

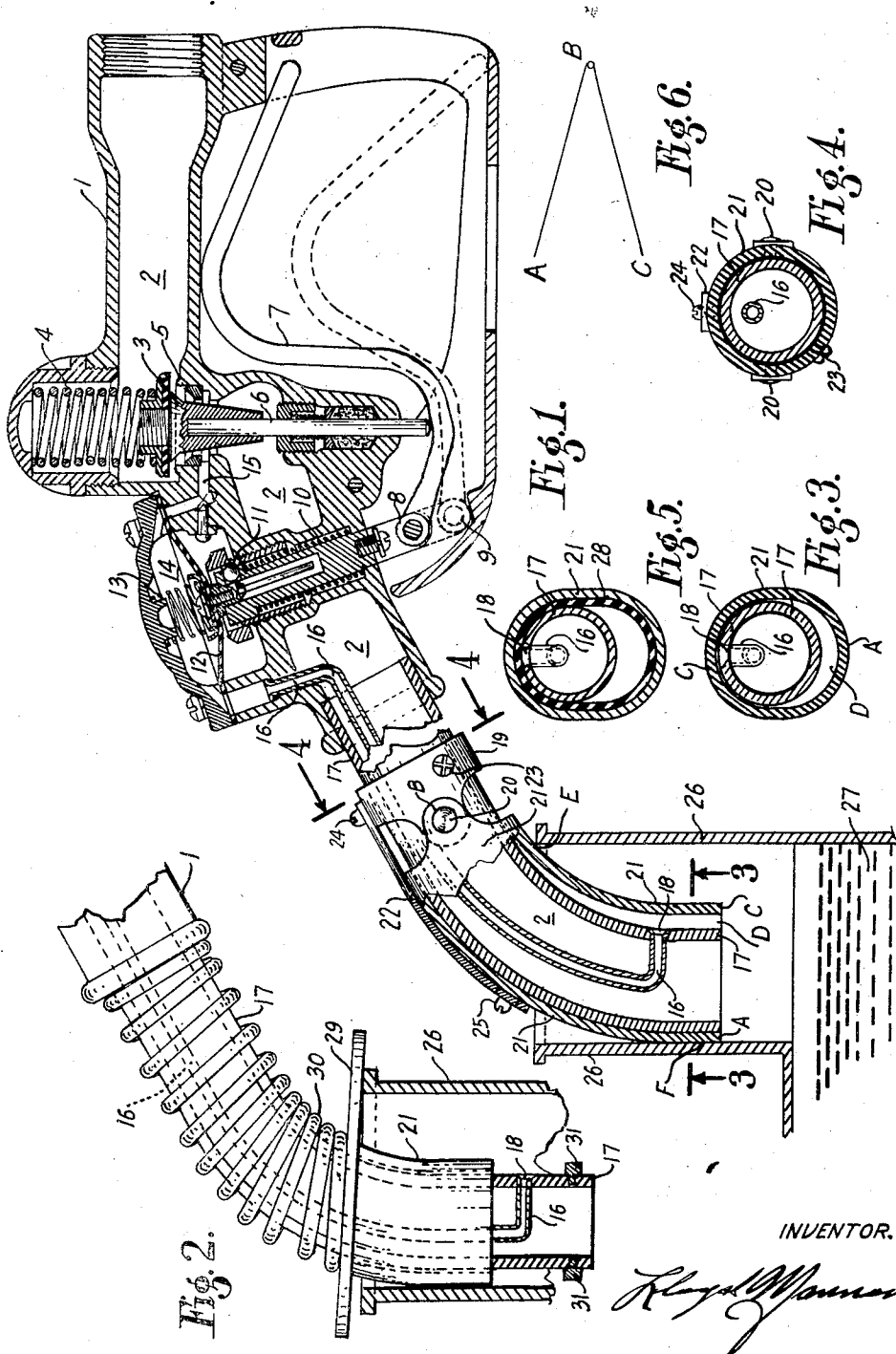
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AUTOMATIC NOZZLE WITH SAFETY SHUTOFF

