

**DUAL-ACTION CHILD-RESISTANT PACKAGE AND
CHILD-RESISTANT CLOSURE FOR SUCH A PACKAGE**

The present disclosure relates to child-resistant packages, and more particularly to a package that is adapted to be opened in either of (at least) two child-resistant modes of operation.

Background and Summary of the Disclosure

5 A general object of the present disclosure is to provide a child-resistant package, and to provide a closure and a container for such a package, in which the package can be opened to dispense product in either of (at least) two child-resistant modes of operation.

 The present disclosure embodies a number of aspects that can be implemented separately from or in combination with each other.

10 A dual-action child-resistant package, in accordance with one aspect of the present disclosure, includes a container having a neck finish with an open mouth, at least one external thread segment, and at least one external lug spaced from the thread segment and having an angled cam surface facing axially toward the open mouth. A closure has a peripheral skirt, at least one internal thread segment for engagement with the at least one external thread segment
15 on the container neck finish, an internal angled cam surface on the skirt, at least one internal lug on the skirt for engagement with the at least one external lug on the neck finish, and a flexible resilient spring for engaging the neck finish and biasing the closure away from the neck finish. The closure is threaded onto the neck finish until the internal lug on the skirt moves over the external lug on the neck finish to resist unthreading of the closure from the neck finish. The
20 closure is removable from the neck finish by: (1) squeezing the skirt to ovalize the skirt such that the at least one internal lug on the skirt moves radially outwardly from the at least one external

lug on the neck finish whereupon the closure can be unthreaded from the neck finish, and (2) pushing the closure over the neck finish against the spring until the cam surface on the at least one external lug engages the internal angled cam surface on the skirt to ovalize the skirt until the at least one internal lug on the skirt moves radially outwardly from the at least one external lug on the neck finish whereupon the closure can be unthreaded from the neck finish. The peripheral skirt of the closure preferably includes a first portion on which the at least one internal thread segment is disposed, and a second portion extending from the first portion on which the internal cam surface and the at least one internal lug are disposed.

A dual-action child-resistant package, in accordance with another aspect of the present disclosure, includes a container having a mouth, at least one external thread segment and a pair of diametrically opposed external lugs on a side of the thread segment remote from the mouth. A plastic closure includes a base with a dispensing opening, at least one internal thread segment for engagement with the external thread segment on the neck finish, and a flexible resilient skirt with a pair of diametrically opposed internal lugs for engagement with the external lugs to prevent unthreading of the closure from the neck finish. The skirt is squeezable to ovalize the skirt and move the internal lugs out of engagement with the external lugs, and thereby permit unthreading of the closure from the neck finish. A lid is coupled to the base by a hinge for movement between a closed position overlying the dispensing opening and an open position spaced from the dispensing opening. A child-resistant latch extends between the lid and the base to permit opening of the lid with respect to the base. Thus, the package can be opened in a first child resistant mode of operation by squeezing the skirt and unthreading the entire closure from the container neck finish, and in a second child-resistant mode of operation by opening the lid with respect to the base to expose the dispensing opening.

Brief De

The disclosure, together with additional objects, features, advantages and aspects thereof, will best be understood from the following description, the appended claims and the accompanying drawings, in which:

- 5 FIG. 1 is a perspective view of a closure and container package in accordance with an exemplary embodiment of the present disclosure;
- FIG. 2 is a fragmentary sectional view of a portion of the package illustrated in FIG. 1;
- FIG. 3 is a sectional view taken substantially along the line 3-3 in FIG. 2;
- 10 FIG. 4 is a fragmentary sectional view on an enlarged scale of the portion of FIG. 2 within the area 4;
- FIG. 5 is a fragmentary sectional view similar to that of FIG. 4 showing a first child-resistant mode of operation of the package;
- FIG. 6 is a fragmentary sectional view similar to that of FIG. 2 showing a second
- 15 child-resistant mode of opening the package;
- FIG. 7 is a fragmentary sectional view on an enlarged scale of the portion of FIG. 6 within the area 7;
- FIG. 8 is a fragmentary elevational view of the package in FIG. 1 in a non-child-resistant mode of operation;
- 20 FIG. 9 is a fragmentary elevational view that illustrates the neck finish of the container in the package of FIGS. 1-8;
- FIG. 10 is a fragmentary perspective view of the container neck finish in FIG. 9;
- FIG. 11 is a sectional view of the closure in the package of FIGS. 2-7;

FIG. 12 is a fragmentary perspective view of a child-resistant package in accordance with a second exemplary embodiment of the present disclosure;

FIG. 13 is a sectional view taken substantially along the line 13-13 in FIG. 12; and

5 in FIG. 14 is a fragmentary sectional view taken substantially along the line 14-14 in FIG. 13.

