July 9, 1929. A. E. HOLMES 1,720,044

SOAP DISPENSER

Filed March 11, 1927

FIG. 1.

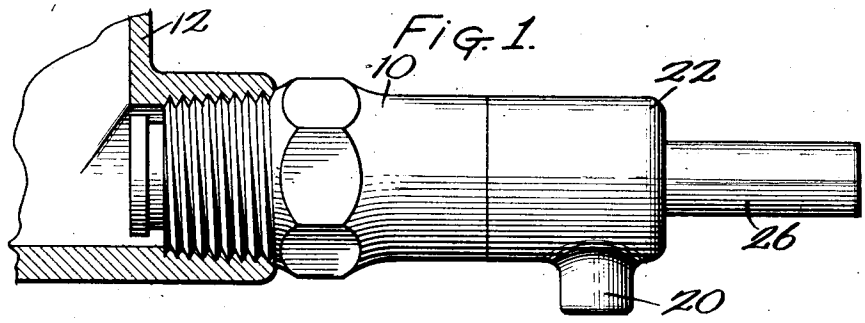


FIG. 2.

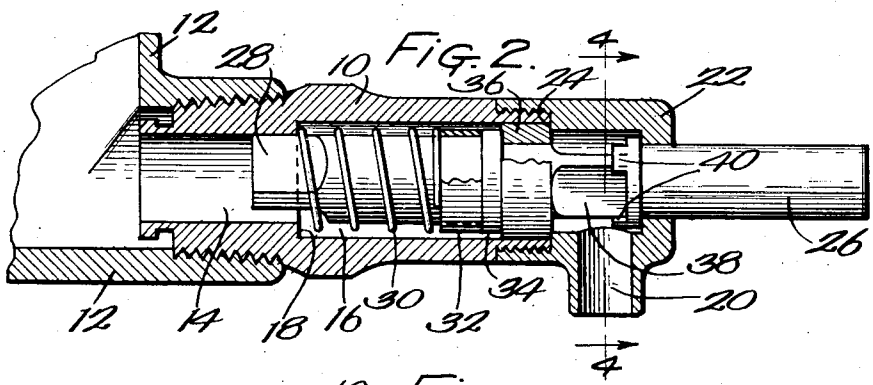


FIG. 3.

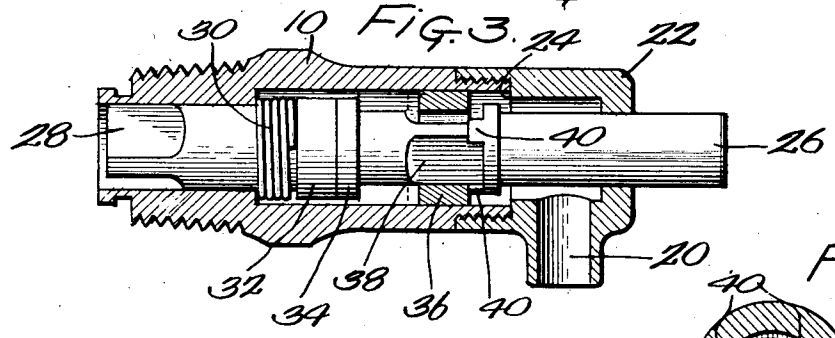


FIG. 4.

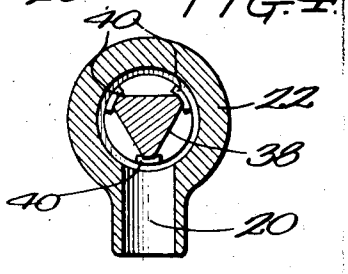
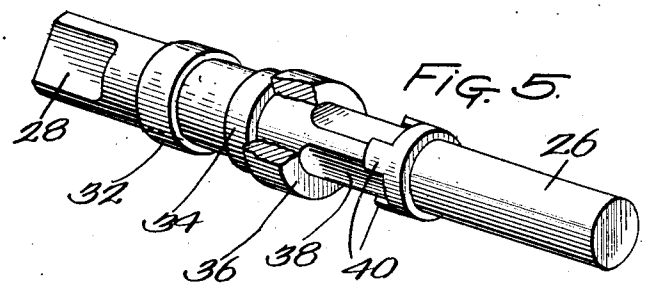


FIG. 5.



INVENTOR
ALFRED E. HOLMES
BY Cheever & Cox ATTY'S

Patented July 9, 1929. 1,720,044

UNITED STATES PATENT OFFICE.

ALFRED E. HOLMES, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM H. PLUNKETT, OF CHICAGO, ILLINOIS.

