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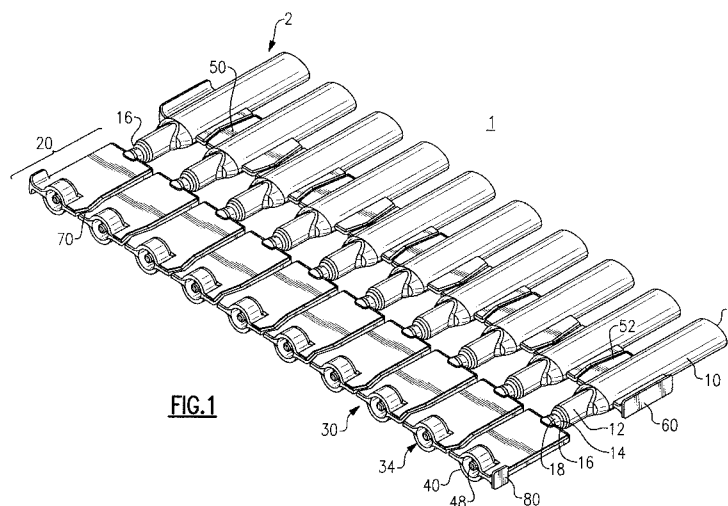
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[Continued on next page]

(54) Title: CONTAINERS FOR FLOWABLE PRODUCTS



(57) Abstract: A container (2) comprises a contiguous piece having: (a) a hollow body (10) having a neck (12), which terminates at a mouth (14); (b) a breakable transition portion (18) being contiguously coupled to the neck; and (c) a handle portion (30) coupled to the transition portion at one end and having a closure member (34) at the other end, which closure member comprises a cup (40) and a plug (48) disposed at a center of the cup. The outer dimension of the plug is sufficient to fit into the neck through the mouth when the handle portion is broken from the neck at the transition portion. A plurality of such containers is joined together by weakened intermediate creases (52) in an intermediate web disposed longitudinally along the body and by weakened distal creases (70) between two adjacent handle portions. Weakened intermediate creases are offset relative to the center line between two adjacent hollow bodies.

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CONTAINERS FOR FLOWABLE PRODUCTS

BACKGROUND

The present invention relates to containers for containing and dispensing flowable products. In particular, the present invention relates to a strip of such containers that are separable at breakable joints. More particularly, the present invention relates to a strip of such containers that contain flowable pharmaceutical products.

Small amounts of flowable pharmaceutical products, such as in liquid form, are often contained in disposable containers. For those products that do not include a preservative, which is used to prevent the growth of microorganisms that may contaminate a product after the container is opened, the container typically contains an amount sufficient for a single dose. Such a unit-dose container is discarded after the single dose is used. However, the treatments of patients may require the use of such products for an extended period of time. In these situations, the products include one or more preservatives for multiple uses and the containers must be reclosable after the initial opening.

Designs of reclosable containers are disclosed, for example, in U.S. Patents 6,234,333 and 6,827,227. A container of these designs has a closure means that includes a severable plug formed contiguously with the mouth of the container, through which mouth the product is dispensed. The connection between the severable plug and the mouth may be weakened to facilitate the separation of the plug from the mouth when the product is dispensed for the first time. After each use, the plug is reinserted into the mouth. However, if a clean break between the plug and the mouth is not made, subsequent reinsertions of the plug into the mouth can be difficult and a tight fit is not achieved, resulting in spillage of the product. For example, a clean break is not made when a portion of the container neck at the mouth is broken off and carried with the plug.

Therefore, improved designs for reclosable containers are needed.

SUMMARY

In general, the present invention provides a container for a flowable product that avoids certain drawbacks of prior-art containers.

In one aspect, the container is reclosable.

In another aspect, a container of the present invention can provide a substantially tight reclosing of the container after it is opened to dispense the product.

In still another aspect, a reclosable container of the present invention comprises a hollow body having a neck at one end. The neck terminates at a mouth or opening. The neck of an intact container is contiguously coupled to a detachable, breakable, or severable transition portion, which sealingly covers the mouth or opening and prevents an escape of the product contained in the hollow body. The transition portion is also coupled to a first end of a handle portion, which is disposed opposite to the hollow body. A second end of the handle portion opposite to the first end thereof comprises a closure member. The closure member comprises a cup, an inner dimension of which is sufficient to accommodate an outer dimension of the neck. A plug is disposed at the center of the cup and attached thereto, extending toward the second end of the handle portion. The outer dimension of the plug is sufficient to fit into the neck through the mouth or opening when the handle portion is separated or broken from the container at the transition portion.

