May 22, 1962 J. J. PACEY 3,035,615

DISPENSING NOZZLE

Filed March 11, 1958 3 Sheets-Sheet 1

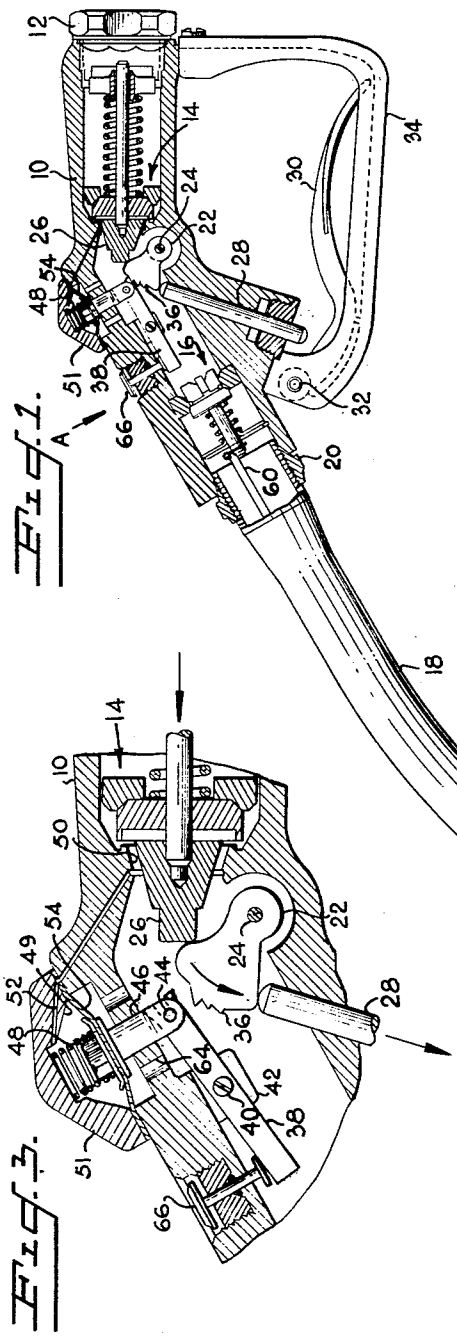


Fig. 1.

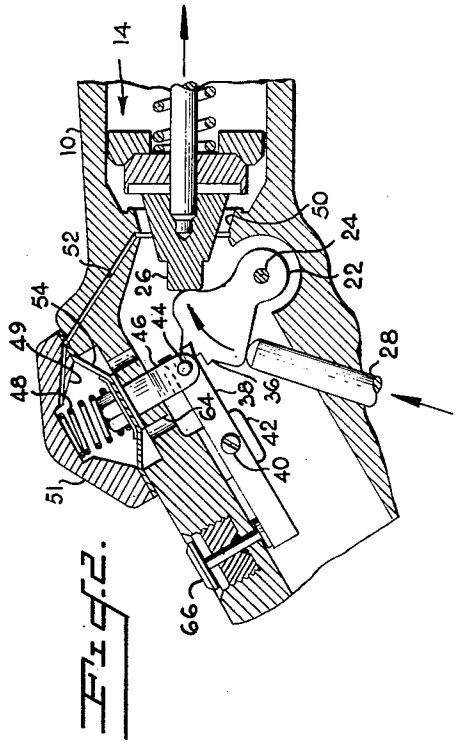


Fig. 2.



Fig. 3.

*INVENTOR.*

JOHN J. PACEY

*BY*

Chapin & Neal

ATTORNEYS

May 22, 1962 J. J. PACEY 3,035,615

DISPENSING NOZZLE

Filed March 11, 1958 3 Sheets-Sheet 2

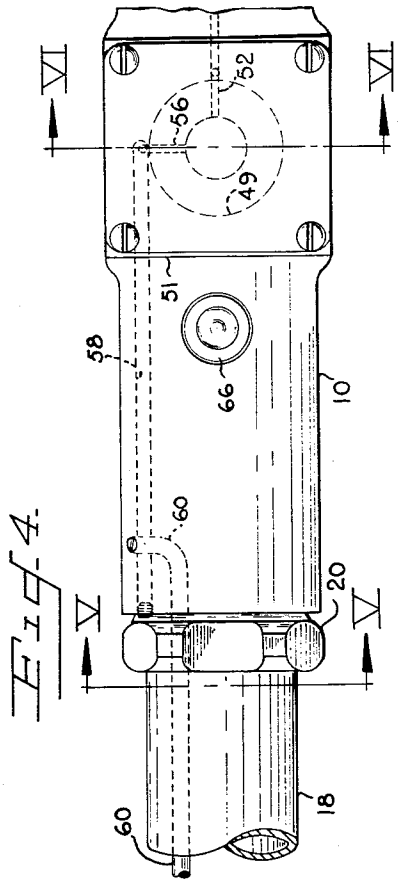



Fig. 4.

