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L. FEIS

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BOTTLE FILLER

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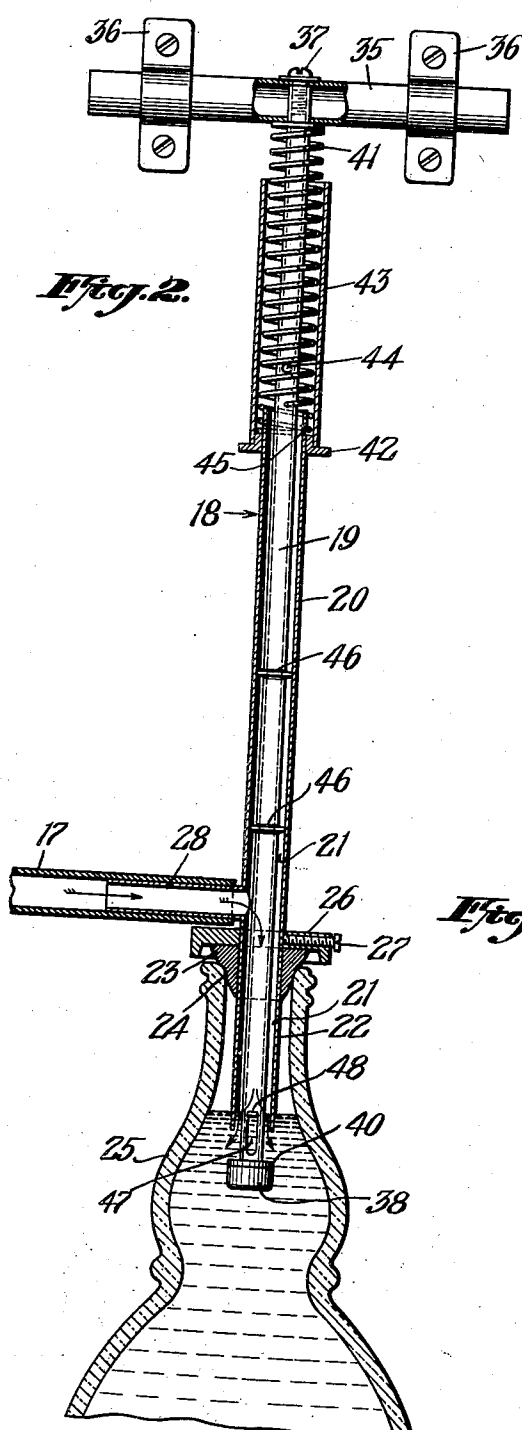
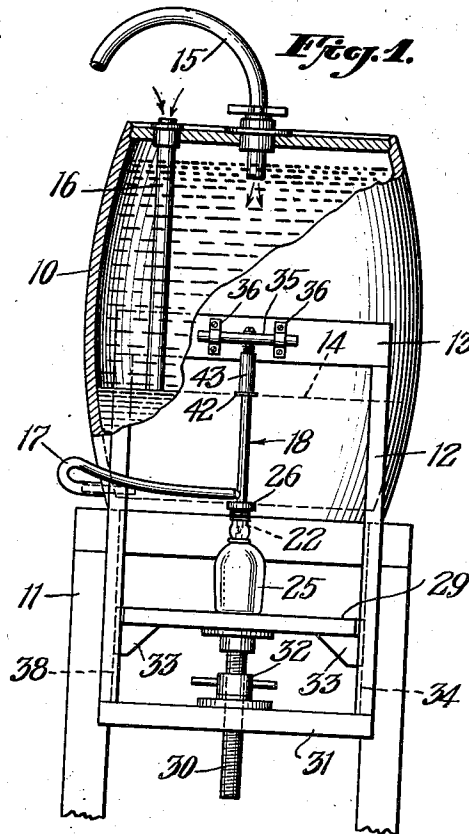


Fig. 3.

