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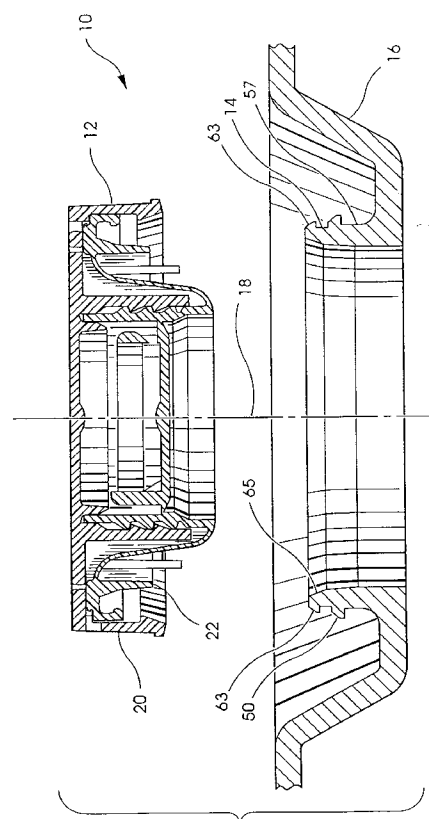
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(54) **Snap-on closure system and method.**

(57) A closure system (10) is disclosed including a container neck (14) extending axially from a container and a cap and spout assembly (12) for snap-on receipt onto the container neck. The cap and spout assembly includes a snap-on spout (22) having a resiliently flexible sealing ring (32) adapted for sealing receipt onto the container neck. The snap-on cap (20) includes a closure member (24) for closure of the spout and an interlocking ring (26) adapted for interlocking receipt onto the container neck over the sealing ring independent of the snap-on spout. The closure member is frangibly attached to the interlocking ring to provide tamper-evident means for the snap-on cap. The interlocking ring of the cap cooperates with the sealing ring of the spout to maintain a positive seal against the container neck regardless of the internal pressure within the container.



*Fig. 1*

## BACKGROUND OF THE INVENTION

This invention relates generally to a closure system for a container that includes a snap-on cap and spout assembly for receipt onto a container neck and, more specifically, to a cap and spout assembly and method for assembling the cap and spout assembly onto a container wherein the cap and spout assembly includes a snap-on tamper evident cap and a snap-on pouring spout.

Many types of closures for sealing onto a container neck are known that include a spout received onto the neck of a container and a cap for closure of the spout. Typically, the cap is threaded onto the spout, and the spout and/or cap is either threaded with the container neck or clamped onto the container neck via a separate crimping ring. For example, U.S. Patent Nos. 4,236,629 to Dwinell, 4,632,282 to Nagashima and 4,568,006 to Mueller, et al. disclose various crimping ring arrangements for clamping the spout onto the container neck, wherein the crimping ring is constructed of a malleable metal. One disadvantage of this type of closure is that the metal crimping ring cannot be recycled together with the various plastic components and, therefore, must be removed from each container prior to recycling. Another disadvantage is that an additional assembly step is required to assemble the crimping ring onto the spout prior to assembly of the cap.

As another example of a closure that seals onto a container neck, U.S. Patent No. 5,004,126 to Kleisius discloses a plastic closure for a plastic container that includes a frame cap adapted to be screwed onto an externally threaded container neck over a flexible pouring spout. The frame cap is frangibly attached to and integral with a screw-on ring adapted to be threaded onto the externally threaded container neck. One disadvantage of this type of closure is the possibility of breaking the frame cap from the screw-on ring during threading of the ring onto the container neck. Although a flexible web is provided between the cap and ring to absorb excessive threading forces, excessive radial forces beyond those accommodated by the flexible web can nevertheless still result during assembly of the cap and ring onto the container neck so as to break the frangible cap and ring attachment, thereby defeating its tamper-evident function. Also, in many applications the tolerances of the container neck are not tightly controlled and depending on the tolerance stack of the cap, spout and container neck, the spout may prematurely seat onto the container neck such that continued threading of the ring onto the container neck breaks the frangible cap and ring attachment.

Other closures that seal onto a container neck include a snap-on spout received onto the container neck and a cap threaded onto the container neck over the snap-on spout. For example, U.S. Patent No.

4,917,270 to Simon discloses a closure device that includes a spout received into a groove provided on the container neck, wherein the spout resiliently deforms over the container neck during installation to seat in the groove. U.S. Patent Nos. 5,108,009 to Davidson et al. and 4,706,829 to Li disclose other similar interlocking spout and container neck configurations. Still, there is always a need for an improved snap-on closure for universal use with a variety of spouts.

For example, both the Li and Davidson closures include a stiff spout constructed of a relatively hard plastic that is molded to a fixed configuration. As such, the spout alone provides the necessary resilient interlocking force required to seal onto the container neck, so that the cap is not required to enhance the spout/container neck seal and can therefore be entirely removed from the container neck. Other more flexible spouts present additional sealing problems beyond those addressed by the Simon, Davidson, et al. and Li closures.

In particular, flexible pour spouts that are movable between a nested position and an extended position are more prone to leakage than rigid spouts at the spout/container neck interface. As a result, flexible spouts typically require additional means for maintaining the spout/container neck seal when the cap is removed from the spout. See, for example, European Patent Application No. EPO 320 808 A1 which discloses a spout having a U-shaped flange flexibly received over a conical container flange and a retaining ring flexibly received onto the spout. The spout is assembled onto the container neck prior to assembly of the cap. One drawback of this configuration is that the sequential assembly potentially leaves the contents of the container accessible to tampering or contamination. If the cap and spout are assembled together, too much force is required to assemble the cap and spout over the container flange since both the U-shaped flange of the spout and the ring of the cap must resiliently flex over the same container flange. If the cap and spout are constructed of a less resilient plastic to facilitate simultaneous assembly, the assembled cap and spout are then more prone to leakage at high internal container pressures.

