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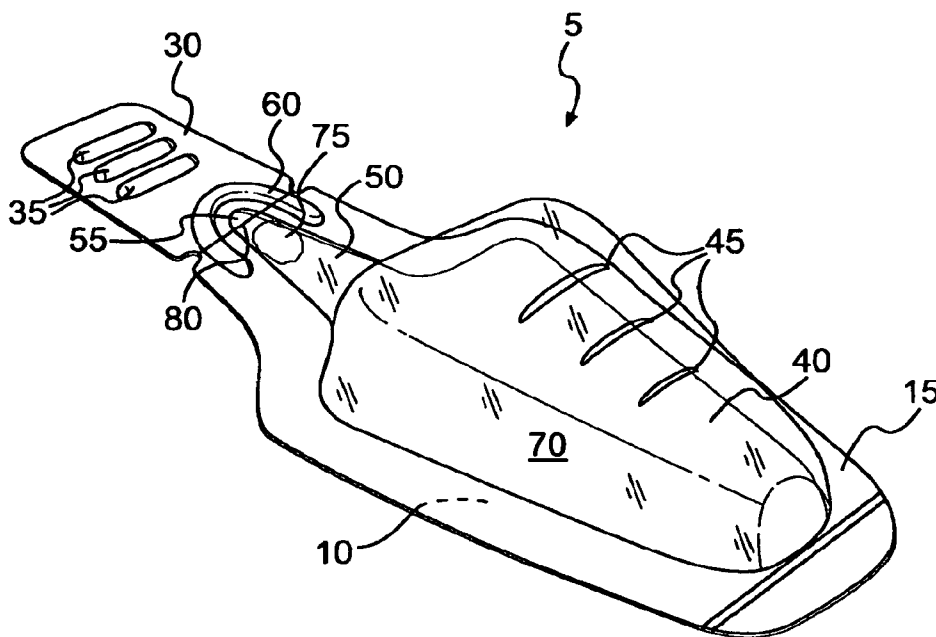
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(54) Title: A TEAR AND SPILL RESISTANT PACKAGE FOR DISPENSING LIQUIDS IN A CONTROLLED MANNER



(57) Abstract: The present invention is directed to a pliable package that is tear resistant, requires a greater degree of dexterity to open, and prevents accidental discharge during or after opening of the package. The package includes a flexible, liquid storage reservoir having a funnel-shaped outlet passageway leading to an opening. The package also includes a reinforced tear resistant tab portion that may prevent accidental discharge of liquid when the tab portion is bent about the score line. The funnel-shaped outlet passageway may be shaped to allow the liquid to be dispensed in a controlled manner.

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A TEAR AND SPILL RESISTANT PACKAGE FOR DISPENSING LIQUIDS IN A CONTROLLED MANNER

BACKGROUND OF THE INVENTION

I. Related Applications

The present disclosure claims the right to priority based on U.S. Provisional Patent Application No. 60/788,572 filed on March 31, 2006.

II. Field of the Invention

[001] The present invention relates generally to dispensary packages. More particularly, the present invention relates to veterinary packages for dispensing liquids.

III. Description of the Related Art

[002] Over the years, designers have sought to improve container designs and processes for dispensing liquids. Conventional designs, however, suffer from many drawbacks. For instance, typical container designs are not adequately childproof. They are not sufficiently tear resistant to insure that the enclosed liquids are used for their intended uses. Many containers can be opened relatively easily, such as by twisting one part of the container relative to another. Nor do conventional designs adequately prevent liquid from being accidentally discharged during the process of opening the container. In the field of dispensing, the terms "kickback," "splashback," and liquid "pops" have been used to describe the problem of accidental discharge that may occur when an opening in the container must be created by tearing a portion of the container along a score line. In addition, current designs are susceptible to uncontrolled discharge after opening because they typically permit liquid to freely flow through the torn opening.

[003] Accordingly, it would be advantageous to provide a container that is tear resistant, requires a greater degree of dexterity to open, prevents accidental discharge during opening, and allows the liquid to be dispensed in a controlled manner.

SUMMARY OF THE INVENTION

[004] The advantages and purposes of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. Moreover, the

advantages and purposes of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

[005] One aspect of the invention provides a pliable package for storing liquids therein, including a plurality of flexible, liquid-impermeable superposed sheets being joined together by a liquid-tight seal along their respective peripheral edges; a liquid reservoir enclosed between the superposed sheets, including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and a reinforced closure located along the liquid-tight seal, configured to block the liquid discharge opening; wherein the funnel-shaped outlet passageway extends across the liquid discharge opening from the flexible reservoir to the reinforced closure.

[006] Another aspect of the invention provides a pliable package for storing liquids therein, including a plurality of flexible, liquid-impermeable superposed sheets being joined together by a liquid-tight seal along their respective peripheral edges; a liquid reservoir enclosed between the superposed sheets, including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and a reinforced closure located along the liquid-tight seal and configured to block the liquid discharge opening; wherein the funnel-shaped outlet passageway is configured to allow the formation of a meniscus upon unblocking the liquid discharge opening in order to prevent liquids from exiting the pliable package.

[007] Yet another aspect of the invention provides a method of storing liquids inside a pliable package, including providing a plurality of flexible, liquid-impermeable superposed sheets; joining the superposed sheets by a liquid-tight seal along their respective peripheral edges; providing a liquid reservoir between the superposed sheets, the liquid reservoir including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and providing a reinforced closure located along the liquid-tight seal for blocking the liquid discharge opening; wherein the pliable package prevents spillage and kickback of the liquids during unblocking of the liquid discharge opening.

[008] A further aspect of the invention that is advantageous over the conventional "twist off" style of packages is that once the package is opened there

is only one piece to discard. Thus, the risk of a pet or child of swallowing a twist off device may be eliminated.

[009] It is to be understood that both the foregoing general description and the following detail description are only exemplary, and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[010] The accompanying drawings are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings,

[011] FIG. 1 is a top plan view depicting a liquid dispenser according to an embodiment of the present invention;

[012] FIG. 2 is a perspective view of the dispenser of FIG. 1;

[013] FIG. 3 is a cross-sectional view depicting a lower section of the dispenser of FIG. 1;

[014] FIG. 4 is a cross-sectional view depicting an upper section of the dispenser of FIG. 1;

[015] FIG. 5a is a side view of the dispenser of FIG. 1 having an upper portion bent 90 degrees;

[016] FIGS. 5b-d are perspective views of the dispenser of FIG. 1 having a tab portion bent away to allow liquid dispensing;

[017] FIG. 6 is a perspective view of the dispenser of FIG. 1 having an upper portion twisted about a longitudinal axis;

[018] FIG. 7 is a perspective view of the dispenser of FIG. 6 having the upper portion twisted substantially 90 degrees about the longitudinal axis;

[019] FIG. 8 is a perspective view of the dispenser of FIG. 1 having the upper portion bent away;

[020] FIG. 9 is a perspective view of the dispenser of FIG. 1 depicting liquid being dispensed;

[021] FIG. 10a is a perspective view of one embodiment of the liquid dispenser;

[022] FIG. 10b illustrates the dimensions according to the dispenser of FIG. 10a;

[023] FIG. 10c illustrates the manufacturing process of the dispenser of FIG. 10a;

[024] FIG. 11a is a perspective view of another embodiment of the liquid dispenser;

[025] FIG. 11b illustrates the dimensions according to the dispenser of FIG. 11a;

[026] FIG. 11c illustrates the manufacturing process of the dispenser of FIG. 11a;

[027] FIG. 12a is a perspective view of yet another embodiment of the liquid dispenser;

[028] FIG. 12b illustrates the dimensions according to the dispenser of FIG. 12a;

[029] FIG. 12c illustrates the manufacturing process of the dispenser of FIG. 12a;

[030] FIG. 13a is a perspective view of yet another embodiment of the liquid dispenser;

[031] FIG. 13b illustrates the dimensions according to the dispenser of FIG. 13a; and

[032] FIG. 13c illustrates the manufacturing process of the dispenser of FIG. 13a.

