Aug. 11, 1931. A. V. MOTSINGER 1,818,422

NOZZLE MECHANISM

Filed Jan. 17, 1929

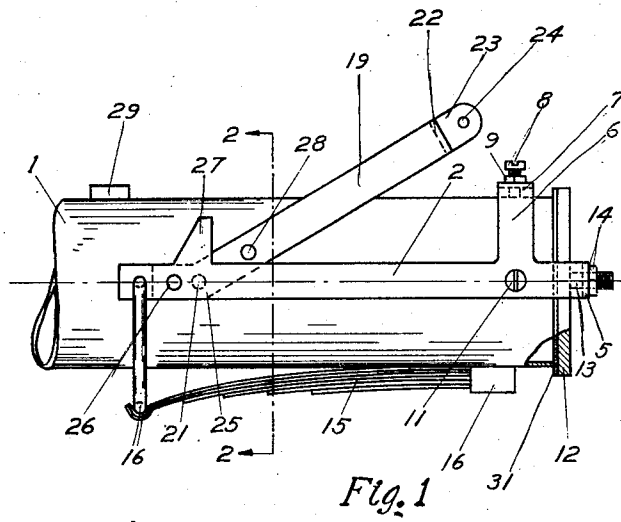


Fig. 1

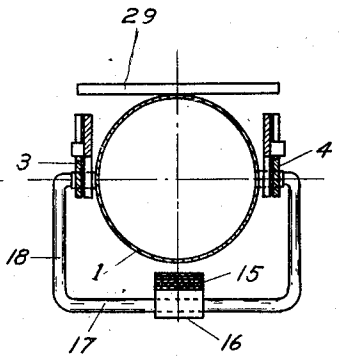


Fig. 2

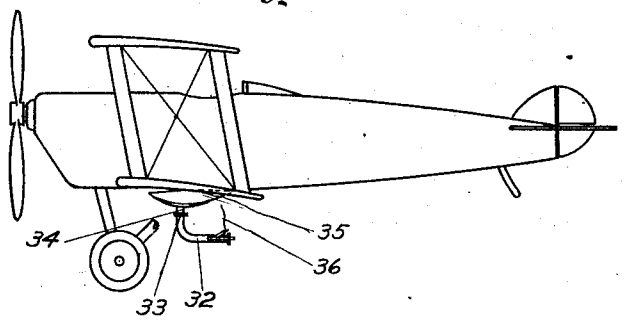


Fig. 3

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NOZZLE MECHANISM

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

This invention relates in general to nozzles and more particularly has reference to a valve mechanism for regulating the flow of reactive substances.

Previous to this time, difficulty has been experienced in preventing corrosion of valves of this character composed of metal chemically affected by the material dispensed. A number of substances also have the property of forming viscous compounds which tend to clog the valve and thus retard the normal operation of the mechanism.

These disadvantages have been present to a marked degree in valves used for releasing the substances commonly employed for generating smoke screens from aircraft or, on the ground, from tanks or lines. Among the materials most generally employed are titanium tetrachloride and stannic chloride, which react with water or water vapor to form hydrochloric acid.

The hydrochloric acid is highly corrosive, and in a short period of time may destroy the metal on the valve to such an extent as to render it unfit for further use. Even though acid resisting material is used in the valve, the titanium tetrachloride forms viscous hydrates which have the tendency to clog the valve and prevent free operation of the parts, thus in many instances making its continued use unsafe.

It will also be appreciated that valves of this type must act positively to regulate the flow of reactive substances to the extent required according to the desires of the operator. Also, the construction should be such that any pressure on the system cannot effect inadvertent operation, as the results of an accidental discharge might often be dangerous.

An object of this invention is to provide a nozzle for dispensing reactive substances having a valve mechanism simple in design and positive in operation.

Another object of this invention is to provide a nozzle for dispensing reactive substances having a valve mechanism operating out of the path of flow of the reactive substances.

Still another object of this invention is to provide a nozzle for dispensing reactive substances having a valve mechanism which may be opened to any desired extent so that in the full position it will afford no obstruction to the free discharge of the reactive substances.

A further object of this invention is to provide a nozzle for dispensing reactive substances having a valve mechanism, which may be opened against pressure and automatically closed, that cannot be opened by any pressure in the system.

With these and other objects in view which may be incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangement, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect, without limiting the improvements in their useful applications to the particular constructions which for the purpose of explanation have been made the subject of illustration.

In the drawings forming a part of this specification:

Figure 1 is a side elevational view of the nozzle showing the improved valve mechanism forming the subject matter of this invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1, showing the duplicate sides of the valve assembly.

