United States Patent [19]

Hazard

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[54] **CHILD-RESISTANT CLOSURES WITH LIMITED SPOUT ACCESSIBILITY**

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[52] **U.S. Cl.**..... **222/534,** 222/536, 222/538

[51] **Int. Cl.**..... **B65d 25/46,** B65d 47/06

[58] **Field of Search** 222/533, 534, 536, 538, 222/498

[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

It is known to manufacture dispensing closures which have a cap adapted to be secured to a container and having a spout rotatably mounted on the cap so as to be capable of being rotated when physically engaged between a closed position in which the spout extends horizontally and seals off an opening through the cap and an open position in which the spout extends vertically and is in alignment with the opening. The chances of any such closure being opened by a small child can be materially decreased through the use of side walls on the cap allowing access to only the tip of the spout when the spout is in a closed position and through the use of a horizontally extending wall serving to prevent the tip of the spout from being directly engaged by a finger when the spout is in the closed position. The horizontally extending wall, however, permits the tip of the spout to be engaged by an implement such as a fingernail so that the spout may be rotated to an open position.

8 Claims, 8 Drawing Figures

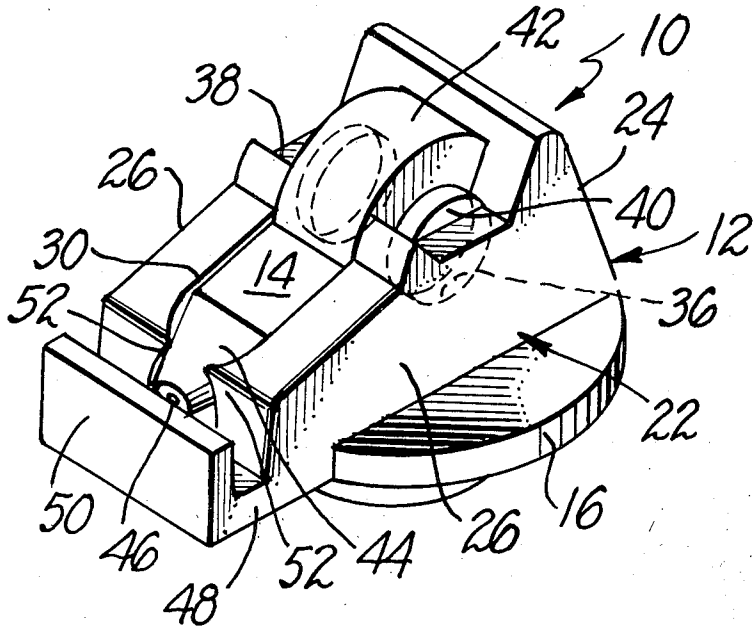


FIG. 1.

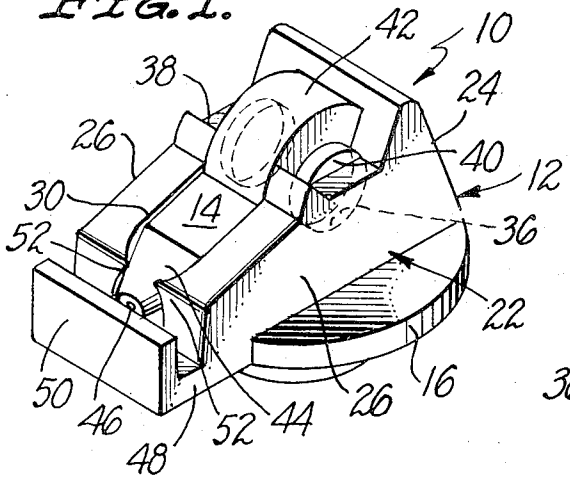


FIG. 2.

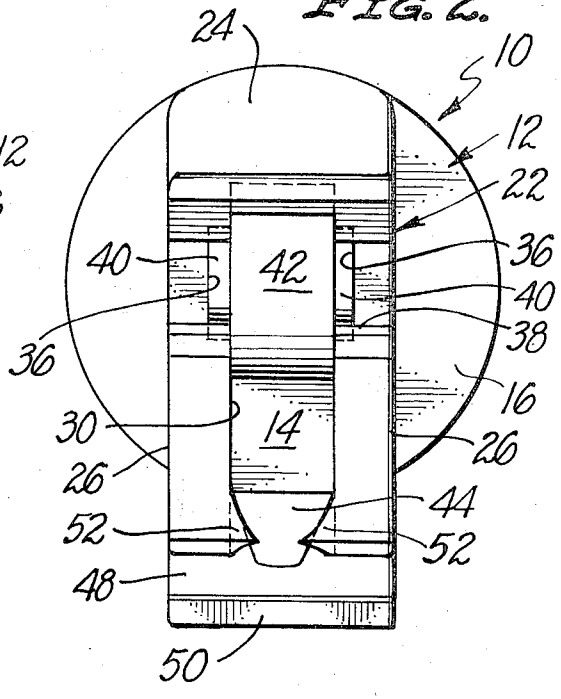


FIG. 3.

