

[54] CLOSURE STRUCTURES HAVING
CHILD-SAFETY FEATURE

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215/250; 215/306

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[58] Field of Search 215/9, 211, 224, 306, 225,
215/250; 220/38.5; 222/153, 546

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[57]

ABSTRACT

Closure structures which are constructed so that when pressure is applied to a portion of a cap in a closed position on a base that the cap is tilted to a position in which it can be moved from the closed position can be constructed by using a fulcrum means adjacent to spaced surfaces on the base and the cap. Flange means on the base and the cap are normally engaged when the cap is in a closed position so as to hold the cap in the closed position. These flange means are at least partially disengaged as a result of the rotation of the cap indicated.

10 Claims, 7 Drawing Figures

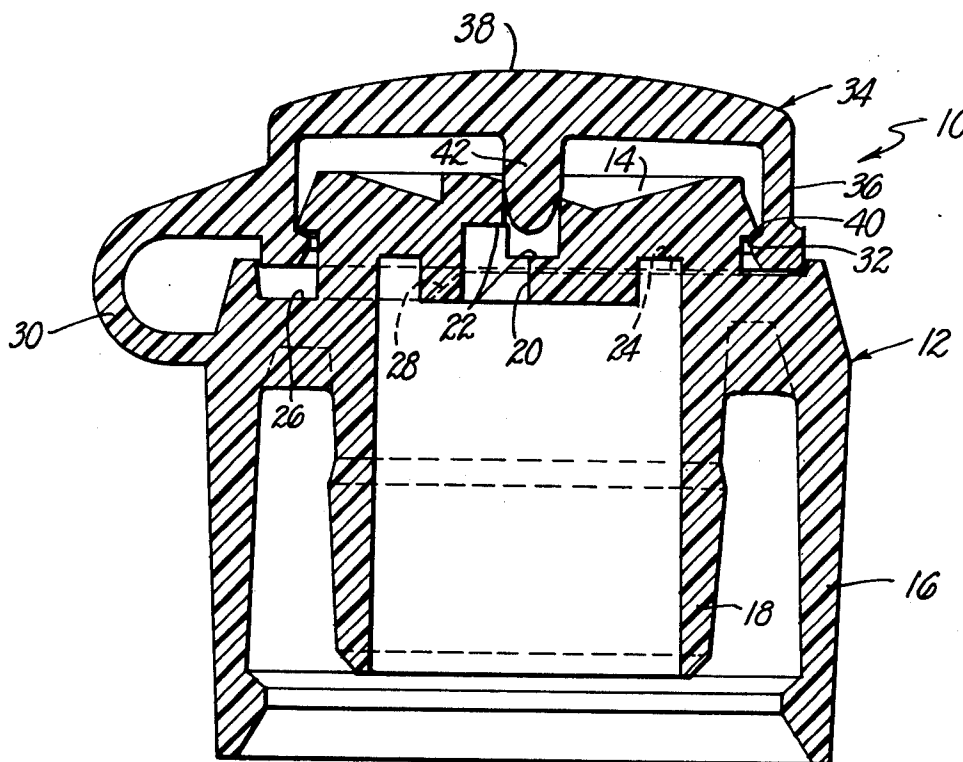


FIG. 1.

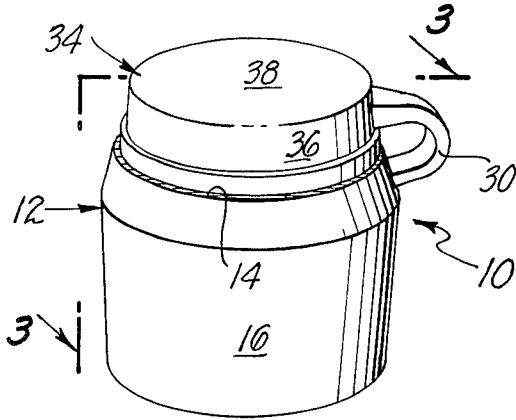


FIG. 2.

