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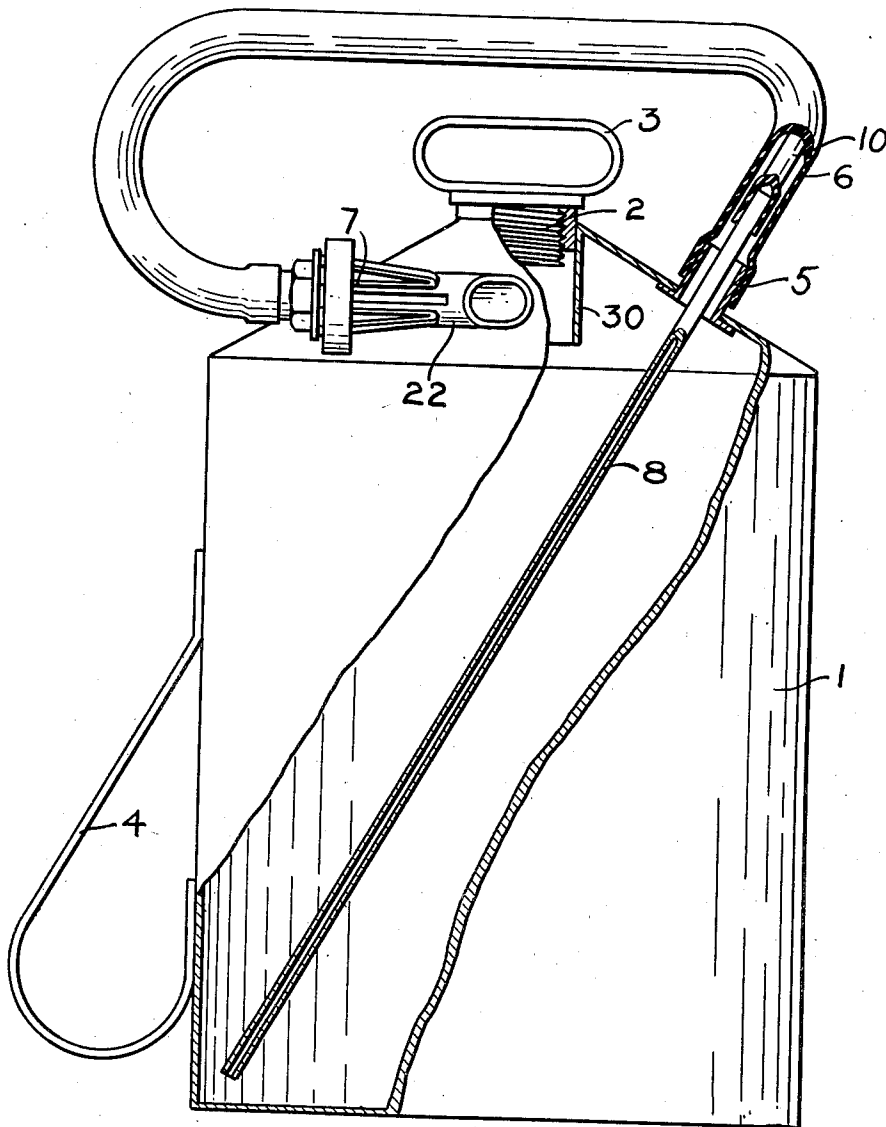
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TANK FILLING APPARATUS

