

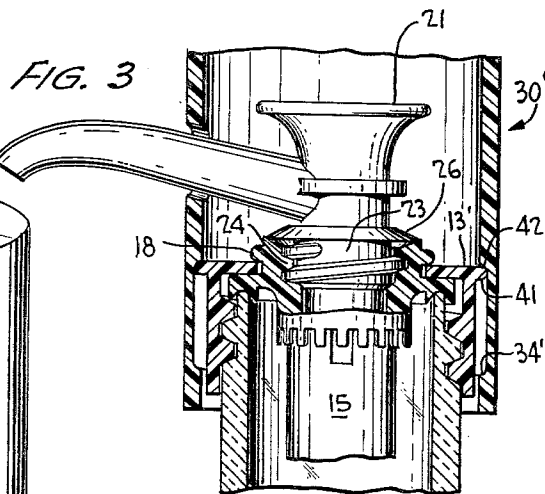
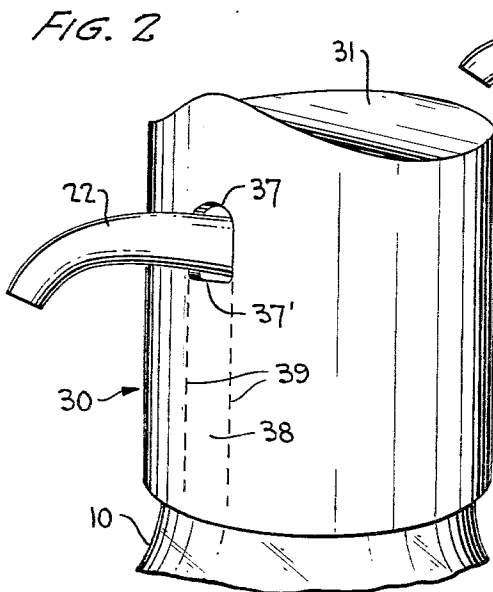
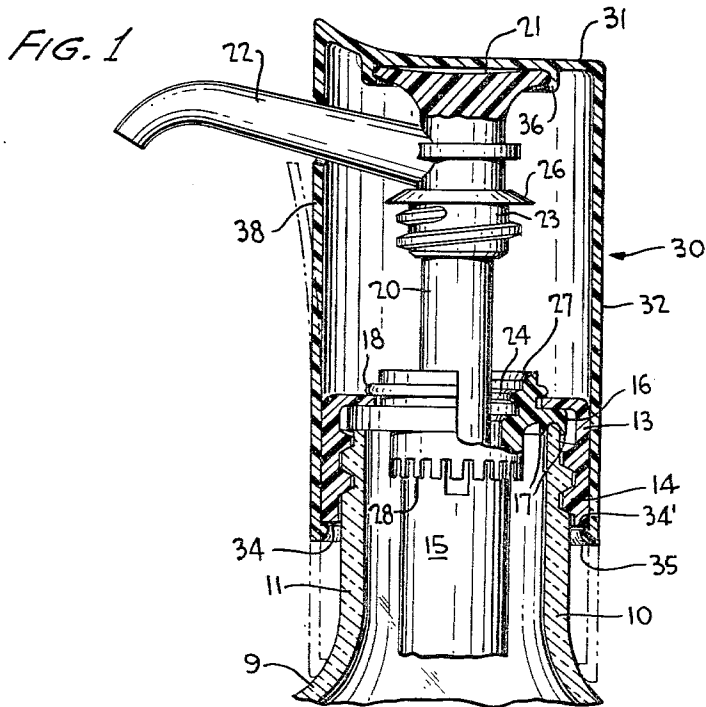
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PROTECTIVE OVERCAP AND STOP MEANS FOR A DISPENSER

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PROTECTIVE OVERCAP AND STOP MEANS FOR A DISPENSER

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This invention relates to an improved dispenser of the reciprocating pump type, such as is customarily applied to a portable liquid container or bottle, and more particularly to an improved protective overcap structure for use with such a dispenser.