In one embodiment, the transition portion is detachable, breakable, separable, or severable from the neck at a weakened intersection. Such a weakened intersection facilitates a provision of a clean break at the mouth.

In still another aspect, the hollow body (including the neck), the transition portion, and the handle portion form a single contiguous piece in an intact condition.

In yet another aspect of the present invention, a plurality of said contiguous pieces, each comprising the hollow body (including the neck), the transition portion, and

the handle portion are joined together in a strip through an intermediate web disposed longitudinally along the body of the container. Such an intermediate web joins two adjacent hollow container bodies. A portion of the intermediate web between two adjacent container bodies comprises a weakened intermediate crease. The free portion of the web on each of the two terminal containers of the strip comprises a first butt that is disposed in a plane that is perpendicular to the plane of the intermediate web. The handle portions of the adjacent contiguous pieces are joined through a distal weakened crease. An outer edge of each of the two terminal handle portions of the strip comprises a second butt disposed in a plane that is perpendicular to the handle portion.

In a further aspect, each weakened intermediate crease is offset from a center line of the portion of the intermediate web between two adjacent containers.

In still another aspect, two consecutive weakened intermediate creases are similarly biased relatively to the container disposed therebetween.

Other features and advantages of the present invention will become apparent from the following detailed description and claims and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an isometric view of a strip of plurality of contiguous pieces comprising hollow bodies, transition portions, and handle portions.

Figure 2 is the plan view of the strip of Figure 1.

Figure 3 shows a cross section of a contiguous piece through the center line of the hollow body and handle portion.

Figure 4 shows the side view of the strip of Figure 1.

DETAILED DESCRIPTION

In general, the present invention provides a container that avoids certain drawbacks of prior-art containers.

In one aspect, the container is reclosable.

In another aspect, separable parts of a reclosable container of the present invention comprise, or are made in, a contiguous article of manufacture.

In still another aspect, a reclosable container of the present invention can provide a substantially tight reclosing of the container after it is opened to dispense the product.

In still another aspect, a reclosable container of the present invention can provide a substantially tight reclosing of the container after it is opened to dispense the product such that a user is not unduly concerned about making a clean break when the container is opened for the first time.

In still another aspect, a container 2 of the present invention comprises a hollow body 10 having a neck 12 at one end. The neck 12 terminates at a mouth or opening 14. Neck 12 of an intact container 2 is contiguously coupled to a detachable, breakable, or severable transition portion 18, which sealingly covers mouth or opening 14 and prevents an escape of the product contained in hollow body 10. Transition portion 18 is also coupled to a first end 22 of a handle portion 30, which is disposed opposite to hollow body 10. Hollow body 10 has an open end 8 opposite to neck 12, which open end 8 serves to receive the product during filling of the container and is sealed at the completion of the filling process. A second end 26 of handle portion 30 opposite to first end 22 thereof comprises a closure member 34. Closure member 34 comprises a cup 40, an inner dimension of which is sufficient to accommodate an outer dimension of neck 12. A plug 48 is disposed at the center of cup 40 and attached thereto, extending toward second end 26 of handle portion 30. The outer dimension of plug 48 is sufficient to fit into neck 12 through mouth or opening 14 and provide a substantially tight seal thereof when handle portion 30 is separated or broken from container 2 at transition portion 18. A gripping plate 32 extends between first end 22 and second end 26 of handle portion 30.

In yet another aspect, all elements of container 2 comprises a polymeric material, such as polyethylene, polypropylene, polycarbonate, polyethylene terephthalate, or like materials. In one embodiment, such polymeric material is a pharmaceutical-grade material, i.e., suitable for use in pharmaceutical applications.

In still another aspect, hollow body 10 has a wall thickness that allows for easy squeezing by two fingers to dispense the product contained therein.

In one embodiment, transition portion 18 is detachable, breakable, separable, or severable from neck 12 at a weakened intersection 16. Such weakened intersection 16 facilitates a provision of a clean break at mouth 14. In one embodiment, weakened intersection 16 can comprises a preset fracture line. In one embodiment, a user typically grips gripping plate 32 and twists handle portion 30 to break weakened intersection 16.

In another embodiment, hollow body 10 can have a circular or elliptical cross section. Similarly, neck 12 can have a circular or elliptical cross section. Cup 40 has a cross section corresponding to the cross-sectional shape of neck 12 such that cup 40 fits substantially tightly over neck 12.