Therefore, a need exists for an improved closure for sealing receipt onto a container neck that overcomes the deficiencies of the above-described closures. Such a closure should provide improved sealing characteristics for high internal container pressures, such as that resulting from impact or dropping of the container, while still being easily assembled together onto the container neck. Preferably, the closure should be constructed entirely of plastic and easily molded to facilitate manufacturing. The closure should be tamper evident and also easily installed onto a container neck without risk of damage to the tamper evident means.

## SUMMARY OF THE INVENTION

A closure system for a container is disclosed according to one embodiment of the present invention that includes a container neck extending axially from a container, a spout including means for sealing onto the container neck, first means for axially interlocking the spout with the container neck, the first means being resiliently flexible to snap onto the container neck, a cap including means for closing of the spout, and second means for axially interlocking the cap with the container neck, the second means being resiliently flexible to snap onto the container neck, the first means interlocking the spout with the container neck and the second means interlocking the cap with the container neck over the spout wherein the first means and the second means maintain the spout in sealing contact against the container neck.

A snap-on tamper evident closure assembly is also disclosed according to one embodiment of the present invention that includes a snap-on spout having a resiliently flexible sealing ring adapted for sealing receipt onto the container neck, the sealing ring including a first interlocking lip adapted for interlocking with a corresponding first interlocking lip of the container neck, the sealing ring being resiliently flexible to snap onto the container neck, a snap-on cap including a closure member for closure of the spout and an interlocking ring adapted for interlocking receipt onto the container neck over the sealing ring, the closure member being frangibly attached to the interlocking ring, the interlocking ring including a second interlocking lip adapted for interlocking with a corresponding second interlocking lip of the container neck, the interlocking ring being resiliently flexible to snap onto the container neck, wherein the second interlocking lip of the interlocking ring extends below the first interlocking lip of the sealing ring when the spout and the cap are received onto the container neck to interlock with the container neck independent of the sealing ring.

A closure assembly is further disclosed according to one embodiment of the present invention that includes a container neck extending axially from a container, the container neck including an inner sealing surface and an outer sealing surface, a spout including a sealing ring for sealing receipt onto the container neck, the sealing ring including an inner sealing ring portion for sealing against the inner sealing surface of the container neck, an outer sealing ring portion for sealing against the outer sealing surface of the container neck, and a transverse sealing ring portion attached between the inner sealing ring portion and the outer sealing ring portion and bridging the container neck, and means for axially restraining the sealing ring against the container neck, wherein the means for axially restraining defines a pivot for the sealing ring to roll thereagainst when the inner sealing

ring portion is forced out of sealing contact against the inner surface of the container neck, the sealing ring rolling about the means for axially restraining to increase the sealing contact of the outer sealing ring portion against the outer sealing surface of the container neck.

A method for assembling a closure onto a container neck is still further disclosed according to one embodiment of the present invention that includes the steps of obtaining a spout including means for sealing onto a container neck and first means for axially interlocking the spout with the container neck, the first means being resiliently flexible to snap onto the container neck, obtaining a cap including means for closing of the spout and second means for axially interlocking the cap with the container neck, the second means being resiliently flexible to snap onto the container neck, assembling the cap onto the spout to form a cap and spout assembly, and axially assembling the cap and spout assembly onto the container neck, the first means and the second means resiliently flexing to snap onto the container neck.

One object of the present invention is to provide an improved closure system for a container that assembles onto the container in a single step.

Another object of the present invention is to provide a closure having improved sealing characteristics.

Yet another object of the present invention is to provide a closure constructed entirely of plastic to facilitate manufacturing and recycling of the package system.

Still another object of the present invention is to provide a closure that is tolerant of variances in the container opening.

Still yet another object of the present invention is to provide a tamper evident threaded closure that is easily installed onto a container neck.

Another object of the present invention is to provide a tamper evident closure employing frangible means and which is resistant to breakage of the frangible means during installation onto the container neck.

These and other related objects and advantages will become apparent from the following drawings and written descriptions.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of a closure system according to the present invention that includes a cap and spout assembly received onto a container neck.

FIG. 2 is an exploded view of the cap and spout assembly of FIG. 1.

FIG. 3 is a top plan view of the cap of FIG. 2.

FIG. 4 is a top plan view of the spout of FIG. 2.

FIG. 5 is a side elevational, cross-sectional view of the closure system of FIG. 1 as assembled, wherein

the views of the cap and spout are taken in the direction of the arrows indicated in FIGS. 3 and 4, respectively.

FIG. 6 is a partial enlarged view of the FIG. 5 assembly depicting in detail its various sealing interfaces.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now to FIG. 1, a closure system 10 is shown including a cap and spout assembly 12 adapted for snap-on receipt onto a container neck 14 of a container lid 16. Unlike prior art cap and spout closures which employ crimping rings or are threaded onto the container neck, cap and spout assembly 12 assembles onto container neck 14 generally axially along central axis 18 by snapping onto container neck 14. As such, the various components of closure system 10 are flexible to facilitate the snap-on action of cap and spout assembly 12 onto container neck 14. Preferably, the components of closure system 10 are constructed of plastic and are easily molded to facilitate manufacturing. Also, by constructing the components of closure system 10 entirely from plastic, closure system 10 is easily recycled without disassembly or separation of its various components.

Referring now also to FIGS. 2-4, cap and spout assembly 12 is shown in greater detail. Cap and spout assembly 12 includes a cap 20 flexibly received over a spout 22. Unlike prior art closures which sequentially assemble onto a container neck, cap and spout assembly 12 assembles onto container neck 14 in a single step. As such, cap and spout assembly 12 does away with interim assembly steps which may leave the contents of the container susceptible to tampering or contamination. Further, by snapping onto the container neck as an assembly rather than as individual components, cap and spout assembly does away with separate assembly tooling specifically adapted to the spout.

Cap 20 includes generally a closure member 24 frangibly attached to an interlocking outer ring member 26 via bail handles 72 and 74 and frangible tabs 28. Interlocking member 26 is constructed of a thermoplastic material and is resiliently flexible to interlock with container neck 14 and restrain spout 22 in

sealing contact against container neck 14. Cap 20 is a tamper evident cap, wherein tamper evident means is provided by the axially interlocking relationship between interlocking member 26 and container neck 14 and the frangible attachment of interlocking member 26 to closure member 24 via frangible tabs 28.