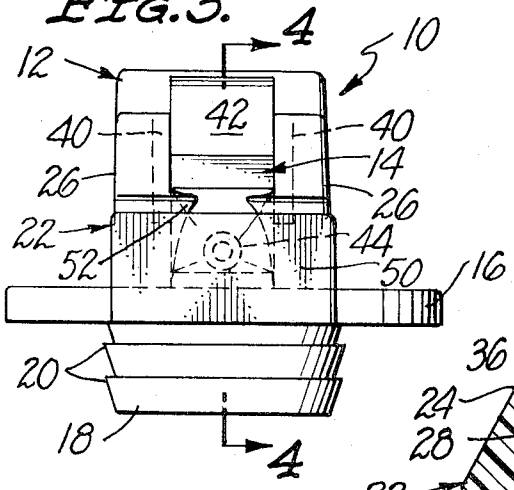
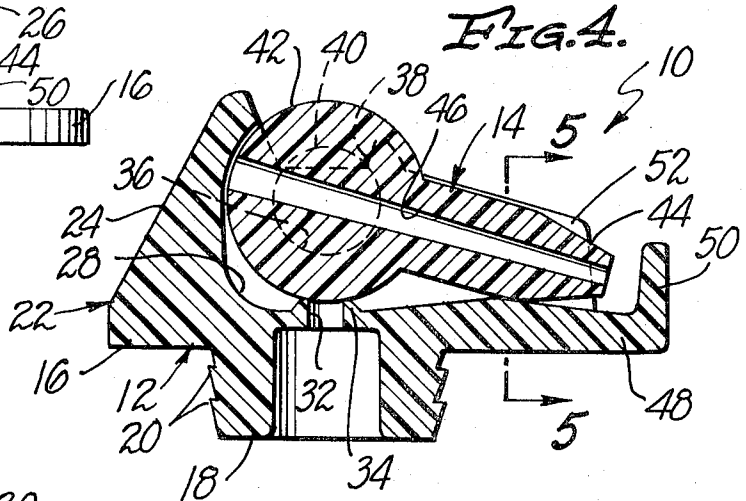


FIG. 4.



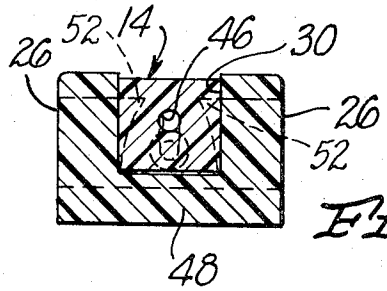


FIG. 5.

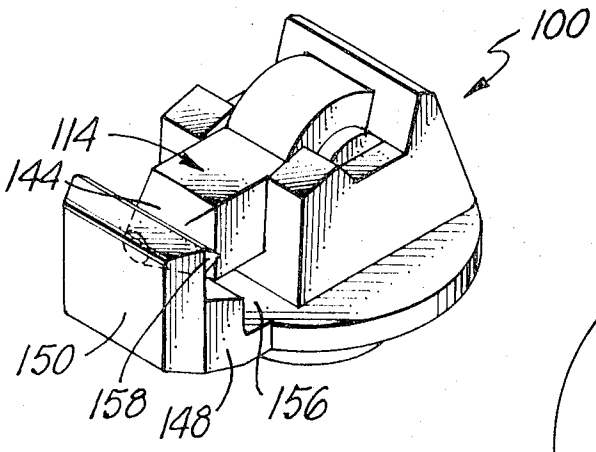


FIG. 6.

FIG. 7.