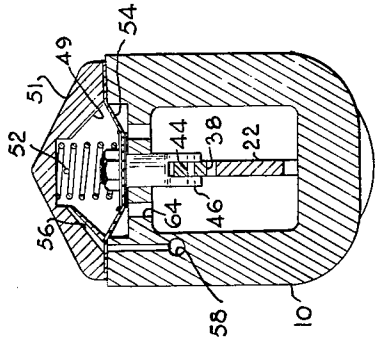



Fig. 6.

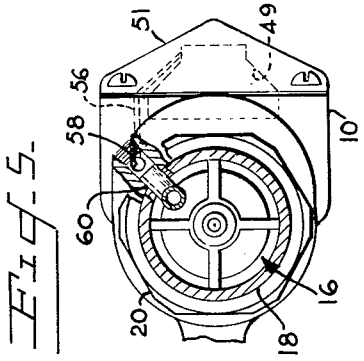



Fig. 5.

*INVENTOR.*
JOHN J. PACEY
*BY*
Chapin & Neal
ATTORNEYS

May 22, 1962 J. J. PACEY 3,035,615

DISPENSING NOZZLE

Filed March 11, 1958 3 Sheets-Sheet 3

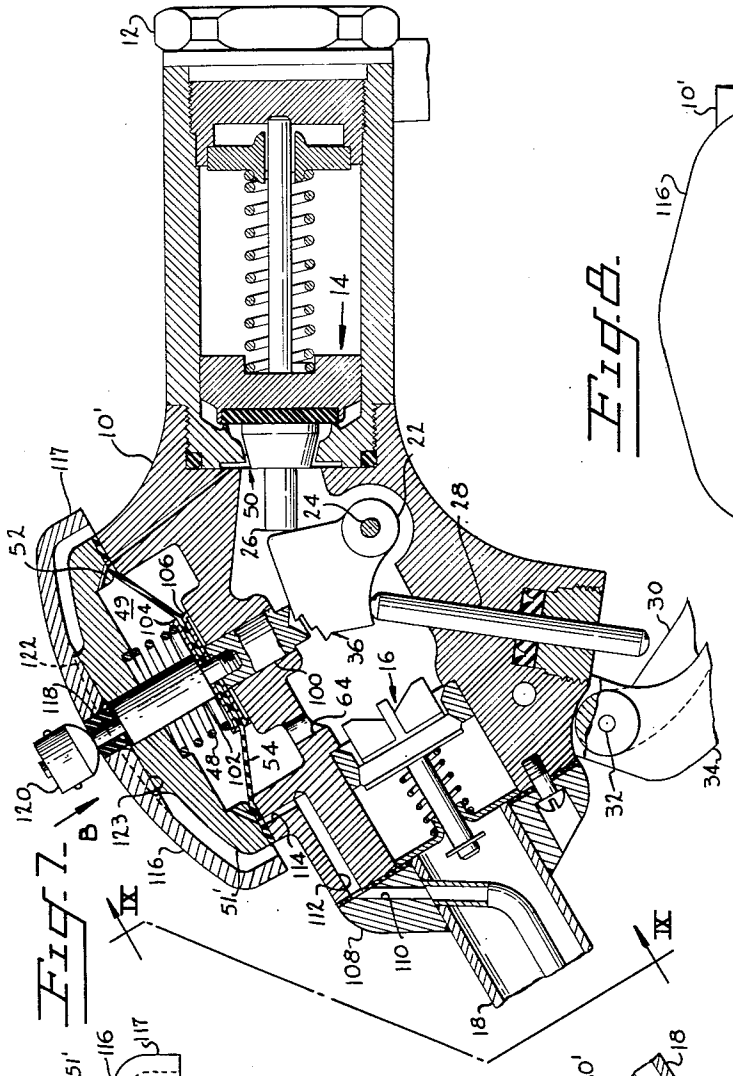



Fig. 7.