DETAILED DESCRIPTION

[033] Reference will now be made in detail to the present embodiment of the invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[034] One embodiment of the invention as shown in FIGS. 1 and 2, includes a tear resistant package 5 that has a bottom layer 10 and a top layer 15 adhered to the bottom layer 10. The package shape is generally symmetrical about a longitudinal axis 18. The bottom and top layers 10, 15 are together shaped to define a base portion 20 (alternatively referred to as an "applicator") and a non-removable tab portion 30. In a preferred embodiment, the tab portion 30 may remain attached to the base portion 20 after the package 5 is opened. Alternatively, the tab portion 30 could be removed from the base portion 20 by cutting with scissors or another cutting implement. Two cross-sectional

perspective views of the package 5 are shown in FIGS. 3 and 4. The bottom layer 10 and top layer 15 may be thermoformed and stamped together resulting in a thermoformed pack.

[035] The thermoformed pack may be made from any of the thermoformable plastic flexible film materials having the adequate melt strength. These materials include the polyolefins, with polyethylene and polypropylene being preferred. Other resins that may be used include polyethylene terephthalate, polyethylene terephthalate glycol modified, high density polyethylene, laminates, multilayered composites comprised of olefins, and other thermoformable materials. In one embodiment, the thermoformed pack is formed of PVC – (Poly Vinyl Chloride), PVDC – (Poly Vinyl Di Chloride film), a multilayer sandwich film of LDPE+EVOH (Ethyl Vinyl Alcohol)+LDPE, OPA – (Oriented Poly Amide) – C.O.C[®] BAREX[®], and ACLAR[®].

[036] As best shown in FIGS. 1 and 2, the top layer 15 is shaped to form a liquid reservoir 40, a neck portion 50, and a reinforcing portion 60. The reservoir 40 is flexible and is configured to store a majority of a liquid 70. The reservoir 40 and the tab portion 30 each may include a series of gripping ribs 35, 45. The neck portion 50 may extend away from the reservoir 40 along the longitudinal axis 18. The neck portion 50 may include an end portion 55.

[037] In one embodiment, the neck portion 50 may be formed as a funnel-shape to gradually restrict the flow of liquid 70 away from the reservoir 40. When the package 5 is held in an upright orientation, this funnel-shape may cause liquid 70 to flow out of the end portion 55 and drain back into the reservoir 40. This is referred to as a “drain back” feature. In another preferred embodiment, a desired amount of air or gas may be included within the reservoir 40 and neck portion 50 to further encourage the liquid 70 to flow out of the end portion 55 when the package 5 is held in the upright orientation. For example, in one embodiment, nitrogen may be injected into package 5 prior to its being filled with liquid 70.

[038] In one aspect of the invention as shown in FIGS. 1 and 2, the reinforcing portion 60 may extend around the end portion 55 of the neck portion 50. The reinforcing portion 60 may be configured as a general U-shape or other shapes, such as for example, a C-shape, O-shape or X-shape. In other embodiments (not shown), the reinforcing portion 60 may include two separated portions each located adjacent to the end portion 55 of the neck portion 50. A

score line 80 may extend through both the reinforcing member 60 and the neck portion 50 along a direction perpendicular to the longitudinal direction of the neck portion 50. The reinforcing portion 60 may be located to span the score line 80. The reinforcing portion 60 may be disposed at the ends of the score line 80, thereby making the package 5 more difficult to initiate a tear from either end of the score line 80 and therefore resistant to opening, by a child, for instance. The reinforcing portion 60 may also be configured to provide rigidity to the package 5, and more particularly, to the neck portion 50.

[039] During manufacture, the reinforced portion 60 may be stamped into the package 5 through the use of a roller or block stamping profile as best shown in the cross-section of FIG. 4. In one embodiment, the reinforced portion 60 may be formed by a male plug and a female plug during the process of thermoforming the package 5 into a forming mold.

[040] In another aspect of the invention, the container 5 may be opened in a controlled fashion. As shown in FIG. 5a, a user may first hold the package 5 in an upright orientation. When the package 5 is held in this orientation, the liquid 70 may drain out of the end portion 55 and back toward the reservoir 40. Since the liquid 70 is not present in the end portion 55 when the package 5 is opened, accidental spillage may be avoided.

[041] Still referring to FIG. 5a, the user may open the package 5 by folding the tab portion 30 about the score line 80. The reinforcing portion 60 may form an expanded portion 67 along score line 80, which restricts the rate at which the tab portion 30 may rotate relative to the base portion 20. In this embodiment, the user also need not remove the tab portion 30 from the base portion 20 to dispense the liquid 70. FIGS. 5b-d illustrate the steps by which the user may fold the tab portion 30 away from the reservoir 40.

[042] In another embodiment as shown in FIGS. 6 and 7, the reinforcing portion 60 also may prevent the tab portion 30 from being torn along the score line 80 when it is twisted relative to the base portion 20. Thus, the reinforcing portion 60 may require a user to have a greater degree of dexterity to open the package 5 by precisely folding the tab portion 30 about the score line 80.

[043] In still another embodiment as shown in FIG. 8, the funnel-shape of the neck portion 50 may prevent accidental discharge of liquid 70 after the tab portion 30 has been folded back on the applicator 20. As shown, when the

package 5 is in an upside down orientation, a liquid meniscus 75 may be formed at the opening of the neck portion 50 based on the funnel-shape of the neck portion 50 and the viscosity of the liquid 70. The dimensions of the funnel-shape, including diameter and length, may be dependent upon the viscosity of the liquid 70. Liquid 70 may be any type of suitable liquid such as a water-based or solvent-based liquid having a viscosity in the range of about 0.5×10^{-3} to 2.0×10^{-3} Pa·s. Thus, package 5 of the present disclosure may be relevant to the dispensing of any suitable liquid so long as its viscosity may be accommodated via appropriate design of the neck portion 50.

