Aug. 6, 1963 C. S. REASBY 3,100,007

DUAL LEVEL CONTROLLED AUTOMATIC LIQUID DISPENSING NOZZLE

Filed May 1, 1961

Fig. 1.

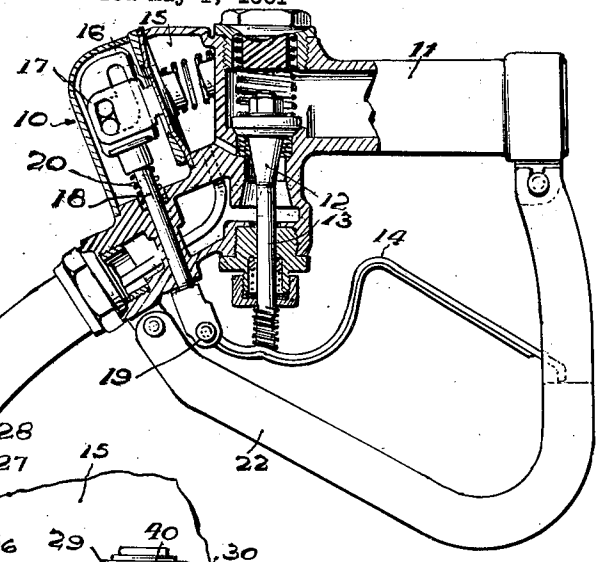
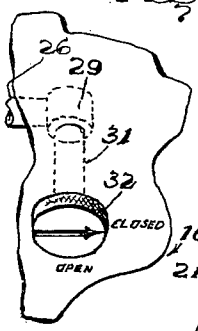


Fig. 7.



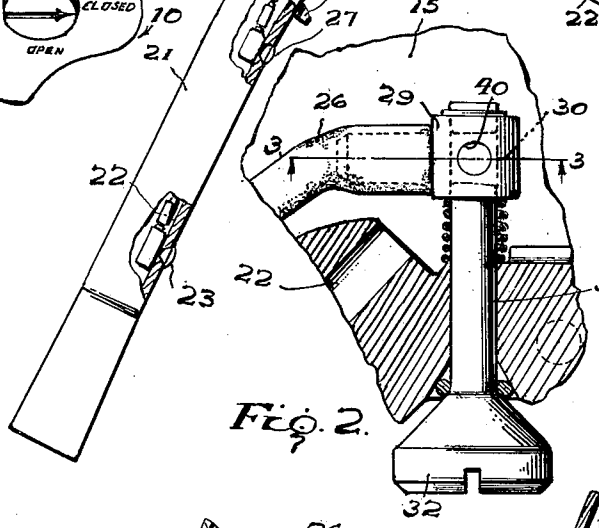
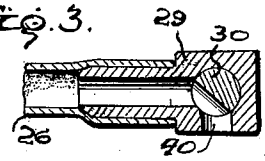


Fig. 2.

Fig. 3.



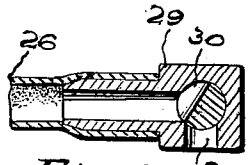


Fig. 4.

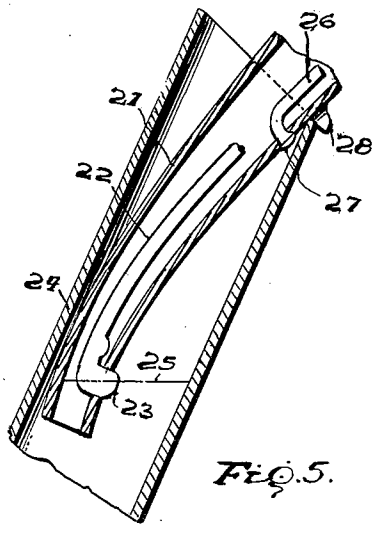


Fig. 5.

