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GASOLINE DISPENSING NOZZLES

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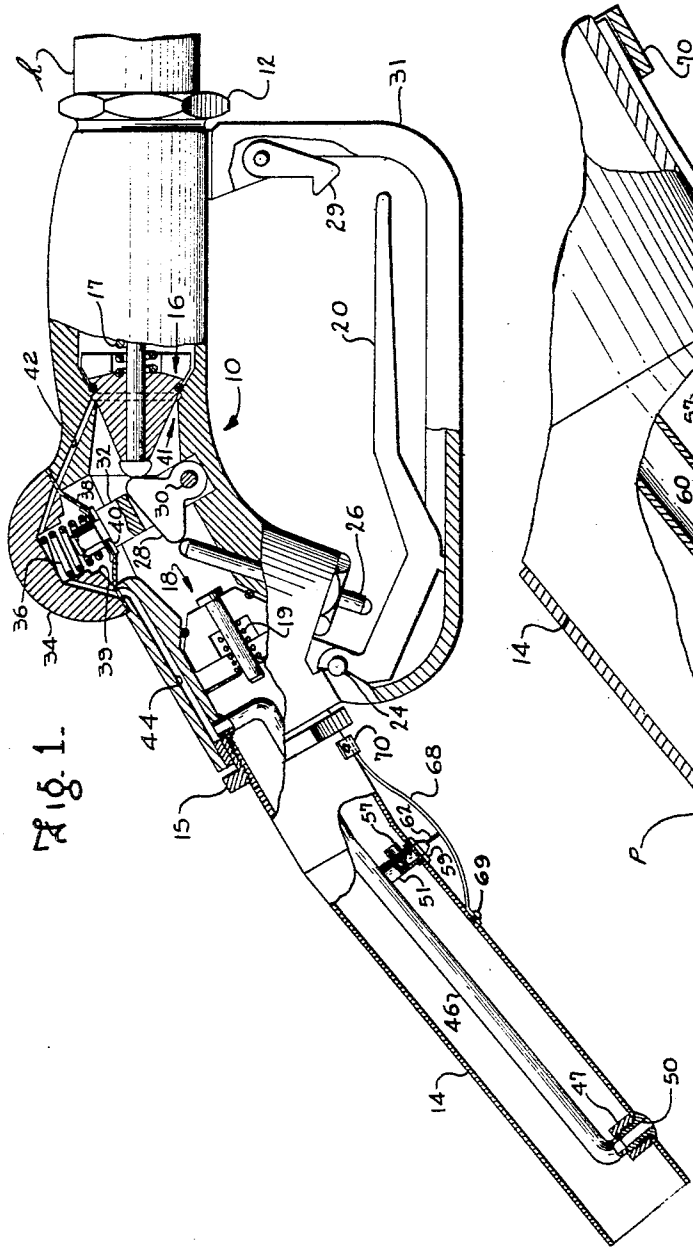

FIG. 1.

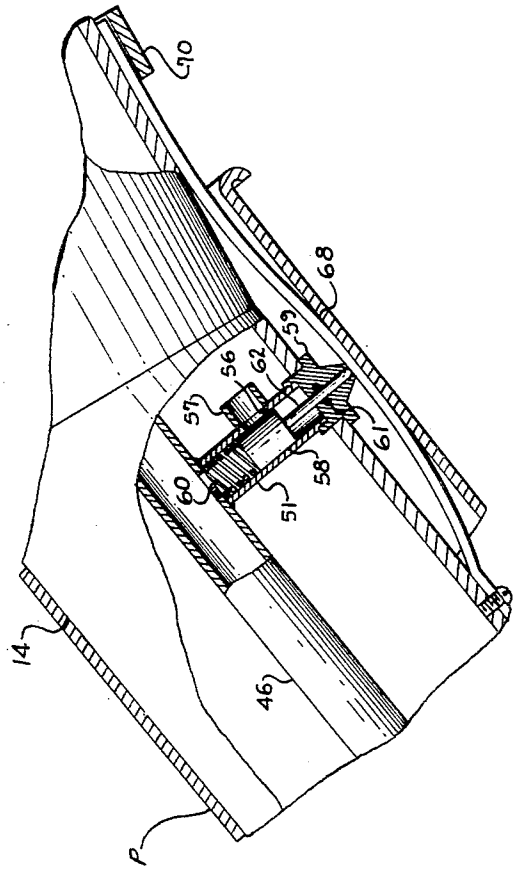

FIG. 2.

