

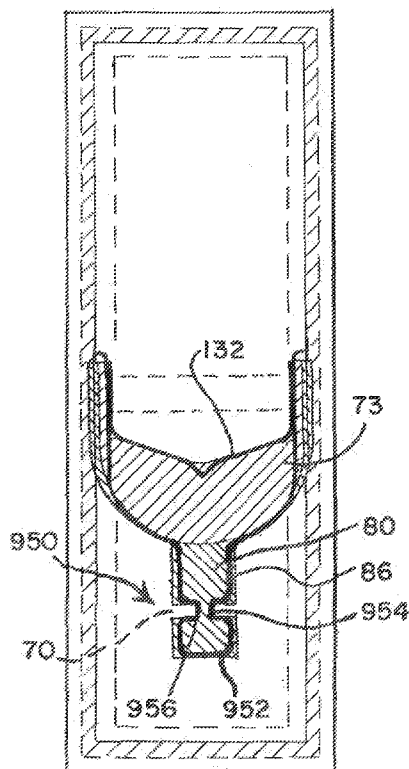


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(54) Title: TAMPER INDICATOR FOR RECLOSABLE PACKAGES

FIG. 23



(57) Abstract: A reclosable package for storing and dispensing product. The package has a reclosable opening panel that can be selectively moved from a closed position where product contained within the package is retained to an open position where product contained within the package is exposed for dispensing. The package includes a tamper indicator that provides one or more of a visual, tactile, or auditory indication that the opening panel is being opened for the first time or has been previously opened



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TAMPER INDICATOR FOR RECLOSABLE PACKAGES

The present invention relates to a reclosable product package for storing and
5 dispensing products, particularly consumable products and more particularly confectionery
products such as chewing gum and candy. In particular, the present invention relates to a
tamper indicator for a reclosable package to provide an indication that the package is being
opened for the first time and/or that the package has been previously opened.

Certain consumable products are provided as individual pieces in a package.
10 Oftentimes, it is desired to retain these products within the package yet when the package is
opened, an individual piece can be exposed and removed from the package. In view of the
fact that the package is reclosable, it would be desirable to provide some indication as part of
the package that the package is being opened for the first time and/or has been previously
opened.

SUMMARY

The present invention therefore provides a package that includes, as part of the
package, a tamper indicator that provides an indication that the package is being opened for
the first time and/or has been previously opened. The package of the present invention is
suitable for storing and dispensing individual pieces of edible product, particularly
20 confectionery products such as candy and more particularly pieces of chewing gum. The
tamper indicator of the present invention may also be used with a reclosable container that is
configured to removably store one or more packages that, in turn, contain several individual
pieces of edible product such as chewing gum or other confectionery products.

The term reclosable as used herein refers to a package having an opening feature
25 which may be repeatedly opened and securely reclosed for at least a sufficient number of
times to permit consumption of the entire contents of the package, one piece at a time.

In one embodiment, the reclosable package includes a laminated sheet having an inner
layer and an outer layer. Each or both of the inner layer and the outer layer may be a single
layer or may include a plurality of layers that act as a single layer for the purposes of the
30 present invention. A first score line is created (for example, by a laser scoring operation) and
extends at least substantially into the inner layer but does not extend into the outer layer. The
term "score line" as used in the following specification and claims means a weakened line in

the layer material that is intended to assist in separating the material along the score line. The score line may be a continuous line cut to full or partial depth of the layer or it may be a linear series of intermittent cuts to full or partial depth of the material. In any case, it is understood that the line may be straight, curved or some combination of these along its length. Due to the benefits of flexibility and precision, laser scoring is the preferred method of creating the score lines. In the case where the score line is created through the use of a laser, the score line may be referred to as a laser scored line.

A second score line is created and extends at least substantially into the outer layer but does not extend into the inner layer. The second score line is laterally offset from the first score line to define a marginal region between the first and second score lines and to further define a surrounding region outside of the marginal region. The second score line also defines an opening panel for the package. A releasable adhesive may be provided between the inner and outer layers in at least a portion of the marginal region. A laminating adhesive is disposed between the inner and outer layers and it is provided substantially throughout the surrounding region such that the laminating adhesive is effective to bond the inner and outer layers together where it is applied. The package includes a tamper indicator that provides one or more of a visual, tactile, or auditory indication when the opening panel is first opened. The tamper indicator may further provide one or more of a visual or tactile indication that the opening panel has been previously opened.

In one aspect, the tamper indicator includes printable ink underlying the opening panel that is revealed when the opening panel is opened. Alternatively, the printable ink (or printing) may be provided on the outer layer in a manner such that the printing traverses at least a portion of the second score line. As a result, when the opening panel is opened, the alignment of the word or at least a portion of it will be disturbed and when the opening panel is closed, alignment of the word or at least a portion of it will be disturbed.

In another aspect, the tamper indicator includes a frangible link connected to a portion of the opening panel that, when lifted, provides an auditory and/or visual indication that the opening panel is being lifted. For example, the second score line may create a tab connected to the opening panel through a narrow conduit which constitutes the frangible link so that when the opening panel is opened for the first time, the frangible link is broken to allow access to the contents of the package. In one embodiment, a discontinuity in the second score line defines the frangible link. In further embodiments, the tamper indicator includes two or

more frangible links located in key locations at the periphery of the opening panel. In an embodiment, two frangible links are located on opposite lateral sides of the opening panel.

In other aspect, the opening panel may be configured such that upon first opening of the opening panel, a portion of the inner layer or outer layer is delaminated from a second portion of the same layer. In one embodiment, the laminating adhesive may be provided in a portion of the marginal region such that in that portion of the marginal region (i.e., where the laminating adhesive has been applied), a portion of the inner or outer layer is delaminated from a second portion of the same layer. In an embodiment, a tab defined by the second score line may have a portion that is permanently adhered to the package (for example, by application of the laminating adhesive) so that when a portion of the tab is moved away from the package, the score line will tear providing a visual and auditory indication that the seal has been broken and that the opening panel may have been opened. After the tab has been torn, evidence of such will be readily evident.

In yet another aspect of the invention, the outer layer may be itself composed of two layers, a first opaque layer oriented toward the inner layer of the package and a second transparent layer oriented toward the outside of the package. In an embodiment, a laminating adhesive is applied (for example, as a pattern) within a portion of the marginal region. When the package is opened for the first time, the outer layer is delaminated where the laminating adhesive was applied, causing a pattern to be revealed in the second transparent layer where the opaque material was removed and on the inner layer where the first opaque layer material adheres to the inner layer of the package. Upon re-closure of the opening panel, it will be difficult or impossible to re-align the patterns thus providing an indication that the package was previously opened.

For purposes of the present invention, “laminated” and “lamination” refer to any process which produces a multi-layer structure. In addition to traditional adhesive lamination, processes such as coextrusion and vacuum metallization are specifically contemplated.

Also for purposes of the present invention, the term “delamination” refers to the complete or partial separation of layers that may occur between layers or within a given layer.

In another aspect, a portion of the package that is covered by the opening panel may be provided with one or more of a light sensitive dye or other material such that when the opening panel is opened to expose the portion, the dye may cause a color change or other

visual indication. In another aspect, the package may include a security tape located over at least a portion of the opening panel such that an expectation of the presence is created, which when the security tape is not present, or is torn, will provide an indication that the package has been previously opened. While particular examples of visual, tactile, and auditory indicators have been noted, the present invention is not limited to these specified examples. Rather, the invention includes any suitable visual, tactile, or auditory indicator that does not interfere with or inhibit the operation of the opening panel.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an individual flexible product package according to one embodiment of the present invention with the reclosable opening panel in an open position to expose contents, which in this instance is chewing gum.

Fig. 2 is a view of a portion of a first side of an outer layer for one embodiment of a package of the present invention showing a pattern of laminating adhesive applied to one side of the outer layer so that the outer layer can be adhered to a first side of an inner layer.

Fig. 3 is a view of a portion of a first side of an outer layer for another embodiment of a package of the present invention showing a pattern of laminating adhesive applied to one side of the outer layer so that the outer layer can be adhered to a first side of an inner layer.

Fig. 4 is a view of a portion of a second side of an inner layer, which will form the inner surfaces of the package and the other side of which is laminated onto a second side of the outer layer of any of the embodiments shown in Figs. 2 and 3 to form a laminate roll stock.

Fig. 5 is a view of a portion of the second side of the outer layer, which will form the outer surfaces of the package, the other side of which is laminated onto the second side of the inner layer to form a laminate roll stock.

Fig. 6 is a partial cross sectional view of the laminate of Fig. 5 with the adhesive pattern of Fig. 2.

Fig. 7 shows the package of Fig. 1 with the reclosable opening panel in a closed position.

Fig. 8 shows an embodiment of the package according to the present invention where the package is formed from a separate front and rear sheets.