In still another embodiment, plug 48 has a cylindrical cross section. In yet another embodiment, plug 48 has the shape of a truncated cone, of which the end attached to cup 40 has a larger dimension or diameter. In a further embodiment, plug 48 has a length substantially equal to the depth of cup 40. In still another embodiment, plug 48 has a length shorter than the depth of cup 40.

In still another aspect, hollow body 10, neck 12, transition portion 18, and handle portion 30 form a single contiguous piece in an intact condition.

In yet another aspect of the present invention, a plurality of said contiguous pieces, each comprising container 2 including hollow body 10 and neck 12, transition portion 18, and handle portion 30 are joined together in a strip 1 through an intermediate web 24 disposed longitudinally along a portion of body 10. Such intermediate web 50 joins two adjacent hollow container bodies 10. A portion of intermediate web 50 between two adjacent container bodies 10 comprises a weakened intermediate crease 52. The free portion 54 of intermediate web 50 on each of the two terminal containers of strip 1 comprises a first butt 60 that is disposed in a plane that is perpendicular to the plane of intermediate web 50. Handle portions 30 of the adjacent contiguous pieces are joined through a weakened distal crease 70 to form a distal web 20. An outer edge 72 of

each of two terminal handle portions 74 of strip 1 comprises a second butt 80 disposed in a plane that is perpendicular to the plane of handle portion 74.

In another aspect, strip 1 comprises 2, 3, 4, 5, 6, 7, 8, 9, 10, or more contiguous pieces joined together.

In a further aspect, each weakened intermediate crease 52 is offset from a center line of the portion of intermediate web 50 between two adjacent hollow bodies 10. In other words, a crease 52 is disposed generally closer to one hollow body 10 than the next adjacent hollow body.

In still another aspect, two consecutive weakened intermediate creases 52 are similarly biased relatively to hollow body 10 disposed therebetween. In other words, when a first crease 52 is disposed closer to a hollow body 10, the second crease 52 is similarly disposed closer to the same hollow body 10. As a result of this bias, the second crease is farther from the next hollow body in the strip. Thus, the third consecutive crease is disposed similarly farther from said next hollow body.

In yet another aspect, distal weakened creases 70 joining adjacent handle portions 30 are disposed substantially at a center line between two adjacent hollow bodies 10. As a result of the relative positions of weakened distal creases 70 and weakened intermediate creases 52, strip 1 can resist bending.

In still another aspect, weakened creases 52 and 70 have the shape of a chevron, as shown in Figures 1 and 2.

In yet another aspect, the apexes of two consecutive chevrons point in opposite directions.

In a further aspect, distal weakened creases 70 join less than an entire length of handle portions 30 between first end 22 and second end 26.

In another aspect, intermediate web 50 lies generally in a single plane.

In still another aspect, joined handle portions 30 lie generally in a single plane.

In yet another aspect, intermediate web 50 and joined handle portions 30 lie generally in a single plane.

An amount of a flowable product, such as a fluid product (for example, a liquid pharmaceutical product) is received in hollow body 10. Then, open end 8 is sealed, for example, by heat. The strip of such containers containing such product may further be sterilized, such as by application of heat or radiation (e.g., gamma radiation).

A user can tear a container 2 from strip 1 at weakened creases 50 and 70. The user can then grip gripping plate 32 and twist handle portion 30, thereby separating it from neck 12 at weakened intersection 16 and exposing mouth or opening 14. The user can reclose container 2 by inserting plug 48 into mouth or opening 14. Cup 40 facilitates the reclosure since its inner dimension matches well with the outer dimension of neck 12.

In one embodiment, the liquid pharmaceutical product can be an ophthalmic pharmaceutical product (such as a topical ophthalmic composition for treating or controlling an ophthalmic condition, such as dry eye, eye infection, eye inflammation, glaucoma, etc.). In another embodiment, the liquid pharmaceutical product can be an oral medicament. In still another embodiment, liquid pharmaceutical product can be a topical medicament, such as for dermatological applications.

List of Elements

1	strip of joined containers
2	containers
8	open end of hollow body
10	hollow body
12	neck
14	mouth
16	preset fracture line or weakened intersection
18	transition portion
20	distal web
22	first end of handle portion

26	second end of handle portion
30	handle portion
32	gripping plate
34	closure member
40	cup
48	plug
50	intermediate web
52	weakened intermediate crease
60	first butt
70	distal weakened crease
72	outer edge of terminal handle portion
74	terminal handle portion
80	second butt

While specific embodiments of the present invention have been described in the foregoing, it will be appreciated by those skilled in the art that many equivalents, modifications, substitutions, and variations may be made thereto without departing from the spirit and scope of the invention as defined in the appended claims.