[044] Fig. 9 illustrates one mode of dispensing the liquid 70 in a controlled manner. To dispense the liquid 70, a user may squeeze the reservoir 40, and compress the top layer 15 inwardly. In one embodiment, the top layer 15 may remain collapsed after the user squeezes the reservoir. Alternatively, the top layer 15 may be biased to return to its original shape after the user squeezes the reservoir 40. In this embodiment, when the top layer 15 moves back to its original shape, a negative pressure within the reservoir 40 may prevent the liquid 70 from flowing out of the reservoir 40.

[045] In one illustrative embodiment, the reservoir 40 may be manufactured with an initial negative internal pressure that is less than atmospheric pressure. Once the reservoir 40 is opened, the negative internal pressure may cause the liquid 70 to flow away from the opening to prevent the liquid 70 from escaping the reservoir 40. In another illustrative embodiment, the reservoir 40 may contain an air pocket in the neck portion 50 to prevent liquid 70 from being in the neck portion 50 before opening and prevent it from spilling during the opening process. In another aspect of the invention, the package 5 may be configured to "aspirate," or cause an internal suction to maintain the liquid 70 within reservoir 40 after opening or until pressure is applied by a user to the reservoir 40.

[046] In still another aspect of the invention, the package as shown in FIGS. 10a-b may be configured to hold a specific volume of liquid. For example, a 2.2 ml package may be configured to have a bottom layer 10 measuring 0.5 mm in thickness. The package also may have a total package depth of 6.5 mm in cross-section. As shown in FIG. 10c, dual roll feeding of web materials may be used in the thermoforming and stamping manufacturing process to form the top

and bottom layers 15, 10 of the package 5. As illustrated, each container may be spaced apart from one another along the web of materials.

[047] In another example, as shown in FIGS. 11a-b, a 2.5 ml package may be configured to have a bottom layer 10 measuring about 0.5 mm in thickness. The package also may have a total package depth of about 8.5 mm in cross-section. As shown in FIG. 11c, dual roll feeding of web materials may be used in the thermoforming and stamping manufacturing process to form the top and bottom layers 15, 10 of the package 5. As illustrated, each container may be spaced apart from one another along the web of materials.

[048] In yet another example, as shown in FIGS. 12a-b, a 4.9 ml package may be configured to have a bottom layer 10 measuring about 0.5 mm in thickness. The package also may have a total package depth of about 10.5 mm in cross-section. As shown in FIG. 12c, dual roll feeding of web materials may be used to form the top and bottom layers 15, 10 of the package in the thermoforming and stamping manufacturing process to form the top and bottom layers 15, 10 of the package 5. As illustrated, each container may be spaced apart from one another along the web of materials.

[049] In still another example, as shown in FIGS. 13a-b, a 7.4 ml package may be configured to have a bottom layer 10 attached to a top layer 15. The package also may have a total package depth of about 13.10 mm in cross-section. As shown in FIG. 13c, dual roll feeding of web materials may be used in the thermoforming and stamping manufacturing process to form the top and bottom layers 15, 10 of the package 5. As illustrated, each container may be spaced apart from one another along the web of materials.

[050] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims. Thus, it should be understood that the invention is not limited to the illustrative examples in this specification. Rather, the invention is intended to cover all modifications and variations that come within the scope of the following claims and their equivalents.

WHAT IS CLAIMED IS:

1. A pliable package for storing liquids therein, comprising:
 - a plurality of flexible, liquid-impermeable superposed sheets being joined together by a liquid-tight seal along their respective peripheral edges;
 - a liquid reservoir enclosed between the superposed sheets, including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and
 - a reinforced closure located along the liquid-tight seal, configured to block the liquid discharge opening;wherein the funnel-shaped outlet passageway extends across the liquid discharge opening from the flexible reservoir to the reinforced closure.
2. The pliable package of claim 1, wherein the funnel-shaped outlet passageway comprises a tapered portion and an elongate throat portion having opposing ends; and
 - wherein the tapered portion extends from the liquid reservoir to one end of the elongate throat portion, and the elongate throat portion extends from its other end to the reinforced closure.
3. The pliable package of claim 1, wherein the reinforced closure and the liquid reservoir each comprise a plurality of gripping ribs.
4. The pliable package of claim 1, wherein the reinforced closure is joined to the liquid reservoir along a score line at the location along the fluid-tight seal.
5. The pliable package of claim 4, further comprising:
 - a reinforcing member formed in the reinforced closure and the liquid reservoir across the score line at the location along the fluid-tight seal.
6. The pliable package of claim 5, wherein the reinforcing member is substantially U-shaped, C-shaped, O-shaped, or X-shaped.

7. The pliable package of claim 5, wherein the reinforced closure is configured to unblock the liquid discharge opening upon being rotated about the score line.
8. A pliable package for storing liquids therein, comprising:
a plurality of flexible, liquid-impermeable superposed sheets being joined together by a liquid-tight seal along their respective peripheral edges;
a liquid reservoir enclosed between the superposed sheets, including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and
a reinforced closure located along the liquid-tight seal and configured to block the liquid discharge opening;
wherein the funnel-shaped outlet passageway is configured to allow the formation of a meniscus upon unblocking the liquid discharge opening in order to prevent liquids from exiting the pliable package.
9. The pliable package of claim 8, wherein the funnel-shaped outlet passageway comprises a tapered portion and an elongate throat portion having opposing ends;
wherein the tapered portion extends from the liquid reservoir to one end of the elongate throat portion, and the elongate throat portion extends from its other end to the reinforced closure; and
wherein the tapered portion is configured to drain liquids from the elongate throat portion toward the liquid reservoir.
10. The pliable package of claim 8, wherein the reinforced closure and the liquid reservoir each comprise a plurality of gripping ribs.
11. The pliable package of claim 8, wherein the reinforced closure is joined to the liquid reservoir along a score line at the location along the fluid-tight seal.
12. The pliable package of claim 11, further comprising:
a reinforcing member formed in the reinforced closure and the liquid reservoir across the score line at the location along the fluid-tight seal.

13. The pliable package of claim 12, wherein the reinforcing member is substantially U-shaped, C-shaped, O-shaped or X-shaped.
14. The pliable package of claim 12, wherein the reinforced closure is configured to unblock the liquid discharge opening upon being rotated about the score line.
15. A method of storing liquids inside a pliable package, comprising:
 providing a plurality of flexible, liquid-impermeable superposed sheets;
 joining the superposed sheets by a liquid-tight seal along their respective peripheral edges;
 providing a liquid reservoir between the superposed sheets, the liquid reservoir including a funnel-shaped outlet passageway and a liquid discharge opening at a location along the liquid-tight seal; and
 providing a reinforced closure located along the liquid-tight seal for blocking the liquid discharge opening;
 wherein the pliable package prevents spillage and kickback of the liquids during unblocking of the liquid discharge opening.
16. The method of claim 15, further comprising:
 configuring the funnel-shaped outlet passageway to drain liquids, therein, back into the liquid reservoir upon holding the pliable package upright for several seconds.
17. The method of claim 16, further comprising:
 joining the reinforced closure to the liquid reservoir along a score line at the location along the fluid-tight seal and configuring the reinforced closure to unblock the liquid discharge opening upon being rotated about the score line.
18. The method of claim 17, further comprising:

forming a reinforcing member in the reinforced closure and the liquid reservoir across the score line at the location along the fluid-tight seal, for preventing accidental unblocking of the liquid discharge opening.