Fig. 9 shows an embodiment of the package according to the present invention where the package is formed with a rear side having a seal.

Fig. 10a and 10b show the rear of the package of Fig. 9 with two different rear seals.

Fig. 11 is a diagrammatic depiction of a method for making a flexible package according to the present invention.

Fig. 12 is a view of the outer layer structure before being laminated to the inner layer structure and after being scored.

Fig. 13 is a cross-sectional view of a portion of one package, for example, a package made according to the process shown in Fig. 11 in a closed configuration.

Fig. 14 is a cross-sectional view of a portion of the package of Fig. 13 in an open configuration.

Fig. 15 is a diagrammatic depiction of a method for making a flexible package according to the present invention, which contains features that can be used in the process depicted in Fig. 11.

Fig. 16 shows a flexible container useful for storing and carrying a plurality of individual product packages such as those shown in Figs. 1 and 7, each of which can contain a plurality of individual pieces of edible product, particularly chewing gum. The container is shown in an unopened position.

Fig. 17 shows the container of Fig. 16 in an open position.

Fig. 18 shows a suitable configuration for a piece of gum that may be stored in the individual product packages.

Fig. 19 shows a suitable configuration for a slab of gum that may be stored in the individual product packages.

Fig. 20 is an alternative individual product package where the individual product package is in the form of a cylinder with a reclosable opening panel in a closed position.

Fig. 21 shows the individual product package of Fig. 19 with the reclosable opening panel in an open position to expose individual pieces of gum.

Fig. 22 shows the individual product package of Fig. 19 with the reclosable opening panel in an open position to expose a portion of a roll of gum that has a portion that has been scored.

Fig. 23 shows an individual product package according to one embodiment of a tamper indicator.

Fig. 24 shows an individual product package according to another embodiment of a tamper indicator.

Fig. 25 shows an individual product package according to another embodiment of a tamper indicator

Fig. 26 shows an individual product package according to another embodiment of a tamper indicator.

5 Fig. 27 shows an individual product package according to another embodiment of a tamper indicator.

Fig. 28 shows an individual product package according to another embodiment of a tamper indicator.

10 Fig. 29 shows an individual product package according to another embodiment of a tamper indicator.

Fig. 30 shows an individual product package according to another embodiment of a tamper indicator.

Fig. 31 shows an individual product package according to another embodiment of a tamper indicator.

15 Fig. 32 shows an individual product package according to another embodiment of a tamper indicator.

Fig. 33 shows an individual product package according to another embodiment of a tamper indicator.

DETAILED DESCRIPTION

20 The invention is described with reference to the drawings in which like elements are referred to by like numerals. The relationship and functioning of the various elements of this invention are better understood by the following description. Each aspect so defined may be combined with any other aspect or aspects unless clearly indicated to the contrary. The embodiments described below are by way of example only, and the invention is not limited to
25 the embodiments illustrated in the drawings.

Turning now to Fig. 1, a reclosable package 10 is shown with a reclosable opening panel 80 in an open position to expose the contents 2 of the package. The package includes opposed surfaces 12, 14, an opposed top 20 and bottom 22, and opposed ends or sides 24, 26. One of the surfaces is scored to define a reclosable opening panel 80 that can be opened to
30 expose the contents 2 stored within the package 10. The package 10 is shown in a closed configuration in Fig. 7.

In the description provided below, the package 10 of the present invention is described as containing sticks (or tabs) 2 of gum. It is to be understood, however, that the use of the package 10 is not limited to gum, confections, or even consumable products, unless otherwise noted. For ease of description, however, the present invention will be described in connection with sticks of gum.

Therefore, a reclosable product package 10 having an array of gum sticks 2 is shown in Fig. 1. The package 10 retains and encloses the array of gum sticks 2 as will be described below. A reclosable opening panel 80 provides selective access to the contents 2 within the package 10.

As is known, gum sticks may be elongate rectangular shaped members that are individually wrapped with a wrapper 4 in a conventional fashion. The wrapper 4 may be a rectangular shaped member typically made of paper or foil. Typically, the longitudinal edges of the wrapper are overlapped and the ends of are turned over against the stick to enclose the stick.

Fig. 1 shows gum sticks 2 contained in wrappers 4, where the gum sticks were individually wrapped prior to being placed in the package 10. The wrapper 4 may be a single sheet or may include one or more sheets or layers. It is noted that the gum sticks 2 can be placed in an array directly into the package, without being individually wrapped.

While Fig. 1 shows the sticks 2 oriented within the package 10 in one direction, it is contemplated that the sticks could be oriented in a direction perpendicular to that shown in Fig. 1. Alternatively, the sticks 2 may be oriented in another direction so long as when the opening panel 80 is in an open position, access to the sticks is provided.

Fig. 1 also shows the gum sticks 2 aligned in a single row. It is to be understood that the gum sticks (wrapped or not) can be placed in a face-to-face manner, i.e., in two or more columns to form the array. When two or more columns are provided, each row may be encircled partially or completely by a wrapper to better contain the individual gum sticks. The array of gum sticks is placed in the package 10 and are retained and enclosed. A portion of the inside of the package 10 may contain an adhesive to releasably secure the gum sticks until the consumer removes them from the package 10.

Although it is not depicted, it is contemplated that one or more gum sticks may be contained within a flexible package 10 and that one or more flexible packages 10 may be provided in a container 800 as described below. Because the package 10 and the container

800 are intended to be reclosable, as described in more detail below, the package is provided with a tamper indicator 950 that will provide an indication that the package 10 has been first opened and/or has been previously opened.

The package 10 is generally a parallelepiped shape and formed of any suitable material. Without being limited, it is contemplated that the package 10 can be formed of a flexible plastic material, such as polyethylene (including but not limited to low density polyethylene and linear low-density polyethylene), polypropylene, mixtures or laminates of such, and other flexible plastics. The package could also be formed from metalized plastics, paper, laminated paper material, or other laminates. While it is contemplated that the package can be formed from a variety of suitable materials, for ease of understanding and description the package 10 and its construction will be described as being formed from a flexible plastic material such as polypropylene.

In general, the package is a laminated sheet having an inner layer and an outer layer. Each of the inner layer and outer layer or both may be a single layer or may include a plurality of layers that act as a single layer for purposes of the present invention. Accordingly, in one aspect, the package 10 is formed from a laminate 30 that includes a polypropylene film and optionally a polyethylene film. For example, the package 10 may be formed from a laminate 30 that includes a metal layer 122 disposed between two layers of polypropylene 42, 120.

Turning now to Fig. 2, one method of forming of one embodiment of the package 10 will be explained. Briefly, this method includes creating a laminate from a first and second material, scoring each side of the laminate, cutting the laminate, filling the laminate with the desired contents, forming the package, and sealing appropriate areas to provide the package 10. While several methods of forming the package 10 are described below, each will produce a package having the features identified and shown in Figs. 1 and 7.

Accordingly, an outer layer of material 40 may be unwound from a web (not shown). The outer layer 40 may be formed of polypropylene having a first side 44, a second side 46, a longitudinal direction 48, and a lateral direction 50 as shown in Figs. 2 and 6. Desirably, the polypropylene is an oriented polypropylene with the orientation in the lateral direction 50. As one skilled in the art will appreciate, orientation in this direction provides a higher resistance to tearing in the longitudinal direction 48 as compared to the lateral direction 50. While Fig. 2 depicts a continuous layer of material, the figure also identifies a first end 52

and a second end 54, which when cut and joined to each other in a later operation will form the bottom 22 of the package.

The first side 44 of the outer layer 40 is patterned with adhesive so that another layer may be adhered to the first side 44 of the outer layer 40. The second side 46 of the outer layer 40 will form the outer surfaces of the package 12 and 14, as will become clear. Typically, the outer layer 40 is patterned with a permanent laminating adhesive 70 and a releasable adhesive 72 (such as a pressure sensitive adhesive) as it is being unwound and before it is adhered to an inner layer 100.

Fig. 2 shows one pattern of adhesive application. As shown in Fig. 2, a fold line 60 is depicted at about the middle of the longitudinal length of the outer layer 40. It is to be understood that the fold line 60 is not provided on the outer layer 40 but instead it represents the portion of the outer layer 40 where the laminate 30 will be folded in a later operation to create the top 20 of the package 10. The fold line 60 defines a top section 62 and a bottom section 64 of the outer layer 40 that will define an inner back surface 18 and an inner front surface 16 of the package 10, respectively.

In the embodiment shown in Fig. 2, a permanent laminating adhesive 70 well known to those of skill in the art is applied to a sufficient portion of the top section 62 of the outer layer 40 and only to a portion of the bottom section 64. The permanent laminating adhesive 70 may be applied to the entire portion of the top section, if desired. Put another way, the laminating adhesive 70 is distributed throughout a surrounding region 63 (explained later in connection with the marginal region) to at least the extent necessary to effectively join the inner layer 100 and the outer layer 40 to allow the package 10 to function as intended. The laminating adhesive 70 may be applied evenly throughout the entirety of the surrounding region 63. Alternatively, it may be applied evenly to key areas where delamination could otherwise occur. It is also contemplated to provide the laminating adhesive 70 as a repeating or random pattern in discrete areas such as by using a dot matrix or cross hatch patterns. Of course, one or more combinations could also be used.