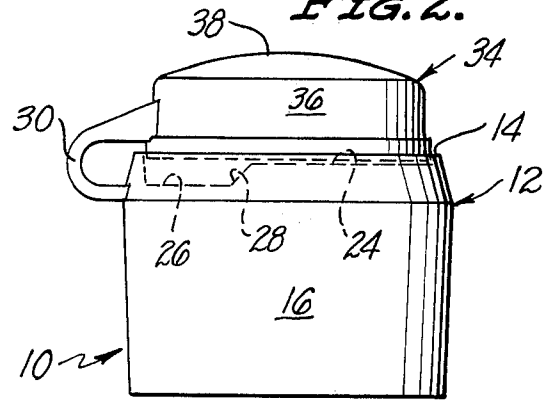
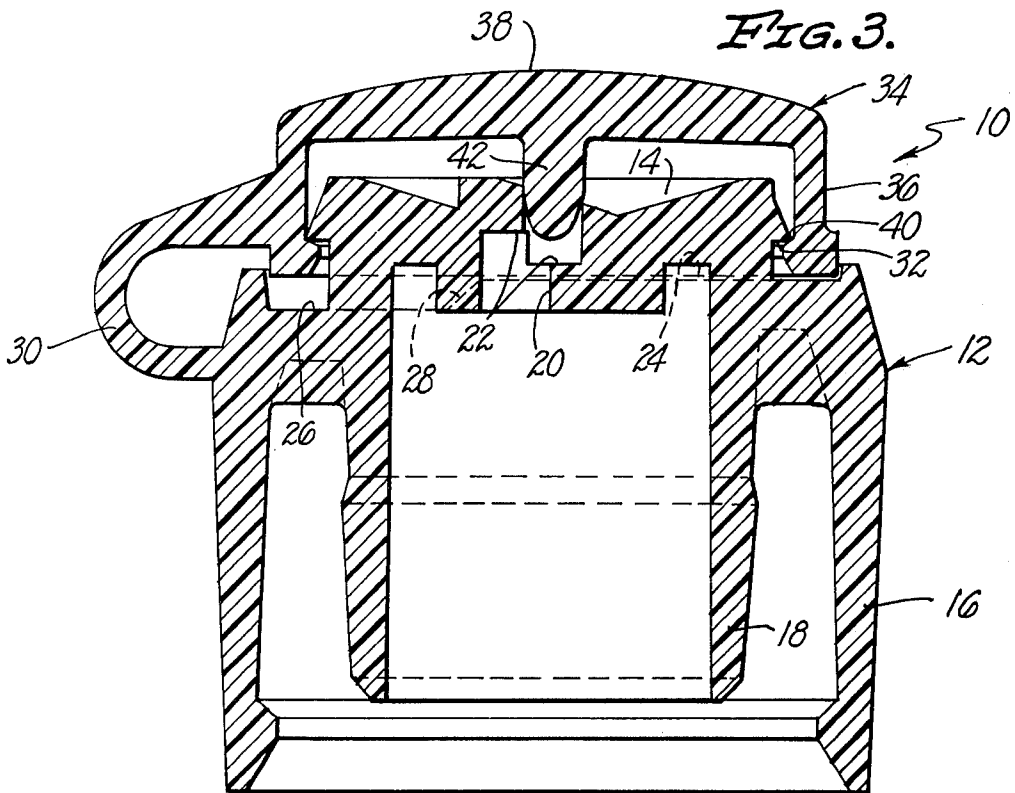
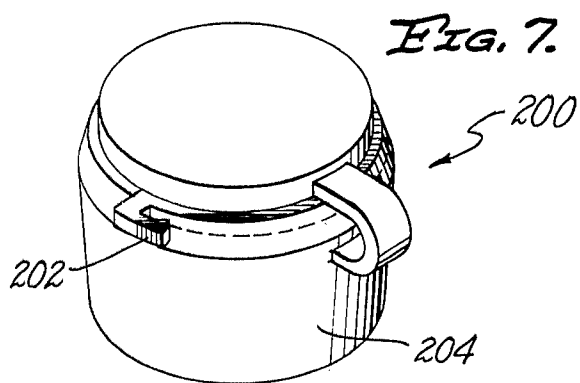
