Jan. 20, 1953 H. A. ROSELUND 2,626,185

FLUID STREAM AND SPRAY GUN HAVING A CLEAN OUT PIN

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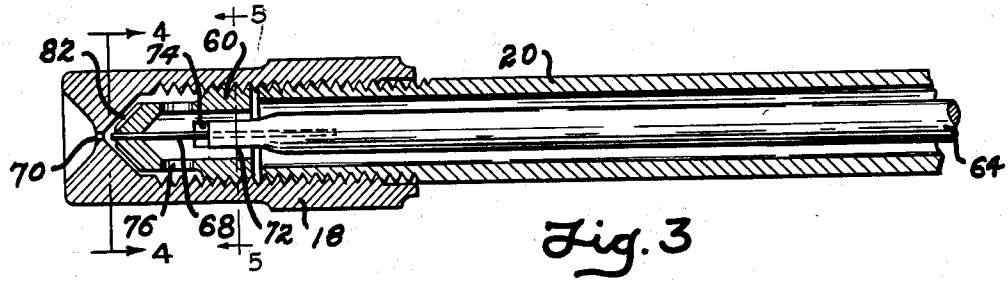

Fig. 3

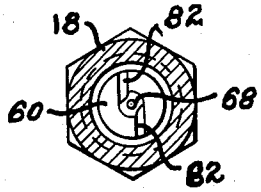

Fig. 4

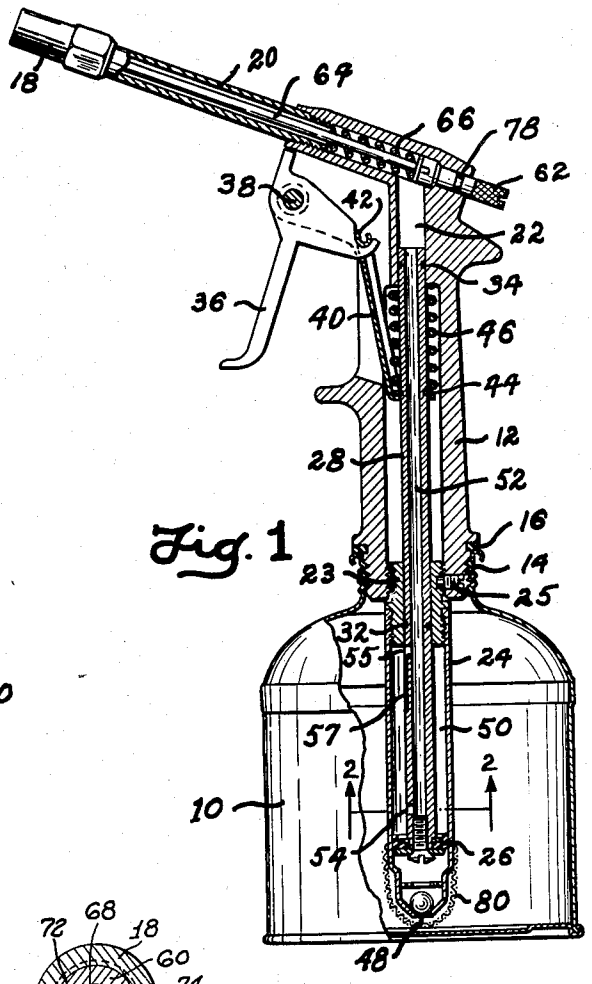

Fig. 1

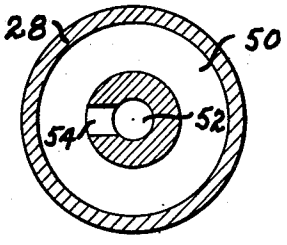

Fig. 2

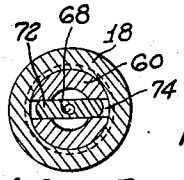

Fig. 5

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FLUID STREAM AND SPRAY GUN HAVING A CLEAN OUT PIN

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9 Claims. (Cl. 299—59)

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This invention relates to a fluid stream and spray gun of the general type used for dispensing liquids of various kinds and represents an improvement over the gun shown in my earlier Patent No. 1,900,668.

Guns of this type are frequently used in places where they are given very rough treatment and therefore must be designed to withstand much abuse and at the same time must be made to sell in competition with low cost inferior designs. It is an object of this invention to eliminate the need for using a large number of precision parts or parts which are quick to bind if not assembled with care.