In the bottom section 64, a first smile area 82 is defined. The first smile area 82 includes a releasable adhesive 72 such as a releasable pressure sensitive adhesive known to those of skill in the art. An adhesive-free area 74 may be provided adjacent to at least a portion of the releasable adhesive area 72. A releasable adhesive 72 functions to join the outer 40 and inner 100 layers and it has a relatively low bond force to allow easy separation

of the outer 40 and inner 100 layers. In addition, the releasable adhesive is capable of re-adhering the outer 40 and inner 100 layers a sufficient number of times (i.e., a sufficient number of iterations of joining and separating the layers). An adhesive-free area 74 may be provided adjacent to at least a portion of the releasable adhesive area 72. The adhesive-free area 74 does not contain any adhesive, the reasons for which will become apparent upon further reading of the description.

Fig. 3 shows an alternative pattern of applying the adhesive to the first side 44 of the outer layer 40. This pattern is similar to that of Fig. 2 except that the adhesive-free area 74 is limited simply to a tongue portion 84.

Turning now to Fig. 4, an inner layer 100 is shown. The inner layer of material 100 may be unwound from a web (not shown). The inner layer 100 may be formed from any suitable material as noted above. The material desirably is formed from a composite or laminate such that one layer can be scored with a laser while the other layer resists scoring. For example, the material may be a laminate of paper and metal or foil, or a laminate of a flexible plastic material and metal or foil. In one aspect of the present invention, the inner layer 100 is a formed from metalized polypropylene, i.e., a layer of polypropylene 120 and a layer of metal 122 provided on one side of the polypropylene 120.

The inner layer 100 has a first side 102 (best seen in Fig. 6), a second side 104 (best seen in Fig. 4), a longitudinal direction 106 and a lateral direction 108. Desirably, the polypropylene is an oriented polypropylene with the orientation in the lateral direction 108.

As the inner layer of material 100 is unwound, the first side 102 of the inner layer 100 is joined with the first side 44 of the outer layer 40. The outer layer 40 and the inner layer 100 are laminated in a manner such that the layer of metal or foil 122 is disposed between the layers of the polypropylene 42 and 120 and such that a laminate 30 is formed. In other words, the layer of metal 122 is in contact with the adhesive 70, 72 provided on the first side 44 of the first layer 40. Desirably, the inner layer 100 is securely adhered to the outer layer 40.

Optionally, a heat-sealing layer 124 such as a layer of polyethylene may be provided on the second side 104 of the inner layer 100. Alternatively, other layers may be provided on the second side 104 or the inner layer 100, as is known to those of skill in the art.

Fig. 4 shows the second side 104 of the inner layer 100. It is to be understood that Fig. 4 also shows the laminate 30 with the second side 104 of the inner layer 100 visible.

While Fig. 4 depicts a continuous layer of laminate, the figure also identifies a first end 103 and a second end 105, which, when cut and joined to each other by folding along fold line 110 in a later operation, will form the bottom 22 of the package. It is to be understood that the fold line 110 is not provided on the inner layer 100 but instead it represents the portion of the inner layer 100 where the laminate 30 will be folded in a later operation to create the top 20 of the package 10. The fold line 110 defines a top section 112 and a bottom section 114 of the inner layer 100, which will form the rear 14 and front 12 surfaces, respectively.

As seen in Fig. 4, a score line 132 is created on the bottom section 114 of the second side 104 of the inner layer 100. Desirably, the scoring may be performed after the laminate 30 is formed. Alternatively, the scoring may be performed before the inner layer 100 is laminated to the outer layer 40. Desirably, the score line 132 is created by laser scoring and, as shown in Fig. 4, can be considered to define an inner smile cut 132. The inner smile cut or score line 132 will also define an inner smile area 130, as will become clear upon reading the following description.

The term score line is means a weakened line that is intended to assist the consumer in separating the material along the line. The score line may be a continuous line cut to partial depth of the layer or it may be a linear series of intermittent cuts to a full or partial depth of the layer. It is understood that the score line may be straight, curved, or a combination of these along the length of the score line.

The scoring is on the polypropylene layer 120 only (or the polyethylene and heat seal layers, if a heat seal layer is present) and does not score beyond the metal layer 122 (i.e., it does not score the first layer). The depth of the laser cut may be controlled in a manner known by those of skill in the art to provide such precision cutting. Specifically, the heat dissipation of the metal layer (or other laser scoring resistant material) reduces the likelihood that it is scored when the power of the laser is controlled for that purpose.

The score line 132 has a first end 131 and a second end 133 each of which is adjacent the fold line 110. Desirably, the first end 131 and second end 133 terminate at substantially the same lateral location so that the inner smile area 130 is substantially symmetric.

Consistent with the objectives of the present invention, a localized weak portion 135 of the score line 132 may be provided between the first end 131 and the second end 133. The localized weak portion 135 has a break force that is less than the break force of the non-localized weak portion of the score line 132.

The term break force is used to mean the force required to separate the inner smile area 130 from the bottom section 114 along the score line. The break force is dictated generally by the materials of construction, their orientation, and the score line itself, (i.e., how many “holes” and how big the “holes”, how far apart are the “holes”). One of skill in the art would understand that when laser scoring the material one or more operating parameters can be varied that will affect the break force. Accordingly, the localized weak portion 135 will have a first end 137 and a second end 139, each of which defines the end point of the localized weak portion 135 along the score line 132. The localized weak portion 135 is generally located at the tear propagation location which generally is located near the tongue 84, as will become clear from the description below.

The top section 112 of the second side 104 of the inner layer 100 may include a releasable adhesive 140 applied along a line or strip that runs in the lateral direction 108. The releasable adhesive 140 may be applied in a continuous or intermittent manner according to methods well known to those of skill in the art. This adhesive strip 140 may engage some or all of the gum sticks 2 or their wrappers 4 so that when the package 10 is formed; the gum sticks 2 are removably adhesively retained in the package. As a result, the gum sticks 2 may remain positioned in the package 10 even when one or more gum sticks 2 are removed. In addition, the adhesive 140 may prevent the gum sticks from becoming inadvertently dislodged from the package 10.

Turning to Fig. 5, the second side 46 of the laminate 30 is shown. It will be understood that Fig. 5 also shows the laminate 30 with the second side 46 of the outer layer 40 visible. As seen in Fig. 5, an outer score line 86 is created on the bottom section 64 of the second side 46 of the outer layer 40. The scoring may be performed after the laminate 30 is created and can be performed before, simultaneously with, or after the scoring is performed on the second side 104 of the inner layer 100. Alternatively, the scoring may be performed before the lamination process described above. Desirably, the score line 86 is created by laser scoring and, as shown in Fig. 6, can be considered to define an outer smile cut 86. The outer smile cut or outer score line 86 defines an outer smile area 82 with a tongue 84. The scoring is on the polypropylene layer 42 only and does not score beyond the metal layer 122 (i.e., it does not score the second polypropylene layer 100). The depth of the laser cut may be controlled in a manner known by those of skill in the art to provide such precision cutting.

The outer smile area 82 is larger than the inner smile area 130. Fig. 6 shows a partial side cross sectional view of the portion of the laminate 30 that has been score cut.

In addition, as will be appreciated from the foregoing description, the first or inner score line 132 and the second or outer score line 86 are located in a manner with respect to each other (e.g. they are laterally offset) to define a marginal region 73 between them and to also define a surrounding region 63 which is the area other than the marginal region 73.

The score line 86 has a first end 81 and a second end 83 each of which is adjacent the fold line 60. Desirably, the first end 81 and second end 83 terminate at substantially the same lateral location so that the outer smile area 82 is substantially symmetric. Consistent with the objectives of the present invention, a localized weak portion 85 of the score line 82 is provided between the first end 81 and the second end 83. The localized weak portion 85 has a break force that is less than the break force of the non-localized weak portion of the score line 86.

The term break force is used to mean the force required to separate the outer smile area 82 from the bottom section 64 along the score line 86. The break force is dictated generally by the materials of construction, their orientation, and the score line it, (i.e., how many "holes" and how big the "holes", how far apart are the "holes"). One of skill in the art would understand that when laser scoring the material one or more operating parameters can be varied which will affect the break force. Accordingly, the localized weak portion 85 will have a first end 87 and a second end 89, each of which defines the end point of the localized weak portion 85 along the score line 86. The localized weak portion 85 is generally located at the tear propagation location which generally is located near the tongue 84.