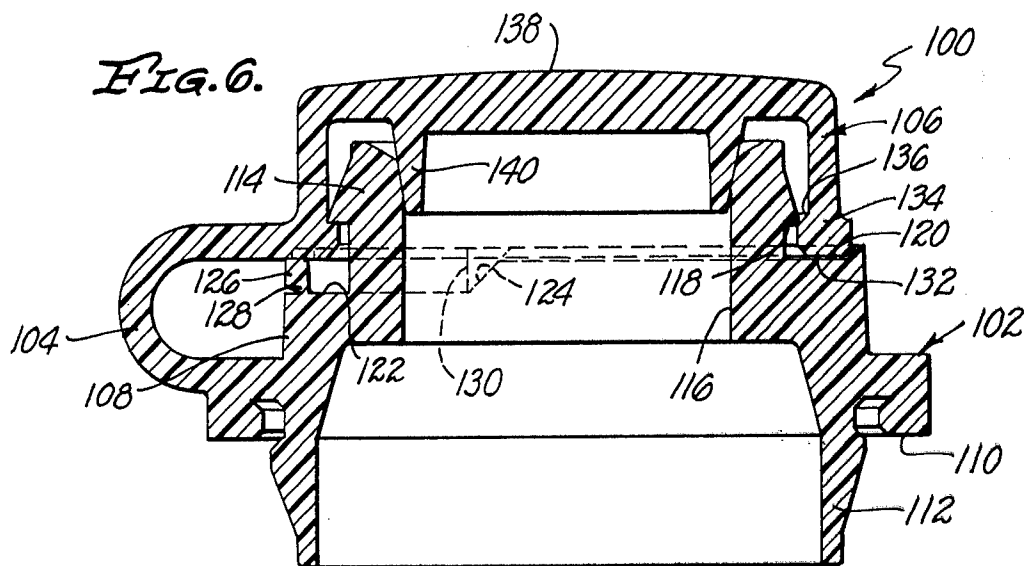
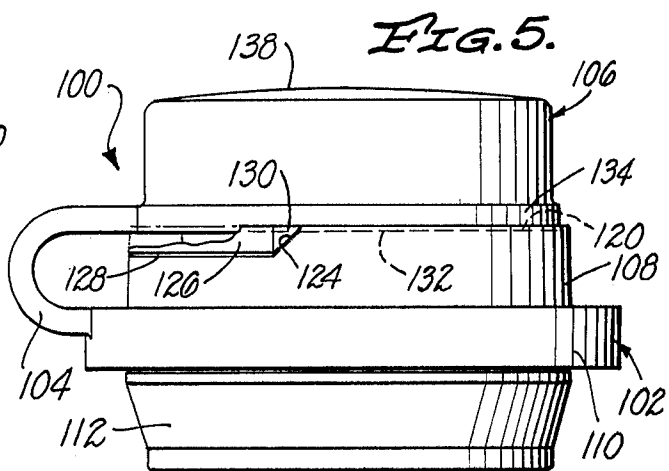
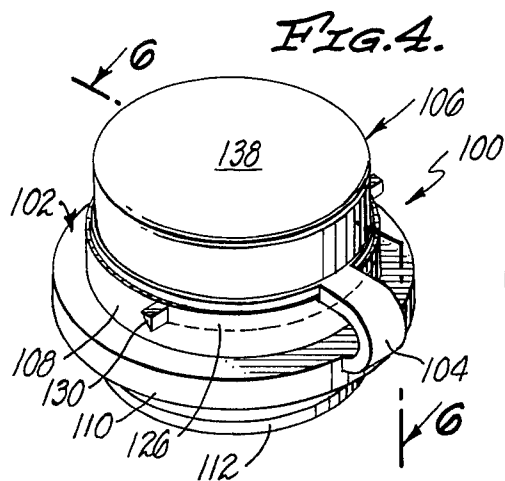


