Dec. 1, 1964 J. L. MINI 3,159,317

LIQUID SOAP DISPENSER

Filed Sept. 28, 1962

Fig-1

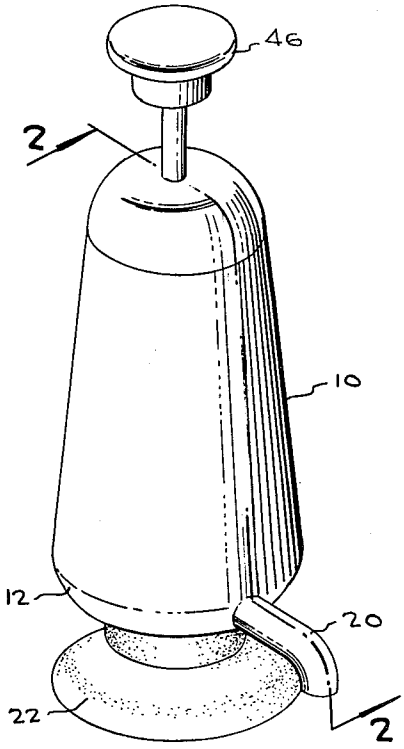


Fig-2

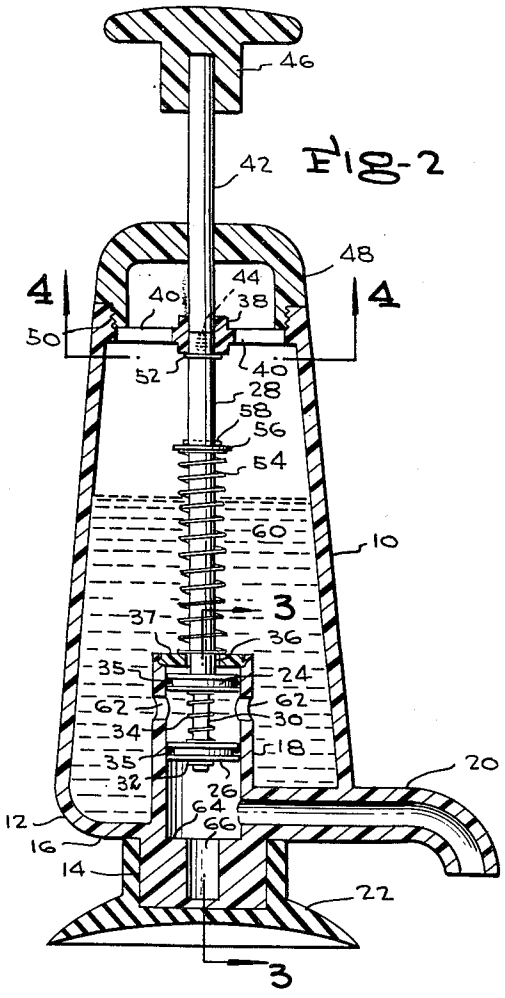


Fig-3

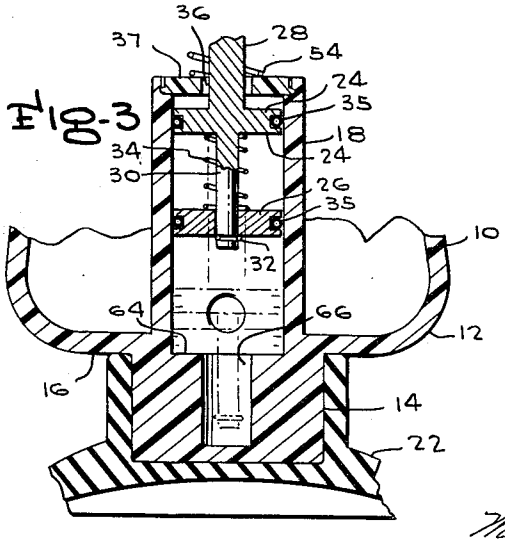
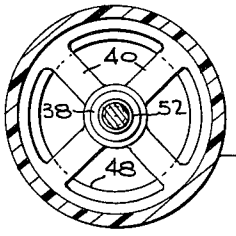


Fig-4



INVENTOR.

JOSEPH L. MINI

BY

McMorrow, Berman + Davidson

ATTORNEYS

United States Patent Office 3,159,317 Patented Dec. 1, 1964

3,159,317

LIQUID SOAP DISPENSER

Joseph L. Mini, 2107 Wynnewood Lane, Peru, Ill.

Filed Sept. 28, 1962, Ser. No. 226,791
7 Claims. (Cl. 222—341)

This invention relates to liquid dispensers, of the metered type, and in particular to a household implement for handling liquid soaps or detergents, although not limited to such use. These modern, liquid, household aids are sold in relatively small containers, and customarily these are kept tucked away, when not in use, among a myriad of other household aids, and must be hunted out for each use, and it is one object of the invention to provide a container or repository for the fluid which is adapted for maintenance in a position of ready availability.