Figure 3 is a side elevational view, showing the mechanism shown in Figure 1 connected to a container mounted under the fuselage of an airplane.

Referring by numerals to the drawings, in which the same and similar elements are designated by like symbols of reference throughout, and more particularly to Figure 1, there is shown a nozzle 1 forming the end

of a section of pipe. The nozzle 1 may be the end of a pipe of any character through which it is desired to convey fluids and dispense the same at the end and at the same time regulate the discharge.

A saddle 2 constructed of duplicate side pieces 3 and 4, as shown in Figure 2, and an integral crosspiece 5 at the end, is fitted over the opening of the nozzle 1 on a plane with the center of the nozzle. The saddle 2 is formed with upwardly projecting extensions 6 integrally formed with a crosspiece 7 adapted to fit over the nozzle and hold the structure in position.

The crosspiece 7 is provided with an aperture for receiving a set screw 8 held by a lock washer 9 and similar screws 11 on the sides of the saddle 2 adjacent the extensions 6, for adjusting the position of the saddle structure on the end of the nozzle.

A cap 12 forming a closure is mounted against the opening at the end of the nozzle 1. A stud bolt 13 is welded to the center of the outside of the cap 12 and secured in an aperture through the crosspiece 5 by a nut 14.

A series of leaf springs 15, of progressively greater length, is mounted on the body of the nozzle and held by a holder 16 formed integral therewith or otherwise suitably attached. The ends of the spring 15 are cupped, as at 16, adapted to receive a crosspiece 17 forming a part of a bracket 18. The ends of the bracket 18 are turned in and pivoted in the termination of the sides 3 and 4 of the saddle 2. It will be appreciated that the cap 12 mounted on the crosspiece 5 is held in position by the crosspiece 7 forming a part of the saddle and resting on the top of the nozzle and the spring 15 resting against the crosspiece 17 on the bracket 18.

The ends of a bracket 19 are pivoted near the ends of the saddle 2 by a plurality of pins 21 seated in the walls of the nozzle 1. The bracket 19 includes an integral crosspiece 22 having a projection 23 formed or otherwise suitably attached in the center thereof, and provided with an aperture 24 for engagement with a pull cord or lever.

The ends of the bracket 19 are formed at an angle to the main body, as shown at 25, so that in the normal position the bracket will be disposed at an angle to the saddle, while the ends will lie in parallel relation. The main portions of the bracket and the angular ends each form in effect integral pairs of levers. The angular ends of the bracket are pivoted to the ends of the saddle by a plurality of pins 26 in line with, but removed from, the pins 21 so that when the bracket 19 is pulled upward, it will pivot on the pins 21 seated in the body of the nozzle and push the saddle downward against the force of the spring 15 engaging the bracket 18, pivoting on the pins 26.

A plurality of integral, upwardly projecting lugs are formed on the top sides of the saddle near the ends above the pins 21 adapted to be engaged by a plurality of pins 28 welded on the outside of the arms of the bracket 19. A bar 29 is welded or otherwise mounted transversely against the top of the nozzle to act as a stop for the arms forming the bracket and limit the movement of the saddle.

A gasket 31 is secured against the inside surface of the cap 12, and the mouth of the nozzle preferably turned to provide a narrow edge and thus afford only a small bearing surface against the gasket to increase the pressure of the closure. The gasket may be composed of any suitable soft material which will not be affected by the particular chemicals flowing through the nozzle, such materials as lead, asbestos or rubber being generally suitable, as they are able to withstand the action of the substances most commonly used.

It is intended that the valve mechanism be mounted on a nozzle, such as that shown in Figure 3, consisting of an elbow 32 connected by a coupling 33 to a pipe 34. The pipe 34 is welded or otherwise suitably secured in a container 35 mounted under the fuselage of an airplane in any suitable manner. One end of a pull cord 36 is attached to the lever operating the valve, and the other end is fixed in the cockpit so that a pilot or observer may operate the valve at will, it being manifest, as hereinbefore described, that all or only a portion of the contents of the tank may be released.

The operation of this invention may be readily understood by having reference to Figure 1. The section of pipe 1 forming the nozzle may be, as indicated hereinbefore, the termination of a pipe connected to a receptacle containing the substances which it is desired to dispense, and suitably mounted on a vehicle or a land emplacement. The pull cord 36 is attached through the aperture 24 in the projection 23 formed on the bracket 19 acting as an operating lever and connected to any suitable operating point, such as the cockpit of an airplane or a desirable interior location on a tank.