The dispensing pump with which the invention is employed is of a well-known type in which the pump cylinder is supported within the container, generally by the container cap or closure, while the plunger is spring projected upwardly through the container closure for reciprocation by intermittent finger pressure on its upwardly presented end. By virtue of such reciprocation, liquid from the container is drawn upwardly through interconnected valved passages within the cylinder and plunger for discharge through a discharge outlet, such as may be defined by a spray orifice, a discharge spout or the like carried by the upwardly projecting external portion of the plunger.

Such overcaps as have been heretofore used in conjunction with a pump of this general type, have been primarily useful only during shipping and handling of the filled containers to which the dispensing pumps are applied. As thus employed, prior overcaps have functioned to cover the upper external end portion of the plunger to shield it from inadvertent actuation, and generally also to secure the plunger in a fully depressed immobile condition. The manner in which such prior art overcaps were associated with the plunger, generally through affixation to the container, necessitated removal of the overcap before the pump could be placed in operation. The overcap generally was discarded at the time of its removal, as it was useful subsequently only in the event it was desired to restore the pump to its immobilized shipping condition.

In accordance with the present invention, however, there is provided a protective overcap which is affixed to the dispenser plunger for movement therewith to retain its protective function both during shipping and during subsequent usage of the dispenser. The overcap of the invention serves as the means through which actuating finger pressure is applied to the pump plunger, as well as offering various other features and advantages which for the most part have been heretofore unobtainable by the prior art. Moreover the overcap of the present invention, in its preferred form, is adapted for use with existing commercially available types of pump type dispensers without the need for modification of either the dispensers or their associated containers.

An important aspect of the present invention consists in its special utility, when employed in combination with a dispensing pump of the class in which the plunger and its cooperating pump cylinder are provided with coaxing threaded or other releasable coupling means capable of actuation by relative rotation between the plunger and its cylinder for selectively immobilizing the plunger in its fully depressed condition during shipping. Where so employed, the overcap is adapted to function as a wrench for transmitting manually applied rotary force to the plunger to either establish or to disengage such coupling. To this end the overcap is journaled on the container for rotary movement with the plunger and has a rotary driving connection with the plunger.

Where the dispensing pump is of the type in which its plunger carries a laterally or radially projecting discharge

spout, the spout itself is preferably employed to establish such a rotary drive connection, while the overcap at the same time affords reinforcement for the spout against vertical deflection.

Preferably also, in the fully depressed position of the plunger and overcap, the overcap abuts axially against the container so as to transmit vertically imposed forces directly to the container rather than to the plunger.

A further highly important feature of the invention consists in the provision of a lost motion connection between the overcap and the container to restrict the stroke of the plunger to a predetermined length, normally less than the maximum stroke of which the particular plunger is capable when disassociated from the overcap. Moreover by quite simple modifications in the overcap the length of such restricted stroke may be varied as desired to effect a corresponding variation in the amount of material dispensed on each stroke. Such a lost motion connection is preferably between the overcap and the closure cap of the container, and such that these may be operatively pre-assembled before application to the container proper.

The foregoing as well as still further features and advantages of the invention will be apparent from the following detailed description, considered in conjunction with the accompanying drawings in which:

FIGURE 1 is a vertical axial cross section through part of a container and container mounted dispensing pump, with the present invention operatively applied thereto, the pump plunger and overcap being shown in full lines in their fully raised or spring projected position, and the lower end portion of the overcap being shown in broken lines in an alternate position.

FIGURE 2 is a perspective view of the structure illustrated in FIGURE 1; and

FIGURE 3 is a view, generally similar to FIGURE 1, of a modified form of the invention.

In the detailed description of the illustrated embodiments of the invention hereinafter following, specific language will be employed for the purpose of describing such embodiments, their construction and mode of operation. However, it is to be understood that such language is merely by way of illustration rather than of limitation and that such further modifications and alterations are contemplated, within the scope of the invention, as would be obvious to persons of average skill in the art here involved.

