessel of relatively large capacity disposed below the level of said reservoir; an auxiliary storage vessel of relatively small capacity disposed below the level of said main storage vessel; a conduit connecting said two storage vessels through which liquid flows by gravity from the larger storage vessel to the smaller storage vessel; a check valve in said conduit which closes toward said larger main storage vessel; a normally open air vent conduit extending upwardly from the upper portion of the interior of said smaller storage vessel, a normally closed delivery conduit having its upper end communicating with said reservoir and its lower end communicating with said auxiliary storage vessel adjacent to the bottom thereof; valve means that is adjustable to close the outlet of said reservoir and to open said delivery conduit when said vacuum reservoir is to be refilled; means for supplying air under pressure to said vent conduit after adjustment of said valve means so that said air under pressure is delivery into said auxiliary storage vessel to force the contents of the latter upwardly through said delivery conduit into said reservoir, and means to provide for the exhaust of air from said reservoir but only while the latter is being refilled through said delivery conduit.

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