Detailed Description of Preferred Embodiments

FIGS. 1-11 illustrate a dual-action child-resistant package 20 in accordance with a first exemplary embodiment of the present disclosure. Package 20 includes a child-resistant closure 22 threaded onto the neck finish 24 of a container 26. Container neck finish 24 includes at least one external thread segment 28 for securement of closure 22 in a child-resistant mode of operation. (The term "thread segment" is employed in its usual broad sense to include both single and multiple threads, and both interrupted and continuous threads.) Neck finish 24 also includes at least one external lug 30, preferably diametrically opposed external lugs 30 as best seen in FIGS. 3 and 9. Each external lug 30 has an angled cam surface 32 that faces axially toward or in the direction of the open end or mouth of neck finish 24. Cam surfaces 32 preferably are flat, although conical, convex or concave cam surfaces could be employed. Closure 22 includes a base wall 34 having a peripheral flexible resilient annular skirt 36. Skirt 36 includes at least one internal thread segment 38 for engagement with external thread segment 28 on neck finish 24 to secure closure 22 to neck finish 24 in a dual-action child-resistant mode of operation. Internal thread segment 38 is disposed on a first portion of skirt 36 adjacent to base wall 34. A second portion of skirt 36 extending remotely of base wall 34 includes an angled internal cam surface 40. Cam surface 40 preferably is conical, and most preferably extends entirely around skirt 36 except where interrupted by internal lugs as will be described. Internal

surface 40 preferably is formed on a portion 42 of skirt 36 that flares radially outwardly at the open edge of the skirt and terminates in a cylindrically extending portion 44.

At least one internal first lug is disposed on the lower portion of skirt 36, preferably a pair of diametrically opposed internal first lugs 46 as best seen in FIG. 3. Each internal first lug 46 preferably has an angled cam surface 48, by means of which lugs 46 ride over lugs 30, ovalizing flexible resilient skirt 36 until internal first lugs 46 snap behind external lugs 30. Each internal first lug 46 preferably has an associated adjacent internal second lug 50 spaced from lug 46 so that external lugs 30 can be received between lugs 46,50. Lugs 50 prevent additional or over-threading of the closure onto the neck finish. A flexible resilient spring 52 is carried by closure 22 for engaging neck finish 24 and biasing closure 22 away from the neck finish. In the illustrated embodiment of FIGS. 2 and 11, spring 52 comprises a segmented annular conical spring having angularly spaced segments 54. A liner disk 56 (FIG. 2) preferably is captured between spring 52 and the open end of neck finish 24. Liner disk 56 can be induction or conduction sealed to neck finish 24 after package 20 has been filled with product and closure 22 applied to the neck finish. As an alternative, spring 52 could be a continuous annular spring that engages the neck finish both to seal the package and to bias closure 22 away from neck finish 24. Spring segments 54 preferably extend downwardly and inwardly from closure base wall 34, as best seen in FIG. 11. As an alternative, spring segments 54 (or a continuous annular spring) could extend from the inside surface of skirt 36 adjacent to base wall 34. Skirt 36 preferably includes a pair of diametrically opposed external finger pads 58 (FIGS. 1 and 3) at 90° spacing from internal lugs 46.

With closure 22 threaded onto container 26 as illustrated in FIGS. 1-3, closure 22 is removable in either of two child-resistant modes of operation. In a first child-resistant squeeze-and-turn mode of operation illustrated in FIGS. 4-5, flexible resilient skirt 36 is

squeezed at finger pads 58 to ovalize the skirt and thereby move internal lugs 46 radially outwardly with respect to external lugs 30. When the skirt has been squeezed sufficiently that lugs 46 clear lugs 30 as shown in FIG. 5, the closure can be unthreaded from the container neck finish. The second child-resistant push-and -turn mode of operation is illustrated in FIGS. 6-7.

5 Closure 22 is pushed downwardly against the force of spring 52. During such downward motion of the closure, internal cam surface 40 on closure skirt 36 engages external cam surfaces 32 on external lugs 30 to spread and ovalize the closure skirt. When the closure skirt is sufficiently ovalized, the closure can be unthreaded from the container neck finish.

FIG. 8 illustrates package 20 in a non-child-resistant mode of operation in which

10 closure 22 is inverted and received by press fit, snap fit or threaded fit onto the open end of neck finish 24. Examples of such inverted non-child-resistant operation are illustrated in US patent documents 2004/0173561 and 2004/0178165.