Referring now in detail to the form of the invention illustrated in FIGURES 1 and 2, the reference numeral 10 designates the externally threaded neck of a conventional bottle or other container. As is usual, the neck defines an upwardly opening passage 11 through which the container may be filled and emptied. Seated over the upper end of the neck 10 is a centrally apertured closure cap 13, of conventional structure, having an internally threaded depending skirt 14 disposed externally around the neck 10 and in threaded engagement with the said neck. A pump cylinder 15 of a conventional dispensing pump is supported in the container. The pump structure, illustrated herein by way of example, is of a commercially available type such as is fully disclosed in the Cooper United States Patent No. 3,064,310, granted November 20, 1962. The means for supporting the pump cylinder 15 consists in the provision of the cylinder of a preferably integral radially outwardly extending sealing flange 16. The flange 16 functions as a sealing gasket between the closure cap 13 and the container and, to this end, may be provided with relatively concentric spaced sealing ribs such as 17 for cooperation in known manner with the container neck 10. The upper end extremity of the cylinder 15 above flange 17 is received through a circular central aperture in the cap 13, being itself of similar circular configuration. A further external radial

flange 18, formed integrally on the upwardly projecting cylinder end above, and in abutting engagement with, the top of the closure 13 firmly clamps the closure between the flanges 16 and 18.

Disposed for vertical reciprocation within the hollow cylindrical interior of the cylinder 15 is a spring projected hollow plunger 20 which, in its fully upwardly spring projected position, extends appreciably above the container and cylinder 15.

In the normal usage of this conventional dispenser, prior to its association with the overcap of the present invention, it will be understood that the plunger 20 will normally be raised to a somewhat greater height than is illustrated in FIGURE 1, when in its fully upwardly projected position. At its upper end, the plunger terminates in a preferably radially enlarged and generally disc-like finger piece 21 adapted to receive intermittent downwardly directed finger pressure for actuation of the pump. It will be readily understood from the aforesaid Coopridger patent that such actuation of the pump will function to deliver the contents of the container upwardly through interconnecting conventionally valved passages in the cylinder and plunger 15 and 20 respectively for discharge through a generally radially and laterally directed discharge spout 22 carried by the plunger.

For selectively and releasably securing the plunger 20 in a fully depressed and preferably sealed condition within the cylinder 15, the plunger is formed with an externally threaded portion 23 for operative reception within the internally threaded and radially enlarged upwardly opening recess 24 at the upper end of cylinder 15. It will be understood that these threaded portions 23, 24 may be operatively engaged with each other by depressing and rotating the plunger in an appropriate direction, while the plunger may be released for upward movement by its actuating spring (not shown) by rotation of the plunger in an opposite direction. Also, as in the earlier identified Coopridger patent, the plunger is provided with a radially projecting sealing flange 26 which is brought into sealing engagement with the upwardly presented sealing end surface 27 of the pump barrel in the fully depressed position of the plunger 20.

The castellated radially presented abutment 28, around the upper end portion of the cylinder 15, simply provides a gripping means by which the cylinder may be held against rotation by a mating castellated gripping tool, while the plunger 20 is rotated to interconnect the threads 23 and 24 before the pump is applied to a filled container.

It will be understood that the several parts of the conventional pump structure above described may be formed by usual injection molding operations from suitable plastic materials such as polyethylene, polyvinyl and the like, all as fully described in the aforesaid Coopridger patent.

The protective overcap of the invention, which is herein designated in its entirety by the numeral 30, is especially adapted for application to and use with such a conventional type of pump and container, without the necessity for modification thereof in any manner. Such an overcap 30 is of generally inverted cup-like configuration, open at its lower end and with its upper end closed as at 31 by a suitable top wall. The cylindrical sidewall or skirt 32 is proportioned for snug axial sliding reception of the cylindrically conformed outer face of the container closure 13, and is provided adjacent its lower end with radially inwardly projecting stop means, such as may be defined by the integrally formed annular beading 33. The overcap 30 may be conveniently formed of a suitable plastic such as is employed in the construction of the pump, although the specific nature of the material from which it is fabricated is not of importance so long as it has sufficient elasticity to permit its application to the cap 13 by forcing its lower end beading 33 downwardly over the cap to snap inwardly beneath the lower downwardly presented edge 34 of the cap 13. Preferably the beading 33 is formed with an upwardly directed annular shoulder

35 for positive abutment with the closure cap edge 34.

