June 25, 1957 G. L. N. MEYER 2,796,892

FILLER VALVE FOR PULP DRINKS OR THE LIKE

Filed Nov. 1, 1954

Fig. 1

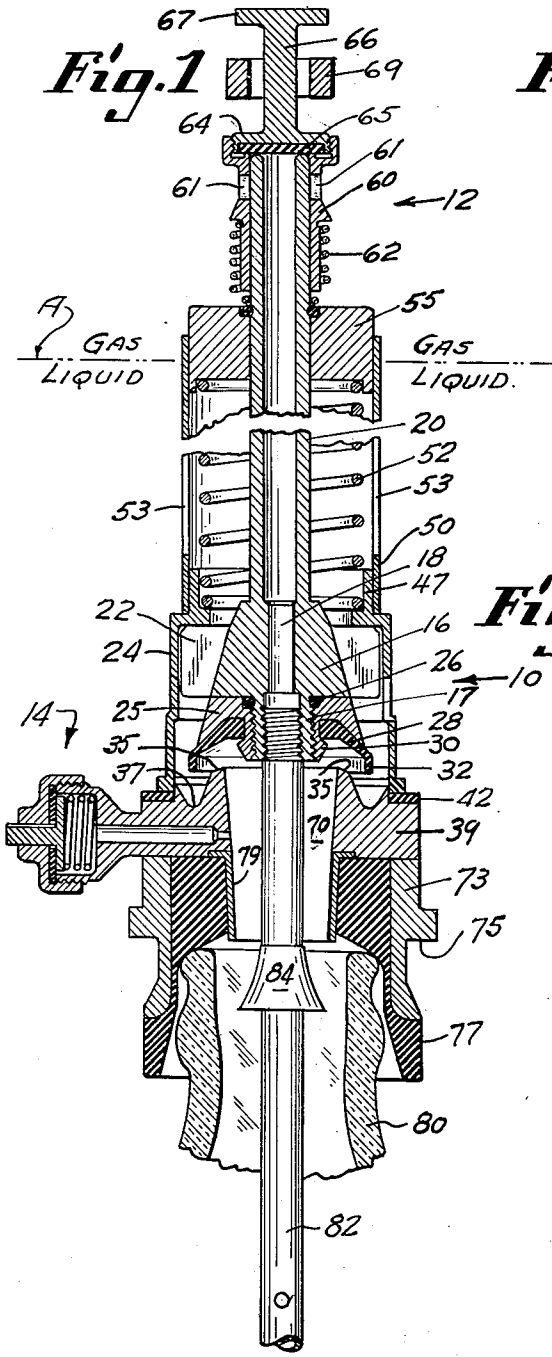


Fig. 2

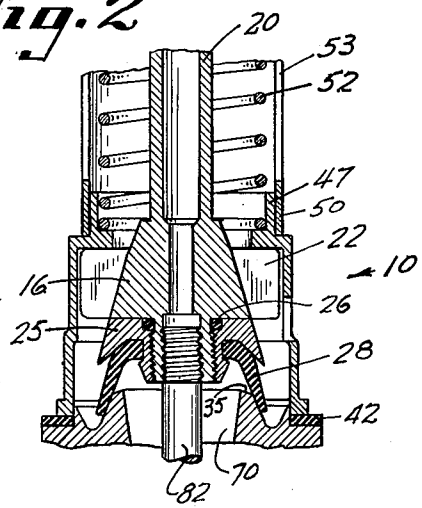
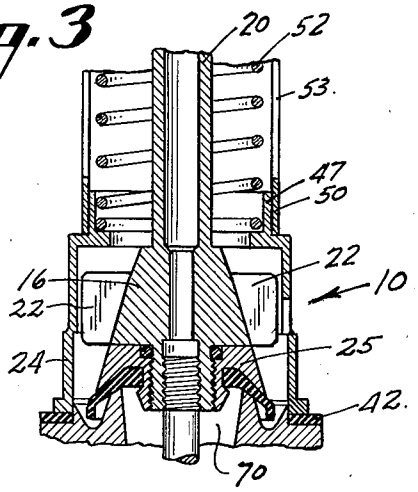


Fig. 3



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United States Patent Office 2,796,892 Patented June 25, 1957

2,796,892

FILLER VALVE FOR PULP DRINKS OR THE LIKE

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Application November 1, 1954, Serial No. 465,847

15 Claims. (Cl. 141—48)

This invention relates to filler valves, and more particularly to a filler valve especially adapted for use with beverages containing a pulp.

In filler valves, and more particularly filler valves employing counter-pressure above the beverage in the filler bowl, such as the patent to George L. N. Meyer No. 2,063,326, dated December 28, 1936, it has been common practice to utilize a foraminous element such as a screen, or the like, to stop the flow of liquid into the container when the pressure within the container was equal to the downward pressure of the entering liquid. Such a valve cannot be used to fill containers with a liquid containing pulp since the pulp would be caught by the screen and would clog the valve rapidly and stop the flow of liquid therethrough.