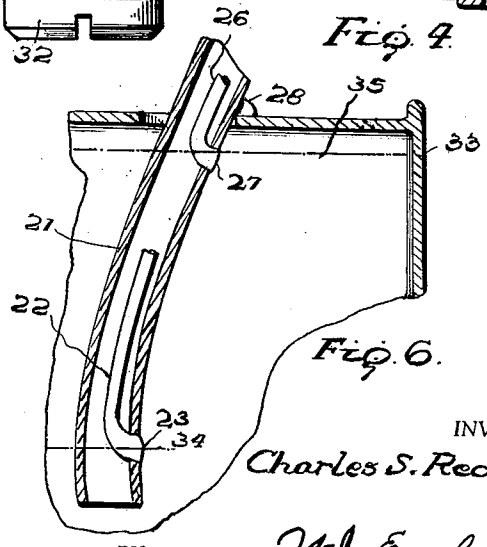


Fig. 6.

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3,100,007

DUAL LEVEL CONTROLLED AUTOMATIC LIQUID DISPENSING NOZZLE

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6 Claims. (Cl. 141—209)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The invention relates to automatic means for cutting off the flow of liquid to a liquid receptacle when the liquid reaches a given height therein. More specifically, the invention relates to automatic nozzles of the type used to supply fuel to the tanks of automotive vehicles.

Such devices are well known in the art and usually include a vacuum chamber in the nozzle and means tending to create a vacuum in said chamber upon flow of liquid into a receptacle through the spout of the nozzle. The spout includes a vacuum breaking air line for supplying air to said chamber from a point adjacent the front end of the spout. When liquid rises in the tank to a point where the front end of the air line is covered, the air supply to the vacuum chamber is cut off whereby means operated by the partial vacuum thus created closes the liquid supply valve in the nozzle in a well known manner.

When such devices are used to fill the fuel tank of an automobile the spout is inserted into the neck of the tank so that the front end of the spout and the adjacent open front end of the air line are five or six inches below the open upper end of the neck. Thus, the fuel supply will be cut off automatically only after the tank has been filled and the liquid has risen part way up the neck. Although such devices are effective enough when used as above, they are not satisfactory when used to fill receptacles which lack filler necks such as fuel drums or cans.

This last is because the spout must be inserted its full length to prevent it from falling out when unattended. This locates the open end of the air line five or six inches below the top of the drum whereby the liquid supply automatically cuts off well before the can or drum is full. This requires manual actuation of the nozzle to complete the filling of the receptacle. This objection becomes formidable when, as frequently occurs, one attendant is operating a plurality of nozzles to fill a large number of drums or cans.

With the foregoing in view, it is an object of the invention to provide an improved device of the class described which is operative to fill receptacles to a level close to the top opening irrespective of whether or not it includes a filling neck.

A further object is to provide an improved combination with a standard device of the class described of a supplementary means which enables it to be used to fill a neckless receptacle close to the top before automatically cutting off the supply of liquid.

Other objects and advantages reside in the specific structure of the invention, the structure of the several elements thereof, combinations and sub-combinations of such elements with each other and/or with a receptacle filling device, all of which will be readily apparent to those skilled in the art upon reference to the attached drawing which illustrates one species of the invention and to the following specification wherein the invention is described and claimed.

In the drawing:

FIGURE 1 is a side elevational view with parts broken away and parts shown in longitudinal vertical section of a dispensing device to which a species of the invention has been applied;

FIGURE 2 is an enlarged fragmentary view of the invention parts being shown in substantially vertical section;

FIGURE 3 is a vertical sectional view taken substantially on the plane of the line 3—3 of FIGURE 2, the valve being shown in the open position;

FIGURE 4 is a view like FIGURE 3 but showing the valve in the closed position;

FIGURE 5 is a fragmentary, longitudinal vertical sectional view of a spout embodying the invention, the same being shown applied to a receptacle having a filling neck;

FIGURE 6 is a view like FIGURE 5 showing the spout applied to a receptacle which lacks a filling neck; and

FIGURE 7 is a fragmentary end elevational view of the actuating means for the valve of the invention.