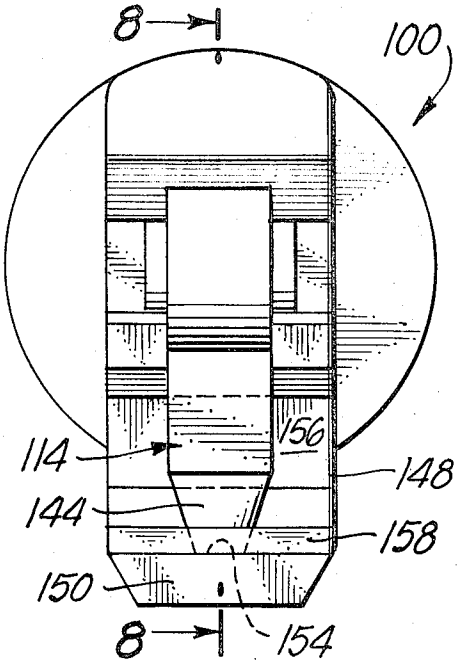
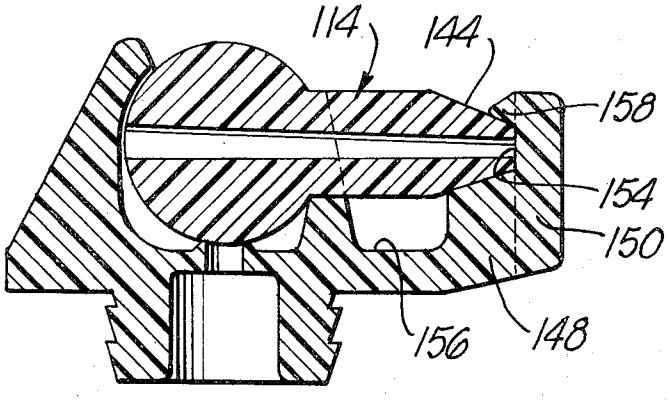


FIG. 8.



CHILD-RESISTANT CLOSURES WITH LIMITED SPOUT ACCESSIBILITY

BACKGROUND OF THE INVENTION

The invention set forth in this specification pertains to so-called "child-resistant" dispensing closures. The term "dispensing closure" is commonly utilized to designate closures having a cap adapted to be secured to a container in any of a variety of ways and having a spout rotatably mounted on the cap so as to be capable of being rotated between a closed position in which the spout extends vertically and seals off an opening in the cap and an open position in which the spout extends vertically and is in alignment with the opening.

Such dispensing closures may be manufactured in a number of different ways. One dispensing closure structure which is considered to be particularly desirable is set forth in the Wilson et al U.S. Pat. No. 2,793,895. Such closures may, however, be constructed in other manners. It is highly desirable to utilize within them a sealing ring which fits against the spout so that leakage cannot occur between the spout and the cap when the spout is in a closed position. One particularly suitable sealing ring is disclosed in the Akers U.S. Pat. No. 3,495,745.

Dispensing closures are unquestionably highly desirable and utilitarian for a number of types of uses in which they are employed in dispensing liquid or nearly liquid ingredients from various containers. Because of the nature of certain of such ingredients it is currently desired to modify such closures so that they are relatively child-resistant in character. This term "child-resistant" is a term which is increasingly being utilized in connection with closures to designate closures which are of such a character that they are not apt to be opened by comparatively young children and/or adult individuals of less than normal mental capacity. In the past the term "safety closure" was commonly utilized instead of the term "child-resistant" closure.

Because of the nature of dispensing closures, the industry pertaining to such closures has been faced with a significant problem in modifying known closure structures so as to make them child-resistant in character. A number of such modifications have been proposed, and in a few cases, such proposals have been more or less accepted or adopted. It is considered, however, that the proposed structures for child-resistant closures have all been deficient in any of several different regards.

On occasion, such closures have been too simple for children to open. On occasion, such closures have tended to be so difficult to open that they cannot be effectively used by normal adults. Frequently the structures proposed for such child-resistant closures have been relatively complex and expensive to manufacture. This matter of economics is of critical significance in the dispensing closure industry because millions of such closures are used every month and are discarded after they have been used.

BRIEF SUMMARY OF THE INVENTION

From the preceding it will be apparent that there is a need for new and improved child-resistant closures. A broad objective of this invention is to teach the construction of dispensing closures which will fulfill this need. Other objectives of this invention of a related

character are to provide child-resistant dispensing closures: which are neither easy nor difficult to open; which may be easily and conveniently used as required by adults of normal mental capacity; and which can be economically produced at a comparatively nominal cost.