FIG. 3.





CLOSURE STRUCTURES HAVING CHILD-SAFETY FEATURE

BACKGROUND OF THE INVENTION

The invention set forth in this specification pertains to new and improved closure structures and more specifically to closure structures employing a base or base part and a cap or cap part which is adapted to be assembled on the base so as to close off an opening when the cap is in a closed position.

Many structures of this type are known and many of such known structures are commonly utilized. Frequently such structures are formed so as to include flanges or similar structures on the parts which are adapted to engage one another so as to hold the caps in these devices in closed positions. Such flanges are normally constructed so that they are sufficiently resilient to permit the caps to be disengaged when sufficient force is applied to cause temporary deformation of these flanges.

Structures of this type are normally comparatively difficult to open as a result of the forces required in order to cause the flanges used to disengage. In order to remedy this problem it has been proposed to locate projecting tabs on the caps in closures of this type. The idea behind this is that such tabs can be used essentially as lever arms to facilitate the application of the forces needed to cause disengagement of the closure parts. Unfortunately such tabs for practical reasons have to be fairly small if a closure is to be utilized with certain types of capping equipment. Further, frequently it is desirable to keep such tabs comparatively short or small for aesthetic reasons and in order to keep down the tendency for a customer to open the closure in a store. This tends to limit the leverage obtainable by this type of expedient.

BRIEF SUMMARY OF THE INVENTION

An objective of the present invention is to provide new and improved closure structures of the type indicated in the preceding which may be easily and conveniently utilized but which do not employ external means such as a tab to facilitate their being opened. The invention is also intended to supply new and improved closures which are sufficiently difficult to open so that to at least a degree they may be classified as child resistant. This latter is considered to be of a certain degree of significance since closures of the type to which this invention pertains are frequently utilized in packaging materials which are in one way or the other somewhat hazardous.

In accordance with this invention these objectives are achieved by providing a closure structure having a base with an opening leading therethrough and a cap having a top, this cap being intended to be positioned on the base so that the top covers the opening in a closed position and being capable of being moved to an open position in which the top does not cover the opening by the improvement which comprises: projecting flange means on the base and on the cap for engaging one another when the cap is in the closed position so as to hold the cap on the base, at least one of said flange means being capable of being temporarily deformed so as to permit the cap to be assembled on the base in a closed position and so as to permit the cap to be removed from the base to the opened position, surfaces on the base and on the cap which are spaced from one

another when the cap is in the closed position and fulcrum means located adjacent to one of the spaced surfaces.

With a structure of this type the surfaces of the fulcrum means are shaped so as to permit the cap to be rotated about the fulcrum means so as to at least partially disengage the flange means when the cap is in the process of being moved from the closed to the opened position. By virtue of this type of structure the flange means can be disengaged to a sufficient extent so that the cap can be moved to open the closure structure by a downward thrust. This is considered to be important since it is comparatively easy to push downward against the closure with a significant force. This manner of operation is considered to be easier and more desirable than opening a closure structure of the type indicated using a tab as a lever arm.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is best more fully explained with reference to the accompanying drawings in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a closure structure in accordance with this invention;

FIG. 2 is a side elevational view of the closure structure shown in FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 1;

FIG. 4 is an isometric view of a modified closure structure in accordance with this invention;

FIG. 5 is a side elevational view of the closure structure shown in FIG. 4;

FIG. 6 is a cross-sectional view taken at line 6—6 of FIG. 4;

FIG. 7 is an isometric view of a slightly altered form of the closure structure illustrated in FIG. 4.

The different closure structures illustrated in the drawing embody certain principles or concepts as are set forth and defined in the appended claims forming a part of this disclosure. These principles or concepts can be applied in a wide variety of differently appearing and somewhat differently constructed closures through the use or exercise of routine skill in the bottle closure field.

DETAILED DESCRIPTION

In FIG. 1 of the drawing there is shown a closure 10 which includes a base or base portion 12. This base 12 is formed so as to include a top 14 which carries a dependent annular skirt 16 and a concentric dependent hollow plug 18. This skirt 16 and the plug 18 are conventional means for mounting a closure such as the closure 10 upon a container such as a squeeze polyethylene bottle (not shown) so that during the use of the closure 10 fluid can be exhausted from such a container through an opening 20 in the top 14. The particular opening 20 illustrated is formed by what may be referred to as a "blind slot" method so as to include internal shoulders 22. This particular opening 20 is thus shaped so essentially it goes through the top 14 at an angle. This is desired for certain dispensing closures.

The top 14 also includes a peripheral groove 24 having a rear portion 26 which is recessed within the top 14 to a greater extent than the remainder of the groove 24. This recessed rear portion 26 is separated from the remainder of the groove 24 by two shoulders 28 located opposite from one another equidistant from a

flexible strap 30 located at the rear of the closure 10. A continuous external downwardly directed flange 32 extends completely around the top 14 in a plane perpendicular to the axis going through the skirt 16 and the plug 18.

It will be noted that the principal portion of the groove 24 and the rear portion 26 are located in two different planes which are also perpendicular to this axis. In the structure shown the shoulders 28 are separated from one another less than 180° around this axis and are symmetrically located about an imaginary line extending from the center of the strap 30 through this axis.