The modern, liquid soaps and the like are provided in highly concentrated form, with the result that relatively small dosages are employed in household operations. As a consequence, the usual hit-or-miss measuring tactics of the housewife result in proportionately greater error, resulting either in inefficiency by reason of low-strength concentration, or wastage by over-concentration. It is, therefore, a further object of the invention to achieve precision of metering, and in particular, to achieve such result by automatic means.

Yet another object is to provide a metering device which, while capable of rigid stationing in a position of customary use, is nevertheless capable of ready removal, for portage.

A still further object is to provide a metering container comprising easily detachable sections affording easy access to the interior for cleaning, inspection, and other forms of maintenance.

The objects also include the provision of a device which is simple of structure, rugged and durable, easy of manufacture, and low in cost.

These and other ends, which will be apparent, are attained by the present invention, a preferred form of which is described in the following specification, as illustrated in the drawing, in which:

FIGURE 1 is a perspective view of the device, assembled,

FIGURE 2 is an axial, sectional view, taken on the plane of the line 2—2 of FIGURE 1,

FIGURE 3 is a fragmental, sectional view of a detail in the region of the piston, enlarged, taken on the plane of the line 3—3 of FIGURE 2, and

FIGURE 4 is a transverse, sectional view, taken on the plane of the line 4—4 of FIGURE 2.

Referring to the drawing by characters of reference, there is shown a composite container, having a main, body portion 10 of generally frusto-conical form, open at the top, and having a rounded, lower corner 12, fabricated from suitable plastic, and carrying, as integral elements of its structure, a shank 14, depending centrally from its base 16, an internal tube or cylinder 18, rising from the base 16, and coaxial with shank 14, and a discharge faucet 20, passing through the wall of body 10, and communicating with the interior of tube 18, near the floor or base 16 of the container. A vacuum cup 22, of suitable, rubbery material, received on shank 14, constitutes a means of fixing the container in place, as on a sinkboard or work table, and will preferably be of a diameter substantially equal to that of container 10, so as to endow it with the necessary degrees of equilibrium and rigidity.

Dispensing of fluid from container 10 through tube 18 and faucet 20, is accomplished by means of a collapsible piston unit, comprising a driving, piston disc 24, and a metering piston 26, movable to and from disc 24 in a cycle of operation. As seen in FIGURE 3, disc 24, which

may be of any suitable material such as aluminum or stainless steel, is an integral part of a piston rod, or push rod 28, and below disc 24 is a reduced, depending, continuation 30 of rod 28, on which the centrally-bored disc 26 is slidably mounted, being retained on the underside by a split, spring ring 32, carried in an annular groove in shank 30, and being biased into position against the keeper ring by a compression coil spring 34, surrounding shank 30 and acting against the two discs. A fluid-tight fit between the discs and the inner wall of tube 18 is provided by O-rings 35, carried in peripheral, annular grooves in the discs.

The piston rod 28 is slidable through a central opening 36 in a friction-fitted, plastic, closure cap 37 in the top opening of sleeve 18, and also has upper, slide-bearing support in a central sleeve 38, carried by spiders 40, extending radially inwardly from the wall of container section 10, near the top thereof. An extension 42 is attached to piston rod 28, as by a threaded, reduced neck 44, and carries a top button 46, secured in any convenient manner, as by friction fit, threads, or pinning. A closure cap 48, secured to container portion 10 by threads 40, is centrally bored to slidably receive rod extension 42, and it will be seen that the container may be recharged upon unscrewing the closure cap.

In FIGURE 2, the driver disc 24 is shown in its uppermost position, and this is determined by a stop means in the form of a split, keeper ring 52, lodged in an annular groove in rod 28, which is interrupted in its upward movement by contact with slide-bearing sleeve 38. The piston system as a whole is biased to this upper position by means of a coil compression spring 54, abutting cap 37 on its lower end, and acting at its upper end on a washer 56, retained by a pin 58, carried in a transverse bore in piston rod 28. The functional effect of the washer and pin is the same as that of a fixed collar on rod 28. In the upper position of the system the fluid 60 in the container freely enters into the tube 18, through openings 62 in the wall thereof, and, therefore, fills the space between the two piston discs, the fluid being retained above the lower disc 26 by the sealing action of the O-ring.