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2 Sheets-Sheet 1



-Fig. 1.-

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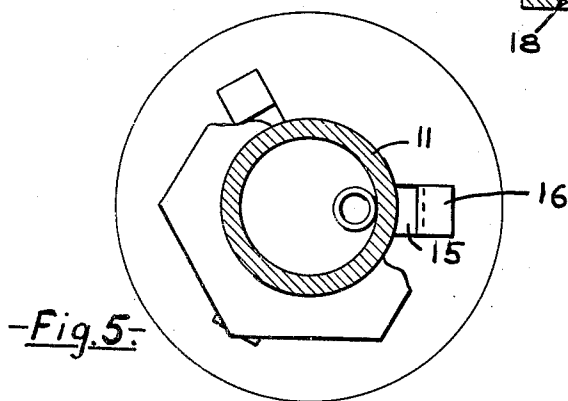
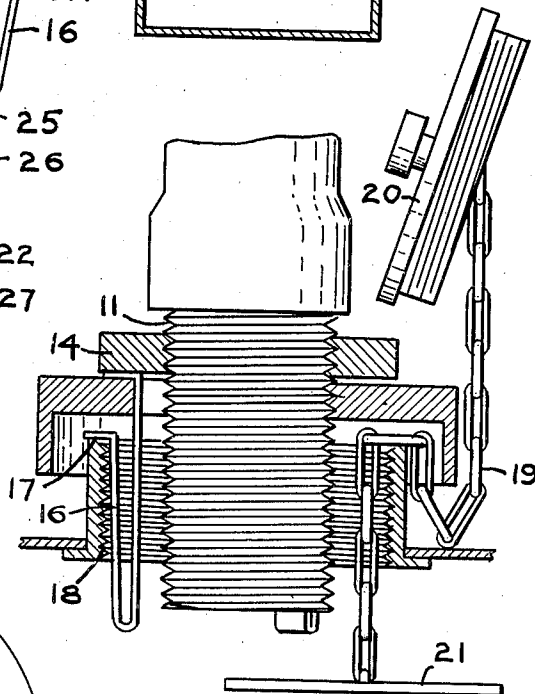
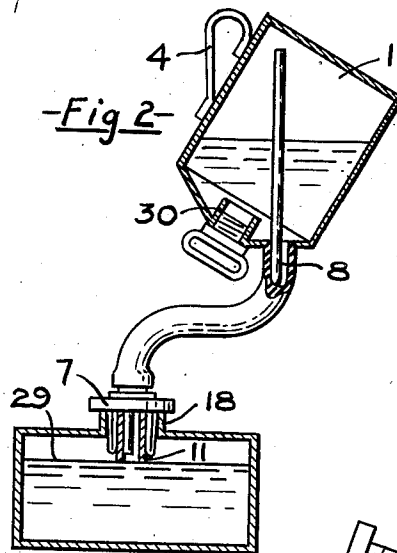
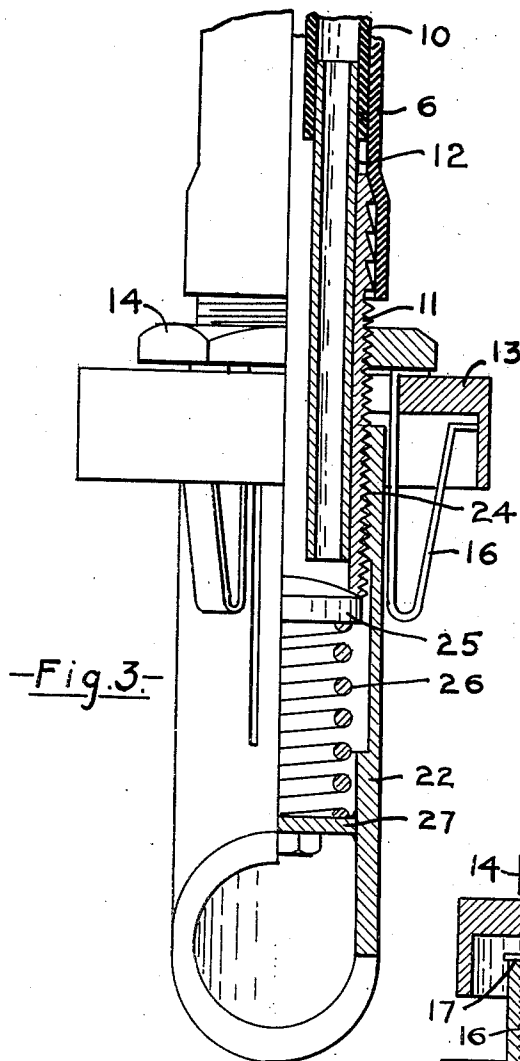
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UNITED STATES PATENT OFFICE

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TANK FILLING APPARATUS

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7 Claims. (Cl. 221—25)

The invention relates to a tank refilling apparatus in which liquid flows from one vessel to another; and the objects of the invention are, first, to provide a partially or totally enclosed transmission of liquid from one container to another; second, to shut off flow of liquid automatically when the liquid reaches a predetermined level in the tank being filled; third, to provide quick means of coupling one tank to another; fourth, to provide easy means of closing the aperture in the filling tank after uncoupling; fifth, to avoid fire risk by the complete enclosure of a combustible liquid during transmission from one container to another; sixth, to avoid loss of liquid and fire risk by avoiding overflow of liquid when tank is filled to a predetermined level.

One form of the apparatus is illustrated in the accompanying drawings in which Figure 1 is a side elevation partially sectioned of the entire filling can; Figure 2 is a diagrammatic view of the can in operation attached to a tank; Figure 3 is a half section and a half elevation of the nozzle of the can when thrust into its socket attached to the can when not in use; Figure 4 is a sectional view of the nozzle attached to the tank, showing the position of the tank stopper and its safety chain, if any, during this process; Figure 5 shows a plan view of the nozzle.