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AUTOMATIC NOZZLE WITH SAFETY SHUTOFF

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My invention relates to automatic filling nozzles of the type which operate on a vacuum created by the flow of liquid through the nozzle. In these nozzles the valve is manually opened and automatically closed. The valve can be opened and the flow of fluid established whether the nozzle is in a container or not. Should one of these nozzles fall or be displaced from a container being filled, the fluid will continue to flow from the nozzle. This would be a very dangerous situation with an explosive fluid such as gasoline. The purpose of my invention is to provide a safety factor in the operation of these nozzles, whereby automatic nozzles are inoperative unless they are operating in a predetermined manner.

A further purpose of my invention is to make a manually opened automatic nozzle inoperative until it is placed in a container.

A further purpose of my invention is to actuate the automatic shutoff of the nozzle in the event the nozzle falls or is pulled from the container being filled.

A further purpose of my invention is to prevent operation of the nozzle until it is properly positioned in a container.

While I do not wish to limit my invention to a particular nozzle, my invention is illustrated by a nozzle designed for filling gasoline tanks on automobiles. Other objects and advantages of my invention will appear in the following specifications.

In the accompanying drawing forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a vertical section of a filling nozzle embodying my invention. The nozzle is in the filling neck of a tank and the parts are shown as in their position when fluid is flowing through the nozzle, filling the tank;

Fig. 2 is an elevational view of my invention in a modified form;

Fig. 3 is a cross sectional view taken on the lines 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a cross-sectional view taken on the line 3—3 of Fig. 1 of my invention in a modified form, and

Fig. 6 is a schematic diagram of the bellcrank action referred to in the following specifications.

The specifications and operation of this type automatic nozzle are well known in the art and I will only refer in detail to those parts pertaining to my invention.

In the accompanying drawing wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 1, Fig. 1, designates the main nozzle body. The numeral 2 comprises the fluid passageway, the numeral 3 the valve, while the numeral 4 designates the spring, 5 the valve seat and numeral 7 designates the operating lever.

The operating lever 7 is attached to movable spring-pressed shaft 8 and pivoted at 9. The pivot 9 could be termed a movable fulcrum support for the lever 7. The spring 10 holds the movable shaft 8 in contact with the

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locking mechanism 11 for instance in the manner shown and described in U.S. Patent No. 2,582,195 granted to L. H. Duerr on January 8, 1952. The diaphragm 12 or pressure sensitive device, operates the locking mechanism 11 and is held in place by the spring 13. A passageway 15 leads from the vacuum chamber 14 into the fluid passageway 2 on the downside of the valve 3. Leading from the other side of the vacuum chamber 14 is an air supply tube 16, which runs inside of the discharge tube 17, to an orifice 18 in the wall of the discharge tube 17, near the exhaust terminal.

Secured to the discharge tube 17, Fig. 1, is a collar 19. The collar is held by the set screw 23 and provides studs 20 for the purpose of holding the housing 21 in a hinged manner. Leaf spring 22 is connected to the collar 19 by the screw 24, the other end of the leaf spring 22 is connected to the housing 21 by the screw 25. The tank 27 has a filling neck 26.

In the operation of this improved automatic nozzle, the exhaust terminal is inserted into the container to be filled as is shown in Fig. 1, and the weight of the entire nozzle rests on the lip of the filling neck 26 at point E and the front wall A of housing 21 is in contact with the filling neck 26 at point F. The weight of the nozzle body 1 has forced the discharge tube 17 against wall A of housing 21, against the tension of spring 22 and air gap D will permit air or fluid to reach orifice 18. In the event the nozzle falls or is pulled from the container, spring 22 will move the housing 21 on the studs 20 until the rear wall C of this housing comes in contact with the discharge tube 17 as shown in Fig. 3. In such an event the air space D is between the wall A and the discharge tube 17 and orifice 18 is sealed by wall C as shown in Fig. 3.