19. The method of claim 18, further comprising:

configuring the liquid discharge opening to allow the formation of a meniscus upon unblocking the liquid discharge opening in order to prevent accidental discharge of liquids from the pliable package.

20. The method of claim 19, further comprising:

configuring the superposed sheets to collapse and discharge liquids in the liquid reservoir through the liquid discharge opening upon a user's rotation of the reinforced closure about the score line, and inward compression of the liquid reservoir.

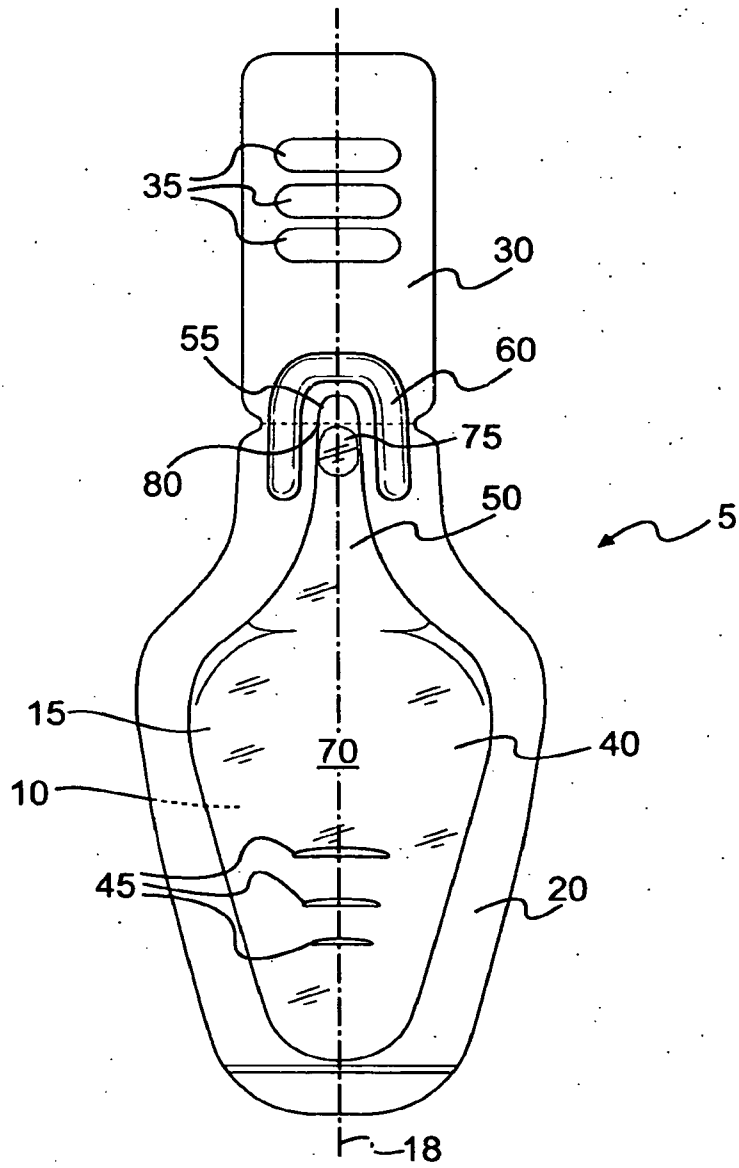


FIG. 1

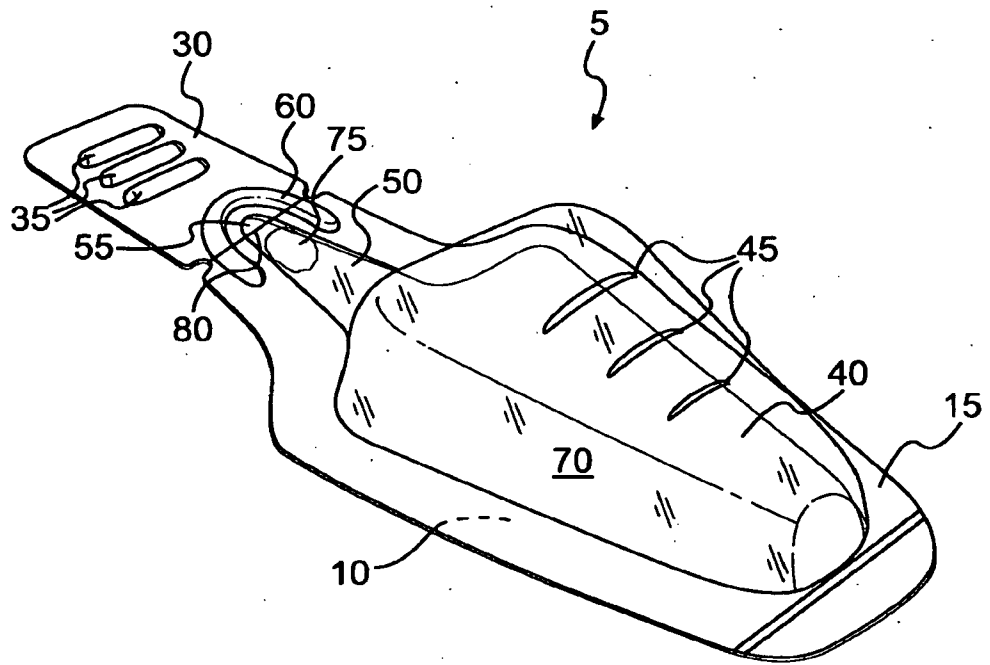


FIG. 2

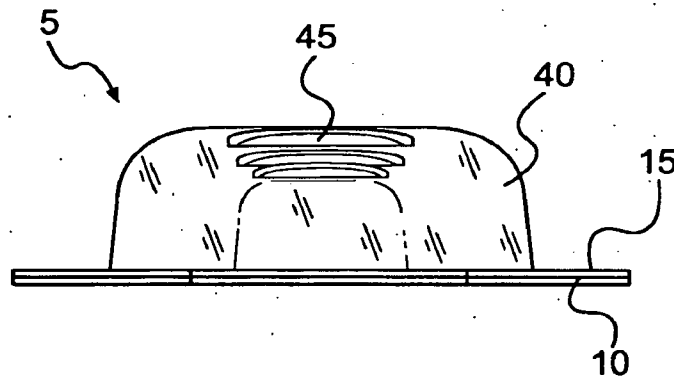


FIG. 3

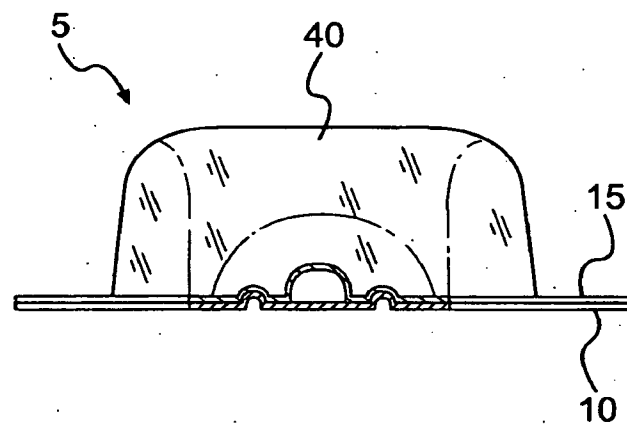


FIG. 4

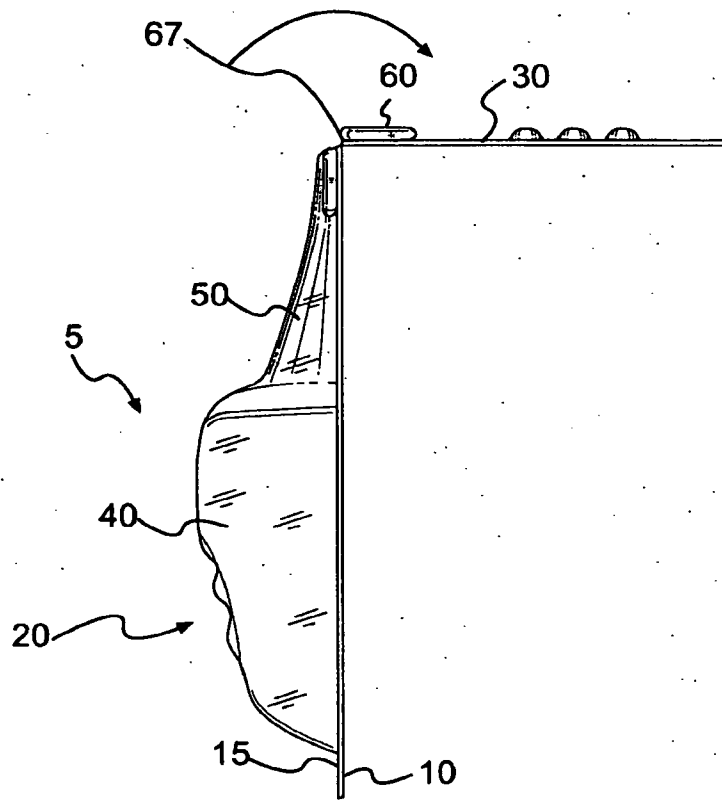


FIG. 5a

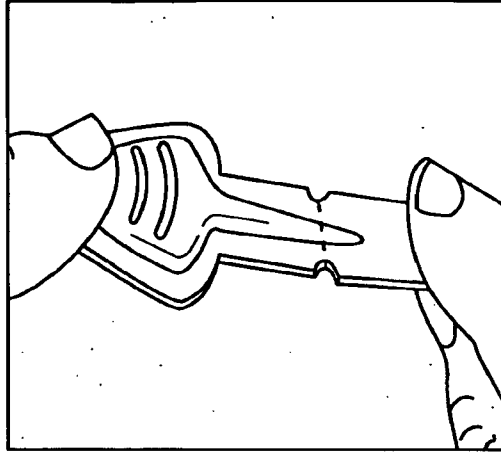


FIG. 5b

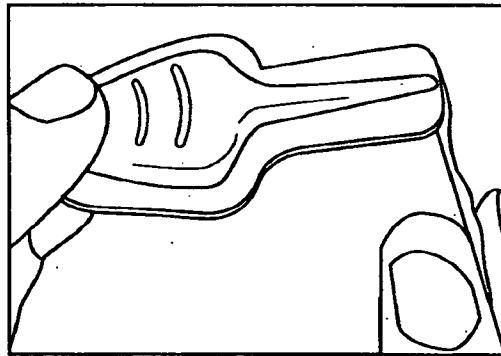


FIG. 5c

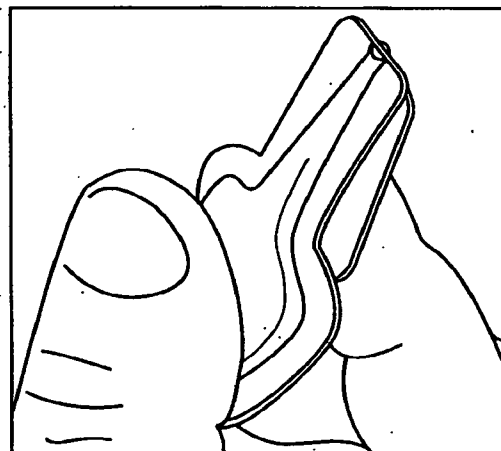


