SAFETY FUELING NOZZLE

To open the valve assembly in the aspirator-type gasoline-fueling nozzle the manually operated handle is moved upwardly but can act on the valve stem only if the actuating lever is resting on the end of the trip latch lever operated by the diaphragm. In order for the latch lever to be in the proper position the nozzle must be so positioned that the safety lever under the spout is actuated to a position in which the spring-loaded bellcrank will permit the latch lever to move into position to be engaged by the actuating lever. Therefore, fuel will shut off either in response to liquid reaching the aspirator tip or in response to removal of the fuel nozzle from the tank to be filled.
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BACKGROUND OF INVENTION

The present construction is generally applicable to many of the aspirator-type fueling nozzles found today but is specifically an improvement upon the construction shown in U.S. Pat. No. 2,827,929 which, in turn, was an improvement upon U.S. Pat. No. 2,821,212. Both of these patents show an aspirator-type fueling nozzle which, as common to all such fueling nozzles, will shut off when liquid level reaches the vent at the tip of the nozzle. Both patents show a valve trip mechanism which is here improved upon by a specifically prevented actuation of the valve to allow fuel flow except when the nozzle is properly positioned in the fuel tank or other container being filled.

SUMMARY OF INVENTION

As indicated above, the present invention is directed to improving upon the prior art so as to not only shut off flow when the fuel level rises to the end of the fueling nozzle but to additionally shut off or prevent flow in the event the fuel nozzle should fail out of the container or not be in the container. This, therefore, prevents accidental spillage and provides a useful safety function.

DESCRIPTION OF DRAWINGS

FIG. 1 is a vertical section showing the interior arrangement of the valve and safety features.

FIG. 2 is a sectional view as taken to show the venturi section of the present arrangement.

FIG. 3 is a fragmentary enlarged view indicating the manner in which the safety mechanism is actuated to permit the trip lever to swing into position for allowing opening of the valve.

DESCRIPTION OF PREFERRED EMBODIMENT

In the following description the old construction will be described first and in doing this it will be assumed that the bellcrank 102 is in position not blocking movement of the fueling support or trip latch 82. The fuel nozzle has a body 10 provided with an inlet 12 threaded 14 for connection to the hose leading from the fuel pump. Gasoline flowing through the inlet is regulated by the valve assembly 16 which includes two valves 26 respectively arranged for actuation by stem 18 through the medium of stiff spring 19 interposed between stem 18 and the valve assembly and housed within hole 21 on the underside of the valve assembly. The first of the two serially arranged valves comprises a disc valve 20 mounted on stem 18 and cooperating with seat 22 pressed in the valve body. This valve regulates the flow to the annular space 23 between seat 20 and cylindrical sleeve 24. When the valve is raised only slightly the cylindrical portion 28 of valve 26, also actuated by stem 18, acts to prevent flow centrally of sleeve 24. Of course, when stem 18 is moved upward further, the conical portion of valve 26 comes into operation and permits a gradual increase in the rate of flow past valve 26.

Whenever valve 20 is raised from seat 22, there will be flow into annular space 23 between the stem 26 and seat 22. The gasoline flows from space 30 through conduit 32 into cross conduit 34 in plug 36 pressed into the body 10. The plug 36 is also provided with a small axial bore 38 through which the gasoline flows into the large bore chamber 40 and conduit 42. As the gasoline flows from the large bore 40 and conduit 42, the gasoline tends to spray outwardly, and it is desired to have the liquid completely fill conduit 42 in order to insure a reduced pressure in the chamber 40 by venturi action. In order to insure this fanning out of the stream coming from the small bore 38 at all flow rates and at all pressures, the wire or spring 44 is bent as shown to provide an end projecting into conduit 42 to break up any solid stream coming from the small bore 38. This very effectively insures filling the bore 42 with liquid to prevent loss of the desired venturi effect. The reduced pressure in chamber 40 acts through the lateral bore 46 to communicate with aspirator chamber 48 on the right-hand side of diaphragm 50. The aspirator chamber 48 is vented through conduit 52 which runs down the center of the nozzle spout and terminates in fitting 54 mounted adjacent the end of the spout and including a vent 56. As soon as the liquid level in the container being filled rises to the level of vent 56, the breathing of the aspirator chamber 48 is blocked and the reduced pressure in chamber 40 becomes effective to act on diaphragm 50 to pull the diaphragm 50 to the right in opposition to the bias of spring 58.

The low-rate liquid flow which is employed to obtain the venturi action at chamber 40 flows from conduit 42 into passage 60 which communicates with the interior of the spout on the downstream side of the valves. When the valve stem 18 is raised to open the conical valve 26, the flow through the venturi section and out passage 60 continues so the venturi effect is operative at all times.

The valves are operated by releasing handle 62 about its pivot 64. It will be noted that stem 18 passes through aperture 66 in the handle to rest on actuating lever 68, the right-hand end of which is pivotally connected to the handle at 70 and the left hand end of which is provided with a roller 72 rotatably mounted on pin 74 and normally resting in operative position on ledge 76 formed by the lower ends of two similar arms forming the rocker arm or trip latch lever 82. Thus, the lower ends of the arms are connected by the pins 84 and are pivotally connected to the body 10 by pins 86. At the upper end of the trip lever 82 the arms are interconnected by a plate 88 which is connected to diaphragm pin 90. This pin is connected to the diaphragm 50 through the medium of the usual plates 92, 94.

