Oct. 26, 1954 C. L. HALL 2,692,718

DRUM FILLING NOZZLE

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Fig. 1

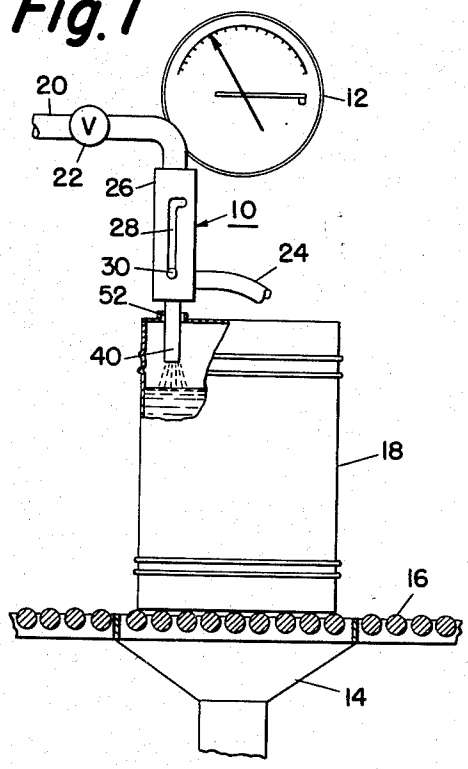


Fig. 2

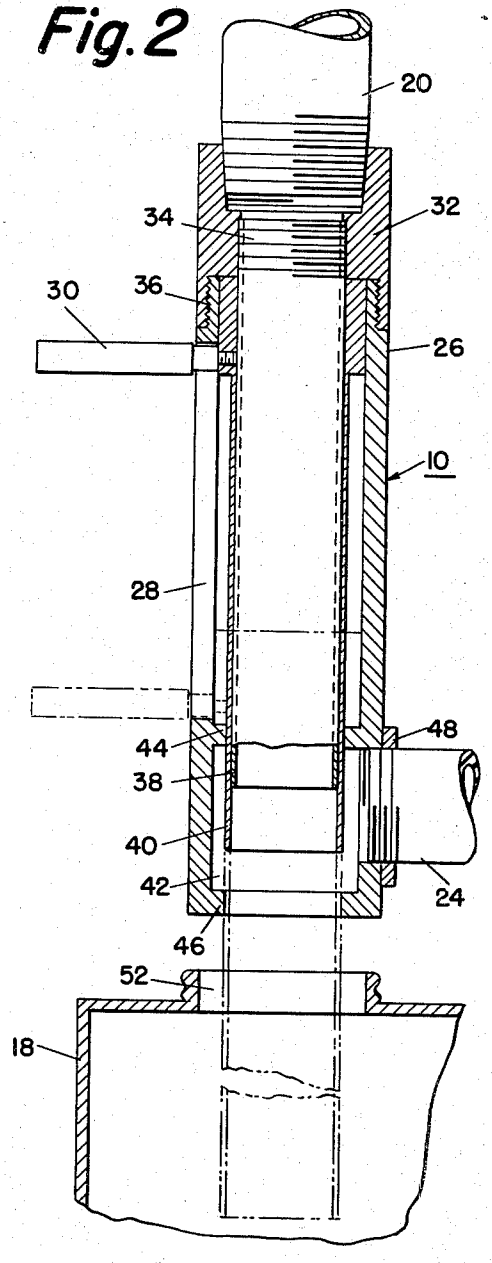
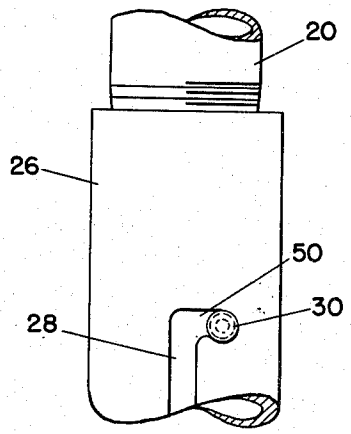


Fig. 3



INVENTOR.
CHESTER L. HALL

BY Robert O. Spurdle

ATTORNEY

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DRUM FILLING NOZZLE

Chester L. Hall, Chester, Pa., assignor to Sun Oil Company, Philadelphia, Pa., a corporation of New Jersey

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3 Claims. (Cl. 226—129)

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This invention refers in general to the rapid packaging of liquids and more specifically to the nozzle means for filling liquid containers without dripping.