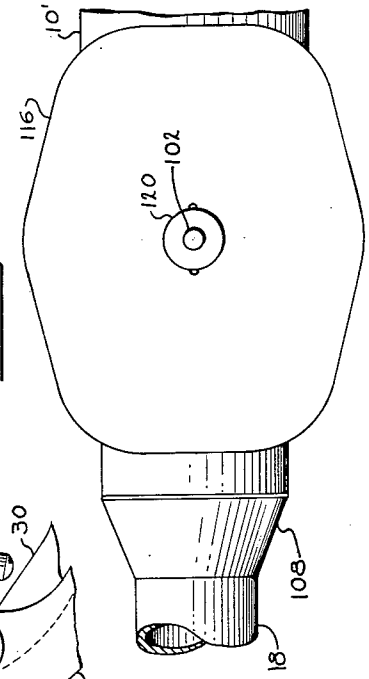



Fig. 8.

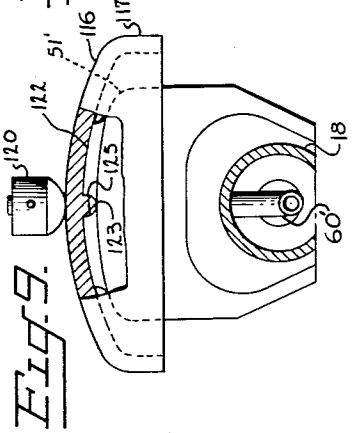
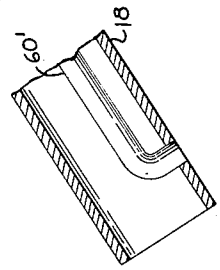



Fig. 9.




INVENTOR

JOHN J. PACEY

BY Chapin + Neal

ATTORNEYS

United States Patent Office

3,035,615
Patented May 22, 1962



3,035,615

# DISPENSING NOZZLE

John J. Pacey, Springfield, Mass., assignor to Gilbert & Barker Manufacturing Company, West Springfield, Mass., a corporation of Massachusetts

Filed Mar. 11, 1958, Ser. No. 721,329
8 Claims. (Cl. 141—209)

The present invention relates to liquid dispensing nozzles and more particularly to nozzles which may be advantageously used in the retail delivery of gasoline. The present application is a continuation in part of my previous application Serial No. 698,171, filed November 22, 1957, and now abandoned.

The primary object of the invention is to provide an improved nozzle which may aptly be described as an automatic nozzle. That is, the improved nozzle of the present invention may be inserted into the fill pipe of an automobile gasoline tank, its operating lever actuated to initiate delivery of gasoline and then released as automatic means continue the delivery of gasoline. The filling station attendant is then able to perform other services such as checking oil and water and cleaning windows. Further the attendant is free to perform such duties without worry of the gasoline overflowing since means are provided for automatically shutting off flow of gasoline when the level of gasoline in the fill pipe reaches a fixed point with respect to the outlet portion of the nozzle.

Another object of the invention is to provide improved means for shutting off flow of gasoline other than in response to the automatic means. The improved means herein disclosed are not only readily exposed for manual operation but also give assurance that the nozzle will be automatically shut off if it should fall from the fill pipe of a gas tank while gasoline is being delivered.

While reference will be made throughout the following specification to use of the present improved nozzle in delivering gasoline, it is to be understood that this nozzle has general utility in dispensing all other types of similarly fluent liquids.

Other related objects and features of the invention will be apparent from a reading of the following description of the disclosure found in the accompanying drawings and the particular novelty thereof pointed out in the appended claims.

In the drawings:

FIG. 1 is an elevation, partly in longitudinal section, of a nozzle embodying the present invention;

FIG. 2 is a fragmentary view, on an enlarged scale of valve means seen in FIG. 1 but in a different position;

FIG. 3 is a view similar to FIG. 2 showing the valve means returning to the FIG. 1 position;

FIG. 4 is a fragmentary view, on said enlarged scale, looking in the direction of arrow A in FIG. 1;

FIG. 5 is a section taken on line V—V in FIG. 4;

FIG. 6 is a section taken on line VI—VI in FIG. 4;

FIG. 7 is an elevation partly in longitudinal section of a modified embodiment of the invention;

FIG. 8 is a view looking in the direction of arrow A in FIG. 7; and

FIG. 9 is a section taken on line IX—IX in FIG. 7.

