United States Patent

[11] 3,589,413

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[21] Appl. No. **871,069**
[22] Filed **June 19, 1969**
Division of Ser. No. 671,742, Sept. 29, 1967, Pat. No. 3,520,338.
[45] Patented **June 29, 1971**
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[54] **AUTOMATIC LIQUID DISPENSING NOZZLE**
1 Claim, 7 Drawing Figs.

[52] **U.S. Cl.** **141/128,** 141/206, 251/284
[51] **Int. Cl.** **B65b 3/24,** B67d 5/28, B67d 5/372
[50] **Field of Search** ..... 141/128, 192—229, 392; 251/109, 284

[56] **References Cited**
UNITED STATES PATENTS
3,020,940 2/1962 Sutcliffe et al. ..... 141/225 X

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Attorneys—K. E. Kavanagh and Thomas H. Whaley

ABSTRACT: An automatic liquid dispensing nozzle wherein a lever, used to activate a control valve and regulate the rate of flow therethrough, is engaged by a holding means against the control valve, being released therefrom by automatic means upon the liquid being dispensed reaching a predetermined level, and subsequently being engaged by manual operation against a restraining member which permits the filling operation to be completed at a predetermined low rate of flow.

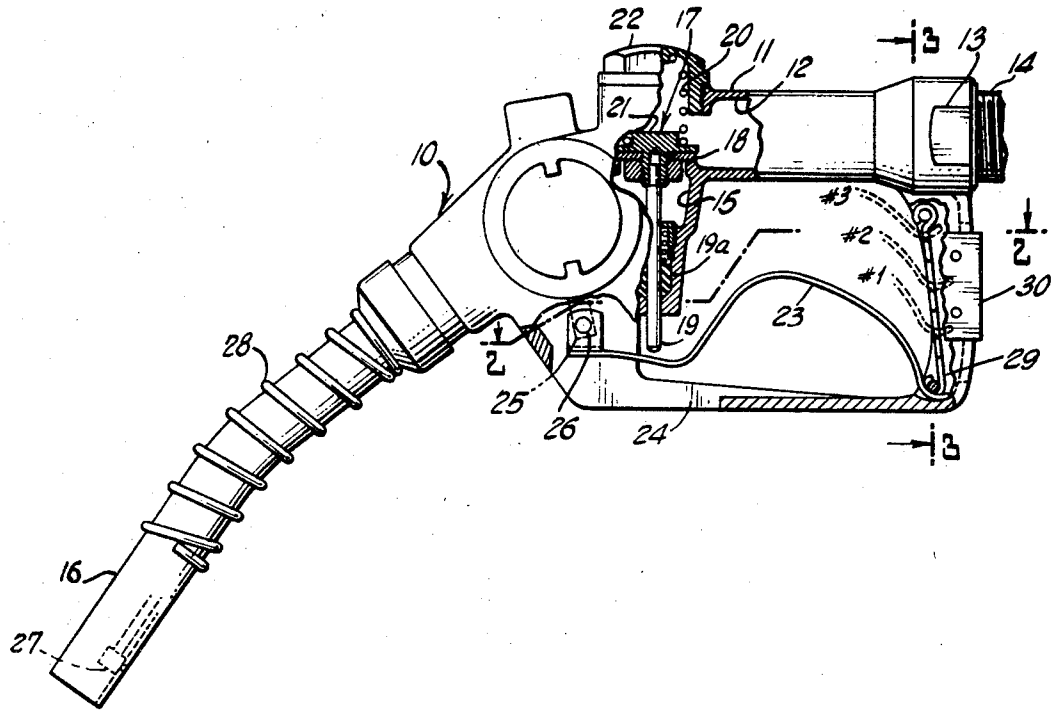


Fig. 1.