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GASOLINE DISPENSING NOZZLES

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6 Claims. (Cl. 141—208)

The present invention relates to liquid dispensing nozzles for gasoline and the like and more particularly it relates to improvements in nozzles of the type wherein the nozzle is locked in an open position with automatic means being provided to shut the nozzle off in the absence of an operator.

A wide variety of nozzles of this type are available with vacuum actuated automatic shut-off means and are extensively used for dispensing gasoline to enable the attendant to perform other duties with the assurance that the gasoline will not overflow. However, a danger exists in using these nozzles in that should the nozzle fall, be knocked or inadvertently removed from a gasoline tank fill pipe with the nozzle locked open there is great danger of substantial gasoline spillage which would create a serious fire or explosion hazard.

There are, at the present time, safety devices available which prevent gasoline spillage under the circumstances described. These devices are, in one way or another based on a secondary control including an air seal for the vacuum shut-off means which is actuated by means responsive to proper insertion of the nozzle in a fill pipe. While these safety devices are theoretically quite workable, air seals are difficult to maintain and break down after a relatively small amount of wear. Thus safety devices dependent on air seals are lacking in a long wear life and in most cases failure of the air seal results in failure of the safety device in a manner not detectable to the operator.

It is therefore the object of this invention to provide a liquid dispensing nozzle having improved safety means for automatically shutting off the flow of liquid upon withdrawal of the nozzle from the fill pipe of a container, and in so doing to overcome some of the difficulties inherent in presently available safety devices.

A characteristic feature of the invention is found in the use of a liquid seal in a secondary safety control for vacuum actuated shut-off means of nozzles of the type referred to, such liquid seal being relatively unaffected by wear of any moving parts and in the case of wear the liquid seal means are arranged to "fail safe" that is if the safety means of the present invention fail from wear, the nozzle is rendered inoperative so that the operator is cognizant of the safety device's failure.

The above and other related objects of this invention will be apparent from the following specification.

In the drawings which are part of this specification:

Fig. 1 is a side elevation and partially in longitudinal section of a dispenisng nozzle embodying the present invention; and

Fig. 2 is a fragmentary view, on an enlarged scale, of a portion of Fig. 1, partially in section, showing details of the safety means of this invention.

The nozzle to be described may best be seen in Fig. 1 of the drawings. Certain constructional details thereof are identical with the disclosure seen in Fig. 8 of U.S. Patent No. 2,786,493, and reference is made thereto if

any further information is necessary or desirable beyond the following brief description.

The nozzle comprises a hollow body **10** having a nut **12** threaded into one end thereof for attachment of a delivery hose *h*. A spout **14** is threaded into the other end of the body **10** with a lock nut **15** maintaining it in its assembled position as shown in Fig. 1. The hollow body **10** provides a passageway for the flow of gasoline from the delivery hose to the spout **14** as controlled by a valve **16**. Valve **16** is seated in the body passageway by a coil spring **17** normally preventing gasoline flow therethrough. Check valve **18** is also seated in this body passageway by coil spring **19** to prevent reverse flow of gasoline through the body passage. Valve **16** may be opened to unseated by a hand lever **20** pivoted about a pin **24**. To open the valve **16**, lever **20** is raised to engage a stem **26** slidably mounted in the body **10** with its inward end engaging rocker **28**. The lever **20** may be held in raised position by a latch **29** pivotally mounted on lever guard **31** permitting the attendant to perform other duties while gasoline is being dispensed.

The rocker **28** is pivoted about a pin **30** to engage and unseat the valve **16** permitting gasoline to flow therethrough. Pin **30** extends between bifurcated portions of a saddle **32** which is slidably mounted in the internal passageway through body **10** for movement in a direction normal thereto. A cap **34** is secured to the body **10** above saddle **32** and provides a seat for a coil spring **36** which normally holds saddle **32** in its lower position (as seen in Fig. 1). A diaphragm **38** is held in place and sealed at its marginal edge portion between cap **34** and body **10** and the edge portion of a central opening in the diaphragm **38** is sealed against a stem **40** extending upwardly from the saddle **32**. An airtight chamber **39** is thus formed between the cap **34** and the diaphragm **38**. A portion of the body passageway is concially shaped to provide a seat for valve **16** and a venturi throat at **41**. A passageway **42** is compositely formed in the body **10** and cap **34** between the venturi throat **41** and the chamber **39** and another passageway **44** is provided from chamber **39** to open into an air tube **46** which extends interiorly of and downward within the spout **14**. The lower end of tube **46** communicates with a hollow screw member **47** which provides an opening **50** through the wall of spout **14** near its lower end. Passageway **44** and tube **46** forming a suction passage from chamber **39** to the atmosphere.