The nozzle seen in FIG. 1 greatly resembles conventional gasoline nozzles now in use from the standpoint of exterior appearance. In fact one of the features of the present invention is the ease with which existing nozzle constructions may be modified in order to obtain the other benefits of the invention, as will be more fully apparent from the following description of the constructional details thereof.



The nozzle comprises a body portion 10 having a clamp nut 12 at one end thereof to facilitate attachment of the nozzle to a flexible hose of the type conventionally provided with gasoline dispensing pumps. The body portion 10 is hollow to provide an internal passageway for the flow of gasoline therethrough as controlled by a spring urged flow valve 14 and a check valve 16, both of which are of known construction. Beyond the check valve 16, a spout 18 is threaded into the other end of the body 10 with a clamp nut 20 being provided to secure the spout in desired relation to the body portion 10.

The valve 14 is normally closed to prevent flow of gasoline through the nozzle. A rocker 22 (FIGS. 2 and 3) is pivotally mounted about a pin 24 interiorly of the body passageway and in contacting relation with an extension 26 of the valve 14. A pin 28 is slidably mounted in the body 10 and is engageable with the opposite side of the rocker 22. The pin 28 extends outwardly of the body portion 10 above an operating lever 30 which is pivotally mounted about a fixed point at 32 and is embraced by a guard 34 in conventional fashion. It will be apparent that when the lever 30 (see FIG. 1) is raised the rocker 22 will be rotated in a clockwise direction, thereby unseating and opening the valve 14 to initiate delivery of gasoline from the nozzle.

In accordance with one of the features of the invention ratchet teeth 36 (FIGS. 2 and 3) are formed on the upper surface of the rocker 22. A latching lever member 38 is pivotally mounted about a screw 40 which extends from an internal lug 42. One free end of the latch 38 is slotted to receive a cross pin 44 which extends between bifurcated portions of a pin 46 (see also FIG. 6). Pin 46 is slidably mounted in the body portion 10 after the fashion best seen in FIGS. 2 and 6. A spring 48 is seated against the upper end of a chamber 49 which is compositely formed by a cap 51 and the body portion 10 to which the cap is secured. The spring 48 at all times urges the pin 46 downwardly and causes the latch 38 to bear against the upper surface of rocker 22. Thus when rocker 22 is rotated, by lifting the operating lever 30, the latch 38 will be brought into engagement with one of the ratchet teeth 36 and automatically maintain the valve 14 open. The lever 30 may then be released and the attendant by fixing the nozzle spout 18 in a fill pipe is free to carry out any other services he desires during dispensing. It will be noted that the plurality of teeth 36 provided on rocker 22 enable the operator to determine the rate at which gasoline will automatically be delivered, since the valve 14 may be selectively maintained in an open position sufficient to give the desired rate of flow, all as determined by which of the teeth 36 are engaged by latch 38.

It will be seen that the internal passageway of body 10 is provided with a venturi throat at 50 (FIG. 2). Extending from this venturi throat is a passageway 52 which leads through the body portion 10 and cap 51 to the top of chamber 49. It will also be seen that the upper portion of chamber 49 is sealed off by a diaphragm 54 which is captured between the spring 48 and pin 46 with

its outer peripheral portions confined against the body **10** by cap **51**. From the chamber **49** a further passageway **56** (FIGS. 4 and 6) leads through the cap **51** and body portion **10** to a longitudinally extending passageway **58** which in turn communicates with a tube **60**. It will be seen (FIGS. 4–5) that appropriate plugs are provided to insure an air-tight connection between the champer **49** and the tube **60**. The tube **60** extends downwardly along the spout **18** and by way of the illustrated fittings terminates in an opening **62** exteriorly of and at the lower end of the spout **18**. The venturi throat **50** is thus in communication with atmosphere at a point adjacent the outlet of the nozzle (i.e. nozzle spout) by way of the suction passageway which is compositely formed of the passageways **52, 56, 58** and tube **60**.