In the assembled relationship of the parts as shown in FIGURE 1, the overcap 30 is affixed to the plunger 20 in such manner as to be retained in fully concentric relation thereto and for reciprocating movement with the plunger, the arrangement being such that the plunger may be actuated by downward finger pressure on the top wall 31 of the overcap. In the preferred embodiment the connection between these parts is defined by a depending annular rim 36 defining a socket for reception of the plunger finger piece 21, the lower end of this socket being of somewhat smaller diameter than the finger piece 21 so that the latter may be snap fitted thereto and thereafter retained against removal.

The discharge spout 22 of the pump projects outwardly through an opening 37, comprising the upper end of an axial slot 38 through the sidewall 32 of the overcap. The lower edge of this opening 37 is defined by the upwardly presented end of a strip 39 of flexible material which normally occupies all except the aperture 37 of the slot. Preferably the strip 39 is of the same material as the overcap 30 and integrally connected thereto at its lower end. With this arrangement the strip or flap 39 will normally remain in the position shown in FIGURE 2 so that, except upon close inspection, it will appear to constitute an unbroken continuation of the adjoining surface portions of the overcap. However the elasticity and flexibility of the plastic or other material from which the overcap 30 are such as to permit a substantial amount of outward flexing of the free upper end of the flap 39 about its fixed lower end to facilitate passage of the spout 22 outwardly through the slot 38 during assembly of the overcap of the pump.

In the assembly of these parts, the overcap 30 will initially be tilted to a nearly horizontal position, with its open lower end generally aligned with the spout 22 for reception of the latter, and will be moved onto the spout with its slot 38 and the spout 22 both in the axial plane of the plunger. The free end of the spout is pressed against the outwardly yieldable flap 39 while the overcap is gradually tilted to a generally vertical position to receive and move downwardly over the upper end of the plunger 20. Such outward yielding of the flap 39 opens the slot so that the spout 22 may project outwardly through it and toward aperture 37 prior to ultimate reception of the spout in the opening 37 incident to the reception and seating of the plunger finger piece 21 within the snap rim 36.

Obviously the distance between the overcap top wall 31 and its stop means or surface 35 may be so selected as to restrict the length of the upward plunger stroke to any desired extent. In the particular embodiment of pump as herein illustrated the normal lower limit of the pump stroke will be determined by the abutting engagement of the threads 23 and 24.

Thus the pump, with the overcap 30 of the invention applied thereto, may be actuated simply by the imposition of downward pressure on the overcap top 31 which, if desired, may be of suitable conformation to readily and comfortably receive such pressure. Usually in such a pump the discharge of fluid in measured quantity through the spout 22 will occur incident to the down stroke of the pump, while on its up stroke the pump will be primed with a further measured charge of material for discharge on the next ensuing downward stroke.

Normally the filled container to which the pump is applied, will be shipped and delivered to the consumer with the plunger secured in its fully depressed position by interengagement of the threaded portions 23 and 24. In order to release the said parts it is necessary for the user only to firmly grip and rotate the overcap 30 in an appropriate direction for releasing the threads, it being understood that the overcap will be freely rotatably journaled on the outer periphery of the container cap 13. By virtue of the rotary driving connection between the overcap

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and the plunger, afforded by reception of the plunger spout 22 in the opening 37 of the relative larger diameter overcap, the torque which is manually applied to the overcap will be transmitted to the plunger at a mechanical advantage.

In order that any downward forces applied to the overcap 30 during shipping may be transmitted directly to the container rather than to the pump plunger 20, the overcap 30 is provided with means adapted for direct axial engagement with the container in the fully depressed position of the plunger.

Such axial engagement between the container and overcap is provided in FIGURES 1 and 2 by the lower edge of the overcap which, at this time, abuts axially against the downwardly and outwardly flaring shoulder 40 of the container.