When the nozzle is in use the flow of gasoline through venturi throat **41** causes a reduction of pressure at valve seat **16** and air is drawn from chamber **39**. The air in chamber **39** is maintained substantially at atmospheric pressure, however, since the chamber **39** is open or vented to the atmosphere by tube **46** and spout hole **50**. Whenever a receiving tank is being filled and liquid seals hole **50**, a vacuum or reduced pressure is created in chamber **39** allowing the fluid pressure in hollow body **10** to raise the diaphragm **38** against the force of spring **36** and thereby raising saddle **32**. Rocker arm **28** will thus be drawn upwardly allowing valve **16** to be seated by valve spring **17**, thus automatically shutting off the flow of liquid through the nozzle. Thereafter latch **29** may be pivoted to release lever **20**, spring **36** will then lower saddle **32** to its illustrated force transmitting position and the nozzle will again be ready for use.

The safety device of this invention is best seen in the enlarged showing of Fig. 2. The device comprises a short tube or cylinder **51** mounted interiorly of the nozzle spout **14** secured at one end to air tube **46** as by brazing or the like. The air tube **46** is suitably apertured to communicate with the interior of cylinder **51**. Cylinder **51** is itself apertured intermediate its length at **56** with a shroud **57** surrounding the aperture and di-

rected upstream of fluid flow through the spout. The cylinder 51 thus provides for communication between the suction passageway tube 46 and the interior of spout 14 through aperture 56. A piston 58 is slidable within cylinder 51 and is urged towards the outer or normal position shown in Fig. 1 by a coil spring 60. It will be noted that the aperture in tube 46 is somewhat less than the bore of cylinder 51 thus providing a seat for spring 60. A piston rod 62 extends from the outer end of piston 58 through and beyond a plug or bushing 59 and terminates exteriorly of spout 14. It will be seen that plug 59 is threaded onto the outer end of cylinder 51 and is flanged to bear against the spout 14 to provide a liquid seal at this point. Further, an O ring 61 surrounds the piston rod 62 to prevent leakage therearound as it passes through the plug 59. The terminal end of rod 62 engages an arcuate central portion of a leaf spring 68 which is secured at one end to the spout 14 by a screw 69. The other end of spring 68 is slidably received within a channel member 70 also secured to spout 14.

When the spout 14 is inserted downwardly into a fill pipe P as in Fig. 2 piston 58 is displaced inwardly to seal off the aperture 56 either by the weight of the nozzle bearing against the upper edge of the fill pipe or the wedging action resulting from the spout 14 and leaf spring 68 being snugly held in the opening through the fill pipe. More particularly leaf spring 68 is progressively flattened during insertion to force piston rod 62 and piston 58 inwardly against the action of coil spring 60 to close aperture 56. With piston 58 in this position the air tube 46 is opened to the atmosphere through opening 50 at the lower end of spout 14 and the nozzle operates to dispense liquid until opening 50 is closed off by the liquid in the receiving tank.

If the spout is inadvertently removed from the fill pipe P, spring 60 forces piston 58 outwardly to uncover aperture 56, leaf spring 68 being restored to its normal condition seen in Fig. 1. If liquid is being automatically discharged from the nozzle when this occurs, a portion of the liquid will enter the suction passageway tube 46 through the upwardly opening aperture 56. This liquid injected in the tube 46 will effectively block or seal chamber 39 from the atmosphere and a vacuum or reduced pressure will be created in that chamber by the action of venturi 41 causing the nozzle to be cut off in the manner heretofore described.