WHAT IS CLAIMED IS:

1. A container comprising:
 - (a) a hollow body having a neck at one end, which terminates at a mouth;
 - (b) a detachable, breakable, or severable transition portion being contiguously coupled to the neck and sealingly covering the mouth; and
 - (c) a handle portion, a first end of which is coupled to the transition portion, the handle portion being disposed opposite to the hollow body, and a second end of the handle portion opposite to the first end thereof comprising a closure member, which comprises a cup, an inner dimension of which is sufficient to accommodate an outer dimension of the neck; a plug being disposed at a center of the cup and attached thereto, extending toward the second end of the handle portion and away from the transition portion; an outer dimension of the plug is sufficient to fit into the neck through the mouth when the handle portion is separated or broken from the neck at the transition portion.
2. The container of claim 1, wherein the transition portion is detachable, breakable, separable, or severable from the neck at a weakened intersection.
3. The container of claim 1, wherein the plug has a form of a truncated cone.
4. The container of claim 3, wherein a length of the plug is less than a depth of the cup.
5. The container of claim 3, wherein a length of the plug is substantially equal to a depth of the cup.
6. A strip comprising a plurality of contiguous pieces, each of which comprises a container that comprises:
 - (a) a hollow body having a neck at one end, which terminates at a mouth;
 - (b) a detachable, breakable, or severable transition portion being contiguously coupled to the neck and sealingly covering the mouth; and

c) a handle portion, a first end of which is coupled to the transition portion, the handle portion being disposed opposite to the hollow body, and a second end of the handle portion opposite to the first end thereof comprising a closure member, which comprises a cup, an inner dimension of which is sufficient to accommodate an outer dimension of the neck; a plug being disposed at a center of the cup and attached thereto, extending toward the second end of the handle portion and away from the transition portion; an outer dimension of the plug is sufficient to fit into the neck through the mouth when the handle portion is separated or broken from the neck at the transition portion;

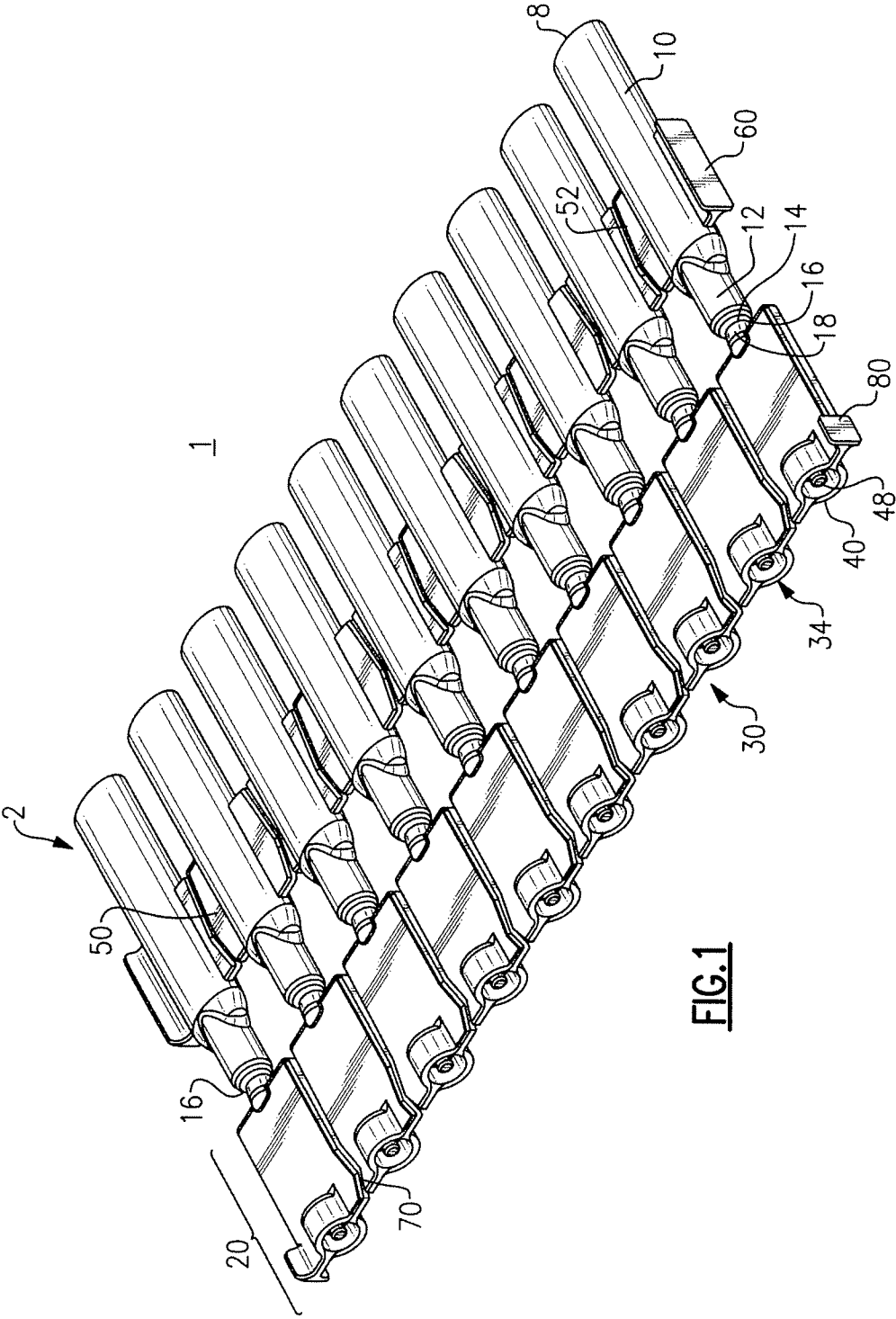
wherein the contiguous pieces are joined together through an intermediate web disposed longitudinally along a portion of the hollow body; a portion of the intermediate web joining two adjacent container bodies comprises a weakened intermediate crease; the handle portions of two adjacent contiguous pieces are joined through a weakened distal crease; a free portion of intermediate web on each of two terminal containers of the strip comprises a first butt that is disposed in a plane that is perpendicular to the plane of the intermediate web; an outer edge of each of two terminal handle portions of the strip comprises a second butt disposed in a plane that is perpendicular to the plane of the terminal handle portion; each weakened intermediate crease is offset from a center line of the portion of intermediate web between two adjacent hollow bodies; and each weakened distal crease is disposed generally at a center line between two adjacent hollow bodies.