In accordance with this invention these objectives are achieved in a dispensing closure having a cap adapted to be secured to a container and having a spout rotatably mounted on the cap so as to be capable of being rotated when the spout is physically engaged between a closed position in which the spout extends horizontally and seals off an opening through the cap and an open position in which the spout extends vertically and is in alignment with the opening by providing the improvement which comprises: two vertically extending walls located on the cap so as to extend vertically along and adjacent to both of the sides of the spout when the spout is in a closed position and a horizontally extending wall located on the cap so as to extend beneath the tip of the spout when the spout is in the closed position.

The vertically extending walls used limit access to the spout when the spout is in the closed position so that only the tip of the spout can be engaged when the spout is in this position to rotate it to an open position. The horizontally extending wall is designed so that the spout may not be directly engaged by a finger applied to the underside of the tip of the spout as in prior dispensing closures in order to rotate the spout from a closed position to an open position.

The horizontally extending wall used, however, is spaced so as to permit an implement such as a fingernail, a knife or the like to be inserted between it and the tip of the spout so as to rotate the spout from such a closed position. Preferably an end wall is provided on the extremity of the horizontally extending wall to further limit the access to the tip of the spout. Preferably detent means are employed so as to hold the spout in the closed position against a minor force such as might be applied to it by a child so as to limit the ability of such a child to rotate the spout to an open position and so as to discourage such rotation.

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 dispensing closure in accordance with this invention;

FIG. 2 is a top plan view of the closure shown in FIG. 1;

FIG. 3 is a front elevational view of the closure shown in FIG. 1;

FIG. 4 is a cross-sectional view taken at line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view taken at line 5—5 of FIG. 4;

FIG. 6 is an isometric view of a modified dispensing closure in accordance with this invention;

FIG. 7 is a top plan view of the modified dispensing closure shown in FIG. 6; and

FIG. 8 is a cross-sectional view taken at line 8—8 of FIG. 7.

The particular closures illustrated in the drawings are two specific structures employing the concepts of this invention defined and summarized by the appended

claims forming a part of this disclosure. These concepts may be easily used in other somewhat differently constructed and/or differently appearing dispensing closures through the use or exercise of routine engineering design skill in the dispensing closure industry.

DETAILED DESCRIPTION

In the initial figures of the drawings there is shown a dispensing closure **10** in accordance with this invention. This closure includes a cap **12** and a spout **14.** Both of these parts are normally formed out of a somewhat resilient material such as polyethylene, polypropylene or the like so that they can be conveniently snapped together in such a manner that the spout **14** rotatably is mounted on the cap **12** through the use of a structure as hereinafter described or a related structure.

The particularly cap **12** illustrated includes a flat disc-like base **16** which is adapted to rest against the top of a container when the closure **10** is used. It also includes a downwardly extending boss **18** located beneath the base **16** which is adapted to project a short distance into such a container. Normally peripheral ridges **20** will be located around the boss **18** so as to make it possible for the closure **10** to be secured to a container in a known manner. A closure such as the closure **10** can, however, be constructed in other manners so that it can be conveniently mounted upon a container in such a way that it cannot be easily removed from the container.

The principal or central part **22** of the cap **12** is located above the base and is shaped so as to include a back wall **24** and parallel side walls **26** which fit together in a generally U-shaped manner so as to define a central cavity **28** and a slot **30** leading from this cavity **28** generally to the periphery of the central part **22.** An opening **32** extends from the bottom of the cavity **28** through the cap **12** so as to be in communication with the interior of the boss **18.** A sealing ring **34** of a known type is preferably located around this opening **32** so as to extend into the interior of the cavity **28.** The side walls **26** preferably include diametrically opposed bearing openings **36** of known design which are connected to the tops of the side walls **26** by sloping slots **38** which are of lesser diameter than the bearing openings **36.**

These slots **38** are designed so that aligned trunnions **40** on a generally cylindrical center member **42** forming the base of the spout **14** can be snapped through the slots **38** into the bearing openings **36** in such a manner that the spout **14** is rotatably mounted on the cap **12** in a position in which the center member **42** constantly rests against the sealing ring **34** so as to form a seal with respect to it. When the spout **14** is so held in a closed position it extends as indicated in the initial four figures of the drawings within the slot **30** so that only a small portion of its conical tip **44** extends beyond the side walls **26.** In such a closed position the tip **44** of the spout **14** is exposed in such a manner that it can be engaged so that the spout **14** can be rotated to an open position in which it extends vertically with a passage **46** in it in alignment with the opening **32** except the exposed extremity of the tip **44.**

