

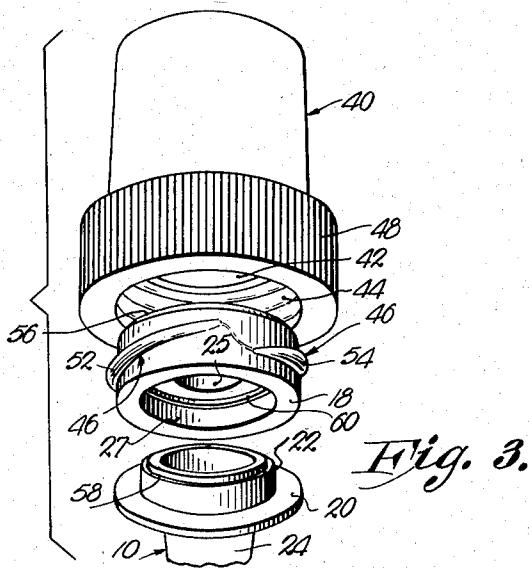
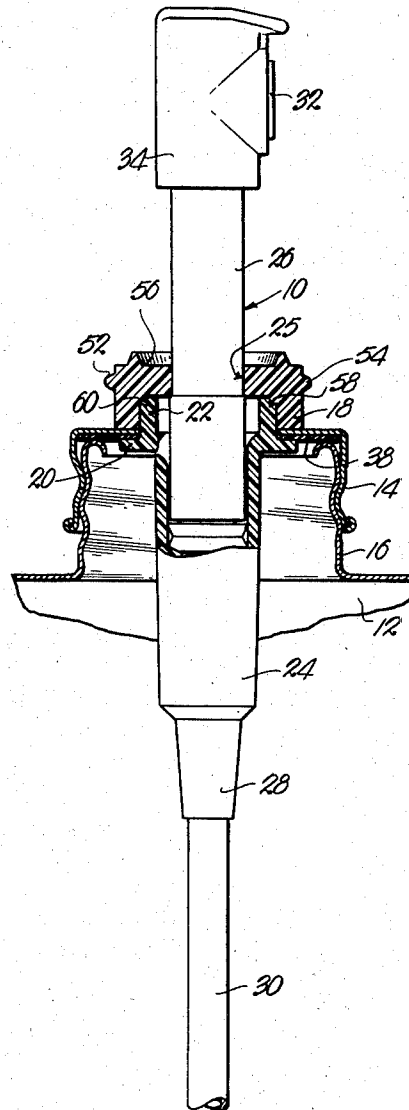
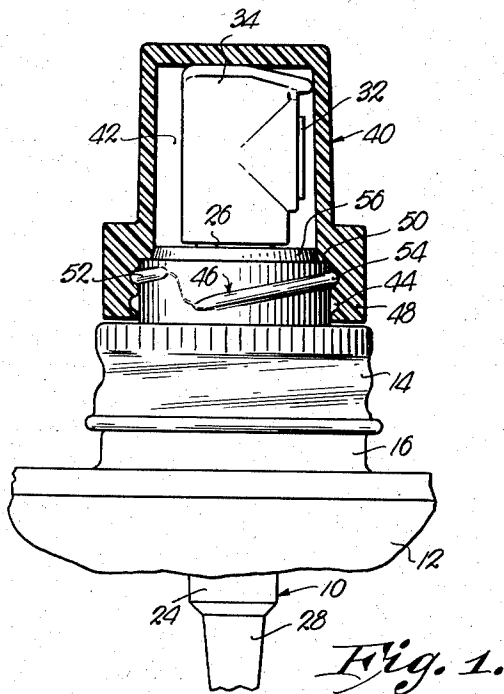
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PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

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PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

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This invention relates to improvements in structures for dispensing liquids wherein is provided a spray-type hand pump mounted within a container for the liquid through use of the closure cap of such container.

It is common practice, as exemplified for example by Patent No. 2,362,080, issued November 7, 1944, to dispense various types of liquids such as insecticides, through use of a finger-manipulated spray pump normally sold as a component part of the container itself. The pump includes a vertically reciprocable plunger extending upwardly beyond the top of the cap within which the pump is mounted and provided with a spray head or nozzle structure capable of emitting a fine mist-like spray when the plunger is depressed by engagement with a finger-receiving saddle forming a part of the spray head.

Difficulties have been experienced in the field by virtue of the inherent nature of such structure since accidental actuation of the plunger causes dispensing of the fluid and oftentimes the material is used in part by store employees prior to sale because of the ready accessibility to the pump itself.

It is the most important object of the present invention, therefore, to provide structure for rendering the pump inoperable during shipment and while in storage, as well as on the shelves of the retail dealer.

Another important object of the present invention is to provide structure capable of carrying out the functions above set forth which is also adapted to enclose the head of the plunger and thereby protect the same, as well as handlers of the merchandise by virtue of the fact that the said plunger is completely enclosed and held at the innermost end of its reciprocable path of travel.

A further object of the instant invention is to provide a hold-down cap that may be quickly and easily applied and removed by virtue of a releasable attachment to a part of the entire unit such as by use of screw-threaded interengagement therewith.

A further object of this invention is to provide improvements of the aforementioned character that advantageously employs a part of the unit which has a secondary function of attaching the barrel of the spray pump to the closure cap of the container.

Other objects include important details of construction to be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a fragmentary, elevational view of a liquid container showing a pump-type sprayer as a part thereof and including the novel hold-down cap of the instant invention, parts being in section for clearness.