The housing 21 is shown as of a tube-like design with walls to fit the discharge tube 17 after movement in either direction. The movement results from the bellcrank action as shown in Fig. 6 wherein any movement of point A results in a corresponding movement of point C through the pivot point B. Housing 21 is shown as of solid tube-like design and many modifications of this design can be made which will achieve the same mechanical action as shown in Fig. 6.

The collar 19, Fig. 1, serves only as a base for the support of the studs 20 and spring 22 and these parts can be anchored to the discharge tube 17 if desired.

It is considered that the parts described are made of metal and except for the spring 22 could be made of plastic. A modification as shown in Fig. 5 wherein housing 21 is lined with a resilient material 28, such as neoprene, is within the scope of this design.

Before the nozzle is positioned in a container as shown in Fig. 1, the rear wall C of housing 21 covers and seals the orifice 18 as is shown in Fig. 3 and fluid will not flow through the nozzle. Placing the nozzle in the tank as shown in Fig. 1, the weight of the nozzle rests on the lip of the filling neck 26 at point E, the front wall A of the housing 21 comes in contact with the wall of the filling neck 26 at point F and the weight of the nozzle body 1 swings the discharge tube 17 away from the rear wall C of housing 21, unsealing orifice 18 and providing air gap D. Placed in this position the operating lever 7 is raised from the dotted line position, and pressure of this lever against valve stem 6 raises valve 3 against the pressure of spring 4 and the flow of fluid through the fluid passageway 2 is established. The fluid flowing past the valve 3 and through the fluid passageway 2 creates a suction in vacuum chamber 14 through the air passageway 15 and air is drawn from the vacuum chamber 14. As the suction action draws air from the vacuum chamber, the air is replaced by air from the atmosphere from the orifice 18 through the air supply tube 16 and a constant pressure is maintained within the vacuum chamber 14. In

the event the fluid in the tank reaches the level of the orifice 18, the fluid will seal the orifice 18 and a minus pressure will occur in the vacuum chamber 14. Should the nozzle fall or be pulled from the container before the fluid reaches the level of the orifice 18, contact between the wall of the filling neck 26 and housing 21 will end, spring 22 will return housing 21 to normal, sealing orifice 18, which will also shut off the air supply to the vacuum chamber 14 and result in a minus pressure within. The minus pressure within the vacuum chamber 14 permits the atmosphere to raise the diaphragm 12 against spring 13. The raising of the diaphragm 12 unlocks the locking mechanism 11, which releases movable shaft 8 and the force of spring 4 against the valve 5, through the valve stem 6, against the operating lever 7, pulls the movable shaft 8 down, resulting in the displacement of the operating lever 7, relief of the pressure against valve stem 6, the seating of the valve 3 and shut-off of the flow of fluid through the nozzle. Any attempt to operate the nozzle when it is not in the position shown in Fig. 1 will result in the foregoing sequence and failure to operate.

My invention as shown in modified form in Fig. 2, wherein like parts are numbered with the same numbers as Fig. 1, comprises the discharge tube 17, inserted into the filling neck 26 of a tank. Housing 21 covers the discharge tube 17 in a manner which enables it to slide up and down on the discharge tube 17. Housing 21 is attached to the collar 29. Spring 30 is seated on collar 29 and anchored against the main nozzle body 1. The two studs 31 prevent the housing 21 from sliding off of the discharge tube 17.

In the operation of this modified form of my invention, the collar 29 comes in contact with the container to be filled upon insertion of the discharge tube 17 into the container. Upon contact with the container, collar 29 holds the housing 21 against the tension of spring 30, while the discharge tube 17 proceeds into the container until the orifice 18 is uncovered. With the orifice 18 uncovered, the nozzle will operate until either the fluid covers the orifice or the nozzle should be pulled or fall from the container. Upon any displacement from the container, spring 30 will force housing 21 against the studs 31, thereby sealing orifice 18 and shutting off the flow of fluid.