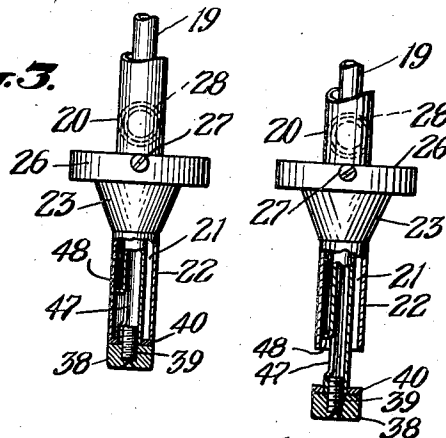


Fig. 4.

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BOTTLE FILLER

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1 Claim. (Cl. 226—124)

This invention relates to bottle fillers, and more particularly to bottle fillers of automatic type.

Objects

5 The objects of the invention are the provision of a bottle filler having generally improved features of construction and combination of necessary parts, such as a reservoir of pressure head construction, gravity feed for the liquid, automatic shut-off, prevention of overflow, and positive positioning of parts.

10 More specifically objects of the invention are the improved combination of gravity feed and automatic shut-off; the provision of air outlet from the bottle during filling thereof; the protection of the air outlet from interference by flow of the liquid; the utilization of the air outlet as a limitation for the level of liquid in the bottle; to provide a relationship of air vents to each other and to the liquid level to prevent overflow from the filling means; the adaptation of the construction to readily accommodate bottles of different heights; the reduction of necessary movements by the operator in filling the bottle; 20 the utilization of simple and rugged parts; and the provision of return passage for liquid which may improperly enter the air discharge tube.

Further objects of the invention are to secure greater simplicity of construction and at the same time, generally increased efficiency. Further objects will be apparent, and if not fully apparent will in part be obvious, and will in part appear hereinafter.

30 The invention accordingly comprises the features of construction, combination of elements, arrangement of parts and relation established for resultant or stated benefits and purposes accomplished as herein indicated by direct or indirect reference thereto and/or exemplified in the following detailed disclosure of drawing or description, and the scope of the application will be indicated in the claim.

Drawing

45 For a more exact and complete understanding of the nature and objects of the invention, reference should be had to the following detailed description of the selected exemplification of the invention, taken in connection with the accompanying drawing thereof, in which:

Figure 1 is a front elevation of my invention wherein the reservoir is partially in section;

Figure 2 is a vertical longitudinal section of the nozzle and associated parts with the spout of the 55 nozzle within the neck portion of the bottle;

Figure 3 shows the lower end of the nozzle with the spout portion thereof in section and in its normal position of rest when not in a bottle; and

Figure 4 is a view similar to Fig. 3 showing the spout in section and open as occurs when lifted by insertion into a bottle.

Description

In the specific embodiment of the invention illustrated in said drawing, reference numeral 10 10 designates a pressure head reservoir mounted upon a stand or table 11 at the front of which is an upstanding rack 12 having an upper cross-bar 13 at a height intermediate of the top and bottom of the reservoir 10. Liquid is introduced 15 into the top of reservoir 10 through an inlet supply pipe 15 by pumping from another tank or by gravity from a higher tank. Reservoir 10 then is closed by a valve in said supply pipe or otherwise, except for prepared outlets. An air vent inlet 16 is shown to comprise a pipe open at its top and bottom and extending through the head of the reservoir at its upper end and extending down to the desired pressure head level 14 at its other end. The bottom of the container 25 is shown as having a gravity outlet from which extends a hose or flexible tube 17.

From cross-bar 13 is hung a swinging nozzle 18. Generally speaking, this nozzle comprises several parts, principal among which may be first mentioned an inner air-vent tube 19 around which is slidably mounted a larger tube or sleeve 20 with space provided between the outer and inner tubes for a liquid flow-passage 21. The lower end portion of the outer tube or sleeve is, 35 for convenience, referred to herein as spout 22, it having a rubber or other washer 23, shown as frusto-conical, therearound for sealing engagement with the mouth opening of the bottle neck 24 of a bottle 25 to be filled, the spout being inserted into the bottle for that purpose as far as permitted by said sealing washer. Projection of the said spout below the washer is a distance representative of the approximate level to which the bottle is to be filled below its mouth. The said 45 washer is prevented from upward displacement by suitable retaining means, such as an inverted metallic hood 26 of circular shape with a radial set-screw 27 therein engaging the outerwall of sleeve or tube 20. Above this hood 26 is a lateral nipple 28 opening into the passage 21 of said tube 22 and receiving upon said nipple the lower end of the flexible tube or hose 17.