In the modified embodiment of the invention illustrated in FIGURE 3, the construction of the pump and its several component parts is identical to that disclosed in FIGURES 1 and 2. The pump parts therefore are designated by identical reference characters to those in the preceding figures. However, in this view there is illustrated one of several possible optional ways of adapting the overcap and the container to restrict the stroke of the pump in the manner desired and also to provide positive axial abutment of the overcap against the container in the shipping condition of the parts.

To this end the container closure 13' is provided at the upper end of its internally threaded skirt with an encircling outwardly projecting radial rib 41 which provides an axial abutment for engagement with the inwardly projecting snap ring or beading 34' of the cap skirt to restrict the upward stroke of the plunger in a manner similar to that of the preceding embodiment. However when the plunger is fully depressed and immobilized in shipping position as shown in this figure, the inwardly and downwardly directed shoulder or projection 42 within the overcap 30' is so positioned that it abuts firmly against the upwardly directed surface of the closure cap 13', thereby transmitting any downward forces to the container through its cap.

Having thus described my invention, I claim:

1. In a container mounted dispensing pump of the class in which the pump cylinder is fixedly supported within the container, and the pump plunger is spring projected axially upwardly from the cylinder through the container mouth for actuation by intermittently applied pressure on its upper end, said plunger including a laterally directed discharge outlet above the container, the combination with the said pump of a protective overcap of inverted cup-like configuration affixed to the plunger for axial movement therewith and having a depending tubular skirt receiving and enclosing the upwardly projecting portion of said plunger, said skirt being provided with an aperture aligned with said laterally directed discharge outlet to permit the dispensing of liquid materials from the container through said aperture, said skirt also depending around and being guided on said container for movement with the plunger, and means carried by the protective overcap for positive axial abutment with the container when the plunger is fully depressed, to thereafter transmit downwardly applied forces from said overcap to the container rather than to said plunger.

2. The combination of elements defined in claim 1, in which said discharge outlet is defined by a laterally projecting discharge spout fixedly carried by and movable with the plunger, said aperture comprising the upper end portion of an axial slot through said skirt, a resiliently flexible strip-like portion of the skirt normally occupying said slot below the aperture and integrally connected to said skirt at its lower end, with the free upper end of said strip-like portion defining the lower edge of said aperture, whereby said strip may be flexed radially outwardly by said spout to facilitate reception of the spout in said

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slot and ultimately in said aperture during assembly of the overcap to the pump.

3. The combination of elements defined in claim 1, wherein said overcap is closed at its upper end, said upper end being formed within the overcap with a downwardly directed socket having undercut sidewalls, and said plunger terminating at its upper end in a radial enlargement shaped for reception in said socket and slightly larger than the mouth of said socket for snap fitting reception therein.

4. In a container mounted dispensing pump of the class in which the pump cylinder is fixedly supported within the container and the plunger is spring projected upwardly through the container mouth for actuation by intermittent pressure on its upper end, the combination with said pump of a protective overcap of inverted cup-like configuration including a depending tubular skirt enclosing the portions of said plunger and said container, said protective overcap being affixed to the plunger for axial movement therewith, means carried by the overcap for positive axial abutment with the container when the plunger is fully depressed, whereby downwardly applied forces thereafter imposed on the overcap will be transmitted to the container rather than to said plunger, co-operating means on the overcap and container respectively establishing a lost motion connection between the container and the overcap in which the extent of said lost motion is commensurate with the operative stroke permitted the plunger and normally less than the maximum stroke of which the plunger is capable when disassociated from said overcap.

5. The combination defined in claim 4, in which said container includes a neck which defines said mouth, an apertured closure cap secured over said neck, said cap including a downwardly axially directed abutment outwardly of the neck, said pump being operatively supported in the container with its stationary pump cylinder affixed to the closure cap and disposed through the aperture of said cap, said skirt of the overcap depending around said closure cap, and stop means carried by said skirt beneath said abutment for engagement therewith to limit the upward movement of the plunger.

6. The combination defined by claim 5, in which said closure cap includes an internally threaded skirt operatively disposed on and externally of said container neck, the said downwardly directed abutment being defined by the lower edge of said skirt.