SOAP DISPENSER.

Application filed March 11, 1927. Serial No. 174,472.

My invention relates to liquid dispensers, and one object of the invention is to provide a dispenser of simple construction and reliable operation. Another object is to provide simple means for varying the cutoff at the inlet port of the casing, that is, the amount of inward movement which the stem may make before it covers or closes the inlet port. Another object is to provide means for regulating the amount of travel of the stem to assist in regulating the amount of liquid which will be delivered at each stroke of the stem.

These and other objects are obtained by the construction illustrated in the accompanying drawing, in which

Figure 1 is a side elevation of the complete device.

Figure 2 is a side elevation chiefly in central section.

Figure 3 is similar to Figure 2, but shows a changed position of the parts.

Figure 4 is a cross sectional view on the line 4—4 Figure 2; and

Figure 5 is a perspective view of the stem and some of the parts carried thereby.

Like numerals denote like parts throughout the several views.

In the form illustrated in the drawing, the device has a casing 10 which screws into or otherwise connects with a reservoir 12 of any suitable design. The casing has an inlet port 14 which is cylindrical and communicates with a piston chamber 16 of somewhat larger diameter, thus resulting in the formation of an annular shoulder 18. There is an outlet port 20 formed in a section 22 of the casing which preferably screws onto the main section 2 and functionally is a part of it. This outer section 22 has an internal diameter somewhat smaller than the diameter of the piston chamber, thus forming an annular shoulder 24 at the outer end of the piston chamber.

Slidably mounted within the casing is a stem 26 which projects beyond the outer end of the casing to form a handle or pusher in the well known manner. At the inner end the stem is cut away at the side to form bypasses 28 through which the liquid may flow from the inlet port 14 to the piston chamber 16 when the stem is in the normal projected position shown in Figure 2. However, the cut away portion of the stem serves chiefly as a guide for the stem and may be omitted, for in any event the stem, fitting as it does the inlet port, would control said port when the stem is reciprocated.

A helical compression spring 30 surrounds the inner end of the stem and at one end abuts a shoulder 18 and at the other end abuts a loose ring or collar 32 which is slidable upon the stem and in turn abuts a collar 34 which is secured to or integral with the stem.

A ring piston 36 fits slidingly within the piston chamber and on the stem, and is located between the fixed collar 34 on the stem and the annular shoulder 24. Thus, among other things, the piston limits the outward travel of the stem in the casing. The ring piston performs another function, common to pistons, that is, of forcing the liquid ahead of it when it travels in the outward direction for discharging. It performs a third function, viz, that of a valve for covering and uncovering bypass ports 38 which are formed by partially cutting away the sides of the stem between the collar 34 and projections 40 which projections are integral with a ring rigidly attached to the stem. These ports communicate with the outlet port 20. Stops 40 are fixed on the stem for limiting the outward travel of piston 36 relative to the stem.

In operation when the device is at rest the parts occupy the position shown in Figures 1 and 2, and the liquid is free to flow from the reservoir into the piston chamber 16. Spring 30 presses outward on ring 32, which presses outward on fixed collar 34, and this in turn presses against the ring piston 36 and holds it in contact with the annular shoulder 24 at the outer end of the piston chamber. Under these conditions the piston through the bypass ports 38 prevents the liquid from escaping from the piston chamber.

If, now, the operator begins to push inward on the stem, he soon causes the full body of the stem to enter the inlet port 14, thus cutting off communication between the inlet port and the piston chamber 16. As soon as this happens, the liquid which is of course incompressible, prevents any further inward movement of the ring piston 36, if any has occurred due to friction, until it is forced by projections 40, with the result that the continued inward travel of the stem soon brings the inner end of the bypass

ports 38 past the inner edge of the ring piston, thus uncovering said bypass ports as indicated in Figure 3. Consequently, the liquid passes out through these ports into the main outlet port 20, and the amount of liquid which thus passes will depend upon the amount of inward travel of the stem after the bypass ports have begun to be uncovered. The inward movement of the stem may be continued until the coils of the spring are entirely closed as shown in Figure 3. It will be evident that if a wider collar 32 were substituted for the one shown the spring would close earlier, and thus a smaller amount of liquid would be passed. It will also be evident that if a ring piston of greater width than piston 36 were substituted, the bypasses 28 would be closed earlier in the inward travel of the stem, and thus, all other dimensions being equal, a smaller amount of liquid would be passed for a complete stroke of the stem. This, however, is subject to certain limitations in that the width of the ring piston must not be such as to prevent the uncovering of the bypass ports 38. But it will be evident that the timing and the quantity of liquid passed for each complete stroke of the stem may be regulated by substituting for the rings 32, 36 similar rings of different width. On the return movement the drag of the walls of the piston chamber on the piston will cause the piston to lag and cover the bypass ports 38, thus trapping the liquid in front of the piston and causing the liquid to be forced through the outlet.