Referring back to Fig. 1, it is seen that one surface of the tongue 84 may be printed or patterned with a rubberized or elastomeric material to provide a gripping surface.

Advantageously, providing such a grip surface may also work to position the tongue in a position where it can be easily grasped by the user. For example, the additional weight caused by the presence of the rubberized or elastomeric material may work to cause the printed surface to lay adjacent the front surface 12. While a representative pattern of printed material is shown in Fig. 1, it is contemplated that the pattern could take any suitable and desired shape.

After the laminate 30 is formed and score cut, the laminate may be wound to form roll stock (not shown). During the package 10 forming operation, the laminate 30 is unwound

from the roll stock. A portion of the sticks 2 are placed adjacent the second side 104 of the inner layer 100 and the laminate 30 is folded along the fold line 110. The laminate 30 is folded such that the top section 112 of the second side 104 of the inner layer 100 is juxtaposed with the bottom section 114 of the second side 104 of the inner layer 100 and such that the top section 62 and the bottom section 64 will form the rear 14 and front 12 surfaces, respectively, of the package 10. The laminate 30 is then cut and sealed to create the bottom 22 and ends 24, 26 of the package 10. Of course, it is to be understood that these operations could take place in other sequences. For example, the laminate 30 may be unwound and cut, after which the sticks are placed adjacent the second side 104 of the inner layer 100.

Thereafter, the laminate 30 is folded along fold line 110, cut, and then sealed to create the bottom 22 and ends 24, 26 of the package 10.

Turning now to Fig. 7, the package 10 is shown with the outer smile cut 86 visible on the front 12 surface. With the above in mind, when it is desired to open the package 10, the tongue 84 is lifted or pulled away from the front 12 surface. Because of the scoring or inner smile cut 132 on the inner layer 100 and because the metal layer 122 on the inner layer 100 is adhered to the outer layer 40, the inner smile cut 132 of the inner layer 100 tears together with the outer smile cut 86 on the outer layer 40. In addition, because the inner smile area 130 is smaller than the outer smile area 82, and because of the prior pattern application of releasable adhesive 72 (as well as the provision of an adhesive-free area 74), a reclosable opening panel 80 is defined with releasable adhesive 72 provided adjacent the perimeter 88 of the opening panel. Moreover, the portion of the opening panel 88 that contains the releasable adhesive 72 is in contact with a portion of the metal layer 122 to provide an effective reclosable seal.

It is understood that the releasable adhesive 72 will have a delamination force, by which is meant the force required to separate the opening panel 80 from the package along the releasable adhesive 72 portion. The delamination force should have a strength suitable to repeatedly maintain the opening panel in a closed position yet not be so strong as to be an impediment to the opening of the opening panel.

In one aspect a localized weak portion 85 may be provided adjacent the tongue 84. Thus, when the tongue 84 is lifted or moved away from the front 12 surface, the initial tear propagation point will be in the area of the localized weak portion 85 between the ends 87 and 89 so that as the tongue 84 is moved away from the front 12 surface, the opening panel

80 will tear along the score line 86 starting at the localized weak portion 85 and terminating at the ends 81 and 83. Because the inner score line 132 is constructed in a similar fashion as the outer score line 86, the inner score line will operate in a similar manner.

In addition, it is desirable to provide a delamination force of the releasable adhesive 72 that is greater than the localized weak portion 85 break force and/or the break force of the score line 86, 132. In this instance, a portion of the opening panel 80 will begin to separate from the package 10 along the localized weak portions 85, 135 and then along the score lines 86, 132 before the opening panel 80 separates from the package 10 along the releasable adhesive 72 location. It is also desirable to provide the laminating adhesive 70 with a bond strength that defines the amount of force necessary to separate the inner 100 and outer 40 layer such that the bond strength of the laminating adhesive 70 is greater than the break force of the first score line 132. In this way, as the opening panel 80 is moved away from the package 10, the inner layer 100 is carried with the outer layer 40 in the surrounding region 63 of the opening panel 80.

Turning now to Fig. 8, another method of making the package 10 is shown. In this embodiment, a first laminate 150 is formed to define a front surface 152. The first laminate 150 may be formed in the same manner described above in connection with the formation of the laminate 30, except that the laminate will not be folded. Instead, a second material 154 will be used or formed to define a back 156 surface. The second material 154 may be formed from any suitable material such as polypropylene, polyethylene, laminates, or other materials that can effectively seal with the first laminate 150 to provide a closed package 10 according to the present invention.

The first laminate 150 will be scored in the manner described above to provide a reclosable opening panel 80 in the same manner as described above. Thereafter, each of the edges of the first laminate 150 and the second material 154 are sealed to create a closed package 10.

Turning now to Fig. 9, another method of making the package 10 is shown. In this embodiment, a laminate 330 is made in the same manner as described above, except, as seen in Fig. 9, the laminate will have three sections 302, 304, 306 with two fold lines 308, 310. In addition, the first section 302 has a peripheral edge 320 that will join with a peripheral edge 334 provided on the third section 306. To finish the package 10, the first section 302 and the third section 306 are folded away from the outer smile cut 86 and toward each other after the

product has been inserted. The peripheral edges 320 and 334 are sealed, such as by heat sealing or other suitable means. Alternatively, a fin seal 350 as shown in Fig. 10a or a lap seal 360 as shown in Fig. 10b may be created at the rear of the package 10. Of course, other known seals may be created as is known to those of skill in the art.

5 Turning now to FIG. 11, another embodiment of the manufacturing process of the present invention is depicted. A first structure 440 is formed by joining a first layer 442 with a second layer 446. The first layer 442 may be advanced from a supply roll 444 and the second layer 446 may be advanced from a different supply roll 448. Adhesive 450 may be applied to the first layer 442, the second layer 446, or both. Thereafter, the first layer 442 and
10 the second layer 446 may be joined in a laminating station 452 to form the first structure 440.

Alternatively, the first structure 440 may be supplied from a roll of preformed first structure laminate 600 (as best seen in Fig. 15). In addition, while Fig. 11 shows the first structure 440 being formed from two film layers, it is contemplated that the first structure 440 could be formed from more than two layers, e.g., from three or more layers. In addition, the
15 formed first structure 440 could be rolled up on a spool 600 for later processing, as described below.

Various materials can be used for the layer(s) of the first structure 440, including polymers such as polyesters, polyolefins (including homopolymers and copolymers), polyamides, and others; paper; metal foil; and the like. Advantageously, when metal foil is
20 used as an inner layer, it allows partial scoring through the outer layer while maintaining structural integrity for later operations such as scoring, batch rolling, transporting, batch unrolling, and the like.

The first structure 440 may then be advanced by suitable web driving and handling equipment (not shown) to an optional print station 480 comprising a printing apparatus, such
25 as a rotogravure printer or the like, for printing graphics and/or indicia on the first structure by applying inks to a surface of the first structure 440. In one embodiment of the invention, the first structure 440 includes an outer layer that is substantially transparent and may be reverse-printed in the print station so that the inks will be visible through the first structure 440. The inks may be applied to the surface of the first structure 440 that is subsequently
30 laminated to another structure, as described below; from the opposite side of the first structure, which will form an exterior of a package 10 constructed from the laminate 430 created according to this embodiment.

Prior to printing the first structure 440 at the print station 480, the surface of the first structure 440 to be printed can be treated by a corona discharge or flame treatment apparatus 482 to render the surface more-receptive to the inks and/or to render the surface more-readily bondable to the pressure-sensitive adhesive that is subsequently pattern-applied to the surface as described below.

Following the optional corona/flame treatment and/or optional printing operation, the first structure 440 may be advanced to the next processing stage or it may be rolled up onto a spool 602 (as best seen in Fig. 15) and stored for subsequent processing operations.

The first structure 440 either from the previous processing step or from roll 602 is advanced to a scoring station 520 where a first score line 86 (Fig. 7 and Fig. 13) is formed through the thickness of the first structure 440. The first score line 86 is in registration with (i.e., coincides with) the printing of the graphics or indicia or other features. The first score line 86 extends substantially through the thickness of the first structure 440.

The first scoring station 520 can comprise a laser. The use of lasers for scoring through flexible materials is generally known, for example as described in U.S. Pat. No. 3,909,582 and 5,229,180, the contents of which are incorporated herein by reference. The depth of the score line formed by the laser can be regulated by regulating the power output or beam intensity of the laser beam, the width or spot size of the laser beam, and the amount of time a given spot on the film surface is irradiated by the beam. These factors generally are selected based on the characteristics of the material being scored. Some materials are more readily scored by lasers than other materials, as known in the art.