When the valve **14** is opened and gasoline flows past the venturi throat **50** a vacuum will be created in the said suction passageway and so long as the opening **62** is open to atmosphere, air will merely be drawn into the stream of gasoline. However, when the level of gasoline in an automobile fill pipe reaches the level of the opening **62** the suction passageway will be sealed off from atmosphere and a vacuum created in this suction passageway as well as in the chamber **49**. At this point it will be noted that openings **64** are provided in the body portion **10** so that the undersurface of the diaphragm **54** is subjected to pressure of the fluid flowing through the nozzle. Then when a vacuum is created in the chamber **49**, the pressure of the gasoline on the lower surface of the diaphragm **54** will overcome the force of spring **48** due to the reduced pressure on the upper surface of the diaphragm. The latch **38** will thus be raised out of engagement with the ratchet teeth **36**. When the latch is so raised the spring urged valve **14** will automatically close, moving the rocker **22** in a counterclockwise position and displacing pin **28** outwardly of the body portion **10** in readiness for a subsequent dispensing operation of the nozzle. It will, of course, be appreciated that at this time hand lever **38** has been released.

The operation of the present nozzle is itself extremely simple. It is merely necessary for the filling station attendant to insert the nozzle in the fill tank of the automobile, raise and then release the lever **30**. Gasoline is automatically delivered as latch **38** cooperating with the teeth **36** maintains valve **14** open (FIG. 2). When the tank is full as evidenced by gasoline covering the opening **62** and thus sealing off the suction passage and chamber **49** from atmosphere, the above described action of the diaphragm under a vacuum condition in the chamber automatically releases latch **38**. Valve **14** will close and shut off further flow of gasoline before spilling over the edge of a fill pipe.

For obvious reasons an operator may desire to stop flow of gasoline at any time. In order to maintain control of dispensing the automatic delivery of the present nozzle is under the manual control of an operator. A headed plunger **66** is slidably mounted in body portion **10** above the other free end of latch member **38**. A simple depression of plunger **66** (as in FIG. 3) will raise latch **38** out of engagement with rocker teeth **36**. Thus the operator may control delivery of any specified amount of gasoline.

FIGS. 7, 8 and 9 illustrate an alternate embodiment of the invention comprising other novel features. This alternate arrangement includes many elements which are equivalent if not identical with elements previously described and such elements shall be identified by like reference characters without any detailed description necessarily being given thereof, where substantial changes have been made in a given equivalent element, primed reference characters are used.

As will be seen the body **10'** is, for manufacturing convenience, of a two-part construction and considerably shorter in length by reason the more compact means for locking the rocker **22** in a position to maintain the valve



**14** in an open position. These locking means include a plunger **100** slidably mounted in the body portion **10'** and threaded onto an upper extension **102** which extends through the chamber **49** and beyond the outer surface of cap **51'**.

Spring **48** bears against a washer **104** which in turn clamps the central portion of diaphragm **54** against a second washer **106** by reason of the force applied in threading the plunger **100** onto the extension **102**. It will be seen that the plunger **100** is thus yieldingly maintained in engagement with the upper surface of rocker **22**, with the conical relief in the outer end of the plunger **100** providing clearance for the ratchet teeth **36**.

With this arrangement the nozzle is actuated in the same fashion as previously described. That is, the lever **30** may be raised to cause the rocker **22** to pivot about pin **24** and open valve **14**. The rocker **22** will be automatically latched by plunger **100** to hold the valve open, permitting the operating lever **30** to be released as before.

A suction passageway is again provided between the venturi **50** at valve **14** and the discharge end of the spout **18**. The only substantial change in this passageway being the interconnection between the upper end of tube **60** and chamber **49**. As shown in FIG. 7 the spout **18** is brazed to a flange **108** secured to the front end of the nozzle body **10'**. The tube **60'** communicates with a passageway **110** in the flange **108** which in turn is connected to passageways **112, 114** through the diaphgram **54** into the upper portion of chamber **49**.

The plunger **100**, as was also true regarding latch **38** (FIGS. 1–3), will be maintained in engagement with the ratchet teeth **36** so long as the lower end of tube **60'** is vented to atmosphere. When the lower end of tube **60'** is sealed off as by gasoline rising in the fill pipe of an automobile, a vacuum will be created in the chamber **49** and the pressure of the gasoline (by way of hole **64**) on the lower side of diaphragm **54** is then sufficient to raise plunger **100** out of engagement with teeth **36** thus permitting the valve **14** to automatically close.