Another object of this invention is to provide a low cost dispenser having a very simple and handy means whereby the fluid may be dispensed either in the form of a fine spray or in the form of a fluid stream.

The nozzle opening in guns of this general type frequently becomes clogged either because of sediment which may be present in the fluid to be dispensed or because of dirt entering the nozzle opening. It is, therefore, necessary to provide some convenient means for quickly clearing out obstructions from the nozzle outlet. It is an object of this invention to provide a spray gun in which an improved means is provided for thus clearing obstructions for the nozzle.

More particularly, it is an object of this invention to provide a spray gun in which operation of a single button is used for either cleaning the nozzle or for changing the characteristics of the fluid stream leaving the nozzle.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawing:

Figure 1 is a vertical sectional view showing the general construction and arrangement of the parts;

Figure 2 is a sectional view on an enlarged scale taken substantially on line 2—2 of Figure 1;

Figure 3 is a sectional view on an enlarged scale showing the nozzle construction;

Figure 4 is a sectional view taken substantially on line 4—4 of Figure 3; and

Figure 5 is a sectional view taken substantially on line 5—5 of Figure 3.

Referring now to the drawing wherein I have shown a preferred embodiment of my invention, reference numeral 10 designates the main liquid receptacle which is adapted to contain a supply of liquid to be dispensed. Reference numeral 12

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designates a pistol grip type of handle which is provided with a conventional screw threaded connection 14 to the receptacle 10 as shown. A suitable gasket 16 is provided between the upper end of the receptacle 10 and the handle 12 so as to prevent the leakage of liquid at this point. The handle 12 is preferably in the form of a casting which serves not only as a handle but also serves as a support for the pumping mechanism and the dispensing nozzle and nozzle control mechanism. The nozzle 18 is screw threaded or otherwise secured to the outer end of the pipe 20 which in turn is supported adjacent the upper end of the handle 12 and which has its central passage communicating with a central passage 22 formed in the handle 12.

A self aligning piston guide bearing 23 is loosely carried by the lower end of the handle, as shown. The connection between the bearing 23 and the handle is a threaded connection in which the pitch diameter of the threads on the bearing 23 is one to two hundredths of an inch less than the pitch diameter of the threads on the handle. The clearance between the threads constitutes a labyrinth passage through which air may freely enter to replace the oil dispensed but through which only a negligible amount of oil would ever pass. This clearance thus serves a multiple purpose. A set screw 25 is used to prevent unscrewing of the guide after the parts are once assembled.

A tubular extension 24 is threaded to the guide bearing 23 and this extension serves as a pumping cylinder in which a plunger 26 is adapted to operate. The plunger 26 is a conventional cup-shaped member as shown in the drawing and is carried by the lower end of a hollow rod 28 which is supported for sliding movement within the guide bearing 23 carried by the handle 12, as shown. Upon downward movement of the plunger, the fluid being pumped rushes past the plunger, but upon upward movement of the plunger, the fluid above the plunger is forced upwardly ahead of the plunger in accordance with well-known principles. Leakage of fluid between the rod 28 and the bearing 23 is prevented by means of a fluid seal 32 which is preferably in the form of an O ring disposed within a circumferential groove formed on the rod 28. The upper end of the rod 28 slides within the central fluid passage and guide recess 22 formed in the handle 12. A similar fluid seal 34 is provided at the upper end of the rod 28, as shown, so as to prevent any leakage between the rod 28 and

the walls of the fluid passage 22. The clearance between the threads on the handle 12 and the guide bearing 23 eliminates the danger of binding between the rod and either the bearing 23 or the handle 12.

Reciprocation of the piston 26 is produced by operation of the bell crank lever or trigger 36 which is pivotally supported on the handle 12 by means of a fixed pin 39. When the operator applies pressure on the bell crank lever 36, the piston rod 28 is pulled upwardly by means of the connecting link 40 which has its upper end journalled in the bell crank lever 36, as indicated at 42, and which has its lower end arranged to engage a shoulder 44 provided on the rod 28. A coil spring 46 serves to bias the piston rod 28 downwardly at all times and consequently as the pressure on the trigger 36 is relieved, the piston rod 28 moves downwardly.