It will be thus noted that in this safety device a vacuum is produced in chamber 39 when air tube 46 is blocked or sealed by liquid injection, piston 58 operating for the purpose of admitting the liquid into tube 46. It is therefore apparent that since a liquid seal is created, a slightly weakened spring 60 or worn piston 58 will not prevent the operation of this safety device as long as liquid is able to enter air tube 46 through aperture 56. Further, wear is minimized by reason of the constant lubrication provided for the piston 58 by gasoline and like products flowing through the spout 14. Another point to be noted is that the present device is a "fail safe" arrangement. That is, if the piston 58 should wear and become inoperative, liquid will flow into tube 46 even when the spout is properly inserted in the fill pipe as indicated in Fig. 2. Therefore the nozzle is rendered inoperative if the safety device is not working.

Having thus described my invention, what I claim is:

1. A liquid dispensing nozzle comprising vacuum actuated shut-off means including suction passageway-forming means, said shut-off means being operative in response to said passageway means being sealed from atmosphere to automatically shut off the flow of liquid through said nozzle, and means operative in response to inadvertent removal of the nozzle from a fill pipe while liquid is being dispensed for injecting sufficient liquid into said passageway to seal same from atmosphere and thereby actuate said automatic shut-off means.

2. A liquid dispensing nozzle having a discharge spout and comprising vacuum actuated shut-off means having suction passage-forming means including a tube extending longitudinally of said discharge spout and opening adjacent the lower end of said discharge spout, said shut-off means being operative in response to said passageway means being sealed from atmosphere to automatically shut off the flow of liquid through said nozzle and means operative in response to inadvertent removal of the nozzle from a fill pipe while liquid is being dispensed for injecting sufficient liquid in said tube to seal said passageway means from atmosphere and thereby actuate said automatic shut-off means.

3. A liquid dispensing nozzle having a discharge spout and comprising vacuum actuating shut-off means having suction passageway-forming means including a tube extending longitudinally of said discharge spout and opening adjacent the lower end of said discharge spout, said shut-off means being operative in response to said passageway means being sealed from atmosphere to automatically shut off the flow of liquid through said nozzle and means disposed adjacent the upper end of said spout for creating a liquid seal in said tube to seal the passageway means from atmosphere and thus actuate said automatic means, said last-named means including means normally biased to permit liquid to flow from said spout to said tube and thus create said liquid seal and displaceable upon proper insertion into a fill pipe to prevent the liquid seal from being created and thereby permitting normal operation of the properly inserted nozzle.

4. A liquid dispensing nozzle having a discharge spout and comprising vacuum actuated shut-off means having suction passageway-forming means including a tube extending longitudinally of said discharge spout and opening adjacent the lower end of said discharge spout, said shut-off means being operative in response to said passageway means being sealed from atmosphere to automatically shut off the flow of liquid through said nozzle means providing communication between the interior of said spout and said tube, and valve means movable to seal off said last-named means and prevent communication between said tube and said spout, spring means normally urging said valve means to a position permitting such communication and means responsive to proper insertion of the spout in a fill pipe for displacing said valve to seal off said communication means whereby the nozzle will operate in a normal manner to dispense liquid and if inadvertently removed from the fill pipe, the valve means will be automatically moved by said spring means to permit flow of liquid into said tube thereby sealing off said shut-off means from atmosphere and stopping the flow of liquid.

5. A liquid dispensing nozzle having a discharge spout and comprising vacuum actuated shut-off means having suction passageway-forming means including a tube extending longitudinally of said discharge spout and opening adjacent the lower end of said discharge spout, said shut-off means being operative in response to said passageway means being sealed from atmosphere to automatically shut off the flow of liquid through said nozzle, a cylinder communicating at one end into said tube and secured at its other end to said spout, said cylinder having an opening intermediate its length whereby the interior of said nozzle may be placed in communcation with said tube, a valve piston slidable in said chamber between a normal position outwardly of said cylinder opening and an operative position wherein said valve seals off said opening preventing communication between said spout and said tube, spring means biasing said valve to its normal position and means responsive to proper positioning of said spout in a fill pipe for displacing said valve to its operative position whereby a properly inserted nozzle may be operated to dispense liquid and upon removal while liquid is being dispensed liquid will flow from said spout into said tube to provide a liquid seal between said passageway-forming means and atmos-

phere to thus automatically actuate said shut-off means.

6. A liquid dispensing nozzle as in claim 5 wherein the means responsive to proper insertion of the spout in the fill pipe comprise a stem extending from said valve piston through the wall of said spout and outwardly thereof and a deflectable leaf spring secured to the spout at a point spaced downwardly from said stem and arcuately passing over said stem, the upper end of said leaf spring being slidably captured at a point above said stem.

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