FIGS. 12-14 illustrate a dual-action child-resistant package 60 in accordance with another exemplary embodiment of the present disclosure. Package 60 includes a closure 62

15 secured to the neck finish 64 of a container 66. Neck finish 64 has one or more external thread segments 28 that are engaged by one or more internal thread segments 38 on the flexible resilient peripheral annular skirt 68 of closure 62. Closure 62 includes a base 70 of which skirt 68 is a part. Base 70 also includes a base wall 72 that covers the open mouth of neck finish 64, and a dispensing opening 74 in base wall 72. A lid 76 is coupled to base 70 by a hinge 79 (FIG. 14)

20 so that lid 76 can be pivoted between the closed position illustrated in FIG. 14 overlying dispensing opening 74 and an open position spaced from the dispensing opening. Hinge 79 can be of any suitable type. At least one internal lug 78 (FIG. 13) is carried by skirt 68. Skirt 68 preferably has a pair of diametrically opposed internal lugs 78 as shown in FIG. 13. Skirt 68 also preferably has diametrically opposed external finger pads 58 at 90° spacing to internal lugs 78.

Internal lugs 78 engage a pair of diametrically opposed external lugs 80 on container neck finish 64. Closure lid 76, in the closed position, preferably is coupled to closure base 70 by a child-resistant latch mechanism 82. Latch mechanism 82 can be of any suitable type, with the type illustrated in U.S. patent document 2005/0023285 being preferred.

5 As closure 62 is threaded onto container neck finish 64, internal lugs 78 on closure skirt 68 engage and ride over external lugs 80 on neck finish 64 until lugs 78 snap behind lugs 80 in the child-resistant position of FIG. 13. The entire closure 62 can be removed from container neck finish 64 in a squeeze-and-turn first child-resistant mode of operation, in which finger pads 58 are squeezed to ovalize skirt 68 until lugs 78 clear lugs 80, at which point closure
10 62 can be unthreaded from the container neck finish. The package alternatively can be opened in a second child-resistant mode of operation by releasing latch 82 and pivoting lid 76 away from base 70 to enable product be dispensed through opening 74.

 There thus have been disclosed a dual-action child-resistant package, and closures and containers for such a package, that fully satisfy all of the objects and aims previously set
15 forth. The disclosure has been presented in conjunction with several exemplary embodiments, and modifications and variations have been described. Other modifications and variations readily will suggest themselves to persons of ordinary skill in the art in view of the foregoing description. For example, the disclosure has been presented in conjunction with so-called single-wall closures in which the internal thread segments and the child-resistance lugs are disposed on
20 the inside of a single wall or skirt. However, the disclosure can as readily be implemented in conjunction with a dual-wall or multiple-wall closure, in which the thread segments are disposed on an inner wall for securing the closure to a container neck finish and the child-resistance mechanisms are disposed on intermediate and/or outer walls spaced from the inner wall. The exemplary closures are comprised of one-piece plastic shells. However, additional components

can be included, such as sealing liners or discs. The disclosure is intended to embrace these and all other modifications and variations as fall within the spirit and broad scope of the appended claims.

Claims

1.

1 A dual-action child-resistant package that includes:

2 a container (26) having a neck finish (24) with an open mouth, at least one
3 external thread segment (28), and at least one external lug (30) spaced from said external thread
4 segment and having an angled cam surface (32) facing axially toward said mouth, and

5 a closure (22) having a peripheral skirt (36), at least one internal thread segment
6 (38) for engagement with said at least one external thread segment on said neck finish, an internal
7 angled cam surface (40) on said skirt, at least one internal lug (46) on said skirt for engagement
8 with said at least one external lug on said neck finish, and a flexible resilient spring (54) for
9 engaging said neck finish and biasing said closure away from said neck finish,

10 said closure being threadable onto said container neck finish until said internal lug
11 (46) on said skirt moves over said external lug (30) on said neck finish to resist unthreading of
12 said closure from said neck finish,

13 said closure being removable from said neck finish by: (1) squeezing said skirt to
14 ovalize said skirt such that said at least one internal lug on said skirt moves radially outwardly
15 from said at least one external lug on said neck finish whereupon said closure can be unthreaded
16 from said neck finish, and (2) pushing said closure over said neck finish against said spring until
17 said cam surface on said at least one external lug engages said internal cam surface on said skirt
18 to ovalize said skirt until said at least one internal lug on said skirt moves radially outwardly from
19 said at least one external lug on said neck finish whereupon said closure can be unthreaded from
20 said neck finish.

2.

1 The package set forth in claim 1 wherein said peripheral skirt (36) includes a first
2 portion on which said at least one internal thread segment (38) is disposed, and a second portion
3 extending from said first portion on which said internal cam surface (40) and said at least one
4 internal lug (46) are disposed.

3.

1 The package set forth in claim 1 wherein said internal cam surface (40) on said
2 skirt is conical.

4.

1 The package set forth in claim 3 wherein said at least one internal lug (46) on said
2 skirt includes a pair of lugs (46, 50) on said skirt angularly spaced from each other to receive said
3 at least one external lug (30) when said closure is threaded onto said neck finish.

