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71 Applicant: Ethyl Products Company  
330 South Fourth Street  
Richmond Virginia(US)

72 Inventor: Wiles, Lawrence Elliott  
671 Overlook Drive  
Cheshire Connecticut(US)

72 Inventor: Page, Frank Charles III  
325 Lea Avenue  
Cheshire Connecticut(US)

72 Inventor: Eibensteiner, Bruno Alois  
45 Harpers Ferry Road  
Waterbury Connecticut(US)

74 Representative: Baillie, Iain Cameron et al,  
c/o Ladas & Parry Blumenstrasse 48  
D-8000 München 2(DE)

54 Child resistant container cover.

57 A safety closure for containers comprising a container with a threaded neck portion 11, a cap 14 provided with a multiplicity of threads 15 cooperatively engaging the threads 12, 12a on the neck portion, means 13a connected to the threaded neck portion for stopping the threading rotation of the cap onto the threaded neck portion at a predetermined position, and resilient liner means 20 interposed between the underside of the top of the cap and the top of the neck portion.

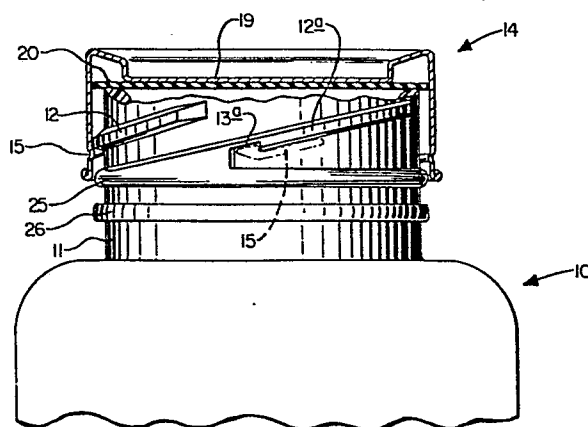


FIG. 6.

CHILD RESISTANT CONTAINER COVERField of the Invention

This invention is in the field of closures for containers for consumer products. More particularly, the invention deals with closure devices for achieving child resistant characteristics.

Background and Prior Art

Many child-resistant caps and closures have been suggested in recent years because of the greater activity directed towards insuring that dangerous and poisonous materials be packaged in containers which are significantly difficult for small children to open.

Exemplary of the containers and closures developed by the art in response to this need is the closure and container shown in U. S. Patent No. 3,888,376. This container and closure is in the class of child-resistant packages which feature latching and unlatching means carried by the threads of the closure and the container. Generally, this class is beset by the problem of requiring very exact container and closure manufacture so that registration of the latching structure can be predictably effected. The manufacturing standards required are oftentimes difficult to achieve when it is considered that the packager oftentimes purchases the containers from sources separate from the closures.

Despite these difficulties, however, this class of child-resistant closure and container is highly desirable in that the locking mechanism is carried internal to the package when the closure is fitted to the container. Other classes of child-resistant closures and containers which rely upon exterior locking systems oftentimes are not entirely satisfactory as a child is free to attack the locking structure.

Therefore, it is an object of this invention to provide a container and closure which is child-resistant, which is in the class of containers and closures which have the locking systems carried by the threads of the containers and closures, and which is able to achieve its child-resistant locking position when manufacturing tolerances are maintained. Furthermore, it is an object of the invention to provide a container and closure combination in which the closure can be oriented to a predetermined position on the container.

#### Description of the Invention

A safety closure for containers comprising a threaded neck portion, a cap provided with a multiplicity of threads cooperatively engaging the threads on the neck portion, means connected to the threaded neck portion for stopping the threading rotation of the cap onto the threaded neck portion at a predetermined position, and resilient liner means interposed between the underside of the top of the cap and the top of the neck portion.

An advantage of the container and closure of this invention is a low application torque, ability to give a tight seal, and easy opening for adults. A disc liner acts as both a spring to maintain required vertical pressure and seal against a vacuum and normal environmental atmosphere. Another advantage is that an

odd shaped cap can be oriented to match a conforming container, e.g., a square cap can be aligned with the sides of a square container.