As noted, the first score line 86 should be in registration with one or more features such as printing, indicia marks, the location of the outer perimeter of the pressure-sensitive strip 492 (and the outer perimeter of the tongue 84 or thumb tab 500, if present). To accomplish this registration, the operation of the laser is controlled to be synchronized with the advancement of the first structure. A sensor disposed adjacent the first structure can be used to detect a feature on the first structure (such as printing) whose location in relation to the strip of pressure-sensitive adhesive 492 is known, and the sensor's output signal can be used by a suitable controller (not shown) for controlling the laser. Subsequent to the scoring, the first structure 440 may be rolled onto spool 604 for subsequent processing (as best seen in Fig. 15).

After scoring, the first structure 440 may be advanced (either from spool 604 or from the previous continuous scoring station 520) to a first adhesive application station 490 at which a pressure-sensitive adhesive 492 (releasable adhesive) may be applied to the first structure 440 in a predetermined pattern that recurs at regular intervals along the lengthwise direction of the first structure 440. The predetermined pattern may be in the form of a strip of various forms or shapes. As illustrated, one shape for the strip pattern may be generally U-shaped or smile shaped, for reasons that will become apparent. Other shapes for the pattern can be used. The pattern can include a region that is free of adhesive 500 and that will ultimately form a thumb tab or grasping portion of the first structure 440 as further described below.

The pressure-sensitive adhesive 492 can comprise various compositions. Pressure-sensitive adhesives form viscoelastic bonds that are aggressively and permanently tacky, adhere without the need of more than a finger or hand pressure, and require no activation by water, solvent or heat. Pressure-sensitive adhesives are often based on non-crosslinked rubber adhesives in a latex emulsion or solvent-borne form, or can comprise acrylic and methacrylate adhesives, styrene copolymers (SIS/SBS), and silicones. Acrylic adhesives are known for excellent environmental resistance and fast-setting time when compared with other resin systems. Acrylic pressure-sensitive adhesives often use an acrylate system. Natural rubber, synthetic rubber or elastomer sealants and adhesives can be based on a variety of systems such as silicone, polyurethane, chloroprene, butyl, polybutadiene, isoprene, or neoprene. When the packaging laminate of the invention is to be used for food packaging, the pressure-sensitive adhesive generally must be a food-grade composition. Various pressure-sensitive adhesives are approved by the U.S. Food and Drug Administration for use in direct food contact, as regulated by 21 CFR Part 175.300. Food-grade pressure-sensitive adhesives are preferred for use in the present invention. Additives (e.g., particulates or the like) can be added to the pressure-sensitive adhesive to reduce the tenacity of the bond to the second structure 460, if necessary, so that the pressure-sensitive adhesive 492 readily detaches from the second structure 460 on opening (particularly on the very first opening).

While denoted as a pressure-sensitive adhesive, the use of a cohesive is also contemplated. In this regard, the term “cohesive” refers to a material that is an adhesive that only sticks to a cohesive surface, most commonly to another layer of itself. Cohesives are commercially available from a supplier such as Henkel and the particular cohesive

composition is not a feature of the present invention. Typically, the cohesive is applied to the first structure 440. The desired cohesive is such that, although it is applied to the first structure 440, a portion of the cohesive is transferred to the portion of the outer structure 460 juxtaposed with the area on which the cohesive is applied. In addition, the cohesive is
5 formulated such that the bonding affinity between the cohesive and either of the first structure 440 and the second structure 460 is greater than the bonding affinity between the cohesive on each of the first and second structure so that the portions containing the cohesive are rebondable or reclosable.

The pattern of pressure-sensitive adhesive 492 is applied to the first structure 440 at
10 regular intervals along the first structure 440. The spacing or index distance d between the patterns can correspond to a dimension, such as a length, of packages 10 to be produced from the laminate 430.

The adhesive application station 490 can comprise any suitable device capable of accurately applying the pressure-sensitive adhesive 492 to the first structure 440 in the
15 desired pattern at regular intervals along the first structure 440. For example, the adhesive application station 490 can comprise one or more gravure rolls that pick up the pressure-sensitive adhesive 492 from a reservoir on the outer surface of the roll such that the adhesive fills one or more recessed areas in the surface. A doctor blade may then be used to scrape off excess adhesive so that it remains essentially only in the recessed area(s). The first structure
20 440 may be contacted by the gravure roll with a backing roll that may be used to provide support on the opposite side of the first structure 440.

After application of the pressure-sensitive adhesive 492, the first structure 440 may be advanced to a dryer 496 such as an oven or the like, to dry the pressure-sensitive adhesive 492. The first structure 440 may then advanced to a second adhesive application station 510
25 at which a permanent laminating adhesive 512 is applied to the first structure 440 in such a manner that a sufficiently large proportion of the surface is covered by the permanent laminating adhesive 512 to permit the first structure 440 to be adhesively attached to a second structure 460 at a downstream laminating station 530. Alternatively, the first structure 440 may be advanced to the second adhesive application station 510 before being advanced to the
30 dryer 496. Thereafter, the first structure 440, which contains both the pressure-sensitive adhesive 492 and the permanent laminating adhesive 512, is advanced to the dryer 516 to dry the adhesives.

The permanent laminating adhesive 512 does not cover the pressure-sensitive adhesive 492. Furthermore, when the pattern of pressure-sensitive adhesive 492 includes an adhesive-free region 500 (74) to form a thumb tab or grasping portion as previously noted, the pattern of the permanent laminating adhesive 512 also does not cover the adhesive-free region 500 (74). Thus, the permanent laminating adhesive 512 should be applied by an apparatus capable of accurately applying the permanent laminating adhesive 512 in a predetermined pattern, in registration with the pressure-sensitive adhesive 492 but not covering it or the adhesive-free region 500 (74), if present. A suitable adhesive application device can be a gravure roll of the type previously described.

The permanent laminating adhesive 512 can comprise various compositions. Suitable examples include two-component polyurethane adhesive systems, such as Tycel 7900/7283 available from Henkel.

While Fig. 11 depicts a certain order of processing of the first structure 440, it is contemplated that the various processing steps can be varied according to manufacturing and processing desires. Thus, for example, it may be desirable to apply adhesives prior to scoring.

After application of the adhesives and any optional drying, the first structure 440 is advanced to a laminating station 530 that can include a pair of rolls forming a nip therebetween. The first structure 440 is passed through the nip along with a second structure 460 that is separately advanced, and the first structure 440 is laminated to the second structure 460.

As noted above, the second structure 460 is advanced separately from the first structure 440 to the laminating station 530. The second structure 460 may be formed from one or more layers. The second structure 460 may be coextensive with the first structure 440, i.e., the width of the second structure 460 may be substantially equal to the width of the first structure 440 and the longitudinal edges of the second structure 460 substantially coincide with the longitudinal edges of the first structure 440.

As shown in Fig. 11, the second structure 460 may be formed from two layers. Accordingly, the second structure 460 is formed by joining a first layer 462 with a second layer 466. The first layer 462 may be advanced from a supply roll 464 and the second layer 466 may be advanced from a different supply roll 468. Adhesive 470 may be applied to the

first layer 462, the second layer 466, or both. Thereafter, the first layer 462 and the second layer 466 may be joined in a laminating station 472 to form the second structure 460.

Alternatively, the second structure 460 may be supplied from a roll of preformed second structure laminate. In addition, while Fig. 11 shows the second structure 460 being
5 formed from two film layers, it is contemplated that the second structure 460 could be formed from more than two layers, e.g., from three or more layers.

After the laminate 430 is formed, the laminate 430 may be rolled up on roll 606 for storage and later processing as shown in Fig. 15. Alternatively, as shown in Fig. 11, the laminate 430 is advanced to a second scoring station 540 at which a second score line 542 is
10 formed through the thickness of the second structure 460. The second score line 542 is in registration with (i.e., coincides with) the inner perimeter of the strip-shaped pattern of pressure-sensitive adhesive 492. The second score line 542 extends substantially through the thickness of the second structure 460, but preferably does not extend to any substantial extent into the first structure 440, as illustrated in FIG. 13 and 14.

The second scoring station 540 can comprise a laser. The operation of the laser is
15 synchronized with the advancement of the laminate 430. A sensor can detect a feature, such as an eye mark or printing, on the laminate 430 whose location in relation to the pressure-sensitive adhesive strip 492 is known, and the sensor output can be used for regulating the laser operation so that the second score line 542 is in registration with the inner perimeter of
20 the pressure-sensitive adhesive strip 492.

As an alternative to the use of lasers for scoring the laminate, the score lines can be formed by mechanical scoring or cutting. For instance, the first scoring station 520 can comprise a kiss roll and backing roll that form a nip through which the first structure is passed. The kiss roll may include a rotary cutting die defining a cutting edge (not shown).

The kiss roll acts in conjunction with the backing roll to cut partially through the thickness of
25 the first structure 440 starting from the outer surface of the first structure, such that the first structure 440 is substantially scored through. The second scoring station 540 may likewise comprise a kiss roll and backing roll for scoring through the second structure 460. The kiss roll acts in conjunction with the backing roll to cut partially through the thickness of the
30 second structure 460 starting from the outer surface of the second structure 460, such that the second structure 460 is substantially scored through while the first structure 440 is left intact.