It is preferred to utilize a flexible tube having an inherent or other resiliency tending to swing 55

the nozzle outwardly from the table or support at an angle from vertical. In such outwardly swung position, the spout or lower end of said nozzle is forward of a bottle support 29 transverse thereto and to rack 12, which support is slidable vertically in the rack to adjusted position. Adjustment of said support is suitably obtained as by a vertical screw 30 thereunder and fixed thereto which depends through the bottom cross-piece 31 of the rack and held by a capstan nut 32 at proper height to accommodate the particular height of bottle being filled. As shown, the ends of support 29 have vertically disposed guiding cleats 33 which ride in vertical ways or tracks 34 provided in the rack.

Nozzle 18 is given a swinging support from cross-bar 13 of the rack by means of a T-head 35 here shown as a horizontally disposed piece of tubing rotatably received toward its outer ends by cleats 36, 36 fixed on the crosspiece. Inner tube 19 of the nozzle has its upper end fixed with respect to the T-head, as by screw 37 and depends therefrom so that as the tube is swung forwardly or rearwardly the oscillation is accommodated by the rotation of said T-head in its cleats.

It is to be noted at this point, that while the inner or air vent tube 19 may thus swing or oscillate its length is constant. At its lower end is an enlarged valve head 38 shown held in place by a screw 39 which enters the bottom of said tube and thereby closes the same. On the top of valve-head 38 is a gasket 40 of size and shape to be engaged by the lower end of outer tube 20 and thereby close the spout. Said outer tube 20 is, in normal position, forced against the gasket 40 and valve head 38 by a spring pressure here shown exerted by a spiral spring 41 encircling the upper part of inner tube 19 and bearing at one end against T-head 35 and at its lower end against a ring 42 fixed near the upper end of outer tube 20. From this ring 42, around the spring, is a protecting sleeve 43. The ring is water tight with respect to both the protecting sleeve 43 and the nozzle tube or sleeve 20, and fixed with respect to both so all of those parts slide in unison. Above the end of nozzle tube or sleeve 20, and above the level of lower end of air inlet vent pipe 16 in reservoir 10, but below the top of protective sleeve 43 is an orifice 44 through the inner tube. While the upper end of nozzle tube 20 is open within the protective sleeve and below the said orifice, assured drainage from above ring 42 is obtained by another orifice 45 through the nozzle sleeve immediately above the ring. By virtue of passage 21 between the inner and outer tubes 19 and 20, any liquid finding its way into the upper protective sleeve will flow back to the spout end and discharge when the valve is opened. To permit this return flow and also retain the tubes concentric or axially coincident, suitable spider or other spacing means 46 may be provided on the inner tube 19 within passage 21 but without sealing the same.

The inner tube 19, at its lower end immediately above the valve head, is provided with an air inlet or slot 47 at the upper end of which is a protruding lip 48 always within and substantially in engagement at its outer end with the inner wall of outer tube 20.

In operation, the liquid with which the bottles 25 are to be filled is introduced into the reservoir and used to fill the bottles until the level in reservoir 10 falls to the level of the lower end of air inlet vent 16, at which time the reservoir is refilled. While filling bottles, the liquid flows from

the bottom of the reservoir through flexible tube 17 to the outer sleeve or tube 20 of nozzle 18. That tube is normally closed at its bottom, as shown in Fig. 3, by valve head 38 and gasket 40 and liquid is therefore prevented from discharge from the spout 22. While the upper end of tube 20 is open to the atmosphere, its level is above the level of the lower end of vent tube 16 in the reservoir and no flow from said upper end of tube 20 will occur. During filling of the reservoir, tube 17 is pinched or otherwise manipulated to prevent escape of liquid from the upper end of tube 20.