These and other features contributing to  
5 satisfaction in use and economy in manufacture will be more fully understood from the following description of a preferred embodiment of the invention when taken in connection with the accompanying drawings wherein identical numerals refer to identical parts and in  
10 which:

FIGURE 1 is a top view of a container of this invention;

FIGURE 2 is a side view of a container of this invention;

15 FIGURE 3 is a cross-sectional view of a closure of this invention;

FIGURE 4 is a bottom view taken of the closure shown in Figure 3;

20 FIGURE 5 is a side view of the closure shown in Figure 2 rotated to show another view of the threads;

FIGURE 6 is a partly cut-away side elevational view of the closure attached to the container shown; and,

25 FIGURE 7 is an enlarged, cut-away, partly sectional view of the top of the neck of the container.

Referring now to the drawings, a conventional container 10 is provided which, while preferably made  
30 of plastic, may be made of glass or suitable material. The container has the usual neck portion 11 provided with threads 12 and 12a which, when the container is made of plastic, may be molded. Threads 12 and 12a have trailing

edges 17 and 17a, respectively, which are generally parallel to the center line of the closure.

As can be seen in the drawings, the two threads 12a have a stop 13 at the end thereof which together  
5 with surface 17a define gap 13a whereas the two threads 12 do not have a stop at the end thereof, although they do have surface 17 which contacts surface 16a in the locked position.

The closure of cap 14 has four harpoon-shaped  
10 threads 15 equally spaced at approximately 90 degrees apart. The harpoon-shaped threads 15 have an arrowhead portion 16 thereon, the surface 16a behind the arrowhead 16 being generally parallel to the centerline of the closure and being designed to interlock in gap 13a as  
15 shown in Figure 6 in the "ghosted" thread 15. The surface line of the top 16b of arrowhead portion 16 is generally parallel to the bottom 12b of threads 12 and 12a to reduce thread damage, as is the tail of thread 15.

The top of the neck has the usual bearing  
20 surface 18. The underside of cap 14 has a depressed top portion 19 which can be molded in the cap when it is made of plastic or embossed in the cap when the cap is made of metal. Lying between the top 18 of the neck 11 and the depressed portion of the cap 14 is a liner 20.  
25 Liner 20 is made of some suitable resilient material which in conjunction with the depressed portion 19 of cap 14 seals the top 18 of container 10 to prevent any fluids flowing therefrom.

The top 18 of container 10 preferably includes a  
30 sealing surface 18a (see Figure 7). Sealing surface 18a includes a flat portion 18b and a curved or radiused surface 18c. Both 18b and 18c cooperate to assure a tight seal.

In assembling the closure to the neck of the container it is merely necessary to manually turn the closure in a manner to screw the closure onto the neck of the container. Closures made in accordance with the invention can be attached to the container with a torque as low as 10 to 12 inch-pounds. The leading edge of the threads 12a and 12 have a tapered surface 21 which acts in conjunction with arrowhead portion 16 of threads 15 to insure ease of threading. When the closure is fitted on the neck of the container and released, the action caused by the depressed member 19 bearing on the liner 20 will cause the cap to move to a slight degree upwardly to securely lock the arrowhead portion 16 in gap 13a.

In order to open the closure it is necessary to exert a downward pressure against the action of the member 19 and the liner 20 whereupon the arrowhead 16 will be forced downward and out of gap 13a and in the same movement the closure may be turned to unscrew the closure from the neck of the container. Thus, it may be seen that the present invention provides a one-piece safety closure obtaining a positive lock against inadvertent opening.

Preferably two sealing bands 25 and 26 are provided at the bottom of neck 11. These sealing bands 25 and 26 provide several functions. They help prevent the container from going out-of-round during high application torques and they serve as a bacteria baffle.

As can be seen from the above, an odd-shaped container having a corresponding odd-shaped cap is feasible in accordance with the present invention because the cap can be oriented and aligned with the

sides of the container to make the combined cap and container symmetric and esthetically pleasing. For example, a square cap can be fitted to a square container by positioning stops 13-13 in the appropriate place on  
5 neck 11.

While the invention has been described in detail in connection with one embodiment thereof, the description and illustration are in no way intended to limit the scope of the invention.

Claims

1. A safety closure for containers including
  - a. a threaded neck portion (11) on said container (10), and
  - b. a cap (14) having a plurality of threads (15) having arrowhead-shaped portions (16) at one end thereof
  - c. means on said threaded neck portion (11) for stopping the threading rotation of said cap (14), said means including a gap (13a) on at least two of said threads on said neck portion (11) said gap being defined by,
    - i. a raised stop (13) at the end of at least two of said threads (12a) on said neck portion (11) against which at least two of said threads (12a) on said cap (14) strike when said cap (14) is threaded onto said neck portion and by,
    - ii. the end (17a) of said threads (12a) on said neck portion and
  - d. resilient liner means (20) interposed between the underside of the top (19) of said cap (14) and the top (18) of said neck portion (11).