7. The strip of claim 6, wherein two consecutive weakened intermediate creases are similarly biased relatively to the hollow body disposed therebetween.

8. The strip of claim 7, wherein the distal weakened crease joins less than an entire length of the handle portion.

9. The strip of claim 8, wherein the creases have a shape of a chevron.

10. The strip of claim 9, wherein apexes of two consecutive chevrons point in opposite directions.



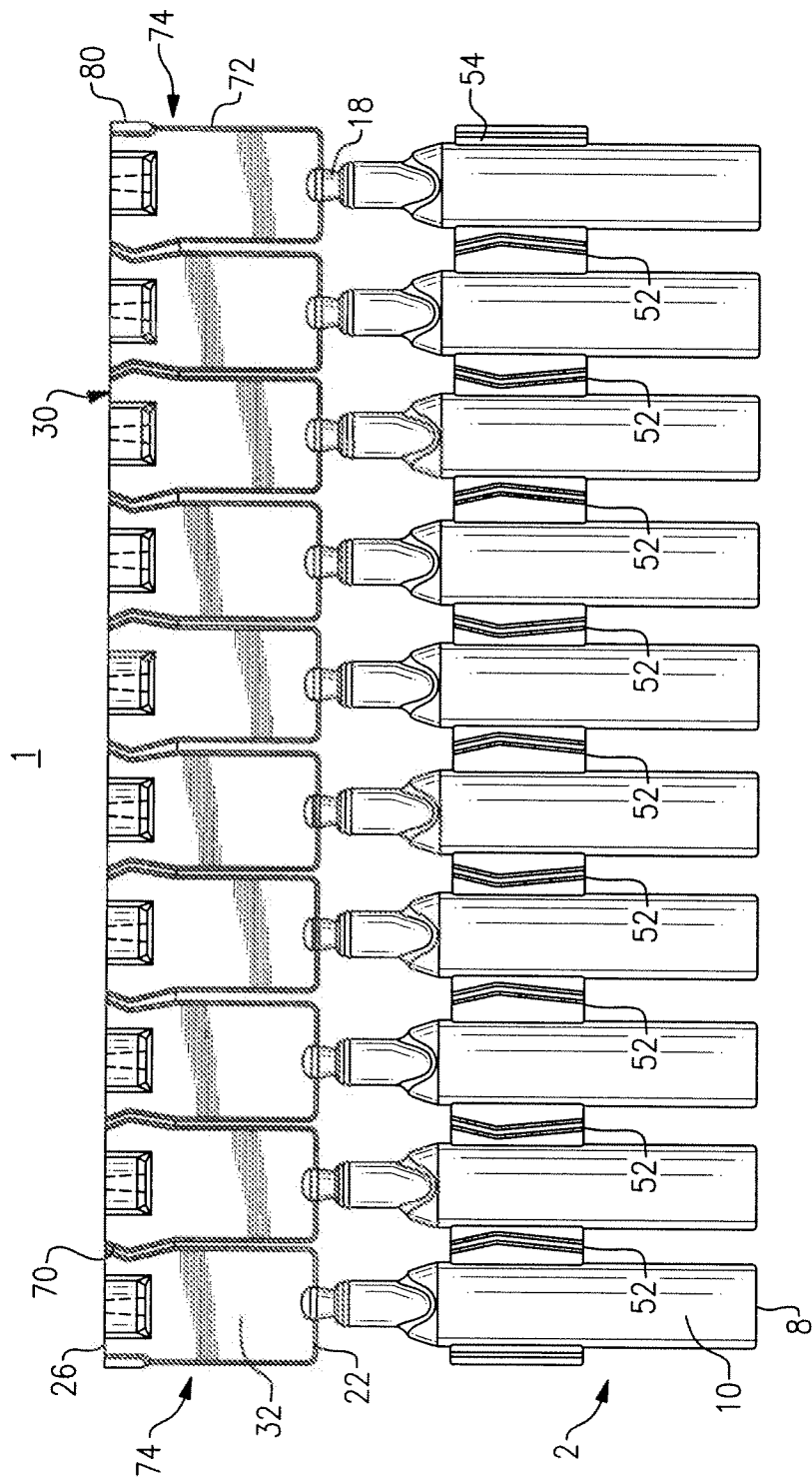
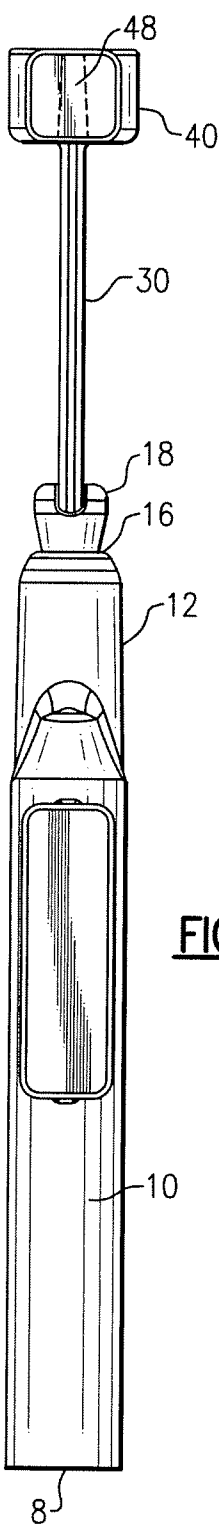
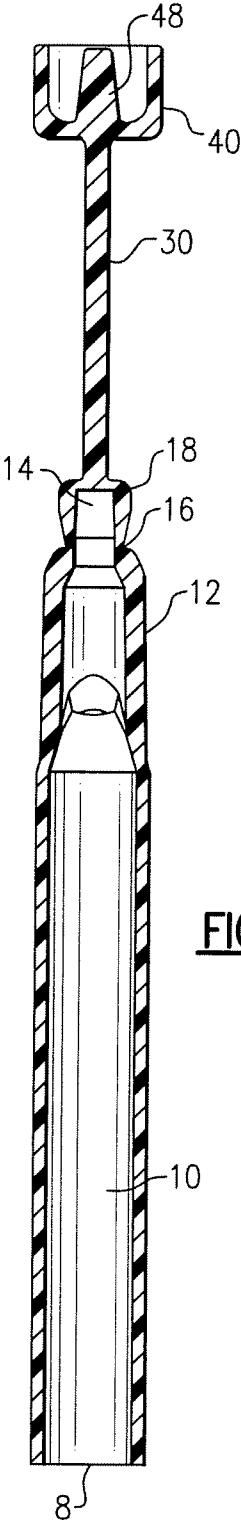


FIG. 2



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/061761

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D1/02 B65D1/09 B65D47/36 A61J1/06

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 A61J

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"E" earlier document but published on or after the international filing date

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"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

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18/12/2009

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/061761

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