7. The combination defined in claim 5, in which said abutment is defined by the downwardly presented surface of a radial projection encircling said closure cap, said means carried by the overcap for positive axial abutment with the container comprising an axially downwardly presented shoulder within said skirt, positioned for axial abutment with said closure cap.

8. The combination defined by claim 5, in which said means carried by the protective overcap for positive axial abutment with the container is defined by the lower axially presented edge of the skirt of said overcap.

9. In a container mounted dispensing pump of the class in which the pump cylinder is fixedly supported within the container and the reciprocable pump plunger is spring projected upwardly through and above the container mouth for actuation by pressure on its upper end, said plunger including a laterally directed discharge outlet above the container, the combination with said pump of a protective overcap of inverted cup-like configuration including a depending tubular skirt receiving and enclosing all of the upwardly projecting portion of said plunger above the container, and affixed to the plunger for axial movement therewith, said skirt being provided with an aperture aligned with said laterally directed discharge outlet to permit the dispensing of the container contents through said aperture, said plunger and said cylinder respectively being provided with interengaging means

adapted for actuation by relative rotary movement between said plunger and said cylinder about the plunger axis, for releasably securing and immobilizing the plunger in a fully depressed position, said overcap and said plunger being freely rotatable about the plunger axis, and means establishing a rotary driving coupling between said overcap and the plunger.

10. The combination defined in claim 9, in which said skirt is both rotatably journaled and guided for axial movement on the container.

11. The combination of claim 9, including means carried by the protective overcap for positive axial abutment with the container when the plunger is fully depressed to transmit downwardly applied forces on the overcap directly to the container rather than to said plunger.

12. The combination defined in claim 9, in which said discharge element of the plunger comprises a laterally outwardly projecting rigid discharge spout affixed to the plunger, said spout extending outwardly through an aperture in said overcap and engaging said overcap at the sides of the aperture to establish said rotary driving coupling between the overcap and the plunger.

13. The combination as defined in claim 9, including cooperating means on the overcap and the container respectively establishing a lost motion connection between the container and overcap in which the extent of said lost motion determines the length of the plunger stroke.

14. The combination defined in claim 9, in which said container includes a neck which defines said mouth, an apertured closure cap secured over said neck with a portion of said cap defining a downwardly directed abutment, the pump cylinder being fixedly operatively supported by the closure cap through its said aperture, the skirt of said overcap depending around said closure cap and below said abutment, and stop means carried by said skirt beneath the abutment for engagement therewith to limit the upward movement of the overcap and plunger.

15. In combination, a protective overcap for the plunger of a container mounted dispensing pump and a closure cap, said protective overcap being of inverted cup-like configuration closed at its upper end, with a cylindrical skirt depending from said upper end and opening down-

wardly, said closure cap having a cylindrical external periphery disposed for relative axial sliding and rotary movement in said skirt, stop means carried by said skirt below said closure cap and positioned for abutting engagement therewith to limit the upward movement of the protective cap with respect to the closure cap, said skirt being formed with laterally directed opening for reception of a plunger mounted discharge spout, and means carried on the underface of said upper end of the overcap defining a socket for providing a snap fit with a cooperating portion of the plunger.

16. The combination defined in claim 15, in which said protective overcap is provided internally with means positioned above the said closure cap for axial abutment therewith to positively limit the downward axial movement of the protective cap with respect to the closure cap.

17. A protective overcap for the plunger of a container mounted dispensing pump, said overcap comprising a cylindrical skirt having a closed upper end, the lower end of said skirt being open, a snap coupling member affixed to the underside of said closed upper end for cooperation with a coupling establishing portion of a pump plunger, said skirt of the protective cap being formed adjacent its lower end with radially inwardly projecting stop means, and said skirt being formed with a laterally directed opening therethrough for reception of a discharge spout carried by the pump plunger.

18. A protective cap as defined in claim 17, in which said aperture comprises the upper end of an axial slot through said skirt, the remainder of said slot being occupied by a substantially flexible strip integrally connected at its lower end to the skirt for radial outward flexing to facilitate reception of the container spout in said slot and said aperture.

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LOUIS J. DEMBO, *Primary Examiner*.