

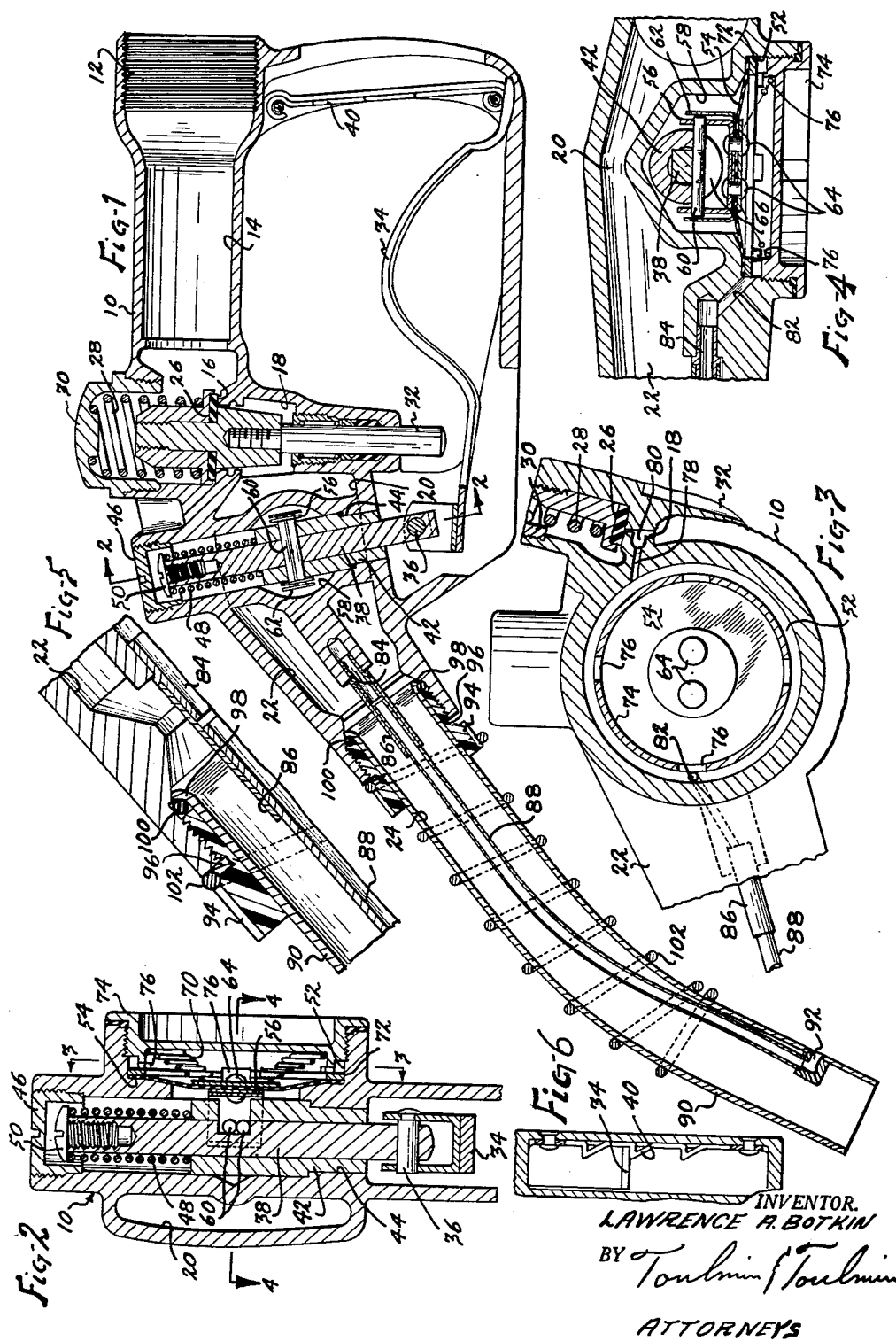
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AUTOMATIC DISPENSING NOZZLE

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AUTOMATIC DISPENSING NOZZLE

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This invention relates to dispensing nozzles and is particularly concerned with an automatic dispensing nozzle for fuels and the like, such as gasoline, embodying novel and advantageous features of construction.

Automatic dispensing nozzles of the type which automatically trip closed when a container being filled reaches a predetermined level are known and are widely used in, for example, filling stations for supplying gasoline to the tanks of automobiles. Such nozzles are arranged to latch open and to trip closed when the liquid in the container or tank being filled reaches a predetermined level.