The strap 30 carries a cap 34 so that this cap 34 may be positioned in a closed position as shown in FIGS. 1-3 of the drawing and so that this cap 34 may be swung away from the top 14. This cap 34 includes a peripheral skirt 36 and a top 38. The skirt 36 is dimensioned so as to fit around the flange 32 so that an upwardly directed flange 40 on it is located in such a position so as to engage the flange 32 in order to firmly hold the cap 34 in place. The top 38 also includes a centrally located plug 42 which engages the interior of the opening 20 in such a manner as to further hold the cap 34 in place. This plug 42 is primarily intended to fit within the opening 20 so as to seal when the cap 34 is in place.

It is to be noted that the strap 30 is connected to the skirt 36 in such a manner as to permit the cap 34 to be pivoted from the closed position illustrated in which the skirt 36 just fits within the groove 24 so that the bottom of the skirt 36 is invisible or hidden from view to a position in which the cap 34 is tilted or rotated about the shoulders 28 so that the skirt 36 fits against the bottom of the rear portion 26 adjacent to the strap 30. For this mode of operation to be achieved it is necessary for the entire closure 10 to be formed of a temporarily deformable material such as polyethylene, polypropylene or the like. In theory it would be possible to form either the base 12 or the cap 34 out of such a material capable of temporary deformation and to form the other part out of a more rigid material.

The important thing is to have these two parts formed so that as pressure is applied to the top 38 of the cap 34 adjacent to the strap 30 the flanges 32 and 40 will "pop" over one another so as to release the cap 34 so that it can be pivoted about the shoulders 28. These shoulders 28 serve as fulcrum means enabling the cap 34 to be rotated to a position in which it can be manually engaged so as to be lifted off of the top 14. When the cap 34 is to be replaced it can be moved to immediately above the closed position shown and pushed downwardly so it can be forced into a position as illustrated.

In FIGS. 4-6 of the drawing there is shown a modified closure 100 in accordance with this invention which is very similar to the closure 10. It has a base 102 connected by a strap 104 to a cap 106. This base 102 includes a top 108 carrying a dependent skirt-like holding flange 110 and a concentric cylindrical plug 112. This flange 110 and the plug 112 are conventional means for mounting the base 102 on a conventional container.

The top 108 includes an upstanding cylindrical flange 114 defining a concentric dispensing opening 116 of rather large diameter extending through the top 108. This flange 114 is surrounded by an external flange 118 corresponding to the flange 32. Immediately beneath it

the top 108 is provided with a groove 120 corresponding to the groove 24. This groove 120 has a recessed rear portion 122 which is also separated from the remainder of the groove 120 by shoulders 124 which correspond to the shoulders 28 previously described. A small spacer band 126 is located along the entire length of the rear portion 122 so as to be spaced from the flange 118. This spacer band 126 is preferably connected to the base 102 by a small thin line or web 128 of material so that it can be conveniently broken off of the base 102. A small projecting end 130 is provided on the band 126 to facilitate this band 126 being removed from the base 102.

This band 126 serves to support the bottom 132 of the skirt 134 on the top 108 so that this skirt 134 is held in a plane perpendicular to the axis of the opening 116 at all times when the band 126 is in place in order to make sure that the cap 106 is not inadvertently moved. Preferably the strap 104 is secured to the skirt 134 adjacent to this bottom 132 so that if the skirt 134 is inadvertently flexed it will fit against the band 126. This skirt 134 carries an internal upwardly directed flange 136 corresponding to the flange 40 which is adapted to fit against the flange 118 so as to normally hold the cap 106 in place so that the top 138 of this cap is positioned with an internal annular plug 140 fitting within the forming a seal against the interior of the flange 118.

This closure 100 is adapted to be formed of a material as used in forming the closure 10. When it is so formed it can be assembled as shown in the drawing with the band 126 in place. When the closure 100 is to be used the end 130 can be manually engaged and pulled so as to sever the band 126 along the web 128. This exposes the rear portion 122 of the groove 120 so that this recessed rear portion 122 is open to the exterior of the closure 100. Pressure can then be applied to the top 108 above this rear portion 122 so as to pivot it about the shoulders 124. This will have the effect of causing temporary deformation enabling this rotation to take place. Such rotation will place the cap 106 in a position in which it can easily be lifted off of the base 102. The cap 106 can, however, be reassembled upon this base 102 by being pushed down on the base 102 to a cylindrical position.

