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CLOSURE ACTUATOR

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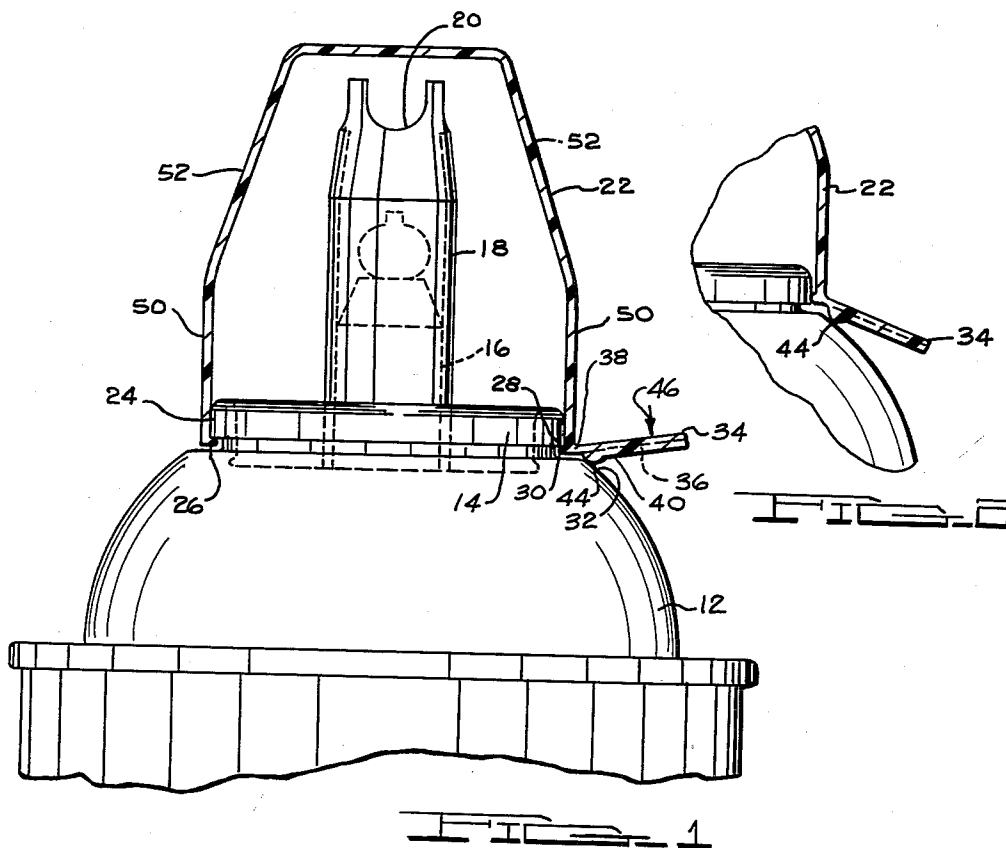
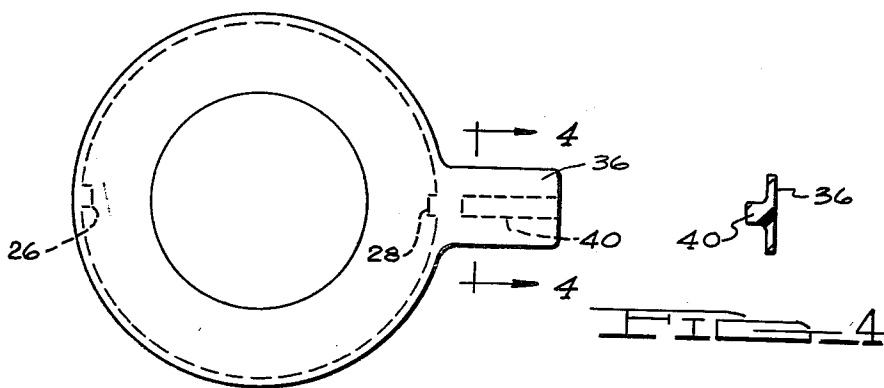


FIG. 3

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CLOSURE ACTUATOR

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6 Claims. (Cl. 222—182)

This invention relates to closure constructions, as for example plastic closures adapted for removable disposition on pressurized containers normally utilized to contain insecticides, paints, shaving cream, whipping cream toppings, and similar products under gas pressure. The term "pressurized" as used herein will be understood to comprehend "aerosol" and similar types of gas charged devices.

In the above described containers there is provided a manually actuable valve construction which is normally shielded from actuation by means of an inverted cup-shaped plastic cover or closure, the function of said closure being to prevent inadvertent actuation of the valve, as for example during shipping or handling.

It is of course necessary with the above described type of closure that the closure be retained on the container with a fairly tight fit in order to act as a dust shield for sanitation purposes and in order to prevent inadvertent removal of the closure during shipping and handling. The requirement that the closure have a tight fit on the container has in the past presented a problem in enabling the housewife or other user to quickly remove the closure when desired. Some closures have been constructed of rigid material such as inflexible plastic. Other closures have been constructed of flexible plastic material in order to provide an elastic grip on the container. However the plastic tends to change in size with temperature changes and molding conditions so that it was not always possible to obtain the desired compromise between a loose and tight fit; as a result it was often necessary to design the closure with a looser than desired fit in order to guard against "closure sticking."

