May 30, 1933. C. M. SMITH 1,911,474

DISPENSING DEVICE

Filed March 4, 1931

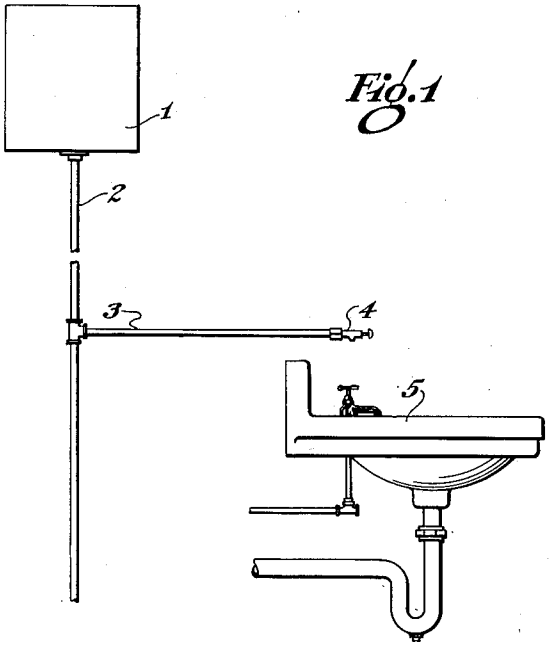


Fig. 1

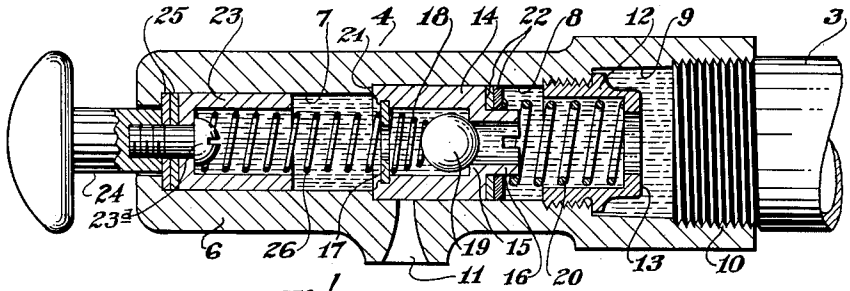


Fig. 2

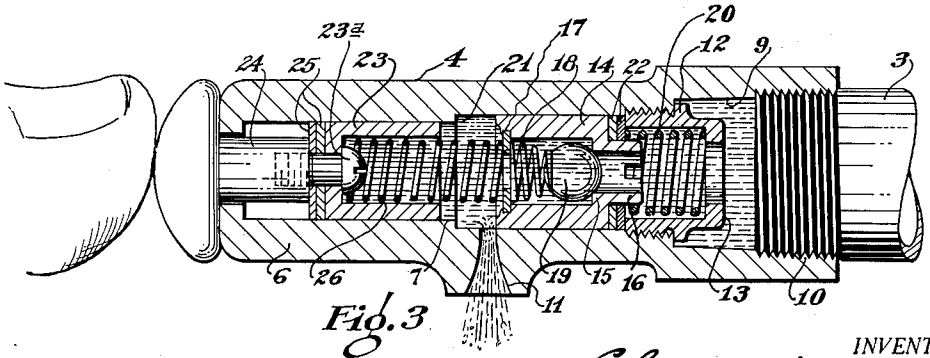


Fig. 3

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DISPENSING DEVICE

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This invention relates to dispensing devices and is particularly applicable to the dispensing of liquids under relatively high pressure.

An object of the invention is to provide an improved dispensing device which will be efficient in operation.

Another object is to provide an improved dispensing device which will not tend to leak even under relatively high pressure.

Another object is to provide an improved dispensing device which will be simple in construction and operation.

Another object is to provide an improved device in which pressure will be so distributed that there will be no tendency to unseat valves, and hence no leakage.

Other objects will hereinafter appear.

The invention will be better understood from the description of one practical embodiment thereof illustrated in the accompanying drawing, in which;

Figure 1 is a somewhat diagrammatic view of a system embodying my invention and designed for dispensing liquid soap, such as used in wash rooms of hotels, office buildings and other large structures;

Figure 2 is a central longitudinal sectional view of the dispensing device forming a part of the system of Figure 1, showing the parts in their normal positions; and

Figure 3 is a view of the parts of Figure 2 showing their positions when being actuated to deliver a quantity of liquid soap.

It is customary, in office buildings, hotels and in many other places, to provide liquid soap systems in which soap is stored in a tank and delivered to more or less faucet-like dispensing devices situated at the various washrooms. If, however, the devices on the various floors are all connected to the same tank, the pressure of the fluid at the dispensing devices on the lower floors is much greater than that on the floors above, and causes the fluid to partially open the valves, and in other manners to leak past the dispensing device, causing wastage of the fluid itself, and also creating an untidy appearance.