FIG. 5d

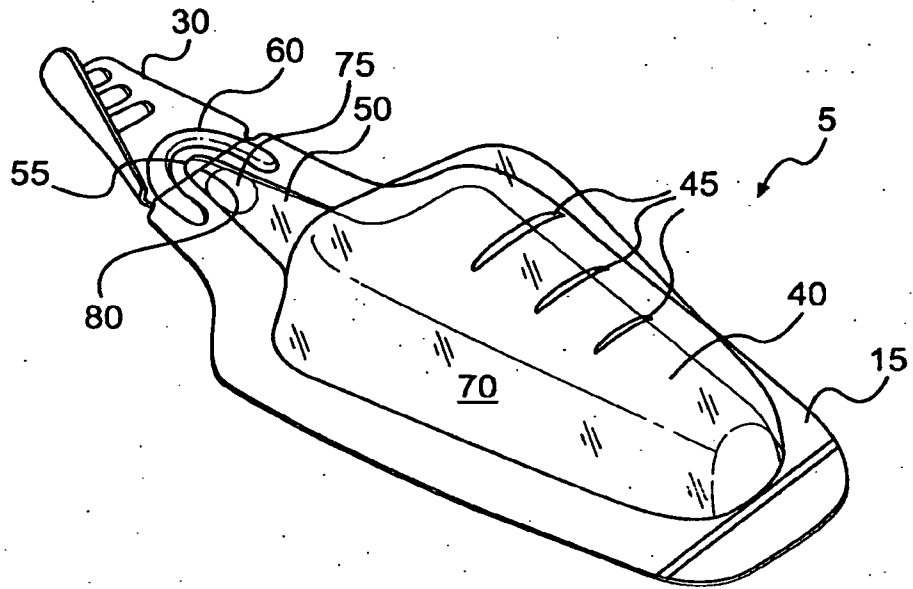


FIG. 6

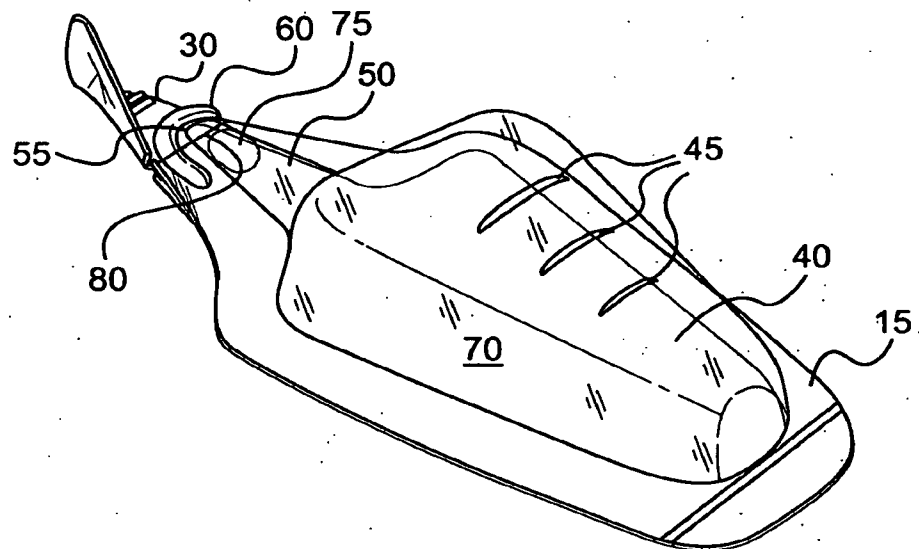


FIG. 7

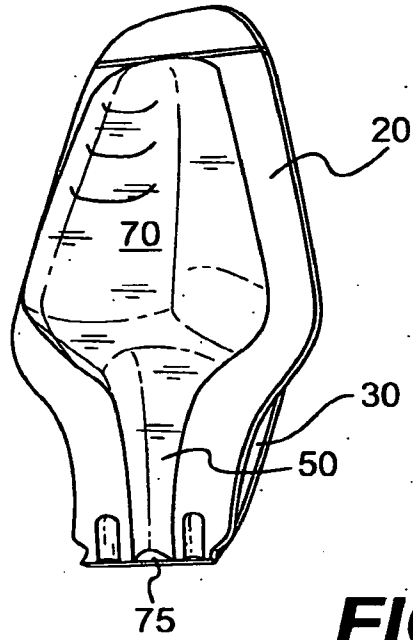


FIG. 8

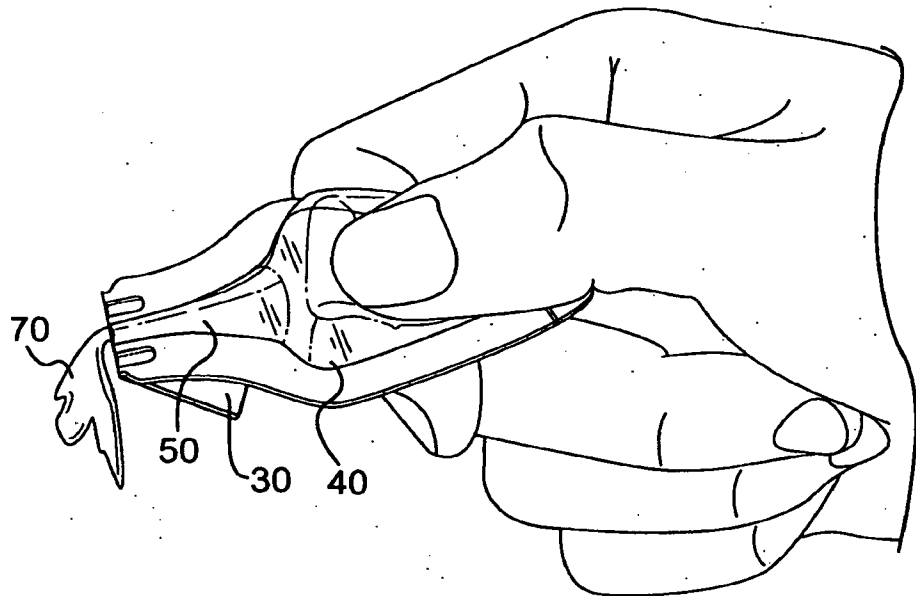


FIG. 9

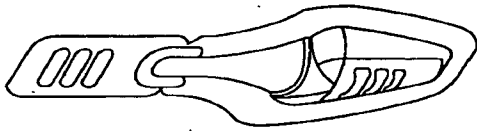


FIG. 10A

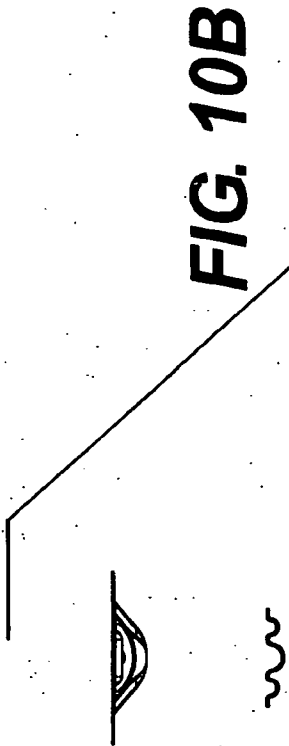


FIG. 10B

SECTION B-B

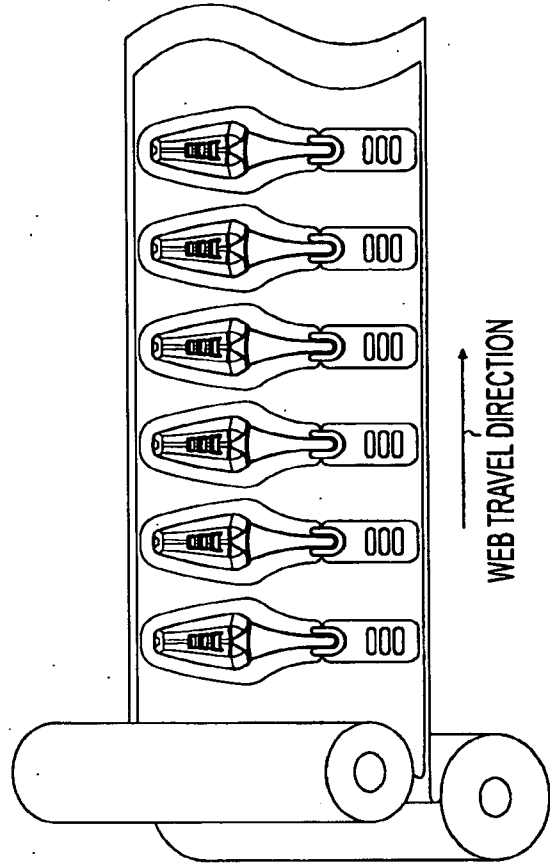
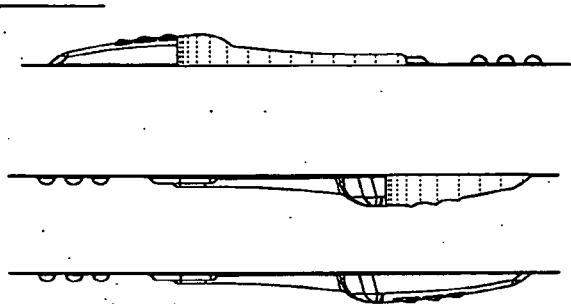
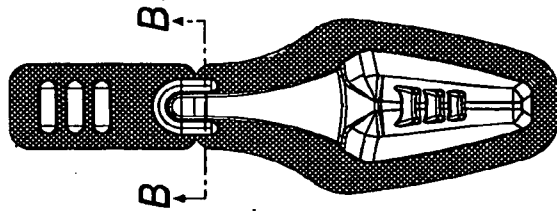