When a bottle is to be filled, it is applied to the nozzle end or spout 22 this being more easily accomplished by virtue of the outward tilt of that end under the resilient impetus of flexible tube 17. Adjustable support 29 is at such elevation that the bottle must necessarily slide the outer tube 20 upward a distance as shown in Figs. 2 and 4 in order to permit the bottle to sit upon said support. The operator, therefore, after applying the bottle to the spout pushes upward and inward to seat the bottle, thereby opening the valve and permitting liquid to flow from the spout into the bottle. The liquid which has entered the inner tube 19 and outer tube 20 after a bottle has been filled and removed, reaches its uppermost level therein indicated by the pressure head line 14 in the reservoir 10. The liquid in said tubes 19 and 20 will remain there until another bottle is set for filling. Said bottle is applied against the spout, thereby opening the valve head 38 which immediately permits the flow of liquid in tube 20 to enter therein, and only a few drops will escape from the inner tube 19 before the air pressure created by the incoming flow of liquid from the outer tube 20 forces the trapped air in the bottle upwardly into the tube 19 through slot 47. By virtue of the trapped air being forced upwardly into the tube 19 the liquid therein will be forced out of said tube through the orifice 44. Any air being forced out of the tube with the liquid will escape through the open end at the top of the tube 20 and the liquid will again find its way back in the passage 21 inside the tube 20 by virtue of the inlet orifice 45 in the nozzle sleeve 20 above the ring. The cooperation of the several parts and openings utilized in the distribution of the air and liquid thereby assures an even flow of the liquid under pressure, and at the same time prevents overflow at any time, either during the time a bottle is being filled or when the valve head 38 is in closed or neutral position. When the bottle has filled to a level where said air inlet slot 47 is submerged, escape of air is stopped automatically thereby at a level a desired distance below the top of the bottle, and removal of the bottle from place automatically closes valve 38. Overflow of the bottle is thus positively and automatically prevented. Flow of liquid from the spout is diverted to the side of said slot 47, by virtue of the lip 48 protruding thereabove.

Inasmuch as the stopper-like washer 23 on the outer sleeve is in sealing engagement with the mouth of the bottle, flow of liquid into the bottle is stopped as soon as the liquid has risen therein to a level closing slot 47 to escape of air, as shown in Fig. 2. The bottle is then swung forward from its support and slid off of the support thereby permitting spring 41 to slide the outer sleeve downward and forthwith shut the valve and stop flow of liquid into or overflow from the bottle since the bottle is not quite filled. The nozzle is

then left tilted outward ready for receiving the next bottle.

I claim:

5 A bottle filler comprising in combination
with a liquid reservoir in which is established a
pressure head level, a bottle filling nozzle associ-
ated therewith and providing a vent tube verti-
cally positioned and pivotally hung at its upper
end above the pressure head level in the reser-
10 voir and providing a vent orifice in said vent tube
above the said pressure head level in the reser-
voir, an outer tube around the said vent tube and
extending above said pressure head level, said
outer tube having a liquid inlet below the said
15 pressure head level of the reservoir and having
a connection entirely below the liquid level in the
reservoir connecting said reservoir and outer tube
below the said pressure head level for obtaining
gravity flow of the liquid from the said reservoir

to the said outer tube, said vent tube and outer
tube providing a spout insertable in a bottle neck,
said spout having means for automatically stop-
ping the gravity flow of liquid when the liquid
level in the bottle reaches a predetermined level
5 below the top of the bottle, said connection com-
prising a resilient tube for both conducting the
liquid and for effecting the outward swinging
force on said tubes, said means for automatically
stopping gravity liquid flow comprising a vent
10 tube opening in the vent tube at the bottom of
the outer tube, said vent being ultimately closed
by the liquid reaching the said predetermined
level, and said tubes providing a valve automati-
cally stopping flow of liquid as the tubes and
15 bottle are separated and before entire separation
has been effected.

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