The rapid filling of liquid containers on a production line basis requires a nozzle means which will deposit the liquid at a rapid rate yet will not drip on the top of the container as the package moves to and from the filling station. Present methods place a container at the loading station ready for filling as one step in an automatic procedure. The empty container is halted and its weight is automatically tared. The taring mechanism, once the weight is balanced, indicates the completion and readiness to receive the filling material. The liquid is then passed rapidly into the container from a controlled feed line. When the proper weight of material in the container has been reached, the valve is automatically shut off by the weighing mechanism and the container moves from the loading station on a conveyor system to closing, sealing, and marking stations.

During the pause at the filling station, it is usually necessary for an attendant to direct a loading nozzle into the container opening. This is particularly true where large drums are used, such as are common in the petroleum industry. Even though the quantity of liquid is determined automatically by the weighing device and automatically operated control valves, the liquid is deposited in the drum by means of a nozzle physically inserted through the bung. When the required amount of material is in the drum, it is necessary for the attendant to remove the nozzle and permit the drum to pass from the loading station and to receive another drum for a repetition of the filling operation. It is during this period of changing the receptacles that the liquid tends to drip over the top of the filling drum and across the head of the empty drum being moved into the filling position. It is an object of the disclosed device to prevent the dripping of the liquid on the containers and on the floor at the loading station, thereby conserving the material being packaged and preventing an accumulation of spilled liquid as a hazard.

In general the invention herein disclosed includes a loading nozzle which is extendable into the receptacle to a sufficient depth to reduce splashing and admit the liquid with a minimum amount of contact with the air outside the drum. Attached to the body of the valve is a vacuum line constantly drawing air through the bottom of the housing around the nozzle sleeve. As the

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sleeve is retracted into the valve housing the constantly applied vacuum pulls the dripping material into the valve housing and away from the head of the filled drum, leaving the drum and area dry.

The complete filling means and the method of operation will be more fully understood after reading the following detailed description with reference to the drawing in which:

Figure 1 is an elevational view of a typical loading station.

Figure 2 is an elevational view of the valve means partially in section.

Figure 3 is a detail of Figure 2.

Referring to the various figures of the drawing wherein like numerals of reference designate similar parts in each of the figures, the numeral 10 designates the drum filling nozzle in working position at the loading station. The weighing scale 12 and movable platform 14, shown as a section of a roller surface 16 on which the drum 18 is moved, constitutes the primary elements at this point. The liquid feed conduit 20 with automatically controlled valve 22 serves the drum filling nozzle 10 with the loading material. The vacuum line 24 completes this view of the general elements necessary to a particular description of the nozzle means which follows.

In Figures 2 and 3, the drum filling nozzle 10 is detailed and shown in both the retracted and extended positions necessary to a complete understanding of the device. The nozzle generally indicated by the numeral 10 includes an external casing 26 longitudinally notched as at 28 to receive a slidable handle 30. An adapter 32 threaded to engage the feed line 20 is additionally threaded on two different diameter measurements as at 34 and 36 for connection with the fixed and moving parts of the filling nozzle.

A fixed tube 39 threadedly engages the smaller of the diameters 34 in close proximity to the adapter connection with the feed line 20. The casing 26 engages the larger threaded diameter 36 and positions the sliding tube 40 within the casing. The handle 30 inserted through the longitudinal slot 28 engages the sliding tube 40 for manual operation and control.

The casing 26 is constructed to form a chamber 42 for positioning immediately above the bung of the drum through which the sliding tube 40 is extended and withdrawn. An upper flange 44 is machined in close fit with the sliding tube or sleeve 40 permitting sliding movement but limiting the passage of air therebetween as much as possible. A duplicate flange 46 in equally close

sliding contact with the tube 40 outlines the opening in the bottom of the casing 26 through which the sliding tube is extended and withdrawn into contact with the drum 18 interior during the loading operation. The vacuum line 24 threadedly engages the casing 26 between the two flanges 44 and 46 through a pad 48 added for strengthening purposes to subject the chamber 40 to a constant vacuum.