As previously noted, spring 58 acts on diaphragm 50 to hold the diaphragm in the position shown in FIG. 1. Under this condition, the fulcrum support or trip lever 82 is urged by the diaphragm spring 58 in a clockwise direction about its pivot 86. This holds ledge 76 under roller 72 so that when handle 62 is raised actuating lever 68 will also be raised to lift valve stem 18 and open valve 20 alone or in combination with the conical valve 26. Now, then, handle 62 can be held open manually or could be propped in the open position while the gasoline fills the container into which it is being dispensed. When the gasoline level reaches aspirator vent 56 in the tip of the nozzle the vent becomes plugged and the low pressure in venturi chamber 40 becomes effective to reduce pressure action on the right-hand side of diaphragm 50 whereverupon atmospheric pressure acting on the left-hand side of the diaphragm will move the diaphragm to the right against the bias of spring 58. When this happens, the fulcrum support or trip latch lever 82 is rotated in a counterclockwise direction about its pivot 86 and ledge 76 is withdrawn from its position under roller 72 leaving the left-hand end of actuating lever 68 without support. When this occurs spring 96, acting on the valves in the seating direction, will act to close the valves while lever 68 drops. It will be noted that the valves close even though the handle is held in the full open position. It will be appreciated that the release of lever 68 is quite smooth and calls for very little effort since there is a rolling connection between lever 68 and latch lever 82.

After the valves have been closed the mechanism may be reset by releasing handle 62 for movement under the influence of spring 98 compressed between the nozzle body and handle 62. As the handle moves downwardly the left-hand end of the released lever 68 will be forced to move upwardly by contact of the lever with fulcrum 100. Thus, as the right-hand end of lever 68 is lowered, the lever 68 is actuated about fulcrum 100. Since the valve has closed there is no pressure action on the diaphragm and latch lever 82 has returned to its normal position. Therefore, the elevation of the left-end of lever 68 permits the latch lever to return to its normal position with ledge 76 under the roller. On the way up the roller cams the latch lever out of its path.
The foregoing construction is described (with the exception of the bellcrank 102) substantially conforms to that shown in U.S. Pat. No. 2,827,929. It should be noted, however, that the specific means for developing the venturi and aspiration, etc. forms no part of this invention except insofar as it actuates the trip latch 82. From the description it will be obvious that the latch arm must underlie the roller 76 on the left end of actuating lever 68 for the valve to be opened to establish flow. Now taking advantage of this, we have provided the bellcrank 102 mounted on pin 104 and biased by spring 106 in the counterclockwise direction so as to move the trip lever 82 out of position in which it can possibly underlie roller 76. It will be noted that one end of spring 106, in turn, overlies the safety lever 108 which is pivotally connected to the end of the spout by means of the bent end engaging the slot in the end of the spout. This safety lever 108 is, therefore, biased downwardly by spring 106 which acts both to urge the safety lever 108 down in the position shown in FIG. 1 and to move the bellcrank 102 counterclockwise to hold the trip lever 82 in the retracted position, also as shown in FIG. 1. Under these conditions the valve cannot be opened even if the handle 62 is actuated in the opening direction. Therefore, no gasoline can flow. When the nozzle is placed into the fuel tank or other container and allowed to rest therein in the usual manner the safety lever 108 is moved upwardly to rotate the bellcrank about pivot 104 in opposition to the bias of spring 106 and allow the trip lever to move to its normal position underlying the roller. Now when the handle 62 is actuated the valve can be opened and flow established. The nozzle can be left unattended since it will shut off as soon as liquid hits the aspirator vent 56 and fuel will also shut off should the nozzle fall or inadvertently be pulled out of the fuel container since this would immediately allow the spring to rotate the bellcrank against the trip lever to trip the mechanism and allow the valve to close.

We claim:

1. In a fuel nozzle of the type in which an aspirator driving a working pressure from a venturi through which fuel flows when the valve is open is employed to release the valve for closure when the aspirator vent is closed, and including a pivotally mounted fulcrum support operatively connected at one end to the aspirator for movement thereby to dispose the opposite end of said fulcrum support in operative and in released positions with respect to an end of a valve-operating lever, a handle pivotally connected to the nozzle body for manual operation, a valve-operating lever pivotally connected to the handle and having one end normally resting on said opposite end of the fulcrum support when the fulcrum support is in its operative position, and a stem connected to the valve-operating lever and to the valve, the improvement comprising movably mounted safety means having a portion acting directly on said opposite end of the fulcrum support and normally effective to block movement of said fulcrum support to said operative position in respect to said one end of said valve-operating lever, means engageable with said safety means and responsive to predetermined positioning of the nozzle relative to a container to be filled to move said safety means out of blocking relation with said fulcrum support thereby to override the safety means to allow normal operation of the nozzle by said valve-operating lever so long as said positioning is maintained.

2. Nozzle according to claim 1 in which the safety means is spring biased to move the fullcrum support to its released position.

3. Nozzle according to claim 2 in which the responsive means comprises a member movable relative to the spout portion of the nozzle and acting on the safety means.

4. Nozzle according to claim 3 in which the member is a lever having one end pivoted on the spout and the other end acting on the safety means.

5. Nozzle according to claim 4 in which the safety means comprises a pivoted device biased by the spring and actuated by said other end of the lever.