The can 1 has an airtight stopper 2, screwed down tightly to the handle 3, by which also it may be carried. A pouring handle 4 is attached low down to one side and a spout 5 is attached on the top on the opposite side. From this spout a large flexible transmission tube 6 leads to the nozzle 7. Soldered into the spout 5 is a small metal tube 8, the outer end of which sticks out above the spout 5 and the inner end of which travels right across and opens into the opposite bottom corner of the can 1. This small bore metal tube 8 is of large enough bore that liquid will not hang in it due to capillary attraction or surface tension.

An air lock pipe 30 is soldered into the top inside of the can so as to surround the filling orifice of the can and extend down into the can.

To the outer end of the tube 5 a small flexible transmission tube 10 is attached running preferably inside the larger transmission tube 6 to the nozzle indicated by 7 on Figures 1 and 2. The nozzle 7 in the special case illustrated, consists of an externally screwed nozzle pipe 11 (see Figures 3, 4 and 5) attached to the end of the large transmission tube 6. A short length of small bore tubing 12 of the same size as the small bore metal tube 8 is soldered inside the screwed nozzle pipe

11 so that it projects at the top but is flush or a little inside the screwed nozzle pipe 11 at the bottom. To the projecting end of the short length of small bore tubing 12 is attached the other end of the small flexible transmission tube 10 (see Figures 1 and 3).

The screwed nozzle pipe 11 screws into an internally threaded hole in the cap 13 and can be locked in any position by the lock nut 14 (see Figures 3 and 4). The threaded hole in the cap 13 has slots 15 (see Figure 5) to take three or more resilient strips 16. These are partially bent back on themselves as shown so that on pushing the nozzle 7 into the tank filling orifice 18 the said resilient strips 16 grip against the sides of the filling orifice 18. For this purpose the resilient strips 16 may be corrugated or serrated to give a better grip.

The resilient strips 16 are attached to the cap 13 by being clamped at one end under the lock nut 14. This permits of their being entirely removed or replaced by others suitable for various types of tank filling orifices.

In the particular case shown the ends of the resilient strips 16 have bent over portions 17, (see Figure 4) which prevent the cap 13 from coming down flush with the top of the tank filling orifice, thereby accommodating the safety chain 19 which is sometimes attached to the tank filling orifice stopper 20 at one end and a bar 21 at the other end. Where such chain 19 is not fitted the bent over portions 17 of the resilient strips 16 are omitted and the cap 13 may then come down flush with the top of the tank filling orifice 18.

When not in use the nozzle pipe 11 is thrust into a sleeve 22 (see Figure 1) with one or more splits 23 (see Figure 3) which make the sleeve 22 expandibly resilient and having an internal screw thread or serrations 24. This screw thread or serrations 24, due to the resilience of the split sleeve 22, engage with the screw thread of the screwed nozzle pipe 11 and form an anchorage for it without the necessity of screwing it in.

The sleeve 22 is attached to the can top in such a direction that pulling out the nozzle from the sleeve will have the effect of screwing up the tank stopper 3, should it be loose.

Inside the sleeve 22 (see Figure 3) is a plug 25 which is attached to the spring 26. This spring 26 is attached to the plate 27 soldered into the end of the sleeve 22. On pushing the nozzle pipe 11 into the sleeve 22 the plug 25 engages the open end of the nozzle pipe 11 and stops any drip.

In the operation of filling the can 1 (see Fig-

ure 1) the stopper 2 is unscrewed by the handle 3 and liquid poured into the orifice. When the level of the liquid reaches the bottom of the air lock pipe 30 air is trapped between the air lock pipe 30 and the conical top or sides of the can 1. Further filling will fill the inside of the air lock pipe 30 till the liquid reaches the top. The air lock pipe prevents the can being completely filled with liquid and ensures some air being left in the can. This does not however prevent the can 1 being completely drained of liquid via the spout 5.

In the operation of filling the tank from the can (see Figure 2) the nozzle 7 is coupled to the tank filling orifice 18, and the screwed nozzle pipe 11, which has been adjusted to the right length, enters the tank to the required depth 29.

The full can 1 is then raised up by the pouring handle 4 so that the inner end of the small bore metal tube 8 is at the highest point. The air trapped by the air lock pipe 30 also rises to this highest point and uncovers the end of the small bore metal tube 8. Air then runs out of the tank 31 (see Figure 2) into the top of the can 1 by going through the short length of small bore tubing 12, the small flexible transmission tube 10 and the small metal tube 8. Meanwhile liquid runs from the can 1 into the tank via the spout 5, the large transmission tube 6 and the nozzle pipe 11.

As soon as the liquid in the tank 31 reaches the level 29 (see Figure 2) of the outlet of the nozzle pipe 11, flow of liquid ceases, as a vacuum is created in the can 1, and where the nozzle 7 is hermetically sealed a pressure is created in the tank 31.