The sliding tube 40 noted as engaged by a handle 30 extending through the longitudinal slot 28, is held in the retracted position by means of an offset slot 50, shown in Figure 3. To keep the sliding tube lifted, it is merely necessary to turn the handle slightly for engagement in the slot. This form of construction facilitates a quick release, as well.

It will be obvious that the cycle of operation of the filling process is practically continuous in order to fulfill its purpose. However, in order to understand the device as disclosed, this operating cycle will be considered as beginning with the introduction of a clean, empty drum to the weighing platform 14 as it moves along the roller bed 16. The drum is automatically tared and a signal light indicates the completion of this part of the filling operation to the loading station attendant.

The sliding tube 40 is lowered through the bung hole 52 of the drum 18 for sufficient depth predetermined with the view to admitting the loading liquid and reducing the tendency to splash with consequent foaming forcing its way upwardly through the bung hole. As designed, this positions the handle 30 at the downward end of the slot 28, as shown in dot and dash lines on Figure 2. By pressing a release button the operator starts the automatic operation of the valve 22 permitting the filling liquid to flow through the feed pipe 20 into the drum 18. When the proper weight of liquid is deposited within the drum, the weighing platform 14, the scale 12 and the automatic valve 22 cooperate to shut off the flow. This is indicated to the operator by another electrically operated signal. These signals are neither shown nor discussed in detail as they are well known and form no part of the claimed nozzle device.

The handle 30 is lifted, withdrawing the sliding tube 40 upwardly into the nozzle casing 26 and is held in the retracted position by the lateral movement of the handle into the engaging notch 50. The vacuum condition supplied through the conduit 24 is established in the chamber 42 and is effective at all times. Consequently, this causes an inward movement of air from outside the valve casing and across the nozzle opening of the sliding tube 40 and thence into the vacuum line 24. Consequently, with the retraction of the sliding tube 40, the inward rush of air to fill the chamber 42 carries with it any drippings which might have been held by the mouth of the sliding tube 40 after its withdrawal from the drum.

The now filled drum is passed onto the roller surface and moves on for further operation. A new drum is placed on the scale platform 14 and the operation is repeated. The constant application of the vacuum condition across the bottom of the sliding tube 40 prevents dripping across either the outgoing or incoming drum reducing the loading hazard and conserving the material.

The invention claimed is:

1. A drum filling nozzle comprising a casing adapted to pass liquid therethrough and divided into an upper and lower chamber, a tube in fixed relation to and extending through the upper chamber and terminating in the lower chamber, a sliding tube in operating engagement with the fixed tube and adapted to be retractably extended through the chambers in said casing, a handle connected to operate the sliding tube extending through a slot in the upper chamber portion of said casing for operating said sliding tube, and a conduit connected to the lower chamber through which a vacuum condition is supplied thereto.

2. A drum filling nozzle comprising a cylindrical casing apertured at the top and bottom thereof, an adapter constructed to engage and position the casing for operation, a pair of concentrically disposed tubes within said casing, the first threadedly engaging said adapter and the second being of substantially the same length adapted to slide longitudinally of said casing on the first tube, a pair of flanges placed in spaced relation in the lower portion of said casing to circumferentially engage the sliding tube and form a chamber at the bottom of the fixed tube, and vacuum creating means connected to the casing between said flanges to maintain a vacuum condition in said chamber.

3. A filling nozzle for a drum comprising a casing adapted at its upper end for communication with a liquid feed, a conduit, a tube within, and in fixed relation with, the casing and adapted to receive liquid from said feed conduit, the casing having inwardly extending flanges at its lower end and above its lower end, forming between them a chamber, a second tube surrounding the fixed tube and slidable downward from an upper retracted position along the fixed tube and along said flanges and then project substantially below the casing, said tubes then constituting a passage adapted to convey the liquid from the feed conduit to the drum to be filled, said slidable tube when retracted clearing the opening formed by the lower annular flange, and a conduit adapted to be placed under suction connected with the said lower chamber of the casing.

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