Fig. 2 is a fragmentary, vertical, cross-sectional view through the container and its cap showing the pump assembly in its operable position with the hold-down cap removed; and

Fig. 3 is an exploded perspective view showing the hold-down cap and certain parts of the sprayer with which the same is operably associated.

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Pump-type sprayer 10 for liquid container 12 is attached to cap 14 for retention thereby when cap 14 is removed from threaded neck 16 of container 12, and if desired, there may be provided sufficient clearance between cup-shaped retainer 18 and annular outturned flange 20 to permit rotation of cap 14 relative to sprayer 10.

Both cap or closure 14 and retainer 18 are received by a cylindrical extension 22 of frusto-conical barrel 24, forming a part of the sprayer 10, extension 22 being integral with flange 20 at the innermost edge of the latter. Flange 20 is integral with barrel 24 near the larger, uppermost edge of the latter and is held against the under side of gasket 38 in the cap 14 when the sprayer 10 is operably associated with container 12.

Retainer 18 is provided with a central opening 25 which receives tubular plunger 26 and has a cavity 27 that accommodates the enlarged extension 22 as is clear in Fig. 2. Retainer 18 is fitted tightly over the extension 22 and maintains the retainer in place with flange 20 against gasket 38 as above set forth.

Reduced end 28 of barrel 24 receives a tube 30 that extends to the bottom of container 12, it being understood that the sprayer 10 is internally constructed in a suitable manner as, for example, in accordance with teachings of the aforementioned patent to pump liquid from the container 12 into the tube 30 and thence through nozzle 32 forming a part of a spray head 34 secured to the uppermost end of plunger 26. The enlarged head 34 is normally depressed by one finger as the operator grasps the container 12 as is well understood in this art.

Cap 14 has a clearance opening therein, as best shown in Fig. 2, for the extension 22 of barrel 24 and when the cap 14 is in screw-threaded engagement with neck 16, the gasket 38 which surrounds barrel 24, is clamped tightly between flange 20 and the under side of the top of cap 14.

A hold-down member broadly designated by the numeral 40, is provided to hold the plunger 26 at the lowermost end of its path of travel within the barrel 24 in the manner illustrated by Fig. 1, it being understood as by reference to said patent, that a spring (not shown) within the barrel 24, yieldably biases the plunger 26 upwardly to the position shown in Fig. 2. The hold-down member 40 is preferably in the nature of a hollow cap so that the same not only encloses or houses the upper end of plunger 26, i. e. spray head 34, but releasably attaches to the retainer 18 and also houses the latter.

A cylindrical bore 42 within the hold-down cap 40 receives the head 34 as seen in Fig. 1, and enlargement of the bore 42 adjacent the lowermost open end of the cap 40 is provided with internal screw threads 44 that mesh with external screw threads 46 on the retainer 18, thereby releasably attaching the cap 40 to the retainer 18.

An enlarged, annular boss 48 on the cap 40 is provided with a ribbed, outermost surface to facilitate mounting and removal of the cap 40 relative to retainer 18. A downwardly-facing shoulder 50 within the cap 40 engages the upper surface of retainer 18, thereby preventing engagement between cap 40 and closure 14 to prevent forcing of the retainer 18 from its tight press-fit engagement with extension 22. As illustrated, the screw threads 46 on the retainer 18 are in the nature of a pair of substantially semi-circular, spirally arranged sections 52 and 54, permitting molding of the retainer 18 with its screw threads 46 as a single unitary part.

In addition to the seal provided between shoulder 50 and the top surface of retainer 18, there is established an additional annular seal between annular rib 56 and the annular surface of cap 40 immediately adjacent to shoulder 50. This seal is clearly illustrated in Figure 1. The cross-sectional contour of rib 56 is as shown

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in Fig. 2 to present an upwardly and inwardly inclined annular face which snugly fits against the "corner" or line of juncture between shoulder 50 and the adjacent annular inner face of cap 40.

The interfitting surfaces between extension 22 and retainer 18 are as illustrated in Fig. 2. There is an annular notch formed in extension 22 at the outer extremity thereof and this notch 58 receives a similarly formed, continuous annular projection 60 formed integrally with retainer 18 and at a point where elements 58 and 60 will interlock when the parts are in assembled condition.

Thus, any accidental leakage or seepage from container 12 through the parts after they are assembled is obviated.

The material from which retainer 18 is produced is soft enough to be slightly compressed when shoulder 50 and the corner adjacent thereto, rides along the upwardly and inwardly inclined outer face of rib 56 when cap 40 is moved to position.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel provided with a tubular extension passing coaxially upwardly through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively, said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the

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distance from that portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment.

2. A closure assembly as set forth in claim 1 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap.

3. A closure assembly as set forth in claim 2 wherein said retainer is provided with a continuous, annular rib integral with the normally upper edge thereof and defining said segment, said rib having an outwardly facing, inclined surface presenting said conical face and of greatest external diameter at the zone of juncture of the rib with the retainer, said member having a pair of inner, coaxial, longitudinally spaced, cylindrical surfaces, the innermost cylindrical surface having a smaller diameter than the outermost cylindrical surface and presenting said shoulder therebetween lying in a plane perpendicular to the axes of said cylindrical surfaces, the diameter of said innermost cylindrical surface of the member being intermediate the diameters of opposed external end margins of said rib.

4. A closure assembly as set forth in claim 3 wherein the member and retainer are constructed of materials having different coefficients of hardness whereby one of the interengaged faces of the rib and said shoulder respectively is deformed as the member is shifted toward the cap to thereby produce a more effective seal therebetween.

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