It should also be noted that unloosening of the closure required the user to squeeze or deform the lower portion of the closure inwardly. The housewife or other user in many cases did not understand the proper procedure for removing the closure, and in many cases the user applied the squeezing pressure at improper points on the closure surface, with the result that the container valve was actuated so as to discharge its contents instead of effecting a closure-removal operation.

In order to overcome some of the defects of the above discussed "flexible" type closure construction there has been devised a rigid plastic closure with a screw threaded insert. In order to utilize this rigid closure construction with the conventional container it was necessary to form screw threads on the container valve. The provision of the threaded insert and the threads on the valve increases the total cost of the unit by reason of increased material costs, increased labor costs and lower volume of production. In this connection, formation of threads in the insert required the insert to be threaded out of its molding device instead of being withdrawn therefrom in a straight motion; as a result lower volume of production was obtained. Also, the insert-closure assembly was not adapted for quick installation onto the container by automatic machinery, whereas the earlier flexible closure construction

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could be applied quickly to the container with inexpensive machinery.

It is an object of the present invention to provide a container construction having the best features of the aforementioned closure constructions without the disadvantages thereof. More particularly, it is an object to provide a closure which has a relatively tight fit on the container while being quickly and easily removed therefrom whenever desired.

Another object of the invention is to provide a closure and actuator therefore, wherein the closure and actuator can be formed as an integral one piece unit in high volume by relatively simple machinery.

Another object is to provide a closure and actuator, wherein the actuator is of relatively small size so as not to project from the container any substantial distance, whereby to prevent inadvertent actuation of the actuator during handling or storing.

Another object is to provide a container closure and actuator therefore, wherein the actuator is easily moved so as to enable use by housewives and other non-muscular people.

Another object is to provide a closure and actuator, wherein the closure can be easily positioned on the container with a single manual movement without interference from the actuator.

Another object is to provide a container closure and actuator, wherein the actuator is effective to move the closure to a partially removed position, the arrangement of the actuator being such that the closure does not tend to return to its completely installed position after release of manual pressure on the actuator.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 is a sectional view through one embodiment of the invention installed on a conventional pressurized container utilized to contain and dispense whipping cream or "topping."

Fig. 2 is a partial view of the Fig. 1 structure, showing the closure in a partially removed position after depression of the closure actuator.

Fig. 3 is a top plan view of the Fig. 1 closure removed from its container.

Fig. 4 is a sectional view taken on line 4—4 in Fig. 3.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown a conventional pressurized aerosol container 10 having a top wall 12 to which is secured a conventional ring member or neck portion 14 for mounting a rubber valve member 16. A plastic sleeve member 18 is frictionally telescoped over the rubber valve member 16 and is provided with a discharge opening 20, the normal operation of the device being such that when closure member 22 is removed the user may press his or her thumb against the outer surface of sleeve 18 so as to deflect the upper portion of rubber valve member 16 and thereby open the valve for discharge of the container contents through discharge opening 20. It will be understood that container 10 is charged with nitrous oxide and carbon dioxide or other gas so that when the container is inverted and sleeve 18

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is deflected laterally the gas pressure will be effective to force the container contents through discharge opening 20.

In order to prevent inadvertent deflection of member 18 and otherwise seal the discharge opening 20 from dust, dirt and the like, there is provided a closure in the form of a cap 22. Cap 22 is preferably formed of thin plastic material of a flexible, somewhat elastic character so as to tightly seat against the outer peripheral surface 24 of ring 14 in such manner as to prevent dust, dirt or foreign matter from entering into the interior of the cap.

In order to releasably retain cap 22 on the container there are provided two diametrically opposed lips or projections 26 and 28. When closure 22 is in its Fig. 1 position lips 26 and 28 engage beneath the shoulder formed by member 14 to releasably retain the closure in place. It will be noted that member 14 cooperates with top wall 12 to define an annular recess 30 for receiving the lip members 26 and 28. The upper portion of top wall 12 defines an abutment surface 32 for engagement with a lever 34 formed integrally with cap 22. Lever 34 includes a relatively thin flap portion 36 which defines a hinge structure at its point of connection with cap 22. Extending downwardly from flap portion 36 is a rib 40 which forms a lug designed to engage abutment surface 32 at point 44. It will be noted that the portion of flap 36 which forms hinge 38 is not provided with a rib. Thus hinge portion 38 is relatively thin in the vertical direction and the ribbed portion of flap 36 is relatively thick in the vertical direction; as a result the ribbed portion is a relatively rigid structure which does not flex when a force is applied thereon in the arrow 46 direction. Application of manual force, as by thumb pressure, in the arrow 46 direction is effective to cause the ribbed portion to pivot as a unit around fulcrum point 44 so as to act on cap 22 for sliding lip 28 upwardly out of the recess 30 to the Fig. 2 position. In the Fig. 2 position lip 28 is out of latching engagement with the shoulder formed by ring member 14, and it is then an easy matter for the housewife or other user to slip closure 22 off of the container.