Spout 22 is a flexible spout to aid in pouring. Spout 22 includes a pouring neck 30 disposed within a sealing ring 32 and a flexible web 34 sealingly attached between pouring neck 30 and sealing ring 32. Pouring neck 30 is positionable between a nested position within sealing ring 32 and an extended position (not shown) upstanding from sealing ring 32. Because spout 22 is a flexible spout, it is constructed from a flexible thermoplastic material similar to that of cap 20. Preferably, however, spout 22 is not so resilient to detract from it flexing between nested and extended positions and being able to sealingly conform to dimensional variations of the container neck upon being clamped thereagainst by interlocking ring member 26.

Cap 20 assembles with spout 22 to form cap and spout assembly 12 by closure member 24 threading onto pouring neck 30. Preferably, closure member 24 includes two threads 36 and 38 having thread start or engagement positions spaced opposite from one another within closure member 24 to facilitate threaded engagement of the cap with the spout every half turn. Similarly, pouring neck 30 includes two threads 40 and 42 to provide corresponding multiple thread engagement positions. To improve sealing of the cap onto the spout, closure member 24 further includes a circular sealing ridge 44 which defines a circular groove 46 for receiving the upper edge of pouring neck 30 in sealing contact therein.

Interlocking ring member 26 includes an interlocking lip 48 extending radially inward thereof and below sealing ring 32 when assembled over spout 22, wherein interlocking lip 48 interlocks with a corresponding interlocking lip 50 of container neck 14 (FIG. 1). As cap 20 is threaded onto spout 22, interlocking lip 48 resiliently flexes radially outward to snap over sealing ring 32. As closure member 24 is further tightened onto pouring neck 30, sealing ring 32 is drawn up to seat against interlocking ring member 26. In particular, interlocking ring member 26 includes a restraining lip 52 which seats against a corresponding groove 54 of sealing ring 32. Interlocking ring member 26 and restraining lip 52 cooperate to improve the sealing characteristics of sealing ring 32 at high internal container pressures as discussed further below, in particular in connection with FIG. 6.

Referring now also to FIG. 5, after cap 20 is assembled with spout 22, cap and spout assembly 12 is snapped onto container neck 14. Upon receipt of cap and spout assembly 12 onto container neck 14, an axially tight fit results between the cap, spout and container neck so that there is little to no axially play be-

tween the various components. As such, any threading of closure member 24 off of spout 22 retracts closure member 24 axially outward away from container neck 14. Because interlocking ring member 26 is axially restrained in place onto container neck 14, the differential axial movement between the closure member and the interlocking ring causes frangible tabs 28 to break, thereby evidencing access to the contents of the container. After tabs 28 are broken, interlocking ring member 26 functions independently of closure member 24 to still maintain positive sealing across the sealing ring to container neck interface at high internal pressures within the container. Interlocking ring member 26 similarly serves to restrain sealing ring 32 snapped onto container neck 14 when force is exerted to extend spout 22.

In the preferred embodiment, container neck 14 extends axially upward from a recessed configuration in which cap and spout assembly 12 is received onto container neck 14 substantially flush with surface 84 of container lid 16. By recessing container neck 14 below surface 84 such that cap and spout assembly 12 is substantially flush therewith, multiple containers can be stacked atop one another. Further, interlocking ring member 26 is less accessible and therefore less prone to tampering.

Referring back to FIGS. 2-4, sealing ring 32 is generally U-shaped in cross-section and includes a transverse sealing ring portion 56 generally forming the bottom of the "U" and an inner sealing ring portion 58 and an outer sealing ring portion 60 generally forming the sides of the "U". An interlocking lip 62 extends radially inward of outer sealing ring portion 60 to interlock with a corresponding interlocking lip 63 of container neck 14 (FIG. 1). Unlike prior closures which interlock the cap onto the sealing ring, sealing ring 32 and interlocking ring member 26 interlock with container neck 14 independent of one another. As a result, interlocking ring member 26 maintains sealing ring 32 clamped against container neck 14 at high internal pressures within the container. In particular, interlocking ring member 26 prevents lip 62 of sealing ring 32 from "popping" off of lip 63 of container neck 14 when the container is pressurized. Further, by initially interlocking cap 20 with container neck 14, cap 20 also prevents pouring neck 30 from extending when the container is pressurized. As such, an improved sealing system results that protects against leakage upon pressurization of the container.

Also, a more positive sealing mechanism is provided over that provided by merely interlocking the cap with the sealing ring. At low internal container pressures, both inner sealing ring portion 58 and outer sealing ring portion 60 resiliently seal against container neck 14. Preferably, inner sealing ring portion 58 also includes a tapered sealing surface 64 corresponding to a tapered inner sealing ring surface 65 of container neck 14 (FIG. 1). At high internal container

pressures, interlocking ring member 26 cooperates with sealing ring 32 to actively counter the unseating of inner sealing ring portion 58 by improving the sealing of outer sealing ring portion 60.

Referring now to FIG. 6, the cooperation of interlocking ring member 26 with sealing ring 32 is shown in greater detail. Restraining lip 52 is molded within interlocking ring member 26 spaced approximately the same axial distance from interlocking lip 48 as the assembled axial distance between groove 54 of sealing ring 32 and interlocking lip 50 of container neck 14. Sealing ring 32 seals against container neck 14 both internally via inner sealing ring portion 58 and externally via outer sealing ring portion 60. Nevertheless, at high internal container pressures such as that resulting from impact or dropping of the container, inner sealing ring portion 58 is prone to lifting off of and radially inward away from container neck 14. Because interlocking ring member 26 interlocks with container neck 14 independent of sealing ring 32, sealing ring 32 is prevented from lifting off of container neck 14. Instead, as inner sealing ring portion 58 rotates to lift off of container neck 14, sealing ring 32 rolls or pivots against restraining lip 52 to drive outer sealing ring portion 60 and lip 62 in greater sealing contact against interlocking lip 63 of container neck 14. Lip 55 is provided at least in part for molding requirements and convenience. Lip 55 may also react against surface 53 of restraining lip 52 as part of or due to any rolling or pivoting motion of sealing ring 32. Lip 55 could also provide a third annular sealing interface against surface 53 if the ring member 26 is continuous and does not include recesses 80 and 82.