Additionally, it is within the scope of the invention to laser-score one of the first structure or the second structure and to kiss cut or otherwise mechanically scores the other. This can be advantageous, for example, when one of the structures making up the laminate 430 is readily scored by a laser but the other structure is not. For instance, when the first
5 structure 440 is a polyester such as PET, it can readily be scored with a laser, but if a polyethylene heat seal layer is employed on the second structure 460, laser scoring may not be the best choice because polyethylene does not score well with a laser. In this case, kiss cutting or other mechanical scoring can be used to score the second structure 460.

It is also within the scope of the present invention to conduct the each of the scoring
10 operations after the laminate 430 has been formed. For example, the first scoring station 520 may be adjacent, opposite, or near the second scoring station 540 so that each of the first and second scoring operations take place either simultaneously or relatively soon after each other.

As noted above, the score line 86 and 132 are located in relationship to each other to define a marginal region 73 between the score line 86 and 132 and to define a surrounding
15 region 63 located outside of the marginal region 73.

After the scoring operation, the laminate 430 can be sent to a reel-up or take up roll 550 and wound into a roll for subsequent processing. Alternatively, it is possible for the reel-up operation to be omitted, such that the laminate 430 is directly advanced to a fill and seal station.

The laminate 430 can also be slit into a plurality of partial widths and wound into
20 multiple rolls. In this latter instance, each partial width would have the recurring patterns of pressure-sensitive and permanent adhesives applied with suitably configured adhesive applicators to the full-width material, and would have the recurring score lines formed by suitably configured scoring devices acting on either the full-width laminate prior to slitting or
25 acting on each partial-width portion after slitting.

Fig. 7 shows a flexible package 10 in a closed position made according to the process described above. The package 10 includes an outer portion that envelopes the package contents and is sealed to enclose the contents. The outer portion comprises a laminate 430 made by a method in accordance with the invention, such as the laminate previously
30 described. The outer portion is manipulated and sealed along seal lines.

In the illustrated package, the score lines 86, 132 are provided to be on a front surface 12 of the package 10. The area of the package 10 bounded by the score lines can constitute

any fraction of the total front surface of the package, but advantageously the area is a majority of the total surface area of front surface 12.

As noted above, it is desirable to provide a releasable adhesive 72 on least a portion of the marginal region 73 to provide a reclosable opening panel 80. In this regard, it is desirable to provide a sufficient amount of releasable adhesive 72 as well as provide the releasable adhesive 72 on a sufficient area of the marginal region 73 so that the opening panel will function to open and close a desired number of times but also will effectively close the opening panel 80 when the opening panel 80 is in the closed position. Thus, the ratio of the area of the marginal region 73 containing releasable adhesive to the area of the opening panel is from about 1:10 to about 10:1, and may be from about 1:5 to about 5:1, or may be from about 1.2 to about 2:1. Alternatively or simultaneously, the ratio of the area of the opening panel to the area of the front is from about 1:10 to about 10:1, and may be from about 1:5 to about 5:1, or may be from about 1.2 to about 2:1. By providing a relatively larger opening panel and/or marginal region 73, the area of the marginal region 73 containing releasable adhesive can be larger and thus provide more surface area for adhering.

Based on the previous description of the laminate 430 and its formation process, it will be appreciated that the presence of the score lines has little or no impact on the barrier function of the package 10 because each score line 86, 132 extends only partially through the total thickness and the score lines are not aligned with each other. Additionally, the pressure-sensitive adhesive 492 fills the space between the score lines so that even if the score lines overlap somewhat in the thickness direction, there is still no open route between them. Furthermore, the score lines typically have a small width, on the order of a few thousandths of an inch.

Various materials can be used for the construction of the package 10. As noted above, the first structure 440 that forms the outer surface of the package 10 may comprise a single layer of flexible material or several layers of various materials. One material is a polyester such as polyethylene terephthalate (PET). As noted, the PET layer can be reverse-printed if desired, although alternatively it can be printed on its exterior and covered by an over-lacquer (not shown). The second structure 460 forming the inner surface of the package 10 may comprise a barrier layer and a sealant layer. The sealant layer constitutes the innermost surface of and can comprise various sealant materials such as heat seals or cold seals. Heat seals generally are preferred because they provide stronger seals than cold seals.

typically are capable of achieving. Any suitable heat seal material can be employed, such as polyethylene, polypropylene, ionomer resins such as SURLYN[®], or others.

The barrier layer can comprise any of various barrier materials including barrier polymer films such as: ethylene vinyl alcohol copolymer (EVOH), polyamide, and the like; metallized polyolefin films such as polyethylene, polypropylene, oriented polypropylene, and the like; AlOx-coated polymer films; SiOx-coated polymer films; metal foil; and others. The barrier layer and sealant layer can be joined in various ways, including adhesive lamination, extrusion lamination, or coextrusion.

The laminate 430 may also include a metallization layer or a metal foil layer between the first structure 440 and the second structure 460, for example by providing a metallization layer on the surface that faces the first structure 440. This is beneficial in enhancing the barrier performance of the laminate 430. The metallization layer or metal foil layer can also be helpful when a laser is used for scoring the second structure 460. In particular, when the sealant layer comprises polyethylene, which is not as readily scored by laser as some other materials such as polyester, it can be difficult to employ a sufficiently high laser energy to score through the polyethylene sealant layer without scoring through the laminate 430 more deeply than desired. In particular, it is undesirable to score the entire thickness of the laminate. The metallization layer or metal foil layer can be helpful in "tuning" the laser to penetrate only up to the metallization layer or foil layer.

The function of the reclosable opening panel provided by the pattern-applied adhesives and the score lines is described with respect to Figs. 1 and 7. The package 10 is shown in a closed condition (Fig. 7), for example as initially filled and sealed in a packaging plant. The package 10 has edges 22, 24, 26, that are sealed to each other with a top edge 20 that may be formed by folding the laminate 430 on itself. On the front surface 12, the first or outer structure is adhesively joined to the second or inner structure via the permanent adhesive. The outer score line 86 bounds an outer opening portion of the outer structure. In this embodiment, the outer opening portion has a generally U-shaped or smile shaped perimeter having three sides defined by the score line 86, and is attached to the remainder of the outer wrapper along a fourth side (i.e., an imaginary line extending between the free ends of the two legs of the U-shaped score line). The inner score line 132 is also generally U-shaped or smile shaped with its portions parallel to adjacent portions of the outer score line 86, but is spaced inwardly of the outer score line 86 so as to define an inner opening portion

of smaller area than the outer opening portion. Accordingly, there is a marginal region of the outer opening portion that extends beyond the edge of the inner opening portion. The pressure-sensitive adhesive 72, 492 is disposed between this marginal region and an underlying surface of the inner structure. The outer opening portion and inner opening
5 portion are permanently joined by the permanent adhesive.

Consequently, when the outer opening portion is detached from the outer wrapper along the outer score line 86 and is peeled back as depicted in FIG. 1, the inner opening portion remains affixed to the outer opening portion and comes with it, thereby creating an opening in the front surface 12 as defined by the inner score line 132. The outer and inner
10 opening portions essentially form a panel 80 that remains attached along a hinge line defined between the free ends of the two legs of the U-shaped score lines.

In one embodiment, the outer structure has a greater affinity for bonding with the pressure-sensitive adhesive 72, 492 than does the surface of the inner structure, and hence the pressure-sensitive adhesive 72, 492 is detached from the surface and remains attached to the
15 marginal region of the outer opening portion. The package 10 is reclosable by re-attaching the pressure-sensitive adhesive 72, 492 to the surface of the inner structure to restore the package 10 to the condition shown in FIG. 7.

The greater bonding affinity of the outer structure can be achieved in various ways. When the outer structure comprises a layer of PET and the layer of the inner structure to
20 which the pressure-sensitive adhesive 72, 492 is attached comprises a polyolefin such as polypropylene, oriented polypropylene, or metallized oriented polypropylene, the PET will naturally have a greater affinity for bonding to the adhesive than will the polyolefin layer. Additionally or alternatively, the surface of the outer structure can be treated, as previously noted, by corona discharge or flame treatment, to increase the surface energy and enhance the
25 bonding affinity. It is also possible, as already noted, to control the bond strength of the pressure-sensitive adhesive to the layer by including an additive in the adhesive to reduce the bond strength, if desired.

Although the pressure-sensitive adhesive 72, 492 may be applied to the outer structure and to remain on the outer structure upon opening, it is also within the scope of the invention
30 to apply the pressure-sensitive adhesive to the inner structure and to remain on the inner structure upon opening.