It is an object of the present invention to provide a valve for a counter-pressure filler which will permit ready filling of the container with beverages containing course fruit pulp.

Another object is to provide a valve for a counter-pressure filler through which pulp will pass freely.

Another object of the invention is to provide a pulp valve for a bottle filling machine which will automatically stop the flow of liquid to the container when the level therein reaches a predetermined point.

A further object is to provide a pulp valve for a counter-pressure filling machine which will automatically shut off the flow of liquid to the container in the event of failure of pressure within the container.

A further object of the invention is to provide a pulp valve for a counter-pressure filling machine which will automatically close or remain closed, in the event the container is improperly placed beneath the valve, to stop the liquid supply thereto.

A still further object is to provide a valve which will not clog when filling containers with a liquid containing pulp.

Other objects will become apparent from the following specification, which, when taken in conjunction with the accompanying drawings, illustrates a preferred form of the invention.

In the drawings:

Fig. 1 is a vertical cross-section through the center of a filler valve made in accordance with the present invention;

Fig. 2 is a fragmentary view similar to Fig. 1 of the liquind control valve with the closure member in position to stop the flow of liquid, with the valve element in raised position; and

Fig. 3 is a view similar to Fig. 2 showing the liquid valve in its normally closed position.

Referring to the drawings, and particularly to Fig. 1, the filler valve comprises three parts, a liquid valve, generally designated **10**, which controls the flow of the beverage into the container, a counter-pressure gas valve, generally designated **12**, which controls the flow of counter-pressure gas in the container, and a snift valve, generally designated **14**, which reduces the gas pressure in the top of the container to atmospheric pressure immediately prior to lowering the container from the filler valve.

The liquid valve **10** comprises a substantially frustro-conical body **16** having an internally and externally threaded nipple **17** on the lower end. The nipple **17** opens into an upwardly extending aperture **18** which in turn opens into an upwardly extending vent tube **20** formed on the upper end of the body **16**, thus providing a gas passage through both the valve body **16** and the vent tube **20**.

The valve body **16** has a plurality of radiating wings **22** formed on its exterior which contact the interior of a valve cage **24** to guide and limit the movement upward of the valve therein.

A seal retainer **25** is received on the threaded exterior of the nipple and depends from the lower end of the valve body **16**. A packing ring **26** prevents leakage between the valve body **16** and the seal retainer **25**.

The lower end of the seal retainer **25** is provided with a frustro-conical recess which receives a somewhat similarly shaped rubber sealing element **28**. A shoulder **30** on the central stem of the ring **25** retains the sealing element **28** in place.

The sealing element is roughly frustro-conical in shape, both on the upper and lower surfaces thereof, and has a depending annular skirt **32** on the lower rim, thereof.

A valve seat **35** is positioned and forms the upper edge of an annular well **37** in the valve base **39**, the inner side of the well sloping outwardly and downwardly and terminating in an upwardly rounded bottom. The depending annular skirt **32** extends downwardly into the well **37** at the extreme upper limit of the travel of the valve, so that the skirt **32** forms, with the well, a trap or an inverted siphon.

The valve cage **24** is mounted on an annular shoulder on the valve base **39** with a gasket **42** interposed therebetween to prevent leakage. The valve cage **24** has a central opening **45** through the top which provides for the movement of the valve body **16** and stem **20** through the top and provides an opening to permit movement of liquid downwardly through the valve **10**.

The opening **45** is surrounded by an upstanding annular collar **47** which receives a perforated cylindrical guide **50**. The cylindrical guide **50** which forms a guide housing for both the vent tube and a valve actuating spring **52**, is perforated, preferably with wide, elongated apertures **53** to permit passage of liquid into the liquid valve **10**.

The valve stem **20** has fixed thereto a cylindrical guide **55** which operates in the cylinder **50**. The guide **55** is urged upwardly by the spring **52** so that the valve **10** is constantly urged into open position.

A cap valve **60** fits over the top of the vent tube **20** and has ports **61** through the cylindrical sides of the cap to permit passage of counter-pressure gas into the vent tube **20** when the cap valve **60** is raised. A spring **62** balances the weight of the cap valve **60** and urges it into open position.

The upper end of the cap valve **60** is provided with a closure member **64** which screws into the upper end of the cap valve and binds a packing **65** in position to form a gas tight seal with the top of the vent tube **20**.

The closure member **64** has an upwardly extending post **66** terminating at its upper end in an actuator button **67**. The actuator button provides a contact surface for a cam follower **69**, permitting the follower **69** to rise and open the valve **12**.