In the instance of land emplacements, or in other installations where it is desired to employ a number of the valves, it is apparent that the cords or levers employed may be arranged so that the entire number may be operated simultaneously or provision afforded for operating them singly.

When the bracket 19 is raised by force exerted by the pull cord 36, the arms will move in a counter clockwise direction, the pins 21 acting as pivots. The pins 26 hinged on the end of the saddle will concomitantly be forced off center, thus moving the saddle structure and cap 12 forward and away from

the mouth of the nozzle 1. The arms of the bracket, acting as levers and continuing to move in a counter clockwise direction, cause the pins 28 welded thereon to engage the fixed lug 27 on the saddle and thus move the valve cap backward and over the mouth of the nozzle, allowing a free path of flow for the fluid emitted from the line in the removed position, preventing contact of any of the substances with the valve structure.

When the tension on the bracket 19 is released by removing the force from the pull cord, the spring 15, pressing against the crosspiece on the bracket 18, will automatically return the saddle to its normal position, determined by the set screw 8 acting as a stop on the top of the nozzle, thus locking the closure in position over the mouth of the pipe.

It will be apparent that a number of containers having valves of the character described on the outlet lines may be attached to an airplane, depending upon the size of the craft, or one large receptacle used if the same is found more suitable, and in like manner similar installations may be made on tanks.

It is to be noted that in this design of valves the discharge line may be made of any soft corrosion resisting material, while the working parts can be composed of stronger metal, like steel or duralumin, and thus insure against breaking of the valve.

There is accomplished by this invention a nozzle for dispensing reactive substances from aircraft, tanks and the like having an improved valve mechanism simple in construction and positive in operation, operating out of the path of flow of the substances dispensed, which affords no obstruction to the free discharge of such substances and which may be opened against pressure and automatically closed and prevented from opening by any pressure in the system.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. A nozzle comprising a valve having a closure, a saddle slidably mounted on the nozzle for carrying the closure, a plurality of levers fulcrumed on the nozzle, each of said levers pivotally connected to the saddle, lugs formed upon said saddle, pins seated in the levers adapted to engage the lugs on the saddle so as to swing the saddle about the pivots connecting it to the levers, a cross piece mounted on the top of the nozzle to limit the movement of said levers, and means connected to said saddle and to the nozzle for normally maintaining the closure over the discharge end of the nozzle.

2. A nozzle for reactive substances, comprising a valve having a closure, a saddle resting on the nozzle for carrying the closure, a bracket pivoted on the ends of the saddle spanning the bottom of the nozzle, a leaf spring engaging the bracket mounted on the bottom of the nozzle, and a plurality of levers pivoted on the side of the nozzle back of the closure, and other levers formed on the levers and pivoted on the saddle to operate the valve against spring tension through movement of the saddle, and to lock the closure.

3. A nozzle for reactive substances, comprising a valve having a closure, a saddle resting on the nozzle for carrying the closure, a plurality of levers fulcrumed on the sides of the nozzle back of the closure, and other levers formed on the levers and pivoted on the saddle, and means pivoted on the levers adapted to cooperate with means formed on the saddle to operate the valve

4. A nozzle for reactive substances, comprising a valve having a closure, a saddle resting on the nozzle for carrying the closure, lugs formed on the saddle, a plurality of levers fulcrumed on the sides of the nozzle back of the closure, and other levers formed on the levers and pivoted on the saddle and means provided on the levers to engage the lugs on the saddle so as to swing the saddle about the pivots connecting it to said levers.

5. A nozzle for reactive substances comprising a valve having a closure, a saddle resting on the nozzle for carrying the closure, lugs formed on the saddle, a plurality of levers fulcrumed on the sides of the nozzle back of the closure, and other levers formed on the levers and pivoted on the saddle, pins seated in the levers to engage the lugs on the saddle so as to swing the saddle about the pivots connecting it to said levers, and means to limit the movement of the levers.

6. A nozzle for reactive substances comprising a valve having a closure, a saddle resting on the nozzle for carrying the closure, lugs formed on the top ends of the saddle, a bracket forming a plurality of levers fulcrumed on the sides of the nozzle back of the closure, and other levers formed on the levers and pivoted on the saddle, pins seated in the levers to engage the lugs on the saddle so as to swing the saddle about the pivots connecting it to said levers, and a crosspiece mounted on the top of the nozzle to limit the movement of the levers.

In testimony whereof I affix my signature.

ARMAND V. MOTSINGER.