The present invention is designed to overcome these disadvantages and to permit the use of a single storage tank which may be situated at a considerable height above a dispensing device which will, however, operate in a satisfactory manner.

In Figure 1, a tank 1 is illustrated which may be positioned several floors above the dispensing device. A conduit 2 extends downwardly from the tank and to this, at the various floors, branch conduits 3 are connected. These conduits are provided on their outer ends with dispensing devices, indicated generally at 4, which are most conveniently arranged as shown in Figure 1, that is, closely adjacent and preferably above wash basins 5.

The dispensing device itself, as shown in Figures 2 and 3, consists of an outer body portion 6 of generally cylindrical shape having its inner surface formed into three concentric cylindrical portions 7, 8 and 9, each of slightly greater diameter than the one preceding it. The latter, 9, is threaded as at 10 and by means of this thread is attached to the end of branch conduit 3.

An ejection or discharge opening 11 pierces the lower side of the body, entering through the wall of the cylindrical portion 8. Threaded at the end of portion 8 is a bushing or ferrule 12 which is provided with shoulders seating against the shoulder formed between surfaces 8 and 9. At the outer end of the bushing is an inwardly directed flange 13 surrounding a central aperture.

Slidable within, but closely fitting the surface 8, is a hollow piston consisting of a cylindrical skirt 14, and an end or head 15 having a central aperture surrounded by an outwardly extending flange 16. Adjacent the other end of the piston is a washer 17 situated in a recess formed in skirt 14 and retained in place by rolling over the outer edge of the skirt. This washer serves as an abutment for a spring 18 which, in turn, bears upon a ball 19 constituting a check valve and seating upon the edge of the opening through the piston head 15. A spring 20 is positioned between flange 13 and head 15, and serves to hold the piston against shoulder 21 which connects surfaces 7 and 8, the

spring being held in central relation by extension 16, and having two washers 22 interposed between it and the piston. The outer washer is of metal or other hard material, and the inner of leather, rubber or other somewhat flexible material, so that the pressure on the inner washer causes it to expand and act as a packing.

In the outer end of the dispensing device and slidable within the cylindrical surface 7 is a cup-shaped plunger 23 and secured to it by a screw 23*a* is an operating handle 24 extending through an opening in the outer or front end of the body, washers 25 being interposed between the plunger and the end of the handle. The washer adjacent the plunger is of flexible material such as leather or rubber, and the outer washer of metal, these two constituting a kind of packing as do the washers 22. A spring 26 is received within the plunger and bears at one end thereon, while at the other end it bears upon washer 17.

Spring 20 is considerably stronger than spring 26, so that in the absence of any fluid within the chamber between the piston and the plunger, the former will be moved to the position shown in Figure 2, in which it is stopped by abutting against shoulder 21. Spring 26 is merely strong enough to return the actuating handle to extended position as shown in Figure 2, when no substantial pressure is exerted upon the handle. Spring 18 need only be sufficiently strong to move the ball into engagement with its seat and thus close the check valve.

The operation of the device is as follows:— With the parts in the position shown in Figure 2, fluid is admitted through branch conduit 3 and moves ball 9 from its seat, permitting the fluid to fill the space between piston and plunger. The pressure of the fluid has no tendency to move the piston out of engagement with shoulder 21 as the pressures on the ends of the piston substantially equalize each other, there being, if anything, an excess of pressure tending to hold the piston against shoulder 21, due to the small circumferential area of the piston covered by this shoulder. When the pressure on both sides of the check valve has become equalized by the filling of the chamber between piston and plunger with soap, spring 18 causes ball 19 to seat. When it is desired to actuate the device, the user presses the handle 24 inwardly into the position shown in Figure 3. The fluid within the chamber between the piston and plunger transmits the pressure to the piston, causing it to move inwardly or in the right hand direction, as shown in the drawing, to the position of Figure 3, where it will have uncovered the ejection opening 11. As soon as this occurs, the fluid will flow through the ejection opening, the plunger approaching more nearly to the piston as it forces the fluid out and at the same time compressing spring 26.

As soon as pressure between the piston and plunger drops sufficiently, spring 20 will return the former to its normal position, bearing upon shoulder 21 and, as soon as the user releases the operating handle, spring 26 will return the handle and plunger to their normal positions. The pressure of the fluid will again unseat the check valve and fill the chamber with a new charge which will be ejected upon the next operation of the handle.

While I have described the illustrated embodiment of my invention in some particularity, obviously many other embodiments will readily occur to those skilled in this art, and I, therefore, do not limit myself to the precise details shown and described, but claim as my invention all embodiments, variations and modifications coming within the scope of the appended claims.

I claim:

1. Dispensing apparatus comprising a force pump having a manually actuated plunger, a sleeve valve controlling the discharge from said pump, and a check valve carried by said sleeve valve and cooperating therewith to constitute a piston when the plunger is operated.