The snift valve **14** is mounted on the exterior of the

valve base 39 and controls a passage leading into a central vertical aperture 70 through the valve base.

A clamping member 73 has an annular shoulder 75 which receives a clamp to retain the valve assembly in a filler bowl.

The clamping member 73 has a central aperture which receives a rubber bottle seal 77. The seal 77 has a nipple 79 mounted in a central opening therein which nipple is in alinement with the opening 70 in the valve base to permit passage of liquid into the container 80.

A vent tube 82 is mounted from the interior threads on the nipple 17 and provides a continuous passage for gas from the valve 12 into the neck of the container 80.

A spreader element 84 is mounted on the vent tube 82 to deflect the liquid flowing past the valve 10 against the sides of the container and permit gas to return from the container to the filler bowl.

Operation

In operation the entire valve structure is mounted in a filler bowl (not shown) and the bowl filled with a beverage or other liquid to be dispensed, to a level such as "A" slightly below the level of the counter-pressure gas valve 12, and air or other gas is supplied to the top of the filler bowl above the level of the liquid to supply suitable counter-pressure.

To operate, a container 80 is placed in position beneath the filler valve and raised until the neck is in sealing engagement with the rubber sealing ring 77.

A cam (not shown) on the exterior of the bowl then raises the follower 69 opening the valve 60 to permit counter-pressure gas to flow down the vent tube 20 through the passage 18 in the valve body, through the vent tube 82 into the container 80 to place the inside of the container at the same pressure as the interior of the filler bowl.

When the pressures are thus balanced the spring 52 opens the valve 10, permitting liquid to flow around the inverted siphon 37, past the valve closure member 28, and through the passage 70—79 onto the spreader 84. The spreader 84 deflects the liquid onto the inner surface of the container 80, the liquid flowing down the inner surface of the container to fill it.

As the container fills, the counter-pressure gas passes upwardly through the vent tube 82 and re-enters the top of the bowl.

It will be noted that as the liquid passes through the valve 10, it passes through a trap or inverted siphon 37 in going around the lower end of the skirt 32.

When the liquid rises above the level of the bottom opening 85 in the vent tube 82, gas can no longer escape from the neck of the container. Hence when liquid rises above that level, gas pressure builds up in the neck of the container which exerts pressure on the inner or discharge side of the siphon to stop the flow of liquid through the siphon with the valve 10 open.

When the filling is completed the cam (not shown) actuates the follower 69 to close both the valves 10 and 12.

After the valves 10 and 12 have been closed, the snift valve 14 is opened to relieve excess pressure in the top of the container 80. When the pressure within the container is reduced to atmospheric, it may be removed from the filler for capping.

Should a bottle break or should the bottle be so misalined as to contact the vent tube and raise the liquid valve mechanically, pressure on the rubber sealing element 28 will force that element downwardly into the distorted position shown in Fig. 2 to close the liquid valve and prevent the escape of liquid from the bowl.

It will be noted that the above construction provides wide open passages which permit the filling of pulp drinks such as orange crush, etc., without any possibility of clogging the valve. It will also be seen that the provision of the trap with the curved bottom provides a flushing means for the solid matter in the liquid which insures further against clogging.

It will be realized that the hereinbefore described form of the invention is to be taken merely as a preferred embodiment thereof and that various changes in size, shape and arrangement of parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas to the containers and to permit return of a portion of said gas as the containers fill, a liquid passage, an inverted siphon in said liquid passage, a liquid control valve in said liquid passage to control the flow of liquid through said passage to said containers, and means to close said valve automatically in response to the failure of counter-pressure in a container.

2. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas into and out of the container at a point spaced below the top thereof and to stop the flow of said gas from the container when the liquid level in the container rises above the bottom of said means, a liquid passage, an inverted siphon in said liquid passage adapted to stop the flow of liquid through said passage when the level of the liquid in the container rises above the bottom of said first named means, a liquid control valve in said liquid passage to control the flow of liquid therethrough, and means to close said valve automatically in response to failure of counter-pressure in a container.

3. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas to a container and to permit return of a portion of said gas as the container fills, a liquid passage, an inverted siphon in said liquid passage, a liquid control valve in said liquid passage to control the flow of liquid through said passage to said container, and means on said valve to stop the flow of liquid therepast in the event of failure of counter-pressure in said container.

4. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas to a container and to permit return of a portion of said gas as the container fills, a liquid passage, an inverted siphon in said liquid passage, a liquid control valve in said liquid passage to control the flow of liquid through said passage to said container, and a rubber sealing element on said valve adapted to deform in the event of failure of counter-pressure in the container to stop the flow of liquid therepast.

5. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas into and out of the container at a point spaced below the top thereof and to stop the flow of said gas from the container when the liquid level in the container rises above the bottom of said means, a liquid passage, an inverted siphon in said liquid passage adapted to stop the flow of liquid through said passage when the level of the liquid in the container rises above the bottom of said first named means, a liquid control valve in said liquid passage to control the flow of liquid therethrough, and means on said valve to stop the flow of liquid therepast in the event of failure of counter-pressure in said container.

6. In a valve mechanism adapted to fill containers with a liquid containing solid particles, means to supply counter-pressure gas into and out of the container at a point spaced below the top thereof and to stop the flow of said gas from the container when the liquid level in the container rises above the bottom of said means, a liquid passage, an inverted siphon in said liquid passage adapted to stop the flow of liquid through said passage when the level of the liquid in the container rises above the bottom of said first named means, a liquid control valve in said liquid

passage to control the flow of liquid therethrough, and a rubber sealing element on said valve adapted to deform in the event of failure of counter-pressure in the container to stop the flow of liquid therepast.

7. In a counter-pressure filter valve mechanism adapted to fill containers with a liquid containing solid particles, a vent tube adapted to supply counter-pressure gas into and out of a container to be filled from a source to a point spaced below the top of said container, a valve on said vent tube to control the flow of counter-pressure gas therethrough, a liquid passage to supply the liquid to the container, an inverted siphon in said passage adapted to stop the flow of liquid through the passage when the level of liquid in the container rises above the lower end of the vent tube, a liquid control valve in said liquid passage to control the flow of liquid therethrough, and means to close said valve automatically in response to failure of counter-pressure in a container.

8. In a counter-pressure filler valve mechanism adapted to fill containers with a liquid containing solid particles, a vent tube adapted to supply counter-pressure gas into and out of a container to be filled from a source to a point spaced below the top of said container, a valve on said vent tube to control the flow of counter-pressure gas therethrough, a liquid passage to supply the liquid to the container, an inverted siphon in said passage adapted to stop the flow of liquid through the passage when the level of liquid in the container rises above the lower end of the vent tube, a liquid control valve in said liquid passage to control the flow of liquid therethrough, and a rubber sealing element on said valve adapted to deform in the event of failure of pressure within the container to stop the flow of liquid therepast.

9. In a filler valve mechanism adapted to fill containers with a liquid containing particles of solid matter, a liquid passage, an inverted siphon in said liquid passage, a valve in said liquid passage, means to open said valve to permit the flow of liquid therethrough, and means to create a gas pressure on the discharge side of said siphon to stop the flow of liquid through said liquid passage independently of said valve.

10. In a filler valve mechanism adapted to fill containers with a liquid containing particles of solid matter, a liquid passage, a liquid valve to control the flow of liquid through said passage, an inverted siphon including a portion of said valve in said passage, and means to create a gas pressure on the discharge end of said siphon at the conclusion of the liquid filling operation to stop the flow of liquid through said passage independently of said valve.

11. A filler valve mechanism adapted to fill containers

with a liquid containing particles of solid matter, a liquid passage, a liquid valve to control the flow of liquid through said passage, an inverted siphon including a portion of said valve concentric with said valve, and means to create a gas pressure on the discharge side of the siphon at the conclusion of the liquid filling operation to stop the flow of liquid through said siphon independently of the filler valve.

12. A valve mechanism as described in claim 11 including means to close the liquid valve and means to release the excess gas pressure subsequent to said closing.

13. In a filler valve mechanism adapted to fill containers with a liquid containing particles of solid matter, a valve base having an annular upwardly concave recess in the upper surface thereof and a concentric liquid passage therethrough, a valve seat on the inner annular face of said recess, a valve mounted above said recess and concentric therewith, a depending skirt extending into said recess and forming therewith an annular inverted siphon for the passage of liquid therethrough, means to create a gas pressure on the discharge side of said siphon to stop the flow of liquid therethrough, and means to seat the valve on the seat after the flow of liquid through the siphon ceases.

14. A counter-pressure filler valve mechanism adapted to fill containers with a liquid containing particles of solid material, comprising, a liquid valve base having an annular upwardly concave recess in the upper surface and a concentric liquid passage therethrough, a valve seat adjacent the inner edge of the recess, a valve element mounted above said recess and concentric therewith, a depending skirt extending into said recess and forming therewith an annular inverted siphon for the passage of liquid therethrough, a vent tube carried by said valve element and adapted to supply counter-pressure gas to the container at substantially the filled level therein whereby the gas trapped above the liquid level creates a pressure on the discharge side of the inverted siphon to stop the flow of liquid, and means to close the said valve.

15. A counter-pressure filler valve mechanism as described in claim 14 in which the depending skirt is of deformable material and is adapted to deform upon failure of counter-pressure in the container to stop the flow of liquid through the valve.

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