2. A closure according to Claim 1 further characterized in that the trailing surface (16a) behind each arrowhead portion (16) is generally parallel to the centerline of said closure and is adapted to interlock in said gap (13a).
- 5 3. A closure according to Claim 1 or 2 further characterized in that said cap (14) has a depressed portion (19) on the top thereof which strikes the liner (20) when said cap (14) is screwed onto the said threaded neck portion (11).
- 10 4. A closure according to Claim 3 further defined in that the threaded neck portion has a sealing top (18) including a flat, circular upward facing portion (18b) and a downwardly curved inner portion (18c) adjacent thereto.
5. A closure according to any of Claims 1 to 4 further  
15 defined in that the leading end (21) of each thread (12) is bevelled toward the body of the neck portion (11).
6. A cap for the closure of any of Claims 1 to 5 further characterized by having a multiplicity of threads having an arrowhead-shaped portion (15) at the leading end  
20 thereof adapted to engage the stop means (13) of the ends of at least two threads on a container neck portion (11).
7. A container for a safety closure as defined in any of Claims 1 to 5.

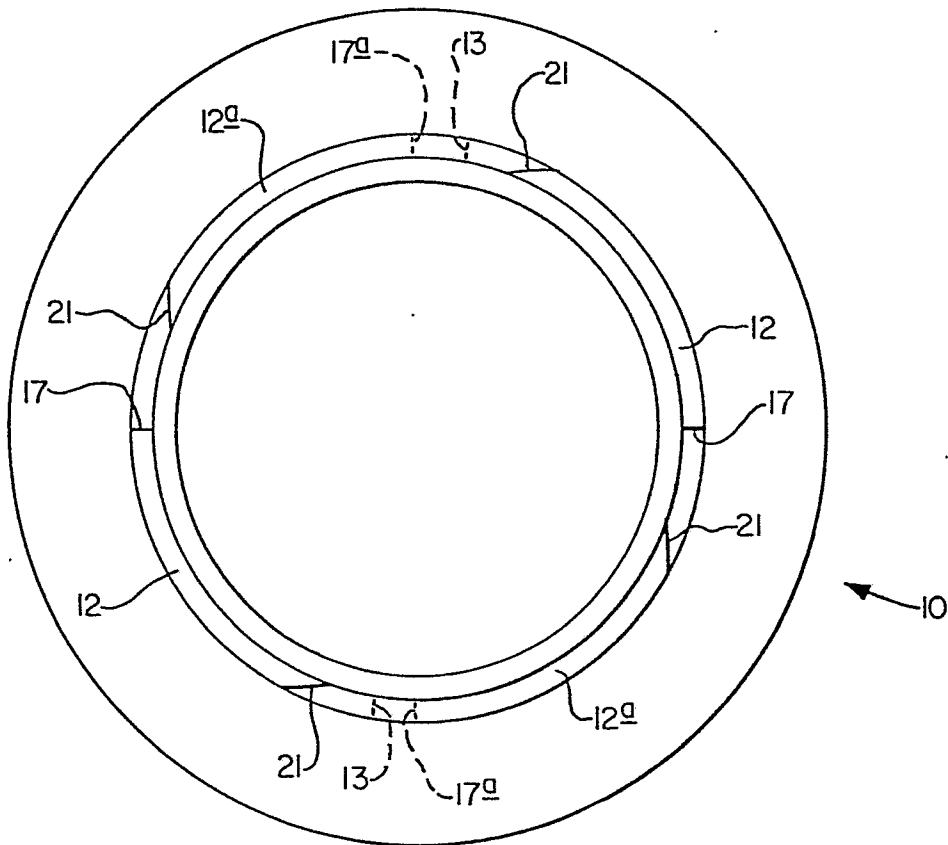


FIG. 1.