Delivery of the fluid is effected by a downward movement of the piston system by pressure on knob 46 with a finger, thumb, or the heel of the hand. During this downward movement the lower disc 26 retains its fixed distance from upper disc 24, by the distending action of the spring 34, the strength of which is sufficient to overcome any friction of the O-ring with the wall of the tube, and also to overcome any inertial effects due to an unduly rapid actuation of the plunger. Thus, the metered amount of fluid, determined by the spacing of the discs, is maintained, and after the upper disc passes below the ports 62, the metered portion is trapped. When the lower disc reaches the bottom 64 of tube 18, its movement is interrupted, but the shank 30 of the piston rod continues to descend, sliding through the lower disc and into a central well 66 opening through bottom 64, and thus defining a shoulder. At this stage, the inner end of faucet 20 is exposed above disc 26, and the fluid between the discs flows through and out of the faucet, under both the action of gravity and the downward pressure of the upper disc, the final positions of the parts being indicated in broken lines, in FIGURE 3. As shown, there is still a degree of spacing between the discs in the position of full exhaust, occasioned by the presence of the spring 30, as fully compressed, and in predetermining the metering, this is taken account of. However, it will be understood that suitable clearance may be provided in the discs for receiving the compressed spring so that the discs may be brought into contact, if this should be deemed necessary or desirable. In either case, when the downward movement of the piston system has been ar-

rested, the dispensing operation is complete, and upon release of the knob 46 the parts automatically return to the positions shown in FIGURE 2, in readiness for the succeeding delivery.

While a certain, preferred embodiment has been shown and described, various modifications will be apparent, in the light of this disclosure, and the invention should not, therefore, be deemed as limited, except insofar as shall appear from the spirit and scope of the appended claims.

What is claimed is:

1. A metering, dispensing device for fluids, comprising a plastic container of generally frusto-conical form, having a bottom with a central, depending shank, a vacuum cup carried by said shank, a threadedly attached top cover having a central opening, an upright tube in said container, above said shank, and a lateral, discharge conduit communicating with the interior of said tube, near said bottom, said tube having lateral ports near its upper end, and said shank having a central well communicating with the interior of said tube, and defining a shoulder with the bottom thereof, a piston system slidable in said tube, and comprising a push rod having a lower end adapted to be received in said well, a first, coaxial disc fixed near said lower end, and a second, coaxial disc slidably carried on said rod between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surounding said rod between said discs, and urging said second disc against said stop means, a bearing sleeve carried axially of said container, above said tube and slidably receiving said rod, said rod also slidably received in said central opening in said top cover, and having an end knob externally of said top cover, a top closure on said tube, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube closure and said collar, and stop means on said rod, adapted to contact said bearing sleeve, to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

2. A metering, dispensing device for fluids, comprising a container having a top closure cap with a central opening, a central, bearing sleeve near said cap, and a bottom with a central, depending shank mounting a vacuum cup, an upright tube in said container, above said shank, said shank having a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod slidably mounted in the opening in said cap, and in said bearing sleeve, and having a lower end adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against said stop means, a top closure on said tube, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube closure and said collar, and stop means on said rod, adapted to contact said bearing sleeve, to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

3. A metering, dispensing device for fluids, comprising a container having a top closure cap with a central opening, and a bottom with a central, depending shank mounting a vacuum cup, an upright tube in said container, above said shank, said shank having a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod slidably mounted in the opening in said cap, and having a lower end adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against said stop means, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube and said collar, and stop means between said rod and said container, adapted to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

4. A metering, dispensing device for fluids, comprising a container having a top closure cap with a central opening, and a bottom having an upright tube and a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod slidably mounted in the opening in said cap and having a lower end adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against said stop means, a top closure on said tube, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube closure and said collar, and stop means between said rod and said container adapted to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

5. A metering, dispensing device for fluids, comprising a container having a top closure cap with a central opening, and a bottom having an upright tube and a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod slidably mounted in the opening in said cap, and having a lower end adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against said stop means, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube and said collar, and stop means between said rod and said container adapted to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

6. A metering, dispensing device for fluids, comprising a container having a bottom with an upright tube and a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod, having a lower end adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in

spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against stop means, a collar carried by said rod, a compression spring surrounding said rod, and acting between said tube and said collar, and stop means between said rod and said container adapted to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

7. A metering, dispensing device for fluids, comprising a container having a bottom with an upright tube and a central well communicating with the interior of said tube, and defining a marginal shoulder at the bottom thereof, a lateral discharge conduit, communicating with the interior of said tube near the bottom thereof, said tube having lateral ports near its upper end, a piston system comprising a push rod having a lower end

adapted to be received in said well, and a pair of discs slidable in said tube, and comprising a first coaxial disc fixed in spaced relation to said lower end, and a second, coaxial disc slidably carried between said first disc and said lower end, stop means defining an outer limit of movement of said second disc on said rod, spring means surrounding said rod between said discs, and urging said second disc against said stop means, spring means urging said pistons upwardly in said tube, and stop means between said rod and said container adapted to limit upward movement of said rod at a position with said first disc above said ports, and said second disc below said ports.

References Cited in the file of this patent

UNITED STATES PATENTS

1,891,787	Swartz	Dec. 20, 1932
2,245,265	Eddy	June 10, 1941