Referring back to FIGS. 2-4, to further improve sealing of cap and spout assembly onto container neck 14, spout 22 also includes a frangible sealing diaphragm 68 sealingly attached across pouring neck 30 and a pull ring 70 attached to sealing diaphragm 68. As such, closure means are provided for spout 22 whereby pouring neck 30 is sealed until pull ring 70 is engaged to break frangible sealing diaphragm 68 free of pouring neck 30.

Other features as well can be added to cap and spout assembly 12 to improve its performance. For example, spout 22 further includes a plurality of vent ears 66 attached to flexible web 34. Ears 66 extend downwardly from flexible web 34 when spout 22 is in its stored position nested within sealing ring 32. When spout 22 is in its extended position with pouring neck 30 upstanding from sealing ring 32, ears 66 extend radially inward within the spout and cooperate to define a central flow aperture and a plurality of peripheral vent openings. Vent ears 66 function similar to those disclosed in U.S. Patent No. 4,555,048 to Hamman et al. issued November 26, 1985, the disclosure of which is hereby incorporated by reference, and U.S. Patent No. 4,618,078 to Hamman et al. issued October 21, 1986, the disclosure of which is also hereby incorpo-

rated by reference.

Also, to facilitate handling and stacking of the container, flexible bail handles 72 and 74 are flexible between a stored position flush with closure member 24 and a usable position upstanding from closure member 24. To improve access to the bail handles, tabs 76 and 78 are provided which extend radially outward of bail handles 72 and 74, respectively. Interlocking ring member 26 similarly includes a corresponding pair of oppositely spaced recesses 80 and 82 for receiving tabs 76 and 78. As such, tabs 76 and 78 are easily accessible when pull rings 72 and 74 are in their initial stored position and frangibly attached to interlocking ring member 26. Such a configuration is particularly well suited for a recessed container neck such as that shown in FIG. 5.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

## Claims

### 1. A closure system, comprising:

a container neck extending axially from a container;

a spout including means for sealing onto said container neck;

first means for axially interlocking said spout with said container neck, said first means being resiliently flexible to snap onto said container neck;

a cap including means for closing of said spout; and

second means for axially interlocking said cap with said container neck, said second means being resiliently flexible to snap onto said container neck;

said first means interlocking said spout with said container neck and said second means interlocking said cap with said container neck over said spout wherein said first means and said second means maintain said spout in sealing contact against said container neck.

2. The closure system of claim 1, wherein said means for sealing includes a sealing ring generally U-shaped in cross-section, said sealing ring including a transverse sealing ring portion generally forming the bottom of the "U" and an inner sealing ring portion and an outer sealing ring portion generally forming the sides of the "U".

3. The closure system of claim 2, wherein said first means for axially interlocking includes a first interlocking lip extending radially inward of said outer sealing ring portion and a second interlocking lip extending radially outward of said container neck, said first interlocking lip resiliently flexing over said second interlocking lip to axially interlock therewith.

4. The closure system of claim 3, wherein said spout includes a pouring neck disposed within said sealing ring and a flexible web sealingly attached between said pouring neck and said sealing ring, said spout being movable between a stored position nested within said sealing ring and an extended position upstanding from said sealing ring.

5. The closure system of claim 4, wherein said pouring neck includes a frangible sealing diaphragm sealingly attached thereacross and a pull ring attached to said frangible sealing diaphragm.

6. The closure system of claim 5, wherein said container neck includes a tapered inner sealing surface and said inner sealing ring portion includes a corresponding tapered sealing surface for sealing against said tapered inner sealing surface.

7. The closure system of claim 6, wherein said spout includes a plurality of ears attached to said flexible web, said ears extending downwardly from said flexible web when said spout is in its stored position and said ears extending radially inwardly within said spout and cooperating to define a central flow aperture and a plurality of peripheral vent openings when said spout is in its extended position.

8. The closure system of claim 1, wherein said spout includes a pouring neck disposed within a sealing ring and a flexible web sealingly attached between said pouring neck and said sealing ring, said spout being movable between a stored position nested within said sealing ring and an extended position upstanding from said sealing ring.

9. The closure system of claim 8, wherein said spout includes a plurality of ears attached to said flexible web, said ears extending downwardly from said flexible web when said spout is in its stored position and said ears extending radially inwardly within said spout and cooperating to define a central flow aperture and a plurality of peripheral vent openings when said spout is in its extended position.