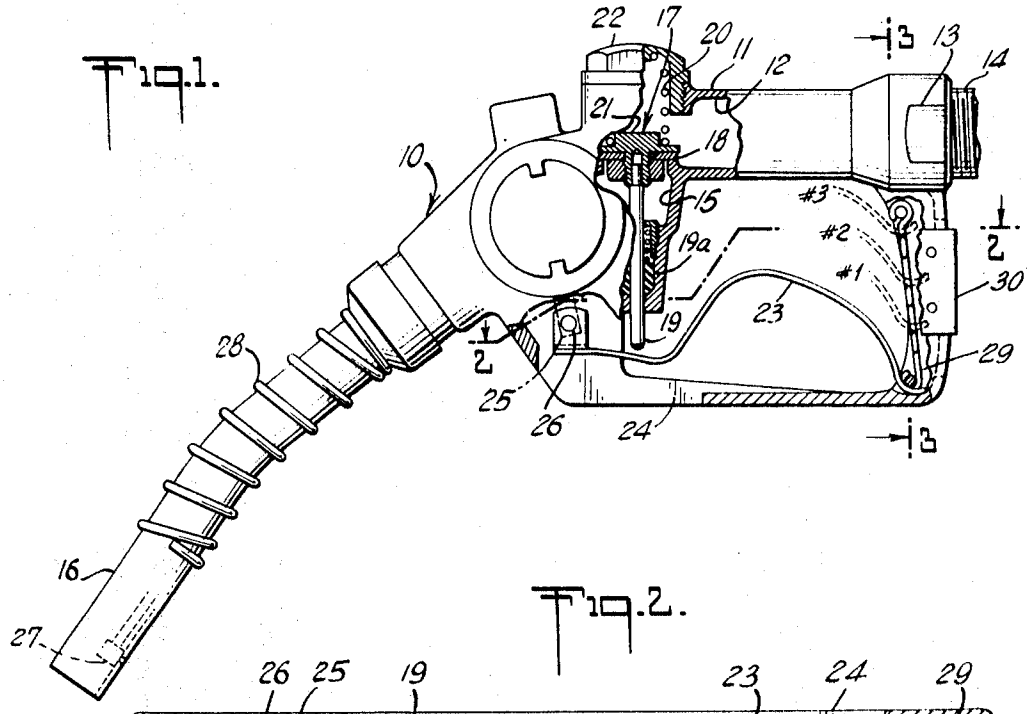


Fig. 2.

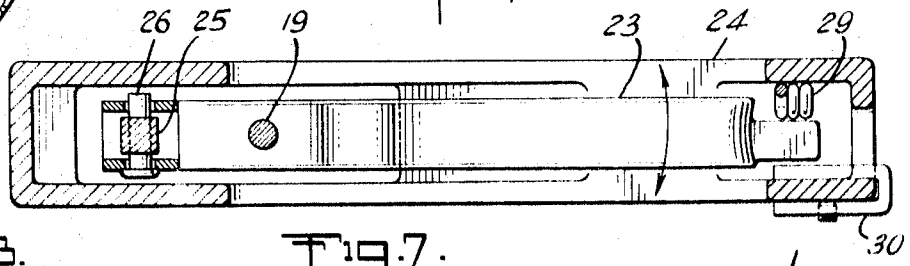


Fig. 3.

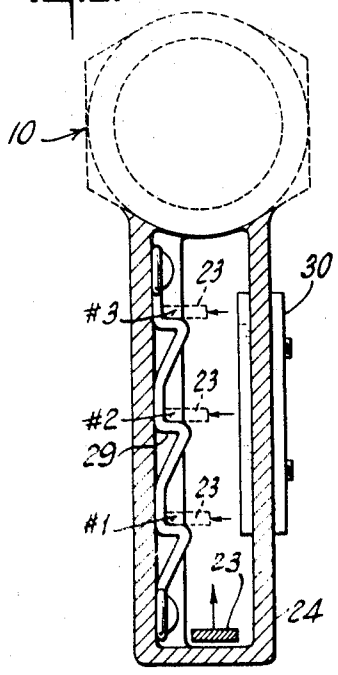


Fig. 7.

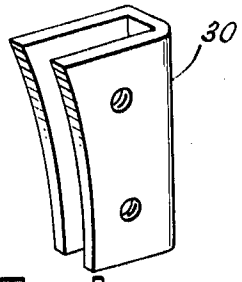


Fig. 4.

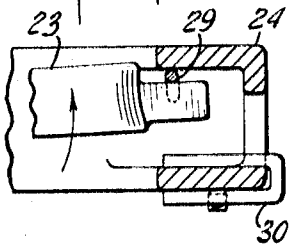


Fig. 6.

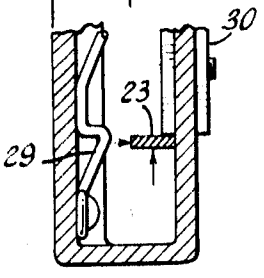
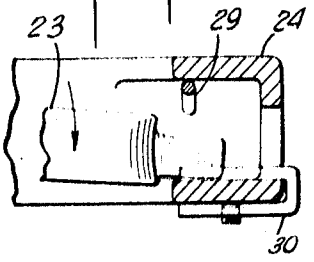


Fig. 5.



AUTOMATIC LIQUID DISPENSING NOZZLE

This is a division of Ser. No. 671,742 filed Sept. 29, 1967.

BACKGROUND OF THE INVENTION

This invention relates generally to a method of and apparatus for dispensing a liquid into a receptacle and more specifically to one wherein the initial filling operation is accomplished by automatic means at a high rate of flow and the final filling operation is accomplished at a predetermined low flow rate, thereby allowing the receptacle to be substantially filled with little probability of overflow or spillage.