5.

1 The package set forth in claim 4 wherein one of said pair of internal lugs has an
2 angled cam surface (48) to cam said one lug over said external lug during threaded application
3 of said closure to said neck finish.

6.

1 The package set forth in claim 3 wherein said neck finish has a pair of said
2 external lugs (30) diametrically spaced from each other on said neck finish, and said closure has
3 a pair of said internal lugs (46) diametrically spaced from each other on said skirt.

7.

1 A closure that includes a one-piece plastic shell having a flexible resilient annular
2 skirt (36) with a first portion having at least one internal thread segment (38), a second portion
3 extending from said first portion and having an internal cam surface (40) angled away from said
4 first portion, at least one internal lug (46) on said second portion of said skirt, and a flexible
5 resilient spring (54) for engaging a container neck finish when said closure is threaded onto the
6 neck finish.

8.

1 The closure set forth in claim 7 wherein said cam surface (40) is conical.

9.

1 The closure set forth in claim 8 wherein said at least one internal lug includes
2 diametrically opposed internal lugs (46) on said skirt.

10.

1 The closure set forth in claim 9 wherein said skirt includes a pair of diametrically
2 opposed external finger pads (58) at 90° spacing to said internal lugs.

11.

1 A child-resistant package that includes:

2 a container (66) having a mouth, at least one external thread segment (28) and a
3 pair of diametrically opposed external lugs (80) on a side of said at least one external thread
4 segment remote from said mouth, and

5 a plastic closure (62) that includes a base (70) with a dispensing opening (74), at
6 least one internal thread segment (38) for engagement with said at least one external thread
7 segment on said neck finish, a flexible resilient peripheral skirt (68) with a pair of diametrically
8 opposed internal lugs (78) for engagement with said external lugs to prevent unthreading of said
9 closure from said neck finish, said skirt being squeezable to ovalize said skirt and move said
10 internal lugs out of engagement with said external lugs and permit unthreading of said closure
11 from said neck finish, a lid (76) coupled to said base by a hinge (79) for movement between a
12 closed position overlying said dispensing opening and an open position spaced from said
13 dispensing opening, and a child-resistant latch (82) between said lid and said base to permit
14 opening of said lid with respect to said base,

15 said package being operable in two child-resistant modes of operation: (1) by
16 squeezing and turning said peripheral skirt, and (2) by unlatching said child-resistant latch and
17 opening said lid.

12.

1 The package set forth in claim 11 wherein said skirt includes a pair of
2 diametrically opposed external finger pads (58) at 90° spacing to said internal lugs.

13.

1 The package set forth in claim 11 wherein said at least one internal thread segment
2 (38) is disposed on said peripheral skirt (68).

14.

1 A closure that includes a one-piece plastic shell having:
2 a base (70) with a dispensing opening (74), at least one internal thread segment
3 (38), a flexible resilient skirt (68) with a pair of diametrically opposed internal lugs (78), said
4 skirt being squeezable to ovalize said skirt,
5 a lid (76) coupled to said base by a hinge (79) for movement between a closed
6 position overlying said dispensing opening and an open position spaced from said dispensing
7 opening, and
8 a child-resistant latch (82) between said lid and said base to permit opening of said
9 lid with respect to said base.

15.

1 The closure set forth in claim 14 wherein said skirt includes a first portion on
2 which said at least one internal thread segment (38) is disposed and a second portion extending
3 from said first portion on which said internal lugs (78) are disposed.

16.

1 The closure set forth in claim 15 wherein said skirt includes a pair of diametrically
2 opposed external finger pads (58) at 90° spacing to said internal lugs.