In addition, the pressure-sensitive adhesive (releasable adhesive) 72, 492 has a delamination force that is greater than the break force of each of the localized weak portions 85, 135 and the score lines 86, 132 so that the opening panel 80 tears from the surface before the pressure sensitive adhesive 72, 492 allows the desired portion of the opening panel 80 to be detached. In another embodiment, particularly where a cohesive is used, a portion of the cohesive is transferred from the surface to which it was initially applied to the other surface and because the cohesive is formulated in a desired manner, the marginal region containing the cohesive is rebondable and reclosable. A cohesive may be desired since it does not exhibit adhesive properties to structures that do not also contain a cohesive. Thus, during processing or use, undesired material will not stick to those areas containing the cohesive; yet, those areas containing the cohesive will readily stick to each other.

It should be noted that the terms "line of weakness" and "score line" as used herein refer either to a complete cutting through of one or more layers of the laminate or to a weakening of such layer(s) allowing the layer(s) to be severed along the score line.

Referring back to Fig. 1, the package 10 of the present invention is shown with the reclosable opening panel 80 in an open position to expose the contents of the package 10. The package 10 includes opposed surfaces only one of which is shown, an opposed top and bottom, and opposed ends or sides. One of the surfaces is scored to define a reclosable opening panel 80 that can be opened to expose the contents stored within the package.

The package of the present invention is shown as containing sticks of gum 2. It is to be understood, however, that the use of the package 10 is not limited to gum but also includes other confectionery products. Therefore, as is known and shown in Fig. 18, a gum stick 2 may be elongate rectangular shaped member having a first face 702, a second face 704 opposite the first face, a first end 710 and a second end 712 opposite the first end, and a third end 706 with a fourth end 708 opposite the third end. The gum stick also has a thickness 714. Specifically, the thickness is substantially smaller than the width (the distance between 706 and 708), which itself is substantially smaller than the length (the distance between 710 and 712). In other words, $[L > W > T]$.

Referring back to Fig. 1, the individual product package 10 will contain one or more sticks of gum 2. As shown in Fig. 1, the sticks of gum 2 may be oriented so that one of the third end 706 and fourth end 708 and one of the first face 702 and second face 704 of the stick of gum 2 are exposed when the opening panel 80 is in an open orientation. In this

orientation, one of the first face 702 and second face 704 of the stick of gum 2 is juxtaposed with one of the inner front surface 16 or inner rear surface 18. Also, it will be appreciated that a plane of one of the third end 706 or fourth end 708 is parallel to a plane defined by first side 20 and second side 22 of the package 10 and that a plane of one of the first face 702 and the second face 704 is parallel to the a plane of one of the front surface 12 or the inner rear surface 18 of the package. Of course, it is contemplated that the sticks of gum 2 can be oriented in other directions. Advantageously, in each of these orientations, when the package 10 is opened, only one or a few sticks are exposed for easy removal.

Turning to Fig. 19, an alternative form of a gum product that can be usefully stored and dispensed from the individual product package 10 according to the present invention is shown. In this alternative form, the gum is in the form of a slab 720 that is shaped and sized to be complementary to the shape and size of the product package 10, for example, generally rectangular. The slab may have a first face 722, a second face 724 opposite the first face 722, a first end 730 and a second end 732 opposite the first end 730, a third end 726 and fourth end 728 opposite the third end 726. The slab 720 also has a thickness 734. Specifically, the thickness is substantially smaller than the width (the distance between 726 and 728) and the length (the distance between 730 and 732). The slab 720 may be provided with at least one and desirably more than one score line 736, which will allow the consumer to easily break a portion of the slab from the remaining portion along the score line 736. The slab 720 is desirably oriented within the package 10 such that the third end 726 or fourth end 728 is parallel to the plane defining the opening of the package 10. In other words, the third end 726 or fourth end 728 is parallel to the plane defined by the first side 20 of the package. Put another way, the slab 720 is oriented such that one or both of the first end 710 and the second end 712 are in a plane substantially perpendicular to the opening or a plane defined by the first side 20 of the package. Desirably, when provided, the score line 736 or lines 736 are oriented such that they are parallel to the plane defining the opening of the package or by the first side 20 of the package. Put yet another way, the first face 722 of the slab is juxtaposed with one of the inner front surface 16 or inner back surface 18 of the package 10. Likewise, the second side of the slab 724 is juxtaposed with one of the inner front surface 16 or inner back surface 18 of the package 10.

While it is contemplated that a single package 10 may be sold or otherwise provided to a consumer, it is also contemplated that two or more individual packages may be bundled

together in a suitable fashion. For example, two or more individual packages may be wrapped with suitable wrapping to provide a multiplicity of individual packages. It is also contemplated to provide a flexible container 800, as shown in Figs. 16 and 17, which can be made using the same material described above for the packages 10 and can be made by any of the processes described above and which can resealably store and contain two or more individual product packages 10. The flexible container 800 is similar to the package 10 described above except that it is wider, i.e., configured such that the distance between its front 812 and rear 814 is can be greater than the distance between the front 12 and 14 rear of the individual package 10 so that two or more individual packages 10 can be stored within the container 800.

Inasmuch as the container 800 shares common characteristics of the flexible package 10 described above, such as the opening panel, the scoring, the releasable adhesive, etc. Suffice to say, the container 800 includes a front 812, a rear 814 opposite the front, a top 820, a bottom 822, opposite the top, a first side 824 and a second side 826 opposite the first side. An opening panel 880 is provided monolithically with the rear 814 and is configured to fold over and resealably join to the front 812, in a manner similar to that described above for the individual package. Advantageously, because the container 800 is flexible, when an individual package 10 is removed from the container, the size of the package can be reduced by, for example pushing the front 812 toward the rear 814.

Turning now to Figs 20-22, an alternative individual package 900 is shown. This alternative individual package 900 is in the form of a cylinder having a first end 902 and a second end 904 disposed between a surface 906 that is cylindrically shaped. An outer score line 910 is provided so that an opening panel 912 is defined. The package 900 may be made from the same material described above for the packages 10 and can be made by the processes described above for the package 10. Therefore, one of skill in the art will understand that the construction, manufacture, and operation of the package 900 are understood from a review of such with respect to the package 10. As shown in Fig. 21, the sticks of gum 2 are oriented in the same direction as shown in Fig. 1. In other words, the ends of the sticks of gum are oriented perpendicular to the opening of the package 900. Fig. 22 shows the container of Fig. 20 but with a slab of gum 720. The slab 720 may be rolled to conform to the shape of the cylinder.

It will be appreciated from the above description that laminates made in accordance with the invention may provide a tamper-evidence function for a package because after opening it is very difficult to replace the opening portions in such a way as to achieve a completely smooth, flush condition with the surrounding portion of the laminate. It tends to be readily ascertainable that the package has been opened. When printing is included on the laminate, it is even more noticeable when the package has been opened because it is difficult to achieve perfect registration of the printed matter across the score line when reclosing the package.

Notwithstanding the ability of the package itself to provide tamper evidence, it may be desirable to provide other tamper evident features. For example, when the outer structure is reverse-printed with ink, an area on the marginal region of the outer opening portion can first be treated (such as by applying a release coating or the like) to reduce the adherence of the ink so that when the package is first opened, the ink on the area of the marginal region detaches from the marginal region of the outer opening portion and remains with the pressure-sensitive adhesive on the inner structure adjacent the package opening. The release coating can be applied in a pattern (e.g., spelling out a word such as "Opened" or the like). Other types of tamper-evidence features can be included.

Referring to Figs. 23 and 24, one form of a tamper indicator 950 is shown. In this embodiment, the tamper indicator 950 includes an opening tab 952 that, as shown in Fig. 23, is connected to the opening panel 80 by a frangible link 954. The frangible link 954 is configured such that when the opening tab 952 is moved in a direction away from the package 10, the frangible link 954 will break causing the opening tab 952 to be separated from the opening panel 80. The frangible link 954 may be defined by a narrow conduit 956 created by the pattern of the second score line 86. By providing a narrow conduit 956 to define the frangible link 954, a sufficient area adjacent the frangible link 954 will contain the laminating adhesive 70, 512, which will provide resistance to the moving of the opening tab 952 away from the package 10 and assist in the breaking of the frangible link 954. The breaking of the frangible link 954 may provide an auditory, visual, and tactile indication that the opening panel 80 is being opened for the first time.

After the opening tab 952 is separated from the opening panel 80 by virtue of the breaking of the frangible link 954, it will be apparent from viewing the package 10 that the opening tab 952 has been removed and thus, that the package 10 has been previously opened.

The underside of the opening tab 952 is generally free of adhesive. In addition, as seen in Figs. 23 and 24, the shape of the second score line 86 within the area of the opening tab 952 may have any suitable shape so that the opening tab 952 may be easily separated from the package and so that the frangible link 954 is defined in a manner to allow the frangible link
5 954 to break when the opening tab 952 is moved away from the package 10. It is also contemplated that the opening tab 952 will have any suitable shape, even though a rectangular shape is shown in Figs. 23 and 24.