Heretofore, such nozzles have been rather bulky, expensive, and accordingly one object of the present invention is to provide a compact stream-lined design for a nozzle of this nature.

A still further object of this invention is the provision of an automatic nozzle which is extremely compact but which nevertheless is relatively simple to manufacture and service.

A particular feature of the present invention resides in the arrangement of the discharge tube of the nozzle which is provided with a break-off nut so that it will snap off at the predetermined load.

A still further object of this invention is the provision of a dispensing nozzle having a discharge tube adapted for being inserted in a gasoline tank of an automobile or the like in which the tube will break off from the nozzle at a predetermined load producing a distinctly audible signal thereby warning the attendants that the mishap has occurred.

The foregoing objects and still other objects and advantages of the present invention will become more apparent upon reference to the following specification taken in connection with the accompanying drawings in which:

FIGURE 1 is a longitudinal section through an automatic dispensing nozzle according to my invention;

FIGURE 2 is a vertical sectional view indicated by line 2—2 on FIGURE 1 showing the automatic latching and unlatching means for the nozzle;

FIGURE 3 is a vertical sectional view indicated by line 3—3 on FIGURE 2 and showing the passages leading to the diaphragm chamber of the latch mechanism;

FIGURE 4 is a transverse sectional view indicated by line 4—4 on FIGURE 2 showing the latch mechanism in plan section and also showing the flow passage through the valve around the latch mechanism;

FIGURE 5 is a fragmentary view drawn at enlarged scale showing the break off nut that attaches the discharge tube to the body of the nozzle and showing the manner in which the discharge tube is sealed to the body; and

FIGURE 6 is a view showing the member which latches the lever of the nozzle in the various positions.

Referring to the drawings more in detail, a dispensing nozzle according to the present invention comprises a body part 10 having a threaded inlet fitting 12 to which a dispensing hose can be attached. The body 10 has a flow passage 14 therethrough leading from the threaded inlet through which the liquids being dispensed flow. The flow passage 14 comprises a valve seat 16 through which the fluid passes to a cavity 18 and which cavity communicates via a passage 20 with the discharge end 22 of the flow passage. The discharge end 22 of the flow

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passage communicates with a discharge tube 24 which is detachably connected with the body of the nozzle.

The valve seat 16 is adapted for engagement by a valve member 26 spring urged downwardly by a spring 28 that bears on the underside of a cap 30 threaded to the valve body and of a size to permit the entire valve member assembly and spring to be inserted into the valve body from above or to be removed therefrom merely by removing cap 30.

The valve member includes an actuating rod portion 32 extending sealingly downwardly through the bottom of the valve body. A lever 34 pivoted at 36 to a rod 38 is operable for moving the valve member upwardly within the valve body to open the flow passage for the passage of fluid therethrough. At the opposite end of lever 34 from its pivotal connection with rod 38, is a latch member 40 having a plurality of notches arranged therealong and which notches are adapted for engagement with the lever 34 to hold the valve in its open position until the trip mechanism trips off. Member 40, as will be seen in FIGURE 6 is advantageously formed of spring wire and it will be observed that lever 34 can swing transversely enough to engage and disengage the lever from the notches of member 40.

The rod 38 previously referred to, extends through a shouldered sleeve 42 which is mounted in a correspondingly shouldered bore 44 formed in the valve body.

Bore 44 is closed by a cap 46 threaded into the upper end of the bore and by removing the cap 46 the parts located within the bore can be assembled therein or removed therefrom.

A compression spring 48 bears between the upper end of sleeve 42 and the underside of a screw 50 threaded into the upper end of rod 38. This provides a bias on the rod urging it toward the position which it occupies in FIGURES 1 and 2.

The trip mechanism for the valve will be seen in FIGURES 2 and 4. This tripping mechanism comprises a cavity 52 formed in the side of the valve body on the side opposite the passage 20 that leads from the downstream side of the valve seat to the discharge end of the valve.

Within cavity 52 there is mounted a diaphragm 54 to which is attached a forked roller carrier 56 which extends inwardly into a recess 58 so as to embrace the sleeve 42. A pair of rollers 60 are mounted in the roller carrier and are adapted for being retained in position by spring clip 62. The carrier 56 and spring clip 62 are attached to the diaphragm by means of rivets 64.

The sleeve 42 is provided with a notch 66 for receiving the rollers and likewise the rod 38 is also notched for receiving the rollers. A spring 70 acts on the diaphragm urging it toward rod 38 so that the rollers are normally engaged with the notches as will best be seen in FIGURE 2. As is known in the art of self tripping nozzles, the diaphragm is adapted for flexing outwardly to withdraw the rollers from the notch in rod 38 whereupon the spring acting on the valve member will force it closed regardless of the position of lever 34.