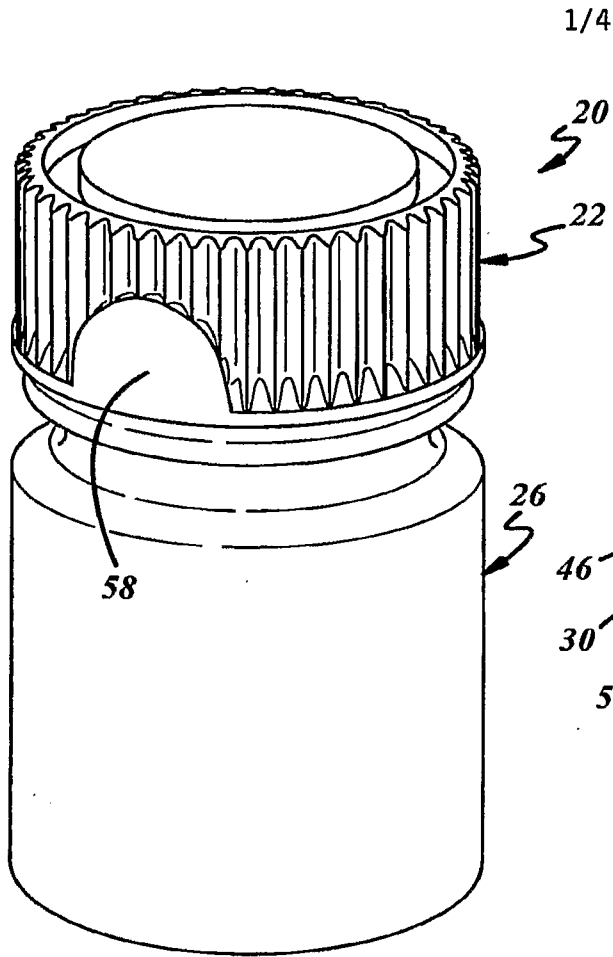


FIG. 1

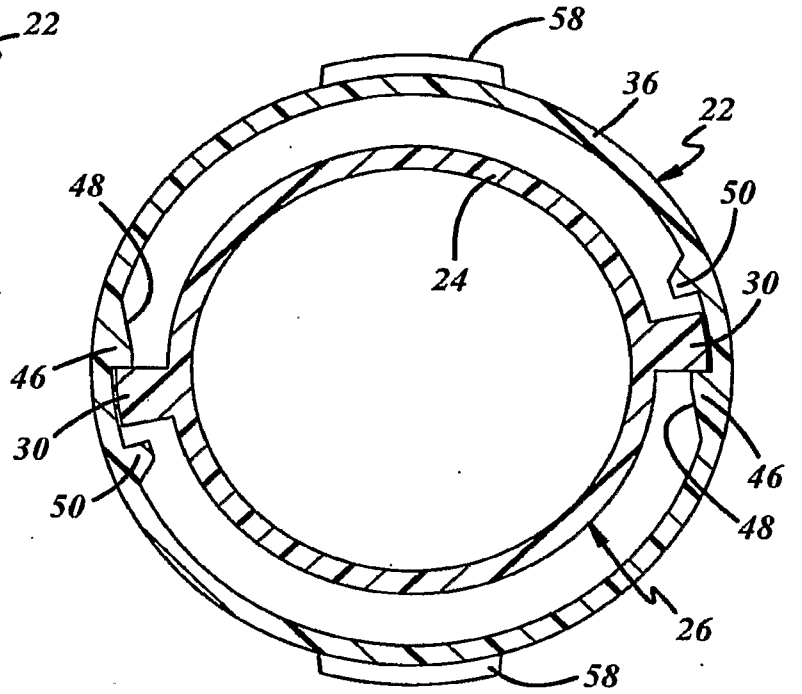


FIG. 3

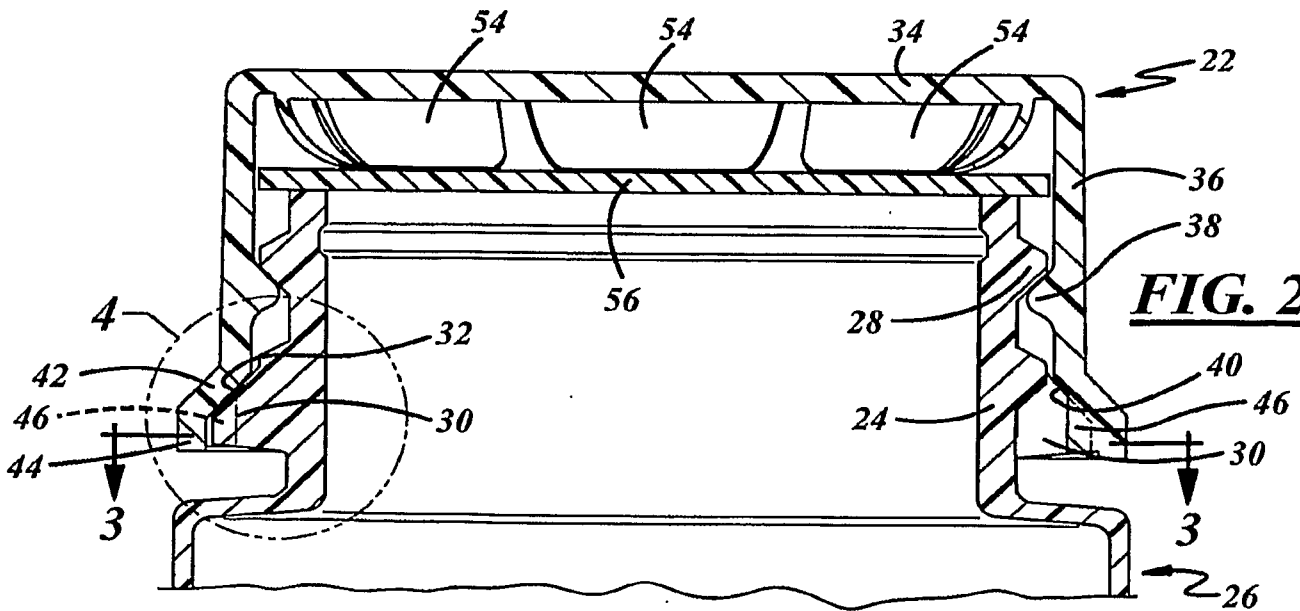


FIG. 2

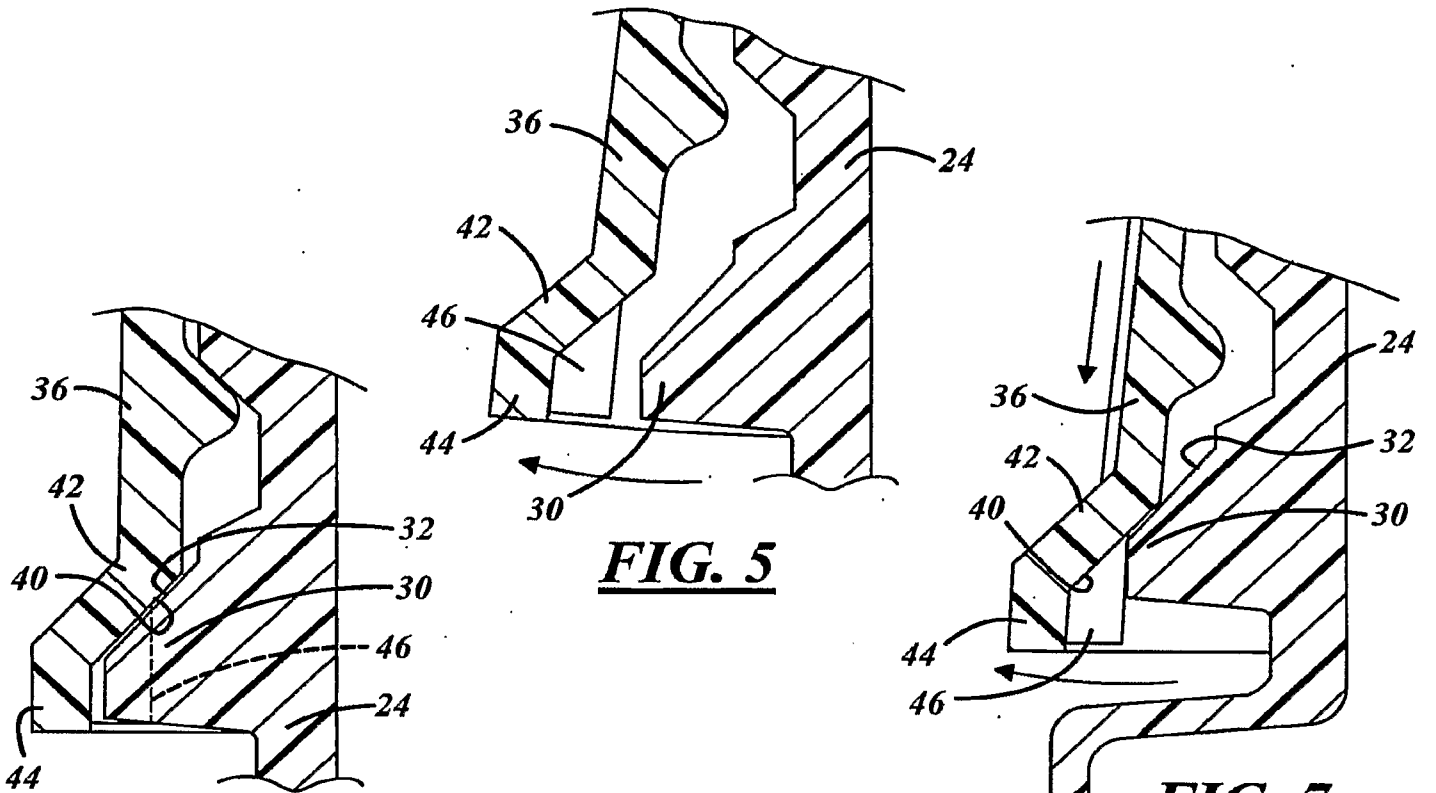


FIG. 4

FIG. 5

FIG. 7

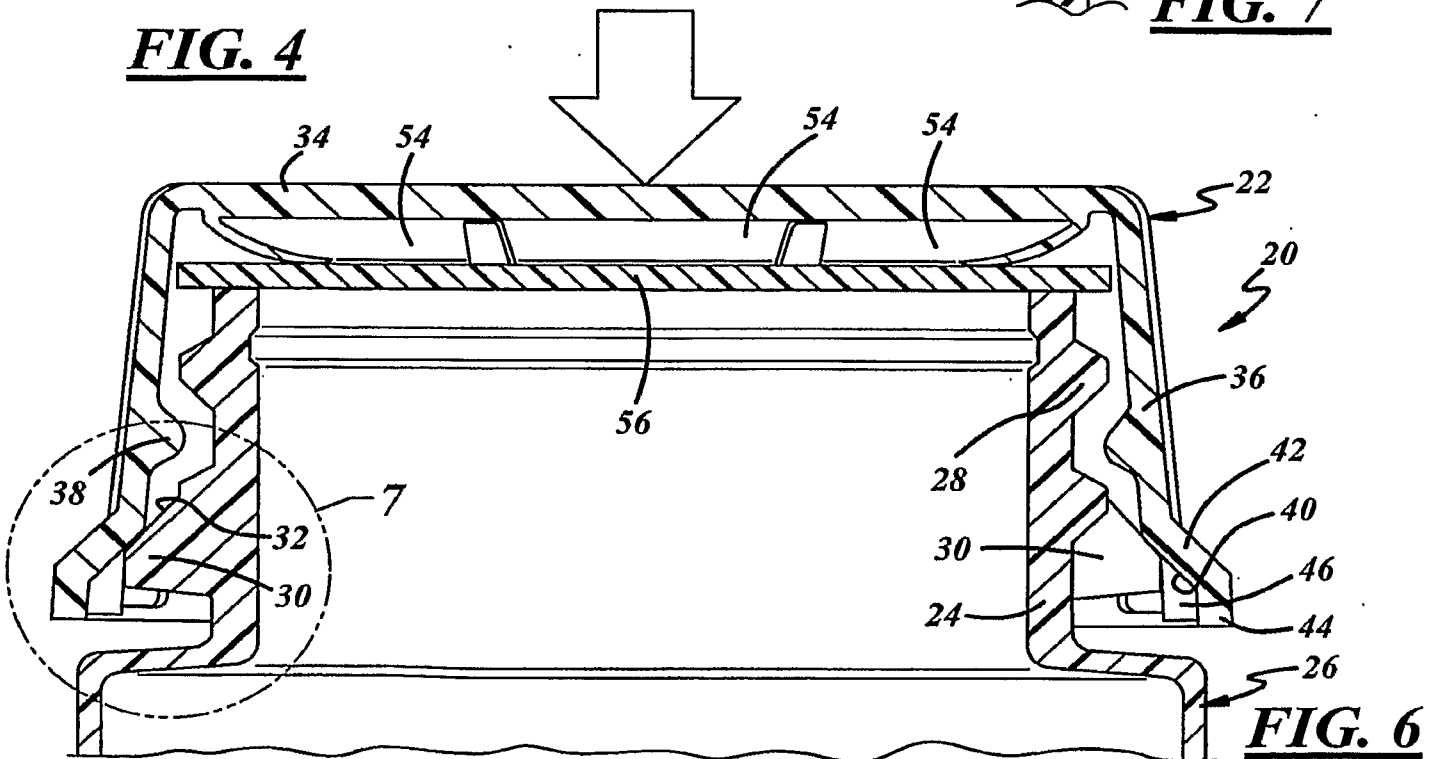


FIG. 6

FIG. 12

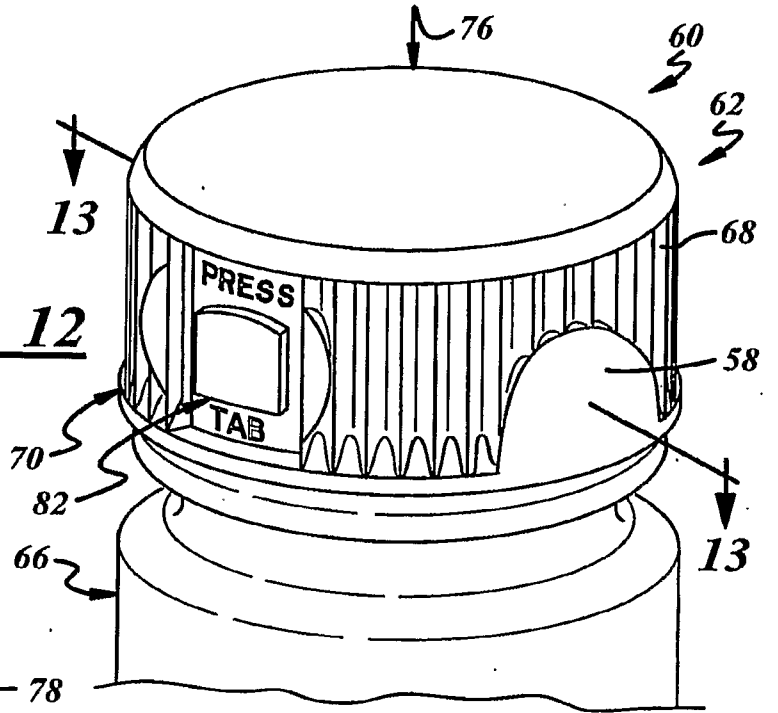


FIG. 13