A further feature of the invention is found in a second means for disengaging the plunger **100** from the teeth **36**. A dome or cap **116** having a depending skirt **117** is rockingly mounted on a reduced outer diameter of the plunger extension **102** by way of a rubber combination bushing and seal **118**. The dome **116** is held onto the plunger extension by a stop **120** pinned to said reduced diameter and provided with a spherical end engaging the dome **116** or combination bushing and seal **118**. The dome itself rests on a raised surface or land **122** formed on the cap **51'** and overhangs for considerable distance therebeyond throughout its peripheral extent. Since the dome **116** and skirt **117** are non-circular in outline, ribs **123** are provided on the undersurface of the dome and received by grooves **125** formed in the raised surface **122** (see also FIG. 9).

It will be apparent that the dome **116** may be manually rocked by pressing on any outer portion thereof preferably at some marginal edge portion. In so rocking the dome **116**, the plunger **100** will be raised as the dome pivots about an edge of the raised surface **122**. The plunger **100** will be brought out of engagement with the ratchet teeth **36** permitting the valve **14** to close when desired.

The dome **116** serves another function in providing safety means for automatically shutting off the valve **14** in the event that the nozzle should fall to the ground when the valve **14** is automatically held open by the plunger **100** engaging the ratchet teeth **36** of rocker **22**. The dome **116** is disposed (see also FIGS. 8 and 9) so that in any normal position which the nozzle might assume on a substantially flat surface, the weight of the nozzle will be sufficient either alone or combined with an impact effect to rock the dome **116** as it engages the surface, the rocking movement of the dome again causing the

valve 14 to close automatically and prevent spillage of gasoline.

Having thus described the invention what is claimed as novel and desired to be secured by Letters Patent of the United States is:

1. A liquid dispensing nozzle comprising a body portion having a passageway therethrough, a nozzle spout communicating with said body passageway and providing a discharge outlet for the liquid, a valve seated in said body passageway with spring means normally maintaining the valve in a closed position, a rocker pivotally mounted within said body and movable to open said valve, a rod slidably mounted in said body and engageable with said rocker to so move said valve, a hand lever pivotally mounted on said body engaging said rod and movable to effect opening of said valve, said rocker having a plurality of ratchet teeth formed on its upper surface, a pivotally mounted latch having one end disposed above said rocker, spring means urging said latch end into engagement with said teeth and comprising a coil spring disposed in a chamber above said latch, whereby the valve will be maintained in an open position by engagement of the latch with one of said teeth when the valve has been opened by movement of said hand lever, said latch having a second free end on the opposite side of its pivotal mounting, a push button plunger mounted in said body above said second free end and accessible for manual depression to raise the latch from said rocker and permit the valve to be closed whenever desired, a diaphragm sealing off the lower end of said spring containing chamber with said spring bearing against the upper surface of the diaphragm and with the lower surface of said diaphragm exposed to the pressure of the liquid in said body passageway, said body passageway having a venturi throat, a suction passageway extending from said venturi throat and communicating with said chamber and opening on the exterior of the nozzle spout at a point adjacent the lower end of said spout whereby when said suction passageway is closed off the suction created in said chamber by liquid flow past said venturi throat will reduce the pressure on the upper surface of said diaphragm and the liquid pressure on the lower surface of said diaphragm will overcome the force of said spring to raise the latch away from said rocker, thus permitting said valve to automatically seat and shut off further flow of liquid.

2. A liquid dispensing nozzle comprising a body portion having a passageway therethrough, a nozzle spout communicating with said body passageway and providing a discharge outlet for the liquid, a valve seated in said body passageway with spring means normally maintaining the valve in a closed position, a rocker pivotally mounted within said body and movable to open said valve, a rod slidably mounted in said body and engageable with said rocker to so move said valve, a hand lever pivotally mounted on said body engaging said rod and movable to effect opening of said valve, said rocker having at least one ratchet tooth formed on its upper surface, a pivotally mounted latch having one end disposed above said rocker, spring means urging said latch end into engagement with the toothed upper surface of said rocker and comprising a coil spring disposed in a chamber above said latch, whereby the valve will be maintained in an open position by engagement of the latch with said tooth once the valve has been opened by movement of said hand lever, a diaphragm sealing off the lower end of said chamber with said spring bearing against the upper surface of the diaphragm and with the lower surface of said diaphragm being exposed to the pressure of the liquid in said body passageway and the upper surface of the diaphragm being under urging of said spring, said body passageway having a venturi throat, a suction passageway extending from said venturi throat and communicating with said chamber and opening on the exterior of the nozzle spout at a point adjacent the lower end of said spout whereby when said suction passageway is closed off the suction created in said chamber by liquid flow past said venturi throat will reduce the pressure on the upper surface of said diaphragm and the liqiud pressure on the lower surface of said diaphragm will overcome the force of said spring and raise the latch away from said rocker, thus permitting said valve to seat and shut off further flow of liquid.