My invention in its broader aspects is not limited to the specific mechanism shown and described, but departure may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a fluid discharge device, a discharge nozzle, a flow control valve in the device normally biased for stopping the flow to said nozzle, a manipulating device for opening said valve, a vacuum actuated device to render said manipulating device ineffective, means to communicate said vacuum actuated device with the discharge side of said valve for creating the actuating vacuum by the flow of fluid from said valve, said nozzle having an air entrance port near its outlet end, an air supply conduit extended from said vacuum actuated device to said air entrance port for breaking down said actuating vacuum, a cover movably mounted on the nozzle and covering said entrance port for permitting creation of said actuating vacuum, resiliently yieldable means normally to urge said cover to port covering position, said cover being adapted to engage a container being filled by said discharge device so as to be moved by the weight of the engaged discharge device away from said port for admitting air for breaking said actuating vacuum.

2. In a fluid discharge device, the combination with a nozzle having a fluid passage therein; a spring-pressed,

self-closing valve for the passage, a manually controlled lever bearing against said spring pressed valve for opening the valve; a movable fulcrum support for the lever; releasable means for normally holding the fulcrum support in a position to fulcrum the lever operatively for opening the valve, vacuum actuated pressure-sensitive means connected to said means for holding said releasable means in said fulcrum holding position; an air duct communicating the pressure-sensitive means with the fluid passage on the discharge side of the valve, so as to create vacuum at said pressure-sensitive means by the fluid flow from said valve, air inlet means to relieve said vacuum at said pressure-sensitive means and having its air entrance disposed near the outlet end of the nozzle to be closed by the fluid in a tank being filled when the fluid level reaches the air entrance so as to permit the creating of said actuating vacuum for releasing the fulcrum holding means so as to render said lever inoperative and permit the spring-pressed valve to close; of a mechanically operated closure for the air entrance operatively connected to the nozzle; the closure being adapted to engage the tank for uncovering the air entrance when the nozzle is in tank filling position and means to urge the closure to air entrance closing position when the closure is disengaged from said tank for permitting the creating of said actuating vacuum and the closing of said valve.

3. The combination as set forth in claim 2; and in which the mechanically-operated closure comprises a tubular housing enclosing the outlet end of the nozzle and being pivotally secured thereto; the outer end of the housing being larger in diameter than that of the nozzle; and spring means for urging the housing over said air entrance; said housing being adapted to be swung into a position away from the air entrance by its own weight when engaged with the inlet of said tank.

4. The combination as set forth in claim 2; and in which the mechanically-operated closure comprises a spring-moved sleeve housing slidable over the nozzle portion and over the air entrance to the tube for closing the air entrance; and a collar carried by the sleeve housing and engageable with the tank being filled during the insertion of the nozzle into the tank so as to retract the sleeve housing and uncover the air entrance of the tube.

5. In a discharge device, the combination with a nozzle having a fluid passage therein; a spring-pressed valve for controlling the flow of fluid in the passage; manual means for opening the valve; means for displacing the manual means for making it ineffective and comprising a vacuum chamber, a diaphragm forming a part of the wall thereof so as to be actuated by vacuum in said chamber; means to connect said diaphragm to the displacing means so as to actuate said displacing means when actuated by said vacuum; means controlled by the flow of fluid in the passage for creating said actuating vacuum in the chamber; an air supply conduit for relieving the vacuum within the chamber and having an air entrance near the discharge end of the nozzle adapted to be closed by the rising liquid level in the tank so as to cut off the air supply to the chamber and permit the creating of said actuating vacuum therein for making the valve opening means ineffective and permitting the valve to close; of spring held mechanical means mounted on the nozzle and normally closing the air entrance; said mechanical means being positioned to be engageable with the filling neck of a tank so as to be shifted by the force of such engagement for uncovering the air entrance.

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