10. The closure system of claim 1, wherein said cap includes;  
     a closure member including said means for closing;  
     an interlocking ring disposed about said closure member; and  
     means for frangibly attaching said closure member to said interlocking ring.
11. The closure system of claim 10, wherein said second means for axially interlocking includes a first interlocking lip extending radially inward of said interlocking ring and a second interlocking lip extending radially outward of said container neck, said first interlocking lip resiliently flexing over said second interlocking lip to axially interlock therewith.
12. The closure system of claim 11, wherein said interlocking ring includes a restraining lip extending radially inward of said interlocking ring and disposed axially opposite said first interlocking lip, said restraining lip cooperating with said first interlocking lip to restrain said spout with said means for sealing in sealing contact against said container neck when said spout and said cap are received thereon.
13. The closure system of claim 12, wherein:  
     said closure member includes a pull ring flexible between a stored position flush with said cap and a usable position upstanding from said cap; and  
     said means for frangibly attaching includes a plurality of peripherally spaced frangible tabs attached between said pull ring and said interlocking ring when said pull ring is in an initial stored position.
14. The closure system of claim 13, wherein said pull ring includes a pair of oppositely spaced tabs extending radially outward therefrom and said interlocking ring includes a corresponding pair of oppositely spaced recesses for receiving said pair of oppositely spaced tabs, said pair of oppositely spaced tabs being accessibly received in said corresponding pair of oppositely spaced recesses when said pull ring is in its stored position.
15. The closure system of claim 14, wherein said means for closing includes thread means having multiple thread engagement points.
16. The closure system of claim 1, wherein:  
     said first means for axially interlocking includes a first interlocking lip extending radially inward of said spout and a second interlocking lip extending radially outward of said container neck, said first interlocking lip resiliently flexing over said second interlocking lip to axially interlock therewith; and  
     said second means for axially interlocking includes a third interlocking lip extending radially inward of said cap and a fourth interlocking lip extending radially outward of said container neck and axially displaced from said second interlocking lip, said third interlocking lip resiliently flexing over said fourth interlocking lip to axially interlock therewith.
17. The closure system of claim 16, wherein said second means for axially interlocking includes a restraining lip extending radially inward of said cap and axially displaced opposite from said third interlocking lip, said restraining lip cooperating with said third interlocking lip to restrain said spout with said means for sealing in sealing contact against said container neck when said spout and said cap are received thereon.
18. The closure system of claim 1, wherein said container neck is recessed in a container lid, said spout and said cap being received onto said container neck substantially flush with the container lid.
19. The closure system of claim 18, wherein said cap includes a pull ring flexible between a stored position substantially flush with said cap and the container lid and a usable position upstanding from said cap and the container lid.
20. The closure system of claim 19, and further comprising an interlocking ring disposed about said cap for interlocking said cap with said container neck, said interlocking ring being substantially flush with said cap and the container lid.
21. The closure system of claim 20, wherein said pull ring includes a pair of oppositely spaced tabs extending radially outward therefrom and said interlocking ring includes a corresponding pair of oppositely spaced recesses for receiving said pair of oppositely spaced tabs, said pair of oppositely spaced tabs being accessibly received in said corresponding pair of oppositely spaced recesses when said pull ring is in its stored position.
22. A snap-on tamper evident closure assembly, comprising:  
     a snap-on spout including a resiliently flexible sealing ring adapted for sealing receipt onto a container neck;  
     said sealing ring including a first interlocking lip adapted for interlocking with a corresponding first interlocking lip of the container neck, said

sealing ring being resiliently flexible to snap onto the container neck;

a snap-on cap including a closure member for closure of said spout and an interlocking ring adapted for interlocking receipt onto the container neck over said sealing ring, said closure member being frangibly attached to said interlocking ring;

said interlocking ring including a second interlocking lip adapted for interlocking with a corresponding second interlocking lip of the container neck, said interlocking ring being resiliently flexible to snap onto the container neck;

wherein said second interlocking lip of said interlocking ring extends below said first interlocking lip of said sealing ring when said spout and said cap are received onto the container neck to interlock with the container neck independent of said sealing ring.

**23.** The closure system of claim 22, wherein said sealing ring is generally U-shaped in cross-section.

**24.** The closure system of claim 22, wherein said spout includes a pouring neck disposed within said sealing ring and a flexible web sealingly attached between said pouring neck and said sealing ring, said spout being movable between a stored position nested within said sealing ring and an extended position upstanding from said sealing ring.

**25.** The closure system of claim 24, wherein said pouring neck includes a frangible sealing diaphragm sealingly attached thereacross and a pull ring attached to said frangible sealing diaphragm.

**26.** The closure system of claim 24, wherein said spout includes a plurality of ears attached to said flexible web, said ears extending downwardly from said flexible web when said spout is in its stored position and said ears extending radially inwardly within said spout and cooperating to define a central flow aperture and a plurality of peripheral vent openings when said spout is in its extended position.

**27.** The closure system of claim 22, wherein said cap includes a pull ring flexible between a stored position flush with said cap and a usable position upstanding from said cap, said pull ring being frangibly attached to said interlocking ring in an initial stored position.

**28.** The closure system of claim 27, wherein said pull ring includes a pair of oppositely spaced tabs ex-

tending radially outward therefrom and said interlocking ring includes a corresponding pair of oppositely spaced recesses for receiving said pair of oppositely spaced tabs, said pair of oppositely spaced tabs being accessibly received in said corresponding pair of oppositely spaced recesses when said pull ring is in its stored position.

**29.** The closure system of claim 22, wherein said interlocking ring includes a restraining lip axially displaced opposite from said second interlocking lip, said restraining lip cooperating with said second interlocking lip to restrain said sealing ring in sealing contact with the container neck when said spout and said cap are received onto the container neck.

**30.** The closure system of claim 22, wherein said closure member includes means for threading onto said spout for closure thereof and said spout includes corresponding thread means for receiving said cap.

**31.** A closure assembly, comprising:

a container neck extending axially from a container, said container neck including an inner sealing surface and an outer sealing surface;

a spout including a sealing ring for sealing receipt onto said container neck;

said sealing ring including an inner sealing ring portion for sealing against the inner sealing surface of said container neck, an outer sealing ring portion for sealing against the outer sealing surface of said container neck, and a transverse sealing ring portion attached between said inner sealing ring portion and said outer sealing ring portion and bridging said container neck; and

means for axially restraining said sealing ring against said container neck;

wherein said means for axially restraining defines a pivot for said sealing ring to roll thereagainst when said inner sealing ring portion is forced out of sealing contact against the inner sealing surface of said container neck, said sealing ring rolling about said means for axially restraining to increase the sealing contact of said outer sealing ring portion against the outer sealing surface of said container neck.

**32.** The closure system of claim 31, wherein said means for axially restraining said sealing ring against said container neck includes:

a first interlocking lip extending radially outward from said container neck;

an interlocking ring for restraining said sealing ring against said container neck, said interlocking ring including a restraining lip extending radially inward therefrom and a second inter-



locking lip extending radially inward therefrom axially below said restraining lip;

said second interlocking lip interlocking with said first interlocking lip to restrain said sealing ring between said container neck and said restraining lip. 5

33. The closure system of claim 32, wherein said transverse sealing ring portion includes a lip extending radially outward therefrom for reacting against said restraining lip when said sealing ring is rolled thereagainst. 10

34. A method for assembling a closure onto a container neck, comprising the steps of: 15

obtaining a spout including means for sealing onto a container neck and first means for axially interlocking said spout with the container neck, said first means being resiliently flexible to snap onto the container neck; 20

obtaining a cap including means for closing of said spout and second means for axially interlocking said cap with said container neck, said second means being resiliently flexible to snap onto the container neck; 25