I am aware that the method of cutting off the flow of liquid from one container at a higher level to another at a lower level, by means of the transmission tube becoming sealed by the rise in the level of the liquid in the lower container has been invented and used prior to my invention; I am also aware that the release of the vacuum in the upper container by means of a tube letting air into the upper portion of the upper container has been invented and used prior to my invention. I do not therefore claim such principles broadly; but

I claim:

1. The combination in a tank refilling apparatus of an anchorage for the nozzle of a flexible filling tube consisting of an internally serrated tube having slits therein to make the tube resiliently expandible to receive the externally serrated surface of the nozzle.

2. An anchorage to receive the nozzle of a flexible filling tube placed on a container tangentially to the stopper of the container to be described, and with the receiving end of the anchorage pointing tangentially in the same direction as the direction of rotation for unscrewing the stopper thereby tending to screw the stopper tighter into the container under the action of pulling out the nozzle from the anchorage while holding the carrying handle attached to the stopper of the container.

3. An anchorage for the nozzle of a flexible filling tube of a tank refilling apparatus consisting of a serrated tube with resiliently expandible sides to receive the serrated surface of the nozzle, and containing a spring loaded valve hermetically to seal the said nozzle and located on the container in such a position that the action of pulling out the nozzle from the anchorage, while holding onto the handle attached to the

stopper of the container to be described, will have the tendency to screw the stopper tightly into the container.

4. A nozzle for a flexible filling tube embodying resilient strips to temporarily attach it to the orifice into which it may be thrust, and having a serrated surface temporarily to locate it in an internally serrated and resilient anchorage and being adjustably screwed into a cap for hermetically sealing the nozzle to the filling orifice into which it may be thrust.

5. A tank refilling apparatus for liquids consisting of a container, flexible transmission tube and smaller tube not projecting beyond the outer end of the nozzle, to prevent liquid flow down the inner tube instead of down the main outer tube if the can is full, and also to afford a flush seat for easy sealing of the end of the nozzle; the inner end of said smaller tube extending into the can to the far side and below the inner opening of the main transmission tube when the can is normally vertical, so that syphoning cannot take place through the main transmission tube if full after pouring; and so that the inner end of said smaller tube is at the highest point when the can is inverted by means of the pouring handle set suitably low down on the can, said smaller tube extending to the far side of the container so that its inner end is at the highest point when the container is inverted by means of the pouring handle.

6. A tank refilling apparatus for liquids consisting of a container, flexible transmission tube and nozzle and a smaller tube for reverse flow of air preferably contained in the larger transmission tube, said inner tube not projecting beyond the outer end of the nozzle so as to prevent liquid flow down the smaller rather than the larger tube, and so as to afford a flush face for easy sealing of the end of the nozzle; the inner end of the smaller tube extending to the far side and to a point below the inner end of the larger tube so as to prevent syphoning through the larger tube when the can is standing normally upright; and a pipe surrounding the filling orifice of the can and extending downwardly to such a depth as to trap a considerable quantity of air sufficient to avoid appreciable vacuum in the can when flow starts, on the can being inverted, and thereby allowing the smaller tube to clear itself of any liquid present in it; said trapped air rising to the highest point and uncovering the inner end of the small tube when the can is inverted by a pouring handle set suitably low in the can; said inner tube together with the nozzle being projected to a predetermined level into the tank to be refilled so that when the liquid in the tank reaches the nozzle outlet air is prevented travelling up the smaller tube so that further flow stops.

7. An apparatus for the partial or entirely enclosed transmission of a liquid from one tank at a high level to another at a lower level, consisting of a closed container, a liquid transmission tube with a further smaller tube preferably contained therein for reverse flow of air, said smaller tube extending inwardly to the highest point in the container when said container is inverted by means of a handle attached near said highest point, a nozzle at the end of said transmission tube with the end of the smaller tube contained therein, resilient strips replaceable with others of different sizes surrounding said nozzle and co-linear with same, temporarily locating said nozzle in the filling orifice of the lower tank, and thread

like serrations spirally surrounding the outer surface of the nozzle and adjustably screwed and locked into a cap hermetically coupling the nozzle to the tank when in use, and said nozzle thereby
5 adjustably projecting to a predetermined level into the tank to be filled, said thread like serrations temporarily locating said nozzle in similar internally cut serrations in a resilient tubular anchorage on the container when not in use, and a
10 spring loaded valve in said anchorage contemporarily hermetically closing the end of the said

nozzle, said container having a carrying handle attached to the stopper of the container screwed in such a direction that releasing the nozzle from the anchorage tends to tighten the stopper into the filling orifice of the container, said filling orifice having a pipe surrounding it permanently at-
5 tached to the inside of the container at its outer end and extending inwardly into the container, all substantially as described.

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