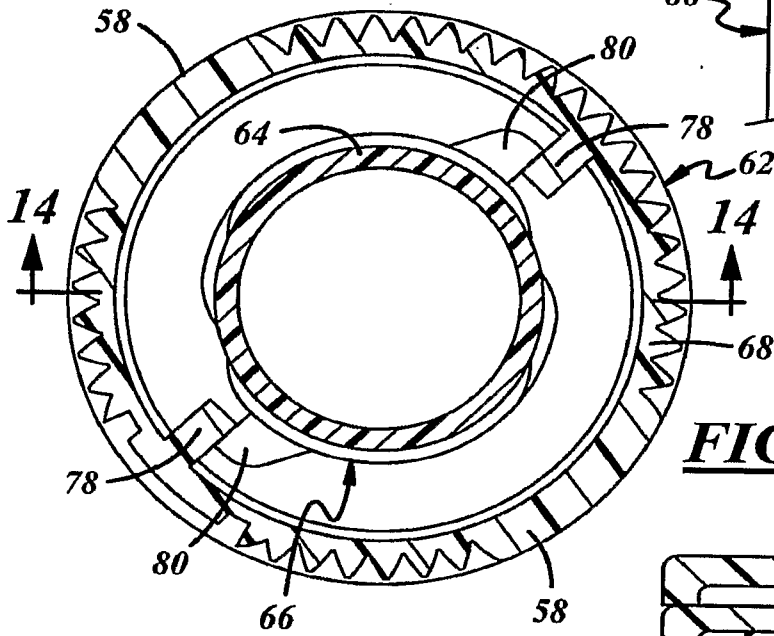
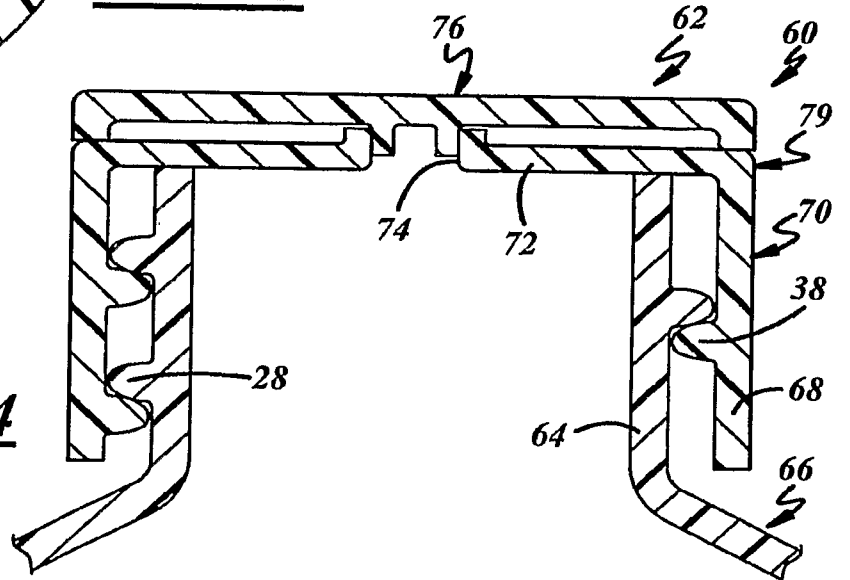


FIG. 14



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/016283

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D47/08 B65D50/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 357 049 A (REXAM MEDICAL PACKAGING INC [US]) 29 October 2003 (2003-10-29) paragraph [0023] paragraph [0029]; figures 1-3	11-16
A	US 2004/222181 A1 (BIESECKER FREDERICK N [US] ET AL) 11 November 2004 (2004-11-11) figures 1-5	1,7
A	US 4 553 678 A (THORSBAKKEN ARDEN L [US]) 19 November 1985 (1985-11-19) figures 6-8	1,7

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

27 November 2007

Date of mailing of the international search report

05/12/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bridault, Alain

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/016283

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1357049	A	29-10-2003	CN 1453193 A	05-11-2003
			US 2003201283 A1	30-10-2003
US 2004222181	A1	11-11-2004	CA 2443315 A1	29-03-2005
US 4553678	A	19-11-1985	NONE	