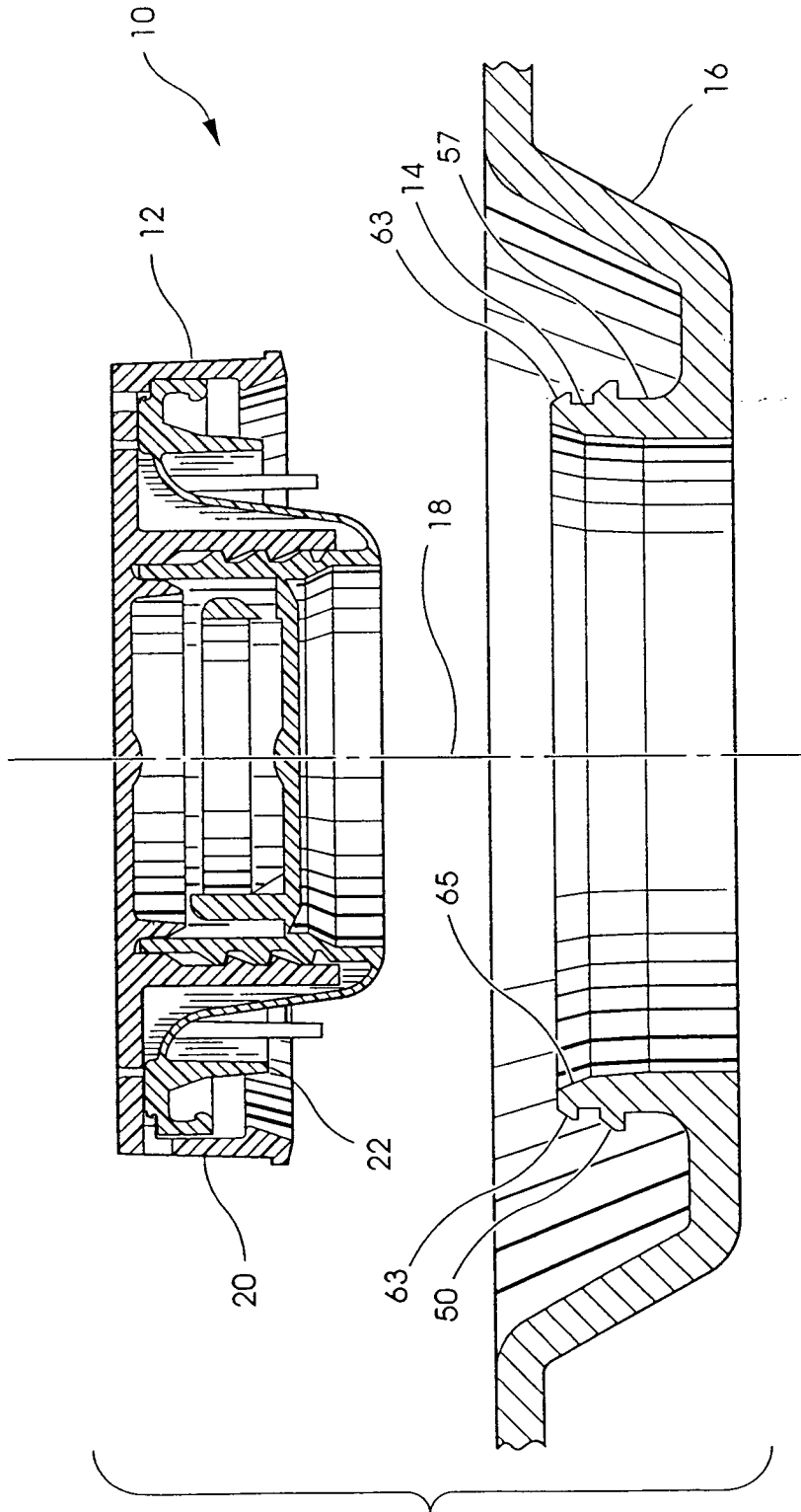
assembling said cap onto said spout to form a cap and spout assembly; and axially assembling said cap and spout assembly onto the container neck, said first means and said second means resiliently flexing to snap independent of one another onto the container neck. 30