FIG. 10C

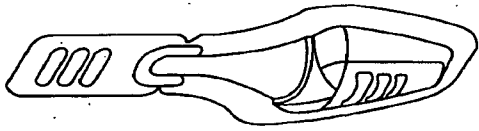


FIG. 11A

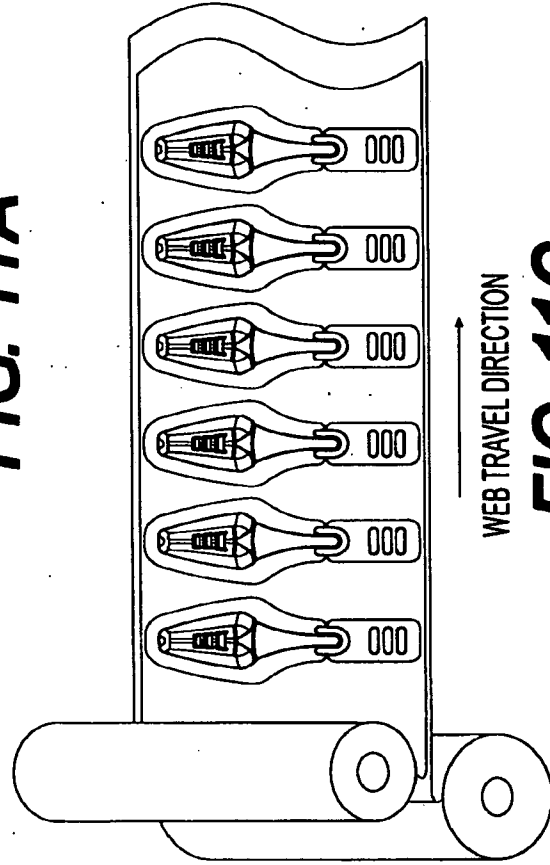
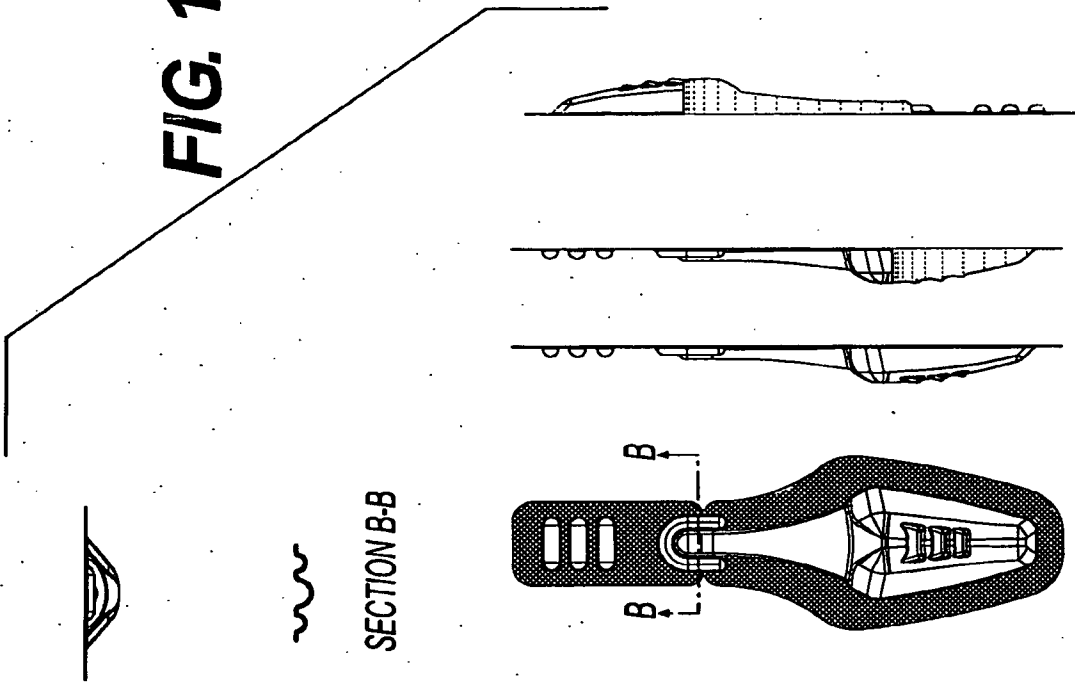
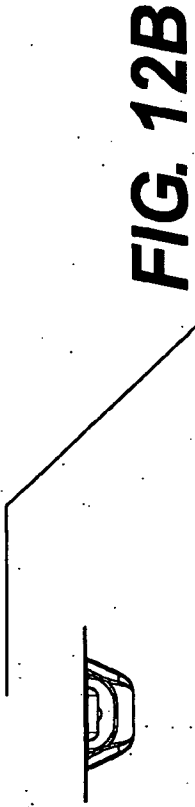
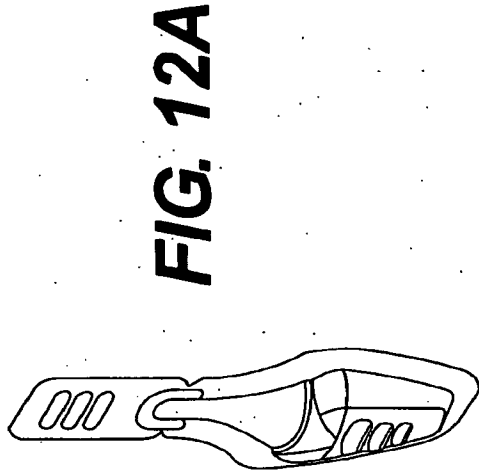