3. A liquid dispensing nozzle comprising a normally closed valve for controlling liquid flow, a body housing said valve, a rocker pivotally mounted within and on said body and engageable with the valve to open said valve, manually operated means engageable with said rocker to cause said rocker to open said valve, said rocker having teeth formed outwardly of said pivotal mounting, a plunger slidably mounted in said body and yieldingly urged into engagement with said teeth whereby the rocker will be automatically maintained in a position holding said valve open, said plunger extending upwardly through the top of the nozzle body, a lever mounted on the outer end of said plunger for rocking movement relative thereto, said lever resting on and overhanging a surface on the top of said body nozzle and means on the outermost end of said plunger preventing unlimited movement of the lever relative to the plunger whereby an outer portion of the lever may be moved towards or away from the nozzle body to raise the plunger out of engagement with said rocker teeth and thereby permit said valve to close.

4. A liquid dispensing nozzle comprising a normally closed valve for controlling liquid flow, a body housing said valve, a rocker pivotally mounted within and on said body and engageable with the valve to open said valve, manually operated means engageable with said rocker to cause said rocker to open said valve, said rocker having teeth formed outwardly of said pivotal mounting, a plunger slidably mounted on said body and yieldingly urged into engagement with said teeth whereby the rocker will be automatically maintained in a position holding said valve open, said plunger extending upwardly to the top of the nozzle, a dome-shaped cap mounted on the outer end of said plunger for rocking movement relative thereto, said cap bearing against a surface on the top of said nozzle and extending substantially therebeyond throughout its peripheral extent and a stop affixed to the outermost end of said plunger and yieldably maintaining by way of said yieldably urged plunger the cap against said surface whereby pressure at any marginal edge portion of the cap in a direction towards or away from said body will rock said cap and cause said plunger to be lifted out of engagement with said rocker teeth thereby permitting said valve to close.

5. A liquid dispensing nozzle as in claim 4 wherein the plunger is formed with a reduced diameter passing through the cap and a rubber bushing is provided between said reduced diameter and said cap, and further wherein the stop is formed with a spherical end facing said cap.

6. A liquid dispensing nozzle comprising a normally closed valve for controlling liquid flow, a body housing said valve, a rocker pivotally mounted within and on said body and movable against the valve to open said valve, manually operated means engageable with said rocker to move said rocker to open said valve, means for automatically locking said rocker in a position maintaining said valve open, whereby said manually operating means may be released and means mounted on top of said nozzle and connected to said locking means, the means mounted on said nozzle being disposed to release said locking means in response to a torque exerted by the weight of the nozzle in seeking a position of stable equilibrium on a substantially flat surface.

7. A liquid dispensing nozzle comprising a normally closed valve for controlling liquid flow, a body housing said valve, a rocker pivotally mounted within and on said body and movable against said valve to open said valve, and manually operable means engageable with said rocker and movable to cause said rocker to open

said valve, means for locking said rocker in a position to hold said valve open whereby the manually operable means may be released, a spring urging said locking means into engagement with said rocker, and means engaged with said locking means and responsive to differential fluid pressure caused by the discharge end of the nozzle becoming immersed in liquid for directly moving said locking means against said spring out of locking engagement with said rocker whereby said valve will be closed shutting off the flow of liquid through said nozzle.

8. A nozzle as in claim 7 wherein the rocker includes a



plurality of teeth, any one of which is engageable by said locking means for holding said valve in any one of a plurality of open positions which determine the rate of flow through said nozzle.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,354,209 | Hammand | July 25, 1944 |
| 2,787,294 | Carriol | Apr. 2, 1957 |
| 2,811,180 | Zaugg et al. | Oct. 29, 1957 |