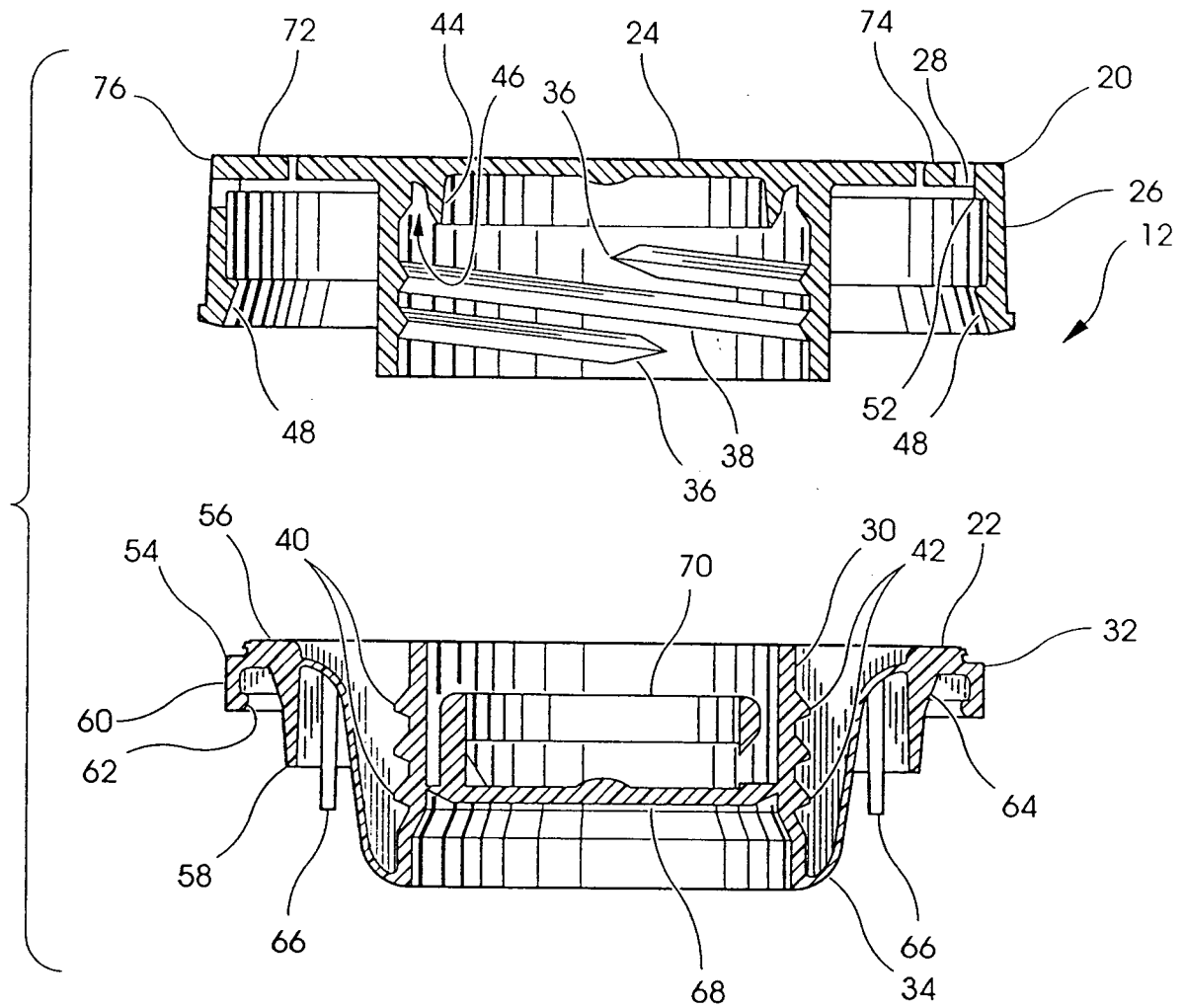
35. The method of claim 34, wherein: 35
- in the step of obtaining a cap, said means for closing includes means for threading said cap onto said spout; and
- in the step of assembling said cap onto said spout, said cap is rotationally threaded onto said spout. 40

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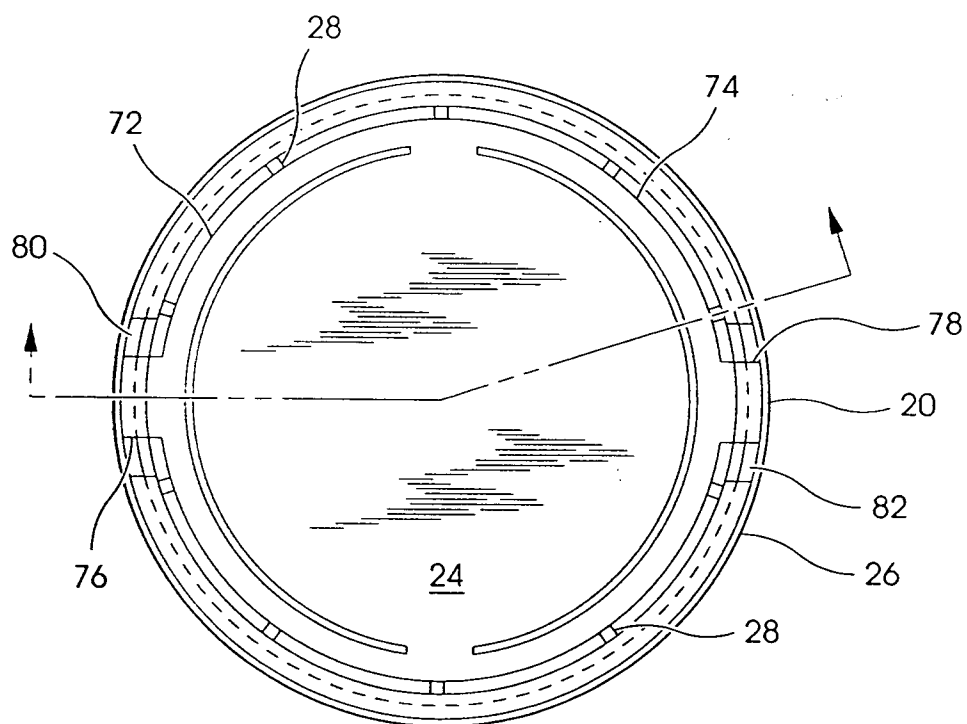
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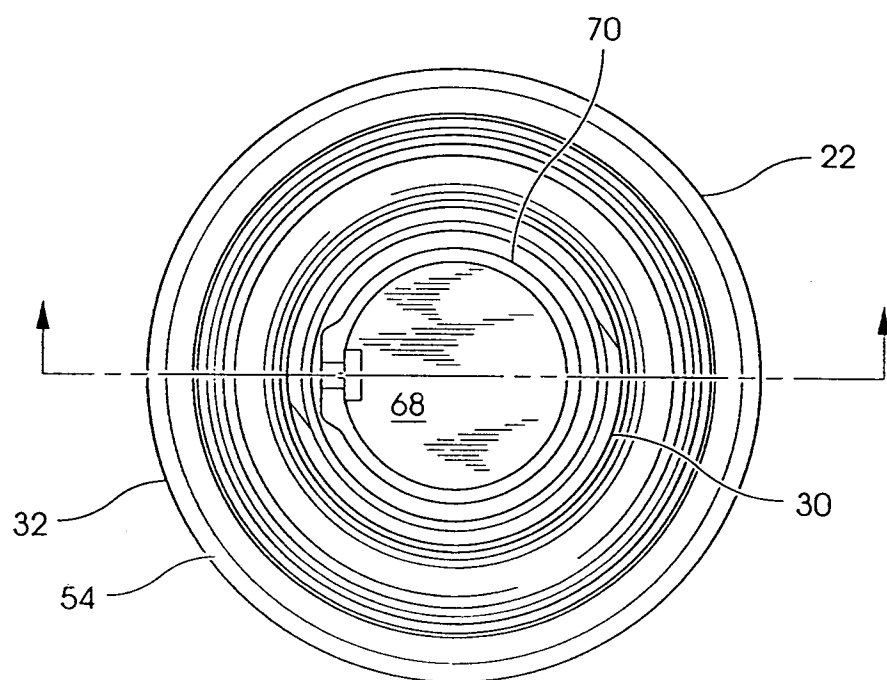