For sealing the diaphragm in the cavity 52, there is a gasket 72 and a cap 74 threaded into the mouth of the recess. This arrangement provides for clamping the periphery of the diaphragm sealing against the bottom of the cavity 52.

The cap 74 comprises a flange engaging the gasket 72 and this flange is provided with a plurality of notches 76 so that there is an annular space about the inner end of cap 74 communicating directly with the diaphragm.

This annular space is connected on the one side by a passage 78 with the groove 80 formed in about the middle of the venturi portion of the flow passage through the valve immediately downstream of the valve seat.

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When the valve member is open, and fluid is passing through the valve seat, a reduced pressure is created in the venturi portion which is conveyed by a passage 78 to the annular space at the inner end of the cap 74, and therefrom through notches 76 to the outer face of the diaphragm.

Normally, the said annular space is relieved of any reduced pressure via a passage 82 leading to a fitting 84 that is connected by a tube connector 86 with a tube 88 located within the discharge tube or spout 90 of the nozzle. Tube 88 leads to a fitting 92 opening through the side of the discharge tube or spout at the desired level so that the relief of the suction on the diaphragm will be terminated when fluid in the container being filled rises to the point that it will cover the fitting 92 whereupon the suction developed on the diaphragm will be sufficient to trip the valve closed.

The discharge tube 90 is attached to the valve by means of a nut 94 which is preferably of a reinforced phenolic resin and which nut has a groove 96 providing a section of predetermined breaking strength that will break off at a predetermined load on the tube such as will occur if a car in which the tube were placed commenced to move away from the dispensing pump. The tube itself is preferably of aluminum and is fairly soft and is flared at 98 with there being a seal ring 100 sealing the tube to the valve body and also urging the tube into good electrical contact with the body. Should the nut 94 break, it will break with a sound which is audible for considerable distance so that there is little likelihood that the nut will break without the attendant hearing the sound.

There is preferably a spring 102 mounted about the discharge tube in a conventional manner to provide friction for holding the tube in the filling opening of a container and also to assist in making electrical contact with the container and the valve body.

In view of the foregoing it will be appreciated that the nozzle of the present invention is extremely compact, and light in weight and is thus more inexpensive to manufacture and more convenient to use. Further, the nozzle is so arranged that it can be serviced quite readily, all parts being readily removable.

Further, the safety feature of the breakoff discharge tube is of particular merit as a precaution against the hazards of spilling gasoline or other highly inflammable fluids.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. An automatic trip nozzle characterized in extreme compactness comprising; a body having a flow passage with a seat, a valve member in the body spring urged toward said seat, a stem on the valve member extending from the body for operation thereof, a lever to operatively engage the end of the stem, a rod pivotally supporting one end of the lever, a bore in the body to receive the rod, a circular recess in the side of the body, a lateral notch in the bottom of the recess intersecting the bore, a diaphragm sealingly mounted in the recess, rollers on the diaphragm in the notch, a spring acting on the diaphragm urging the rollers against the rod, said rod having a notch to receive the rollers so the rod is supported by the rollers when the lever is operated to open the valve, a venturi throat in the flow passage downstream of the valve seat connected with the space behind the diaphragm, and means to relieve the suction in the space until it is desired for the valve to close whereupon the diaphragm flexes to withdraw the rollers from the notch in the rod.

2. An automatic trip nozzle characterized in extreme compactness comprising; a body having a flow passage with a seat, a valve member in the body spring urged

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toward said seat, a stem on the valve member extending from the body for operation thereof, a lever to operatively engage the end of the stem, a rod pivotally supporting one end of the lever, a bore in the body to receive the rod, a circular recess in the side of the body, a lateral notch in the bottom of the recess intersecting the bore, a diaphragm sealingly mounted in the recess, rollers on the diaphragm in the notch, a spring acting on the diaphragm urging the rollers against the rod, said rod having a notch to receive the rollers so the rod is supported by the rollers when the lever is operated to open the valve, a venturi throat in the flow passage downstream of the valve seat connected with the space behind the diaphragm, and means to relieve the suction in the space until it is desired for the valve to close whereupon the diaphragm flexes to withdraw the rollers from the notch in the rod, there being means to latch the lever in open position comprising a wire attached to the body bent so as to present a ledge for the end of the lever opposite the rod to rest upon.