It will be evident that as a result of the described construction piston 36 performs a quadruple function of limiting the outward travel of the stem, forcing the liquid outward, covering and uncovering the bypass ports 38 and regulating the amount of liquid dispensed at a single stroke.

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

1. A liquid dispenser having a casing with inlet and outlet ports, a reciprocable stem slidable within the casing for covering and uncovering the inlet port, the stem having a bypass port in the side, and a ring piston slidably mounted on the stem and slidable relatively to the casing and stem for preventing the flow of liquid through the bypass port when the stem uncovers the inlet port and for permitting the flow of liquid through the bypass port when the stem covers the inlet port.

2. A liquid dispenser having a casing with an inlet port, an outlet port and a piston chamber located between them, a ring piston slidable in the piston chamber, a reciprocable stem capable of occupying two positions in the first of which it uncovers the inlet port, and in the second closes the same, the piston being slidable on the stem and the stem having a bypass port in the side through which liquid may pass to the outlet port, and means on the stem for limiting the amount of relative movement between the stem and the piston to thereby cause the bypass port in the stem to be covered and uncovered.

3. A liquid dispenser having a casing with an inlet port, an outlet port and a piston chamber located between them, a ring piston slidable in the piston chamber, a reciprocable stem capable of occupying two positions in the first of which it uncovers the inlet port, and in the second closes the same, the piston being slidable on the stem and the stem having a port in the side through which liquid may pass to the outlet port, means on the stem for limiting the amount of relative movement between the stem and the piston to thereby cause the port in the stem to be covered and uncovered, and stops formed on the stem on opposite sides of the piston for limiting the amount of motion thereof.

4. A liquid dispenser having a casing with inlet and outlet ports, a reciprocable stem slidable within the casing for covering and uncovering the inlet port, the stem having a bypass port in the side, a ring piston slidable relatively to the casing and stem for covering the bypass port when the stem uncovers the inlet port and uncovering the bypass port when the stem covers the inlet port, a helical spring surrounding the stem within the casing, a collar fastened to the stem and a loose ring surrounding the stem between the collar and the spring, the spring at one end abutting against the ring and at the other end against the casing for normally holding the plunger in outward position in the casing.

5. A liquid dispenser having a casing having a piston chamber with an inlet port at one end and an outlet port at the other, a reciprocable stem adapted to open the inlet port when the stem is in outward position and close it after a partial inward movement, the stem having a bypass port in the side communicating with the outlet in the casing, a ring piston surrounding the stem and making a sliding fit with the stem and piston chamber, and means on the stem for pushing the ring piston outward to eject the contents as the stem moves outward.

6. A liquid dispenser having a casing with a piston chamber in the middle and an inlet port and outlet port at opposite ends of reduced diameter, a ring piston slidable in the piston chamber, and a stem slidable in the casing and extending through and slidable relatively to the ring piston, the stem having a collar and projections oppositely positioned with respect to the sides of the piston at a distance apart greater than the length of the piston for actuating the piston,

and having a bypass port in the side, the stem controlling the inlet port and normally uncovering it and holding the piston in position to cover said bypass port, the piston being of such length as to uncover the bypass port when in contact with the outer projection on the stem.

7. A liquid dispenser having a casing with a piston chamber formed within it with an inlet port at one end and an outlet port at the other end, the inlet port being of reduced diameter to provide an annular shoulder, a stem slidable longitudinally in the casing to control the inlet port, a piston for controlling the flow of fluid from the piston chamber to the outlet port, said piston being controlled by the stem, a fixed collar on the stem serving as a stop, and a ring slidably mounted on the stem between said stop and the inner end of the piston chamber.

8. A liquid dispenser having a casing with a piston chamber formed within it with an inlet port at one end and an outlet port at the other end, the inlet port being of reduced diameter to provide an annular shoulder, a stem slidable longitudinally in the casing to control the inlet port, a ring piston encircling the stem for controlling the flow of fluid from the piston chamber to the outlet port, a projection on the stem designed for engagement with the ring piston to open the outlet port, a fixed collar on the stem serving as a stop, a ring slidably mounted on the stem between said stop and the inner end of the piston chamber and a helical compression spring surrounding the piston between said ring and the shoulder at the inner end of the piston chamber.

In witness whereof, I have hereunto subscribed my name.

ALFRED E. HOLMES.