The closures 10 and 100 can be modified in a number of different ways. As a rather obvious example of this there is shown in FIG. 7 a closure 200 which is identical to the closure 100 in all respects except for the substitution of a handle 202 for the end 130 and except for the substitution of a skirt 204 corresponding to the skirt 16 and an internal plug (not shown) corresponding to the plug 18 for the flange 110 and the plug 112. It is noted that the handle 202 is curved back along the periphery of the closure 200 so as not to extend from it any significant distance. This is to enable the closure 200 to be utilized with conventional capping equipment.

In all of the closures illustrated the shoulders described serve as fulcrums so as to obtain a degree of leverage in causing the temporary material deformation necessary to open these closures. The amount of such deformation required can to a degree be regulated by varying the positions of these shoulders. The positions illustrated are presently considered preferable in providing closures which are relatively difficult to open but which still can be opened without extreme difficulty. This counterbalance of these two considerations is con-

sidered important in providing closures which are relatively child resistant and/or child proof in the sense that they are not apt to be opened by comparatively young children.

The spacer means illustrated and described in connection with the closure 100 can also be utilized to increase the degree of difficulty involved in opening and closing a closure as herein described. As an example of this the band 126 indicated is formed so that it is joined to the base 102 by the web 128 in such a manner that this band 126 may be easily separated. The extremity of the web 128 remote from the end 130 can be spaced so that it will not interfere with movement of the cap 106 and can be formed thicker than the remainder of this web 128 so that it will not be broken in use but instead will serve as a resilient hinge. When this is done the band 126 can be used as a resilient latch to control when the cap 106 is opened. Other equivalent latch means can be employed.

I claim:

1. In a closure structure having a base with an opening leading therethrough and a cap having a top, said cap being intended to be positioned on said base so that said top covers said opening in a closed position and being capable of being moved to an opened position in which said top does not cover said opening the improvement which comprises:

projecting flange means on said base and on said cap for engaging one another when said cap is in said closed position so as to hold said cap on said base, at least one of said flange means being capable of being temporarily deformed so as to permit said cap to be assembled on said base in said closed position and so as to permit said cap to be removed from said base to said opened position, surfaces on said base and said cap which are spaced from one another when said cap is in said closed position, and

fulcrum means located adjacent to one of said spaced surfaces,

said surfaces and said fulcrum means being shaped so as to permit said cap to be rotated about said fulcrum means so as to be at least partially disengage said flange means when said cap is being moved from said closed to said opened position.

2. A closure structure as claimed in claim 1 wherein: the bottom of said cap fits against the top of said base except where said surfaces are located.

3. A closure structure as claimed in claim 2 including:

spacer means located between said surfaces, said spacer means serving to prevent said cap from

being rotated about said fulcrum means, said spacer means being capable of being removed from between said surfaces so as to permit said cap to be rotated about said fulcrum means.

4. A closure structure as claimed in claim 1 wherein: said base has a cylindrical neck surrounding said opening.

said cap has a dependent skirt which fits around said neck secured to said top,

said flange means on said cap comprises an internal flange located within said skirt,

said flange means on said base comprises an external flange located on said neck.

5. A closure structure as claimed in claim 4 wherein: the bottom of said skirt fits against the top of said base when said cap is in said closed position, said surface on said base is a recessed portion in the top of said base,

said surface on said cap is a part of the bottom of said skirt.

6. A closure structure as claimed in claim 5 wherein: said recessed portion is a groove in the top of said base.

said cap being capable of being rotated about said fulcrum means so a part of said skirt extends into said groove.

said fulcrum means comprises shoulders at the extremities of said groove.

7. A closure structure as claimed in claim 6 wherein: said groove is covered by the bottom of said skirt when said cap is in said closed position.

8. A closure structure as claimed in claim 5 wherein: said recessed portion is exposed to the exterior of said base when said closure structure is used.

9. A closure structure as claimed in claim 8 including:

spacer means located within said recess between said cap and said base for preventing said cap from being rotated about said fulcrum means,

said spacer means being capable of being removed from between said cap and said base so as to permit said cap to be moved from said closed to said opened position.

10. A closure structure as claimed in claim 9 wherein:

said spacer means comprises a spacer band integral with said base and connected to said base by a small quantity of material capable of being easily severed so as to permit said spacer band to be removed from said base.

* * * * *