Referring specifically to the drawing wherein like reference characters designate like parts in all views, and referring at first to FIGURE 1, **10** designates generally any suitable automatic dispensing nozzle such as that disclosed in U.S. Patent No. 2,320,033 dated May 25, 1943. Nozzle **10** includes a fluid entrance passage **11**, a fluid control valve **12**, valve stem **13** and hand lever **14** for engaging the valve stem to open valve **12**. The nozzle **10** includes also a vacuum chamber **15** having one wall **16** formed as a flexible diaphragm to which is connected suitable actuator means **17** for a spring loaded stem **18** which is engageable with the pivoted end **19** of the hand lever **14**. When a partial vacuum occurs in the chamber **15**, diaphragm **16** is moved to the right taking with it actuator **17** which action releases stem **18** which moves downward under the load of its spring **20** to cause the pivoted end **19** of hand lever **14** to move downwardly. This permits valve **12** to close automatically in a manner readily understood and as more fully explained in the prior patent identified supra. A partial vacuum is tended to be created in chamber **15** when fluid flows through the dispensing spout **21** of nozzle **10**. However, a vacuum breaking air line **22** extends longitudinally within the spout **21** and has a front end **23** which is open to the atmosphere through the spout wall in the region of the spout front end. The back end of the air line **22** opens into the vacuum chamber **15**. Thus, as long as the front end **23** of the air line **22** is open, air flows freely to the vacuum chamber and no vacuum is created therein by the flow of fluid through the spout. However, as best seen in FIGURE 5, when fluid rises in neck **24** of a container to the level of the line **25**, the front end **23** is covered so that the air line **22** is closed and a partial vacuum is created in the chamber **15** whereby to cause the valve **12** to be automatically closed. As so far described the structure is conventional and forms no part of my invention apart from any combinations or sub-combinations involved.

When the invention is applied to a conventional nozzle as described above, a second air line or passage **26** is disposed in the spout **21** and has a front end **27** which opens to the air a substantial distance rearwardly of the like end **23** of the first air passage **21**. Indeed, the open end **27** is preferably located just forwardly of any suitable stop means such as the lug **28** which limits the entrance of the spout into a receptacle or the neck thereof.

The second air passage or line **26** opens into the vacuum chamber **15** through any suitable valve casing **29** which mounts any suitable manually operable cut-off

valve 30. The species illustrated includes a rotatable stem 31 extending through a wall of the vacuum chamber 15 and which stem includes suitable actuating means such as the head or finger grip 32 on the outer end thereof. Valve casing 29 includes a port or vent 40 which supplies air to chamber 15 when valve 30 is open and the front end of passage 26 is uncovered. Suitable indicia may be provided on the head 32 and the wall of the vacuum chamber to designate when the valve 30 is open or closed. As shown a quarter turn will open or close the valve. While a specific form of valve has been disclosed, it is understood that any suitable valve may be substituted.

In operation, when a necked container is being filled as in FIGURE 5, the valve 30 is moved to the closed position of FIGURE 4 so that dispensing valve 12 is closed when fluid reaches the level 25, FIGURE 5. However, when the device is used to fill a neckless container as that 33 of FIGURE 6, the valve 30 is moved to the open position of FIGURE 3. Thus, when the fluid reaches a level 34 which covers the open end of 23 of the first air line 22, no vacuum is created in the chamber 15 because air flows freely to it through the second air line 26. Then, when the fluid rises to the level designated by the line 35, the open end of 27 of the second air line 26 is covered so that a partial vacuum is created in the chamber 15 whereby to close the dispensing valve 12.

Although the invention has been shown and described as being applied to a conventional nozzle for filling necked containers, it is understood that the invention may be utilized in nozzles where the first air line 22 is entirely eliminated whereby the invention may be used in its automatic aspect solely to fill neckless receptacles. In such an instance, of course, no valve 30 is required.