In certain prior art types of containers not equipped with actuator 34, it was necessary to apply a squeezing pressure on cap 22 in the areas thereof designated by numeral 50. Such squeezing pressures caused the lips (corresponding to lips 26 and 28) to be forced outwardly so as to permit removal of the closure. However in many instances the user applied manual pressure at the upper portion of the cap generally designated by numeral 52, with the result that plastic sleeve 18 was deflected so as to cause inadvertent discharge of the container contents through discharge opening 20. With the present construction it is a simple matter to manually depress lever 34 so as to move the closure to the Fig. 2 position for easy complete removal. In this connection it should be noted that when the thumb pressure is removed closure 22 does not return to its Fig. 1 position; rather the closure remains in its Fig. 2 position so as to permit the user to conveniently slip the closure off of the container. In this connection cap 22 is preferably molded with actuator 34 extended horizontally therefrom; as a result the actuator does not tend to return to the Fig. 1 "upwardly angled" position after release of manual force.

It will be noted that actuator 34 adds very little material to the closure and therefore does not appreciably increase the closure cost. Additionally the structure of the actuator is such that simple low cost molding machinery can be employed to form the closure-actuator construction.

I claim:

1. A cap for a container having an annular shoulder, an annular abutment surface spaced from said shoulder and concentric therewith, and a manually actuable valve projecting from the container through the central space

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defined by the shoulder; said cap having a side surface engageable with said shoulder, a lip extending inwardly from the cap and adapted to underlie the shoulder for normally retaining the cap in position on the container, and manually actuable thrust means formed integrally with said cap and engageable with said abutment surface, whereby manual movement of said thrust means is effective to cause the lip to move out of its position underlying the shoulder and upwardly therealong for facilitating removal of the cap from the container.

2. A cup-shaped cap having a lip extended inwardly from the mouth-forming portion of said cap and having a lever extending integrally from said mouth-forming portion in a generally outward radial direction, said lever including an extension spaced outwardly from the point of connection of the lever with the cap, said extension forming a fulcrum portion for the lever, and said point of connection forming a hinge.

3. The combination comprising a container, a recess formed in a portion of said container and defining a shoulder and abutment surface; a closure having a lip engaged in said recess for normally retaining said closure on the container; a lever integrally formed with said closure and extending therefrom into abutment with said shoulder; the lever portion in direct connection with the closure being relatively thin, and the abutment surface-engaging portion of said lever being relatively thick, whereby said connection portion may serve as a hinge and said abutting portion may serve as a rigid lever arm.

4. A reusable cap for a container having a top wall and neck structure projecting upwardly therefrom, said cap being integrally formed and having a plurality of inwardly extending projections adjacent the bottom thereof for engagement with the neck structure of the container to secure the cap to said neck structure, a lever carried by the cap end extending outwardly from one side thereof adjacent its lower end, at least one of said inwardly extending projections being adjacent said lever, said lever having a camming surface adapted to engage the top wall of said container outwardly of the cap when said lever is depressed vertically to tilt said cap and to effect disengagement of the inwardly extending projection adjacent said lever and cam said cap upwardly away from said neck structure to thereby effect disengagement of said cap from said neck structure.

5. A reusable cap for a container dispensing liquids under pressure having a nozzle extending upwardly of said container, said cap having a body member formed of a plastic material for enclosing said nozzle and provided with an opening at the bottom thereof for engagement with the neck of the container, said body having a plurality of inwardly extending projections integrally formed with said body and adapted to engage the neck of the container for locking said cap to said container, a lever integrally formed with said body and extending outwardly of said body, said lever having means engaging a surface portion of said container whereby said surface portion acts as a fulcrum for said lever when said lever is depressed to cause at least one of said projections to become disengaged from said neck to permit disengagement of said cap from said container.

6. In a container; a tubular container side wall; a container top wall radiating inwardly from said tubular side wall; a neck structure projecting centrally upwardly from the top wall; an annular enlarged ring portion extending outward radially from the upper end of the neck structure to form an annular recess outwardly of the lower portion of the neck structure; a one-piece annular cap of flexible plastic material having an upper end wall spaced above the ring portion, an annular side wall frictionally engaging the peripheral side surface of the ring portion, and a plurality of projections extending inwardly from the lower end of said annular side wall into the recess to releasably lock the cap on the container; and a manually engageable lever integrally formed with the cap, said lever

including a flexible hinge section extending from a lower region of the cap side wall, a lug portion connected with said hinge section, and extending downwardly into abutting engagement with the container top wall at a point outside the vertical confines of the cap annular side wall, and a manually depressible portion extending outwardly from said hinge section and lug portion but terminating within the vertical confines of the container side wall.

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