Fluid to be pumped enters the lower end of the pumping chamber 24 through a check valve 48 which allows free flow of fluid into the pumping chamber but prevents the escape of fluid therefrom when the piston 26 moves downwardly. As the piston 26 moves upwardly, the fluid which has entered the cylinder chamber 50 is forced through the aperture 54 into the hollow passage 52 provided in the piston rod 28. As the piston rod continues to move upwardly, the fluid trapped in the chamber 50 is forced up through the passage 52, the passage 22 in the handle 12, the pipe 20, and is discharged out through the nozzle 18. Any air which may be trapped in the pumping chamber 50 may escape through the hole 55 in the side wall of the piston rod 28. A portion of the rod 28 is cut away directly beneath the hole 55 as indicated at 57, so as to allow air to escape even after the hole 55 moves up into the bearing 23.

In order to control the flow of fluid from the nozzle, there is provided a rotatable element 60 within the nozzle which is provided with a screw threaded connection to the inner wall of the main nozzle housing. The location of the member 60 within the nozzle may be changed by rotating the button 62 which is drivingly connected to the outer end of the plunger 64. The plunger 64 may be either rotated or reciprocated. A spring 66 serves to bias it into the position in which it is shown in Figure 1 of the drawing. However, pressure on the button 62 serves to reciprocate the plunger 64 so that the projecting pin 68 carried by the plunger 64 enters the nozzle orifice 70 so as to clear out any obstructions that may be lodged therein. This reciprocation of the plunger 64 does not change the location of the element 60, as the flattened end portion 72 of the plunger 64 is free to slide within the slot 74 which is provided in the end of the member 60.

By turning the button 62, the member 60 will be moved toward or away from the outlet orifice 70 in the nozzle, depending upon the direction of rotation of the button. The member 60 is provided with one or more grooves 82 adjacent the outer end which are so arranged that when the member 60 moves toward the orifice, the grooves cause the liquid passing between the member 60 and the nozzle wall to flow in a direction tangential to the walls of the orifice 70 so as to cause the liquid to leave the nozzle in the form of a fine spray. These grooves have no appreciable effect when the element 60 is moved toward the rear and consequently the liquid then leaves the nozzle in a solid stream or jet. Thus, when the member 60 is moved away from the outlet of the nozzle by rotation of the button 62, the liquid will be delivered from the nozzle in a solid stream, whereas if the member 16 is moved up toward the nozzle outlet, the liquid will leave the nozzle in the form of a fine spray.

The member 60 is a hollow screw machine part which may be manufactured very cheaply and still have the necessary accuracy required. Apertures 76 are provided in the side walls of the member 60, as shown, so that the liquid coming through the tube 20 can find its way to the orifice 70. Both ends of the plunger 64 are flattened, as shown, and loosely fit within slots in the members 60 and 62, as shown. By virtue of this construction, there is no trouble in obtaining proper alignment of the parts and all danger of binding has been eliminated. A suitable seal 78 has been provided on the shank of the button member 62 so as to prevent leakage between the member 62 and the opening in the handle 12 through which the member 62 slides.

A screen 80 has been provided at the inlet to the pumping chamber, as shown, so as to prevent dirt particles from entering the pumping chamber.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. A device for use in dispensing liquids comprising in combination, a tube, a nozzle mounted on one end of said tube and consisting of a head having a central orifice, a fluid flow control insert threaded within said nozzle for controlling the discharge of fluid through said nozzle upon reciprocation of said insert, a rod disposed within said tube having one end thereof arranged in free sliding relationship to said insert, a clean-out pin carried by the one end of said rod adapted for movement into said orifice for cleaning the same, and complementary means formed on said rod and said insert for transmitting rotary movement to said insert upon rotation of said rod.

2. In a device of the class described, a nozzle having a restricted discharge orifice, a rod free to slide in said nozzle and having a needle-like extension at one end adapted to pass through said orifice for cleaning the same, a fluid flow control insert means disposed within said nozzle for varying the flow of fluid through said orifice in response to rotation of said insert means, complementary means on said rod and said insert means for preventing relative rotation between said rod and said insert means, means connected to said nozzle forming a fluid passage surrounding said rod, and a push button projecting through the one end of said passage and having an articulated connection with said rod whereby reciprocation of said push button imparts longitudinal movement to said rod.