Moreover, while there has been shown and described what is now thought to be the preferred forms of the invention, it is to be understood that the same is susceptible to still other forms and expressions. Therefore, it is not my intention to limit myself to the exact structures shown and described hereinabove but only as hereinafter claimed.

I claim:

1. A dual level controlled automatic liquid dispensing nozzle including a discharge spout having a free front end, a shut-off valve for supplying liquid to said spout, means for opening said valve, a vacuum chamber including means for closing said valve upon creation of a vacuum therein and means creating a partial vacuum in said chamber upon flow of liquid through said valve; first and second air lines in said spout, means operatively connecting said air lines to said vacuum chamber for supplying vacuum-breaking air thereto, said first air line having a front end opening through said spout adjacent said free front end of the same, said second air line having a front end opening through said spout a substantial distance rearwardly of said front end of said first air line, and manually operated valve means for opening and closing said second air line.

2. A dual level controlled automatic liquid dispensing nozzle including a discharge spout having a free front end, a shut-off valve for supplying liquid to said spout, means for opening said valve, a vacuum chamber including means for closing said valve upon creation of a vacuum therein and means creating a partial vacuum in said chamber upon flow of liquid through said valve; first and second air lines in said spout, means operatively connecting said air lines to said vacuum chamber for supplying vacuum-breaking air thereto, a valve fitting, said second line having a rear end operatively connected to said fitting, said fitting including a port opening into said vacuum chamber, a manually operated valve in said fitting

adapted to selectively connect or disconnect said second line to said port, said first air line having a front end opening through said spout adjacent said front end thereof, and said second air line having a front end opening through said spout a substantial distance rearwardly of said front end of said first air line.

3. A dual level controlled automatic liquid dispensing device including a spout adapted to be inserted into a liquid receptacle, a manually openable valve for delivering liquid to said receptacle through said spout, operating means for closing said valve, a first means on said spout which is adapted to actuate said operating means to close said valve as liquid reaches a first level in said receptacle, a second means on said spout which is adapted to actuate said operating means to close said valve as liquid reaches a second and higher level in said receptacle, and means for selectively activating or deactivating said second means.

4. A dual level controlled automatic liquid dispensing device including a spout adapted to be inserted into a liquid receptacle, a manually openable valve for delivering liquid to said receptacle through said spout, a vacuum chamber, vacuum actuated means for closing said valve operatively associated with said chamber, means adapted to create a partial vacuum in said chamber upon passage of liquid through said valve to actuate said vacuum actuated means, a first vent means connecting said chamber and spout and adapted to be closed as liquid reaches a first level in said receptacle, a second vent means connecting said chamber and spout and adapted to be closed as liquid reaches a higher level in said receptacle, and manually actuated valve means for closing said second vent means.

5. The combination with an automatic liquid dispensing nozzle including a discharge spout having a free front end, a shut off valve for controlling the flow of liquid to said spout, means for opening said valve, a vacuum chamber including means for closing said valve upon the creation of a partial vacuum in said chamber, means tending to create a partial vacuum in said chamber upon flow of liquid through said nozzle, there being a first air passage normally supplying vacuum breaking air to said chamber, said passage having a front end opening through said spout in the region of said free front end thereof; of a second air passage for supplying vacuum breaking air to said chamber, said second air passage having a front end opening through said spout a substantial distance rearwardly of said front end of said first air passage, and manually operated valve means for opening and closing said second air passage.

6. The combination with an automatic liquid dispensing device including a spout adapted to be inserted into a liquid receptacle, a manually openable valve for delivering liquid to said receptacle through said spout, operating means for closing said valve, and a first means on said spout which is adapted to actuate said operating means to close said valve as liquid reaches a first level in said receptacle; of a second means on said spout which is operative to actuate said operating means to close said valve as liquid reaches a second and higher level in said receptacle, and manually operated means for deactivating said second means.

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