2. A dispensing device comprising a hollow body having two cylindrical portions, a manually operated plunger sliding in one of said portions, a sleeve valve sliding in the other cylindrical portion, a check valve carried by the sleeve valve and arranged to permit fluid to pass through the sleeve valve toward the plunger, a discharge opening controlled by said sleeve valve, and a spring pressing the sleeve valve in the direction to close said discharge opening.

3. A dispensing device comprising a hollow body having two cylindrical portions, a manually operated plunger sliding in one of said portions, a sleeve valve sliding in the other cylindrical portion, a check valve carried by the sleeve valve and arranged to permit fluid to pass through the sleeve valve toward the plunger, a discharge opening controlled by said sleeve valve, a spring pressing the sleeve valve in the direction to close said discharge opening, and a spring urging the plunger away from the sleeve valve.

4. A dispensing device comprising a hollow body provided with three coaxial internal cylindrical surfaces, a plunger slidable within the first of said surfaces and provided with an actuating handle, a sleeve valve slidable in the second cylindrical surface and arranged to overlie a discharge opening, the valve when in a position to cover the opening abutting a shoulder between the first and second cylindrical surfaces, a passage through said sleeve valve provided with a check valve, a spring interposed between the plunger and sleeve valve, a bushing threaded into said

body at the juncture of the second and third cylindrical surfaces, a spring interposed between the sleeve valve and bushing, and means adjacent the end of the third cylindrical surface for securing the device to a conduit.

5. A dispensing device comprising a hollow body provided with three coaxial internal cylindrical surfaces, a plunger slidable with the first of said surfaces and provided with an actuating handle, expansible packing carried by said plunger, a sleeve valve slidable in the second cylindrical surface and arranged to overlie a discharge opening, the valve when in a position to cover the opening abutting a shoulder between the first and second cylindrical surfaces, a passage through said sleeve valve provided with a check valve, a spring interposed between the plunger and sleeve valve, expansible packing carried by the sleeve valve, a bushing threaded into said body at the juncture of the second and third cylindrical surfaces, a spring interposed between the sleeve valve and bushing, and means adjacent the end of the third cylindrical surface for securing the device to a conduit.

6. A dispensing device comprising a hollow body, a manually operable plunger slidable in said body, a piston freely slidable in said body, stops limiting the motion of said piston, there being a discharge opening through the side of the body arranged to be covered by the piston in one position, and means permitting fluid to pass freely to the space between the plunger and piston and prevent its return.

7. A dispensing device comprising a hollow body, a manually operable plunger slidable in said body, a piston slidable in said body, stops limiting the motion of said piston, there being a discharge opening through the side of the body arranged to be covered by the piston in one position, means permitting the fluid to pass freely to the space between the plunger and piston and prevent its return, and a spring urging the piston to the position in which it covers said discharge opening.

8. A dispensing device comprising a hollow body, a manually operable plunger slidable in said body, a piston slidable in said body, stops limiting the motion of said piston, a discharge opening through the body arranged to be covered by the skirt of the piston in one position, a check valve carried by the piston permitting the fluid to pass freely to the space between the plunger and piston, and a spring urging the piston to the position in which it covers said discharge opening.

9. A dispensing device comprising a body having a hollow cylindrical interior, a manually operable plunger slidable within said body, a piston slidable in said body, the plunger and piston being coaxial, stops limiting the motion of said piston, a discharge opening from the interior of the body adapted to be covered by the skirt of the piston at one limit of its motion, a spring urging the piston to a position covering said discharge opening, and a check valve permitting fluid to pass to the space between the plunger and piston.

10. Fluid dispensing apparatus comprising a force pump having an enclosed chamber provided with an inlet opening and an outlet opening, a sleeve valve slidable within said chamber and arranged always to be interposed between said openings, a check valve interposed between said openings, and a plunger slidable in said chamber.

11. Dispensing apparatus comprising a tubular body having a discharge opening intermediate its ends, a plunger slidable within one end of said body, a source of fluid supply connected to the other end of said body, a sleeve valve slidable in said body between the second mentioned end thereof and said discharge opening and arranged in one position to cover said discharge opening, said sleeve valve comprising an annular skirt, an aperture head, and a ball arranged to seat at said aperture.

12. Dispensing apparatus comprising a tubular body having a discharge opening intermediate its ends, a plunger slidable within one end of said body, a source of fluid supply connected to the other end of said body, a sleeve valve slidable in said body between the second mentioned end thereof and said discharge opening and arranged in one position to cover said discharge opening, said sleeve valve comprising an annular skirt, an apertured head, a ball arranged to seat at said aperture, a spring urging the ball upon its seat, and an abutment for said spring consisting of a washer secured to the skirt of the sleeve valve adjacent the end remote from the head.

In testimony whereof, I hereunto affix my signature this 28th day of February, 1931.

CLARENCE M. SMITH.