3. A spray device for use in dispensing liquids, comprising in combination, a liquid delivery tube having a threaded end portion, a nozzle element provided with internal threads for cooperation with said threaded end portion, an insert within said nozzle element having external threads of the same size as the threads on said tube for cooperation with one portion of the threads on

said nozzle element, said nozzle element having a discharge orifice formed in the one end thereof, a plunger disposed within said tube and including means for imparting rotation to said insert so as to adjust the position of said insert within said nozzle element for adjusting the fluid stream, and a clean-out pin carried by one end of said plunger in alignment with said orifice whereby upon reciprocation of said plunger said clean-out pin moves through said orifice.

4. A spray device for use in dispensing liquids, comprising in combination, a liquid delivery tube having a threaded end portion, a nozzle element provided with internal threads for cooperation with said threaded end portion, an insert within said nozzle element having external threads of the same size as the threads on said tube for cooperation with one portion of the threads on said nozzle element, said nozzle element having a discharge orifice formed in the one end thereof, a plunger disposed within said tube and including means for imparting rotation to said insert so as to adjust the position of said insert within said nozzle element for adjusting the fluid stream, a clean-out pin carried by one end of said plunger in alignment with said orifice whereby upon reciprocation of said plunger said clean-out pin moves through said orifice, and means for either reciprocating or rotating said plunger including a plunger operating button having an articulated connection to the one end of said plunger.

5. In combination with a liquid discharge tube, a nozzle having a restricted orifice at the discharge end thereof, a fluid flow control insert mounted within said nozzle and formed with channel means in its forward face, said channel means being arranged to direct the liquid flowing therethrough in tangential relation to the inner walls of the orifice, means for causing reciprocation of said insert relative to said orifice in response to rotation of said insert, reciprocating means for cleaning out said orifice, and means comprising a common operator for selectively rotating said insert and/or reciprocating said means for cleaning out said orifice.

6. In a nozzle, means forming a nozzle housing having a restricted discharge orifice at the one end thereof, a fluid flow control insert mounted within said nozzle and formed with a channel in its forward face for imparting a swirling action to the liquid in response to movement of said fluid flow control insert toward said restricted orifice, means for causing reciprocation of said insert relative to said orifice in response to rotation of said insert, reciprocating means for cleaning out said orifice, and means comprising a common operator for selectively rotating said insert and/or reciprocating said means for cleaning out said orifice.

7. In combination with a liquid discharge tube, a nozzle having a restricted orifice at the end thereof, a fluid flow control insert mounted within said nozzle and formed with a channel in its forward face, the discharge end of said channel being arranged in tangential relation to the inner walls of the orifice, means for causing reciprocation of said insert relative to said orifice in response to rotation of said insert, reciprocating means for cleaning out said orifice, and means comprising a common operator for selectively rotating said insert and/or reciprocating said means for cleaning out said orifice.

8. In a device of the class described, a nozzle having a discharge orifice at its one end, a handle element secured to said nozzle, pump means for forcefully feeding liquid to said nozzle and including a pump operating trigger disposed adjacent one side of said handle element for engagement by one or more of the operator's fingers while grasping the handle element, a fluid flow control element disposed within said nozzle, means for causing reciprocation of said fluid flow control element in response to rotation thereof so as to vary the flow through said nozzle, a plunger disposed within said nozzle and having a driving connection with said fluid flow control element, a plunger operating button projecting from the opposite side of said handle element for engagement by the operator's thumb, said plunger having a clean-out pin on its one end edapted to be pushed through said nozzle orifice upon reciprocation of said plunger, and means for biasing said plunger and said clean-out pin away from said orifice.

9. In a device of the class described, a nozzle means, a handle secured to said nozzle means, said nozzle means having a fluid flow passage formed therein and having a discharge orifice at its one end communicating with said fluid flow passage, means for pumping fluid into said passage including a trigger-like pump operator having a trigger portion projecting from one side of said handle, a fluid flow control element disposed within said nozzle means, means for causing reciprocation of said fluid flow control element in response to rotation thereof so as to vary the flow through said orifice, a plunger disposed within said fluid flow passage and having a driving connection with said fluid flow control element, a plunger operating button projecting from the opposite side of said handle, said plunger having a clean-out pin on its one end adapted to be pushed through said nozzle orifice upon reciprocation of said plunger, and means for biasing said plunger and said clean-out pin away from said orifice.

HAROLD A. ROSELUND.

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