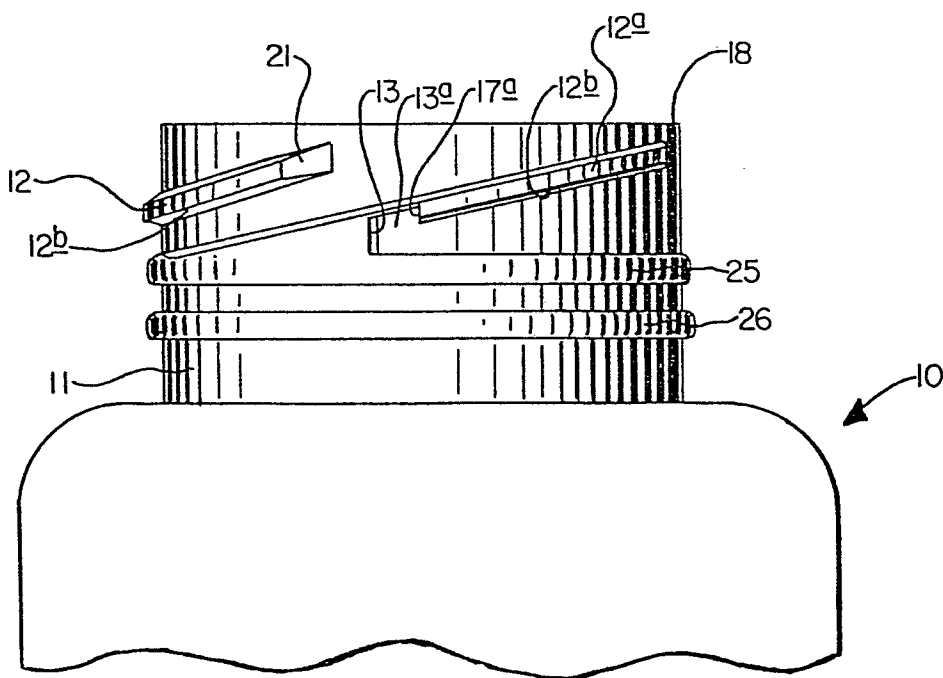


FIG. 2.

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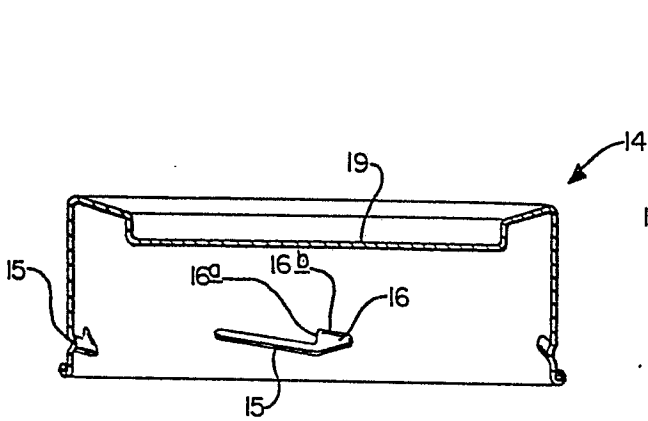


FIG. 3.

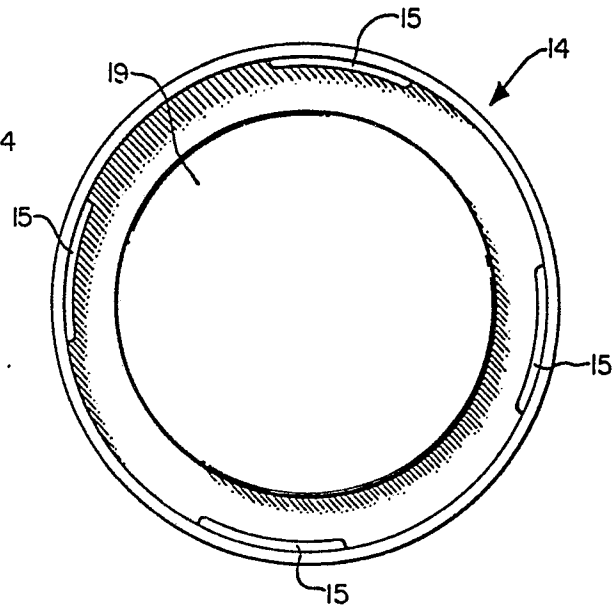


FIG. 4.

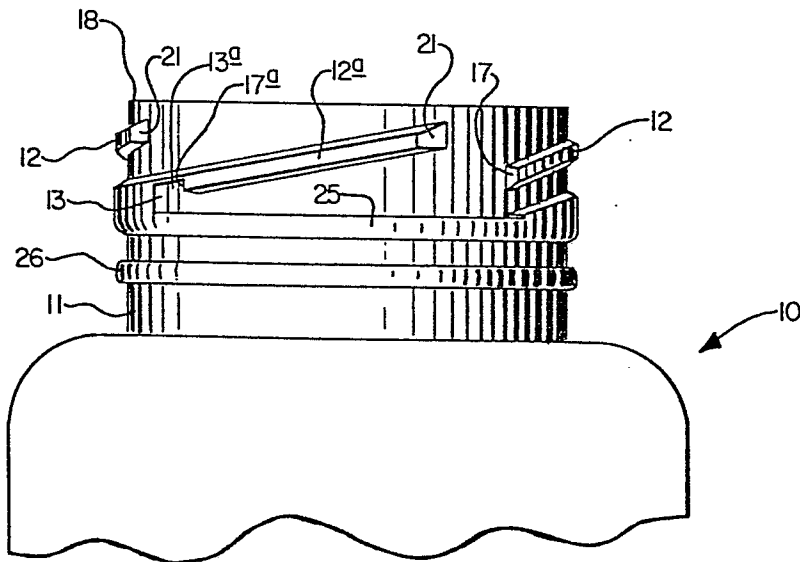


FIG. 5.