The usage of automatic dispensing nozzles at gasoline service stations has greatly decreased the time required to adequately service an automobile, since the station attendant is now free to perform other services while the gasoline tank is being filled. A variety of automatic dispensing nozzles are presently known and utilized in the art, with nozzles of this general variety being described in U.S. Pat. Nos. 2,528,747, 2,582,195 and 3,196,908, the disclosures of which are incorporated herein by this reference thereto.

In the operation of nozzles of this type, after the automatic tank filling operation is completed, usually a significant unfilled volume remains in the average automobile tank. Service station attendants, generally, then manually engage the lever against the nozzle control valve in order to discharge the amount of liquid necessary to fill the tank as completely as possible. This final operation is accomplished most effectively at a relatively low flow rate. It is difficult, however, for the attendant to manually position and retain the lever against the control valve in the optimum position and complete the operation without some overflow or spillage. To eliminate this problem, a novel device has been developed for restricting the movement of the lever, thereby enabling the tank filling operation to be completed at a predetermined low rate of flow, thereby reducing, if not eliminating for all practical purposes, the chances of wasteful and dangerous spillage of gasoline.

SUMMARY OF THE INVENTION

The invention herein disclosed provides a holding means for engaging a lever against a nozzle control valve, thereby permitting the discharge of fluid into a receptacle, without the necessity for an attendant to operate the apparatus. When the liquid reaches a predetermined level in the receptacle and contact means provided in the nozzle, the lever is disengaged from the holding means and the control valve is rendered inoperative. Means are provided for completing the filling of the receptacle at a low rate of flow by engaging the lever against a restraining member which restricts the opening of the nozzle control valve.

The principal advantage made possible by the use of this invention over prior art methods is that the tank may be substantially filled without the familiar overflow or spillage. When the attendant attempts to complete the filling of the tank by means disclosed in the prior art, opening of the control valve too much causes the fluid to be discharged at a high flow rate and almost immediately results in backup and overflow. As a result, either the customer is inadequately serviced in that the tank is not completely filled and/or an unwanted amount of the fluid overflows. With the apparatus herein disclosed, a substantially full tank of gasoline is provided the consumer without any undesirable overflow and spillage during normal operation.

Accordingly, it is a primary object of this invention to provide a simple and reliable apparatus to dispense liquid into a receptacle which reduces the danger of spillage.

A further object of this invention is to provide a novel method wherein liquid is dispensed into the receptacle at a predetermined low flow rate during the completion of the receptacle filling operation.

These and other objects, advantages and features of the invention will become more apparent from the following description taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevation, partly in cross section, of a liquid dispensing nozzle with the fixed restraining member for the operating lever;

FIG. 2 is a plan view of the nozzle with the fixed restraining member taken approximately along line 2–2 of FIG. 1;

FIG. 3 is an end elevation view of the nozzle with a fixed restraining member taken approximately along line 3–3 of FIG. 1;

FIG. 4 is a fragmentary plan view showing the operating lever position during the automatic filling operation;

FIG. 5 is a fragmentary plan view showing the operating lever engaging the restraining member;

FIG. 6 is a fragmentary end elevation view taken in the direction of line 3–3 of FIG. 1 showing the lever engaging the restraining member;

FIG. 7 is an isometric view of the restraining member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, the liquid dispensing nozzle, indicated generally at **10**, comprises a main nozzle body **11** having a liquid conduit **12** therethrough. At the rearward end of the nozzle **10**, is a threaded inlet fitting **13**, which provides a means for connection to a hose **14**. The hose **14** is connected to a pump in communication with the source, e.g. an underground tank, of the liquid to be dispensed. The liquid passes through the liquid conduit **12** to the cavity indicated at **15** and then through the spout **16** at the forward end of the nozzle. A control valve **17** is interposed between the liquid conduit **12** and the cavity **15** in order to regulate the amount of liquid flow. The control valve **17**, comprises a valve seat indicated at **18**, with the opening and closing being regulated by the actuating rod **19**. A spring **20**, seated on valve member **21** and having its upward end bearing against a cap **22**, provides the self-closing mechanism for the valve assembly. Cap **22** is provided to facilitate easy removal and repair of the control valve **17**. The actuating rod **19** is engaged by an operating lever **23** and provides the means for controlling the rate of liquid flow through the nozzle. A sealing member **19*a*** is spaced about actuating rod **19** to preclude any liquid leakage therethrough.