Many prior dispensing closures have been constructed in this same general manner so that either the end of the spout or so that an overhanging portion of a spout is exposed to the exterior of such a closure when the spout is in a closed position. Such prior structures have been constructed in this manner so that a finger could be brought up underneath the extremity of such a spout or a portion of the spout to apply leverage in rotating such a spout to an open position. This type of construction has been considered quite desirable inasmuch as it is permitted leverage to be used in facilitating the opening of a dispensing closure of the type indicated. Unfortunately, closures of this type are too easy to open to be considered as child-resistant in character.

In accordance with this invention this disadvantage of prior closures is prevented by locating on the cap **12** a horizontally extending wall **48** so that it extends outwardly from the base **16** a distance which is at least equal to and which is preferably slightly greater than the distance to which the tip **44** of the spout **14** extends beyond a central part **22** of the cap **12.** The wall **48** shown is in alignment with the base **18** so as to fit closely adjacent to, but still so as to be spaced a short distance from this tip **44.**

By virtue of the use of the wall **48** and the walls **26** a user of the closure **10** cannot directly engage the spout **14** with a finger so as to rotate this spout to an open position but instead must resort to the insertion of an implement between the wall **48** and the tip **44** in order to provide a force to rotate the spout **14** from a closed position as shown. The term "implement" is used herein in a broad sense so as to include virtually anything smaller than a finger which can be inserted as described. Thus, this term designates such things as a knife, a portion of a paper clip or even a comparatively elongated fingernail.

Preferably the cap **12** also includes a vertically extending end wall **50** located on the extremity of the wall **48** remote from the central part **22** of the cap **12.** This end wall **50** extends upwardly far enough so as to be opposite with and aligned with the tip **44.** It will be apparent from the foregoing that the walls **48** and **50** define an upwardly extending passage extending transversely of the tip **44** of the spout **14.** This construction makes it impossible to insert an instrument as described beneath the tip **44** from opposite this tip **44** so as to rotate the spout **14** to a vertical position. This end wall **50** is, however, spaced from the central part **22** and the side walls **26** so as to permit such an implement to be inserted beneath the tip **44** from a side of this spout **14.** Thus one end of the identified passage defined by the walls **48** and **50** is used in opening the spout **14.** This is considered to improve the child-resistant opening characteristics of the closure **10.**

Such characteristics may also be included by providing curved extremities or ends **52** on the side walls **26** opposite the end wall **50.** These extremities **52** are designed so as to resiliently engage the conical exterior of the tip **44** in such a manner as to serve with this exterior as coacting detent means which will block initial rotation of the spout **14** in a closed position to an open position unless significant force is applied to the tip **44.** Such detent means are considered to serve as a deterent to a child attempting to open the closure **10** even if such a child should determine where an implement should be located and applied in order to open this closure **10.** Various equivalent detent means may be employed instead of those shown.

In FIGS. **6, 7** and **8** of the drawings there is shown a modified closure **100** of the present invention which is essentially very similar to the closure **10.** In the interest

of brevity various parts of the closure **100** which are identical or nearly identical to various parts of the closure **10** are not separately described in this specification and are indicated in the drawings and in the remainder of this specification by the numerals previously used to designate such parts preceded by the numeral **1**.

In the closure **100** the spout **114** is lengthened so as to extend in a closed position into a notch **154** in the end wall **150** and the side walls **126** are cut back in length a short distance so as to provide an upwardly facing opening **156** between the spout **114** and the wall **148** when the spout **114** is in a closed position. This opening **156** is adapted to receive a pencil tip, a match, toothpick or a similar instrument which can be used in lifting the spout **114** so as to rotate it to an open position.

With the closure **100** the curved extremities **52** previously described are not utilized. Instead it is possible to provide a curved side wall **158** above the notch **154** so as to obtain a coacting detent action with respect to the tip **44** tending to impede rotation of the spout **114** to an open position. Such an action requires that the end wall **150** be somewhat resilient.

From a detailed consideration of the preceding it will be apparent that the invention pertains to a very simple concept of creating a child-resistant closure from a known dispensing closure by essentially adding to such a closure features as described making it relatively difficult to gain access to the spout so as to swing the spout to an open position. This concept is considered to be highly utilitarian in providing effective child-resistant closures based upon known closures. In many cases, closures in accordance with this invention can be manufactured using existing molds by modifying these molds to a limited extent. From an economic point of view this factor is considered to be particularly important.