*Fig. 2*



*Fig. 3*



*Fig. 4*

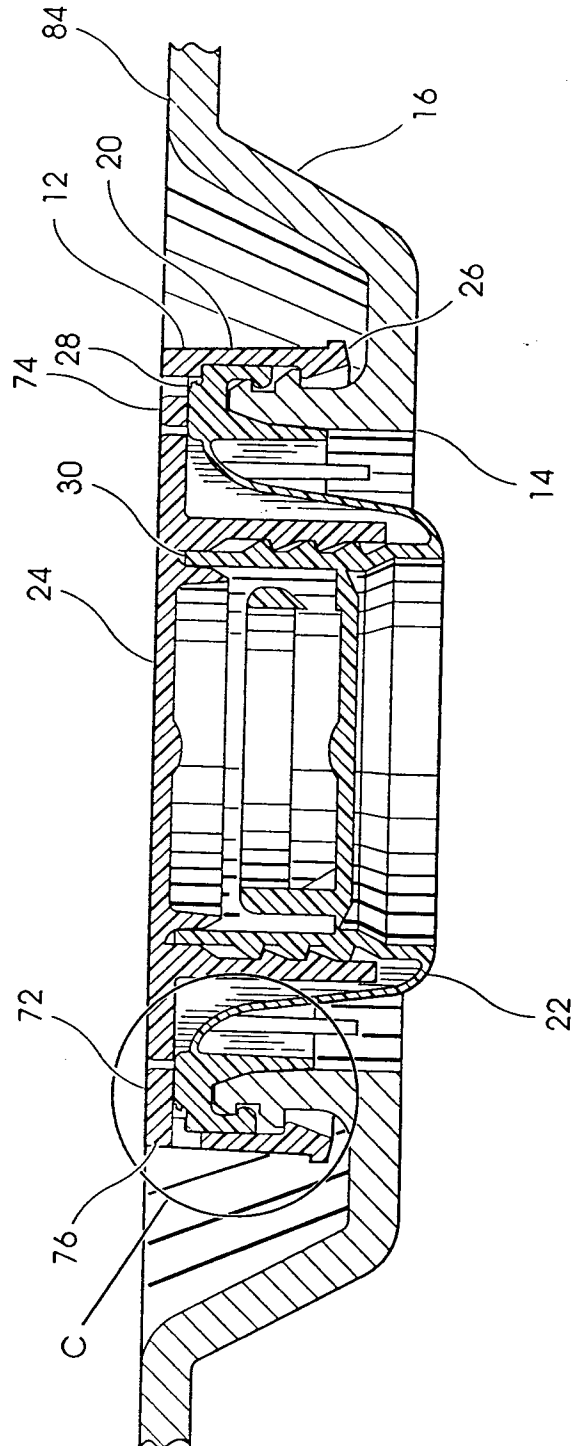
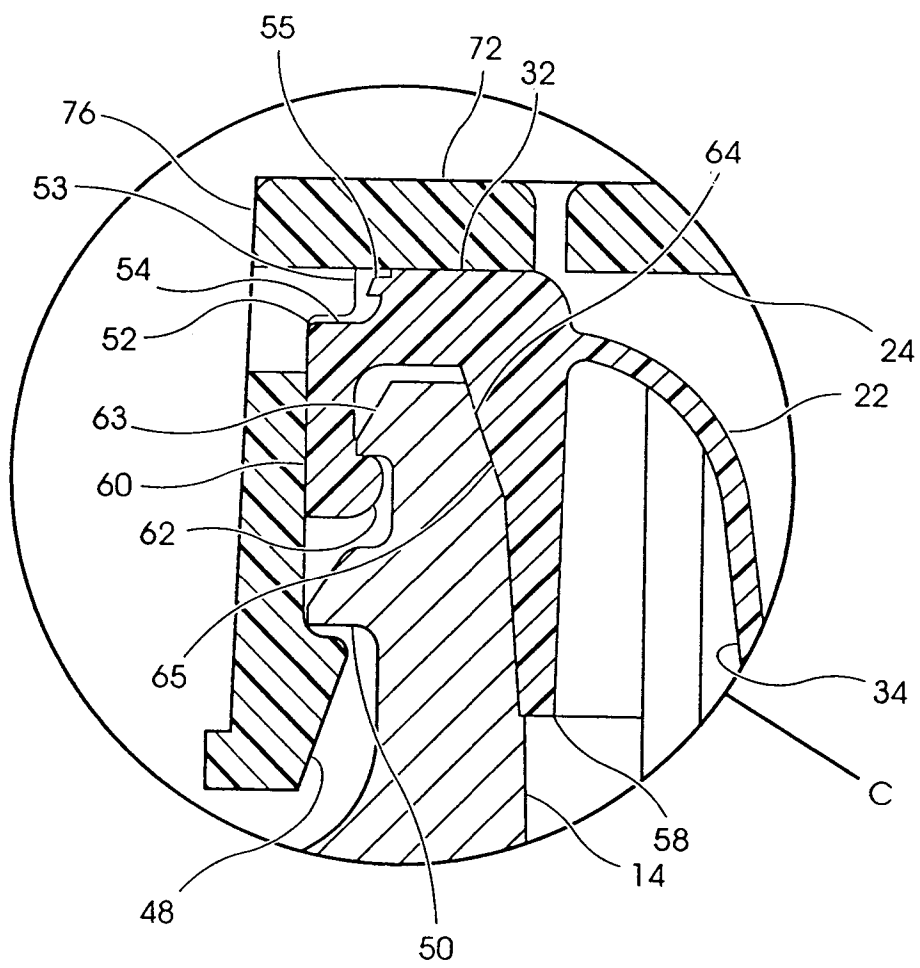


Fig. 5



*Fig. 6*