3. In an automatic trip nozzle; a body with a flow passage therethrough having a seat with a venturi throat downstream of the seat, a valve member spring urged toward the seat and a stem on the valve member extending from the body, a bore in the body in about the same longitudinal plane as the valve seat, a bushing in the bore, a rod slidable but non-rotatable in the bushing having an end projecting from the body adjacent the valve stem, a lever pivoted to the said end of the rod engageable with the end of the stem, a recess in the side wall of the body which the bushing intersects, a diaphragm in the recess, a bracket on the diaphragm on the bushing side thereof, a notch in the bushing to receive the rollers, a notch in the rod to receive the rollers so the rod is supported thereby when the lever is operated to open the valve, a cap threaded in the recess to clamp the diaphragm sealingly in the recess and to provide a space behind the diaphragm, spring means urging the diaphragm inwardly of the recess, and a passage connecting said venturi throat with said space to create tripping suction in the said space, there being a spring weaker than the spring acting on the valve member urging said rod upwardly in the bushing.

4. In an automatic trip nozzle; a body with a flow passage therethrough having a seat with a venturi throat downstream of the seat, a valve member spring urged toward the seat and a stem on the valve member extending from the body, a bore in the body in about the same longitudinal plane as the valve seat, a bushing in the bore, a rod slidable in the bushing having an end projecting from the body adjacent the valve stem, a lever pivoted to the said end of the rod engageable with the end of the stem, a recess in the side of the body which the bushing intersects, a diaphragm in the recess, rollers on the diaphragm on the bushing side thereof, a notch in the bushing to receive the rollers, a notch in the rod to receive the rollers so the rod is supported thereby when the lever is operated to open the valve, a cap threaded in the recess to clamp the diaphragm sealingly in the recess and to provide a space behind the diaphragm, spring means urging the diaphragm inwardly of the recess, and a passage connecting said venturi throat with said space to create tripping suction in the said space, there being a spring weaker than the spring acting on the valve member urging said rod upwardly in the bushing, said rod being rectangular and fitting anti-turningly in the bushing and said bushing and bore being circular.

5. In an automatic dispensing nozzle; a body having a flow passage therethrough, a seat in the flow passage and a valve member in the body spring urged toward engagement with said seat, a stem on the valve member extending from the body, a lever adjacent the stem, a rod pivotally supporting one end of the lever and extending into the body, said body being formed with a cylindrical portion to one side of said flow passage defining a bore which receives said rod which is sealed from the flow passage, a circular recess extending laterally into said body

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and at its inner portion intersecting said cylindrical portion, notch means in the wall of said cylindrical portion opening toward the outer end of the recess, a diaphragm clamped in said recess, rollers on the diaphragm extending into said notch, a notch in the rod receiving said rollers when the rod is in one position in said bore to support the rod when the lever is operated to open the flow passage, and means to cause said diaphragm to flex outwardly to withdraw the rollers from the notch in the rod to trip the valve closed regardless of the position of the lever, said flow passage in the region of the said cylindrical portion of said body being narrow laterally of the body in the direction of the axis of said cylindrical portion and wide in a direction at right angles to said axis to provide for compactness of the valve body without loss of capacity.

6. In an automatic trip nozzle having a body with a flow passage therethrough having a seat with a venturi throat downstream of the seat, a valve member spring urged toward the seat and a stem on the valve member extending from the body, a bore in the body in about the same longitudinal plane as the valve seat and located to one side of the flow passage, a cylindrical bushing in the bore having a non-circular bore, a non-circular rod slidably fitting the non-circular bore in the bushing and having an end projecting from the body adjacent the valve stem, a lever pivoted to the said end of the rod engageable with the end of the stem, a recess in the side wall of the body on said one side of the flow passage which the bushing intersects, a diaphragm in the recess, rollers

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on the diaphragm on the bushing side thereof extending at right angles to the axis of said rod, a lateral notch in the bushing to receive the rollers, a lateral notch in the rod to receive the rollers so the rod is supported thereby when the lever is operated to open the valve, a cap threaded in the recess to clamp the diaphragm sealingly in the recess and to provide a space behind the diaphragm, spring means between the cap and diaphragm urging the diaphragm inwardly of the recess, a passage connecting said venturi throat with said space to create tripping suction in the said space, and means for relieving said suction until it is desired for the valve to close whereupon the diaphragm flexes to withdraw the rollers from the notch in the rod, there being a spring acting between the end of the rod opposite its connection to said lever and the end of the said bushing for resetting the rod after a tripping operation.

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