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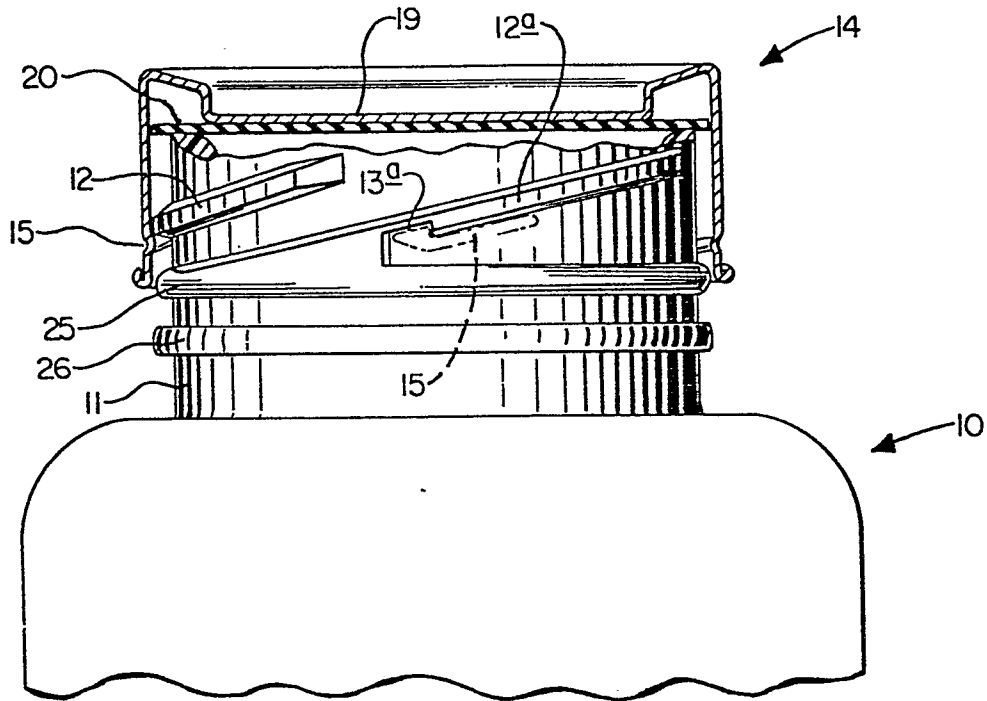


FIG. 6.

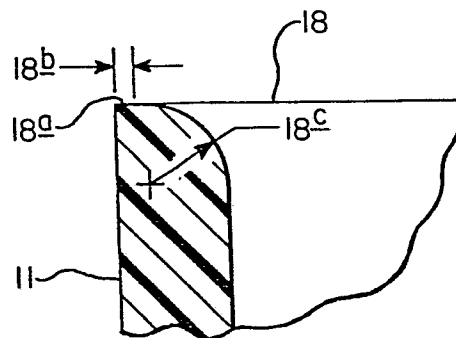


FIG. 7.



European Patent  
Office

# EUROPEAN SEARCH REPORT

0042603

Application number

EP 81 10 4733

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>FR - A - 1 528 549</u> (TAMPER-PROOF-TOPS) * Patent specification * ---	1,7	B 65 D 55/02 41/06
	<u>US - A - 3 339 770</u> (WEIGAND) * Patent specification * ---	1,7	
	<u>US - A - 4 053 077</u> (DE FELICE) * Patent specification * ---	1,5,7	
	<u>US - A - 4 032 018</u> (REISS) * Patent specification * ---	1,3,7	TECHNICAL FIELDS SEARCHED (Int. Cl.)
	<u>US - A - 3 880 313</u> (AKERS) * Column 2, line 36 to column 4, line 40; figures 1-6 * ---	1,2,6,7	B 65 D
	<u>US - A - 3 802 590</u> (CULVER) * Column 5, paragraphs 2,3; figures 3 and 4 * -----	1,4	
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
<div style="display: flex; justify-content: space-between;"> <div> <div style="border: 1px solid black; padding: 2px;">K</div>           The present search report has been drawn up for all claims         </div> <div>           Place of search  <b>The Hague</b> </div> <div>           Date of completion of the search  <b>16.09.1981</b> </div> <div>           Examiner  <b>VANTOMME</b> </div> </div>			