I claim:

1. In a dispensing closure having a cap adapted to be secured to a container and having a spout rotatably mounted on said cap so as to be capable of being rotated about an axis when said spout is physically engaged between a closed position in which said spout extends horizontally and seals off an opening through said cap and an open position in which said spout extends other than horizontally and is in alignment with said opening, the improvement which comprises:

two vertically extending walls located on said cap so as to extend vertically along and adjacent to both of the sides of said spout when said spout is in said closed position, said vertically extending walls surrounding the sides of said spout when said spout is in said closed position so that only the tip of said spout can be engaged to rotate said spout from said closed position to said open position,

a horizontally extending wall located on said cap so as to extend beneath the tip of said spout when said spout is in said closed position, said horizontally extending wall extending from the central part of said cap beyond the tip of said spout when said spout is in said closed position,

an end wall located on the extremity of said horizontally extending wall remote from the central part of said cap and extending upwardly from said horizontally extending wall so as to be aligned with the tip of said spout when said spout is in said closed position,

said horizontally extending wall and said end wall being located so as to cooperate to define a passage extending transversely of the tip of said spout, at least one end of said passage being open to provide access to an under portion of said tip of said spout when said spout is in said closed position,

said vertically and horizontally extending walls and said end wall serving to prevent said spout from being directly engaged by a finger when it is in said closed position so that said spout cannot be rotated from said closed position to said open position by a finger but serving to permit an under portion of said tip of said spout to be engaged by an extending implement inserted through an end of said passage so that a force can be applied beneath said tip when said spout is in said closed position to rotate said spout to said open position.

2. A dispensing closure as claimed in claim **1** wherein:

said end wall is spaced from said tip of said spout when said spout is in said closed position.

3. A dispensing closure as claimed in claim **1** wherein:

said end wall has a notch formed therein, and

said tip of said spout fits within said notch when said spout is in said closed position.

4. A dispensing closure as claimed in claim **1** including:

interengaging detent means on said spout and said cap for holding said spout in said closed position against undesired rotation to said open position.

5. In a dispensing closure having a cap adapted to be secured to a container and having a spout rotatably mounted on said cap so as to be capable of being rotated about an axis when said spout is physically engaged between a closed position in which said spout extends horizontally and seals off an opening through said cap and an open position in which said spout extends vertically and is in alignment with said opening, the improvement which comprises:

two vertically extending walls located on said cap so as to extend vertically along and adjacent to both of the sides of said spout when said spout is in said closed position, said vertically extending walls surrounding the sides of said spout when said spout is in said closed position so that only said tip of said spout can be engaged to rotate said spout from said closed position to said open position,

a horizontally extending wall located on said cap so as to extend beneath the tip of said spout when said spout is in said closed position, said horizontally extending wall extending from the central part of said cap beyond the tip of said spout when said spout is in said closed position and being so closely spaced relative to the tip of said spout when said spout is in said closed position so that a finger of a user of said closure cannot be inserted between said tip and said horizontally extending wall,

said tip of said spout having a rounded, tapered configuration, and

said vertically extending walls having resilient curved extremities which engage said tip of said spout so as to hold said spout in said closed position against undesired rotation to said open position,

said tip and said curved extremities serving as inter-engaging detent means on said spout and said cap for holding said spout in said closed position against undesired rotation to said open position,

said vertically and horizontally extending walls serving to prevent said spout from being directly engaged by a finger when it is in said closed position so that said spout cannot be rotated from said closed position to said open position by a finger but serving to permit said tip of said spout to be engaged by an extending implement such as a fingernail so that a force can be applied beneath said tip when said spout is in said closed position to rotate said spout to said open position.

6. A dispensing closure as claimed in claim **5** wherein:

an end wall located on the extremity of said horizontally extending wall remote from the central part of said cap and extending upwardly from said horizontally extending wall so as to be aligned with the tip of said spout when said spout is in said closed position,

said end wall serving to limit the access to said tip of said spout when said spout is in said closed position.

7. A dispensing closure as claimed in claim **6** wherein:

said end wall has a notch formed therein, and

said tip of said spout fits within said notch when said spout is in said closed position.

8. A dispensing closure as claimed in claim **6** wherein:

said end wall is spaced from said tip to said spout when said spout is in said closed position.

* * * * *