Accidental engagement of the actuating rod **19** by the operating lever **23** is prevented by means of a lever guard **24**, which generally is an integral part of the main nozzle body **11**. The operating lever **23** is fulcrumed to a release plunger **25** which provides a means for releasing the operating lever **23** from the actuating rod **19** when the dispensed liquid reaches a predetermined level. During the filling operation, when the liquid contacts the opening **27** of a control fitting located near the discharge end of the spout **16**, a diaphragm (herein not shown but disclosed in U.S. Pat. No. 3,196,908) is actuated, which thereby releases the plunger **25** and returns the operating lever **23** to the off position. Nozzle **10** may be provided further with a buffer spring **28** which engages the tank opening in the automobile and prevents the nozzle from inadvertently being jarred loose from the tank. The foregoing description of the operation of an automatic dispensing nozzle is abbreviated and for a more detailed description thereof, reference is made to the aforementioned U.S. patents

Referring to FIGS. 1 to 6 inclusive, wherein one embodiment of the invention is illustrated, a latch member **29** is mounted in the back opening of the lever guard **24**. The latch member **29** is formed from a springlike material and provides a plurality of positions for engaging the operating lever **23**, thereby holding the actuating rod **19** in the open position. As indicated in the drawing, latch member **29** provides three positions for engaging the lever **23**, each of which allows a different flow rate. Upon the liquid reaching a predetermined level in the tank, release plunger **25** is actuated by a

diaphragm, as previously described, lowering the forward end of the operating lever **23** sufficiently to cause the control valve **17** to return to the closed position and terminate the flow through the nozzle. This action also generally releases the operating lever with a force sufficient to disengage it from the latch member **29**.

Restraining member **30** is attached fixedly to the back portion of the lever guard **24**. As illustrated in FIG. **7**, the restraining member **30** comprises a U-shaped bracket with mounting holes therein, which permits fastening to a side leg of the lever guard **24**.

For the automatic filling phase of the automobile tank, the lever **23** is engaged with the latch member **29** by the attendant with an upward force in any one of the numbered positions as indicated in FIGS. **1** and **3**. The numbered position to be engaged is determined by the attendant in considering the type of automobile to be filled and the desired rate of flow to be utilized. Position No. 1 opens the valve seat **18** the least, thereby permitting the lowest rate of flow, while the higher numbered positions open the valve seat **18** to a greater degree and thereby permit higher flow rates.

As illustrated in FIG. **2**, the lever **23** is fulcrumed to the pivot pin **26** with a loose fit in order to permit a sufficient transverse motion of the lever such that it is capable of engaging either the latch member **29** or the restraining member **30**. FIG. **4**, illustrates (by the arrow) the operating lever **23** being moved with a transverse motion to engage the latch member **29**. Once the tank has been substantially filled and the liquid dispensed into the tank contacts the opening **27** at the end of the nozzle **10**, the automatic cutoff means terminates the liquid flow through the nozzle. The lever **23** is returned to the off position and the automatic filling phase of the tank is completed. The attendant then engages the lever **23** with an upward and transverse motion, as indicated by the arrow in FIG. **5**, thereby contacting the lever **23** against the restraining member **30**, as shown in FIGS. **5** and **6**. The restraining member **30** may be positioned so that it will engage the lever **23** at any predetermined flow rate. However, it is generally desirable to provide for a low flow rate during the completion of the tank filling operation, so that the vapors in the tank are displaced at a corresponding low rate. As described previously, upon the dispensed liquid contacting the opening **27**, release plunger **25** once again disengages the lever **23** from the actuating rod **19** and thereby closes the control valve **17**. If it is found desirable by the attendant to further discharge liquid into the tank, the nozzle spout **16** may be withdrawn somewhat from the tank opening and additional liquid discharged into the tank by engaging the lever **23** by manual means against the restraining member **30**. In the event that the attendant wishes to dispense the liquid into the tank by manual means alone, the lever **23** may be engaged against the actuating rod **19** to achieve the desired flow rate without contacting either the latch member **29** or the restraining member **30**.

Thus there has been shown and described an improved method and apparatus for dispensing liquid into a receptacle whereby the receptacle is substantially filled with decreased probability of overflow or spillage.

Other modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. In the automatic shutoff liquid dispensing nozzle of the type having a main body with a liquid conduit therein and a self-closing valve for controlling the rate of liquid flow through said conduit, a hand operated lever movable about a fulcrum in a direction for opening said valve, means for holding said lever against said valve in open position during the automatic filling operation, automatic means for operatively releasing said lever from said valve to render the same inoperative, the improvement comprising means for engaging said lever for limiting the movement thereof to provide for partial opening of said valve for a low rate of liquid flow therethrough,

said last named means including a lever guard extending about and in the plane of said lever, said lever guard having an opening in one extremity through which a free end of said lever extends,

said lever guard on either side of said opening providing side legs,

said means for engaging said hand operated lever comprising a U-shaped member fixedly embracing said one of the side legs of said lever guard,

one leg of said U-shaped member extending into said opening in said lever guard and having a flat surface extending a substantial distance into said opening in the lever guard and providing a positive stop facing the free end of the lever in its said direction of movement for opening said valve, thereby to restrain said lever at said low flow position.