FIG. 11C
WEB TRAVEL DIRECTION

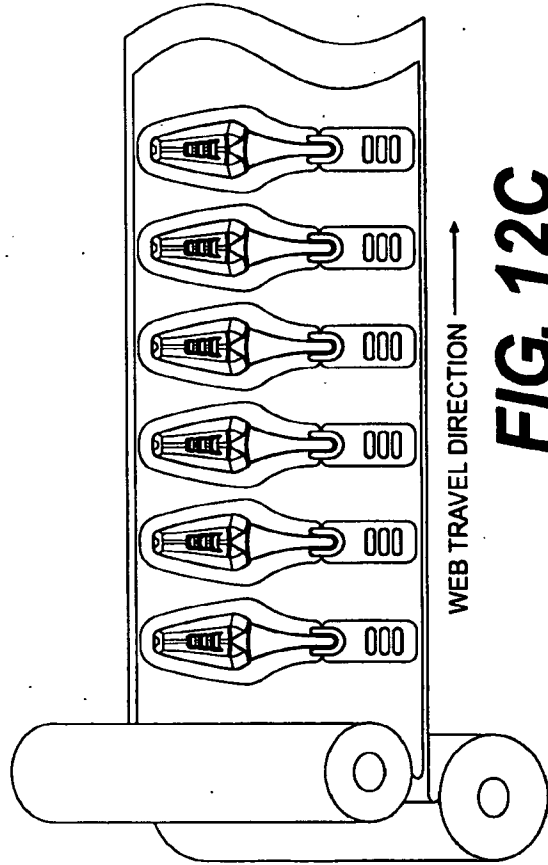
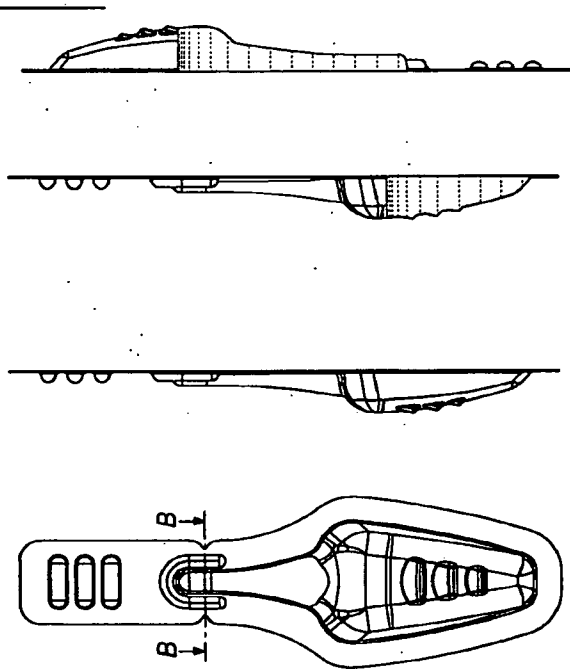
FIG. 11B



SECTION B-B



SECTION B-B



WEB TRAVEL DIRECTION →

FIG. 12C

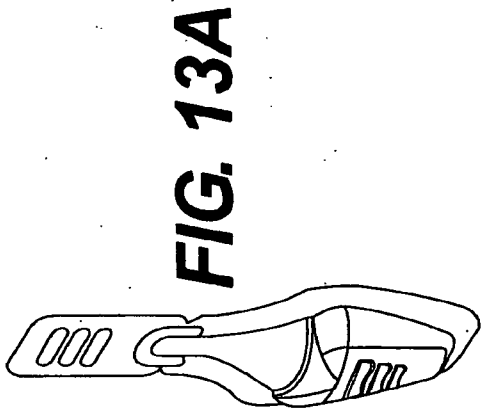


FIG. 13A

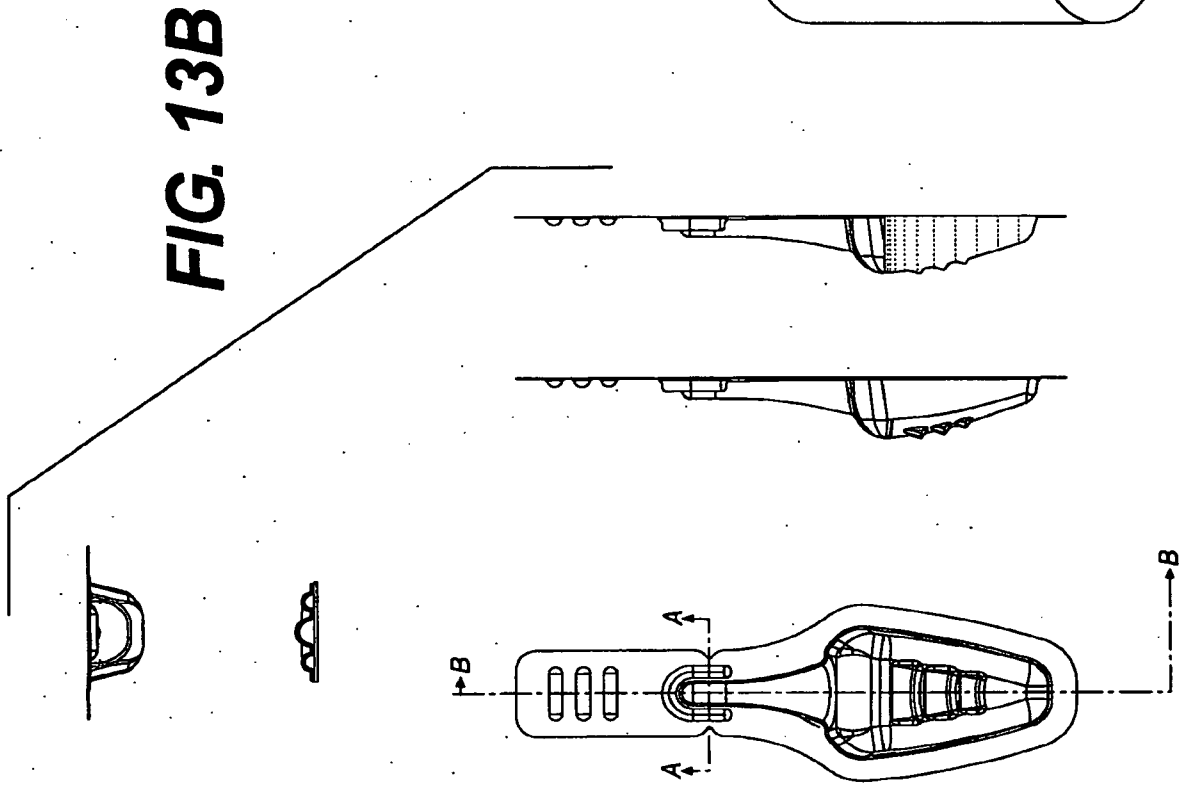


FIG. 13B

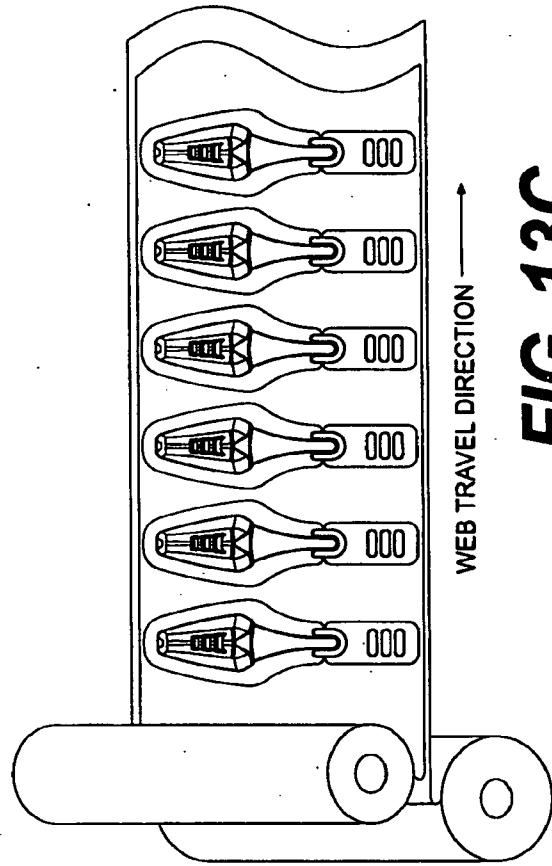


FIG. 13C