It is possible to increase the effectiveness of the tamper indicator 950 by using two or more frangible links 954 placed in key locations on the periphery of the opening panel 80. In
10 general, it will be advantageous to position two frangible links 954 on opposite lateral sides of the opening panel 80. Such a configuration increases the difficulty of partially opening the opening panel 80 to gain access to the contents without breaking at least one of the frangible links 954. An example of such a configuration is shown in Fig. 25 where each frangible link 954 includes a narrow conduit 956. Lifting or moving the opening panel 80 away from the
15 package will cause the frangible links 954 to break and also cause the material encircled by the frangible links 954 to remain laminated or attached and thus provide a visual indication that the package 10 has been opened. It will also be appreciated that, when the opening panel 80 is moved to a closed position after the initial opening, it will be evident that the frangible link has been previously broken and that the package has been previously opened.

Alternatively, as seen in Figs. 26-30, the tamper indicator 50 includes configuring the opening panel 80, the score line 86 and the laminating adhesive 70, 512 in a manner such that upon first opening the opening panel 80, a portion of the outer layer is delaminated from another portion of the outer layer. For example, as shown in Fig. 25, the score line 86 is
20 configured to provide a pair of wings 970 that extend beyond the outer periphery of the opening panel 80 and between which laminating adhesive 70 is present. Put another way, laminating adhesive is present not only in the surrounding region 63 but also in a portion of the marginal region 73. As a result, as the opening panel 80 is lifted (moved away from the package), the area within the wings delaminates a portion of the outer layer 40 from another portion of the outer layer. As a further example, where the outer layer 40 includes two layers
25 (such as a plastic layer laminated with a metal layer) in the wing area, the metal layer is lifted with the opening panel 80.
30

Fig. 27 shows another configuration where the opening panel 80 has a shape such that a portion of the marginal region 73 contains laminating adhesive 70. The score line 86 in the area of the opening panel 80 may have a “boot shape”, with the heel of the boot containing a laminating adhesive, which when the opening panel 80 is lifted, will cause a portion of the outer layer 40 to delaminate from another portion of the outer layer. Figs. 28-30 show other configurations to provide delamination of one portion of the outer layer from another portion of the outer layer. In each instance, once the opening panel 80 has been opened for the first time, it will be evident that a portion of the outer layer has been delaminated from another portion of the outer layer.

In each of Figs. 27-30, certain configurations of the delamination portion are shown. It is contemplated that, instead of the shapes shown, letters or words may be created by the patterning of the laminating adhesive. For example, as illustrated in Fig. 33, words such as OPENED, ENJOY, or the like may be used. In addition, in each of these embodiments and configurations, the outer layer 40 could include a laminate formed of an opaque first layer and a transparent second layer. Desirably, the transparent second layer is oriented toward the outside of the package 10. In other words, the transparent second layer may be the outermost layer. Accordingly, as the opening panel 80 is lifted the first time, a portion of the opaque first layer will be delaminated from the transparent second layer. As a result, not only will the package contain evidence of the delamination but the opening panel 80 will also contain evidence of the delamination (i.e., the portion that has been delaminated will be transparent).

Turning to Fig. 31, another form of a tamper indicator 950 is shown. In this form, the tamper indicator 950 includes printing 980 on or in the outer layer 40 such that the printing traverses at least a portion of the score line 86. In this way, when the opening panel 80 is opened for the first time and it is later closed, it is likely that each of the portions of the letters forming the line will not be aligned, which will provide a visual indication that the opening panel 80 has been opened.

Turning to Fig. 32, another embodiment of a tamper indicator 950 is illustrated. In this embodiment, a security tape 990 is provided to overlap at least a portion of the opening panel 80. The security tape 990 is removably adhered to the outer layer 40 of the package and may or may not contain printing 992. The printing 992 may be incorporated with the security tape 990 through a permanent adhesive so that when the security tape 990 is removed, the printing 992 remains on the outer layer 40 of the package.

The foregoing detailed description has described only a few of the many forms that this invention can take. For this reason, this detailed description is intended by way of illustration, and not by way of limitation. It is only the following claims, including all equivalents that are intended to define the scope of this invention.

CLAIMS

1. A reclosable package for consumable products comprising:

a. a laminated sheet comprising an inner layer and an outer layer wherein the inner layer is oriented toward the inside of the package and the outer layer is oriented

toward the outside of the package;

b. a first laser scored line extending at least substantially into the inner layer but not extending into the outer layer;

c. a second laser scored line extending at least substantially into the outer layer but not extending into inner layer, and being laterally offset from the first laser scored line to

define an opening panel in the package and a marginal region between the first and second laser scored lines and further defining a surrounding region of the sheet

outside of the marginal region; and

d. a tamper indicator that provides an indication that the opening panel has been previously opened, the tamper indicator comprising at least one of: a frangible link

that breaks when the opening panel is being opened for the first time, the inner layer comprising a laminated sheet and wherein the opening panel is configured such that upon first opening of the opening panel a portion of the inner layer is at least partially delaminated, or a security tape located over at least a portion of the opening panel such that the security tape is broken upon first opening of the package.

2. The reclosable package of claim 1 wherein the tamper indicator is a frangible link that breaks when the opening panel is being opened for the first time.

3 The reclosable package of claim 2 wherein the second laser scored line has a configuration such that at least a portion of the second laser scored line defines the frangible link.

4. The reclosable package of claim 3 wherein the configuration of the second laser scored line defines a narrow conduit within the outer layer.

5. The package of claim 3 wherein a discontinuity in the second line defines the frangible link.

6. The reclosable package of any of claims 2 to 5 wherein, the tamper indicator includes at least two frangible links located on opposite lateral sides of the opening panel.

7. The reclosable package of claim 1 wherein the tamper indicator is the inner layer comprising a laminated sheet and wherein the opening panel is configured such that upon first opening of the opening panel a portion of the inner layer is at least partially delaminated.

8. The reclosable package of claim 7 wherein the configuration includes laminating adhesive applied to a portion of the marginal region.

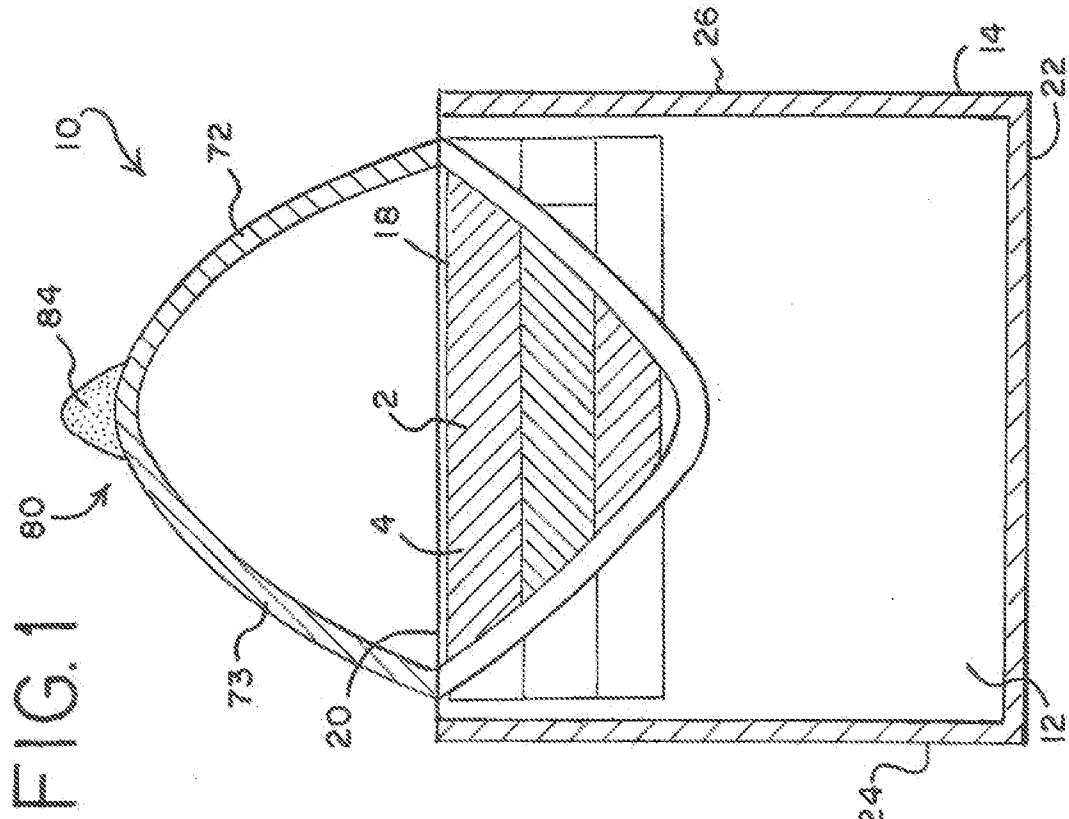
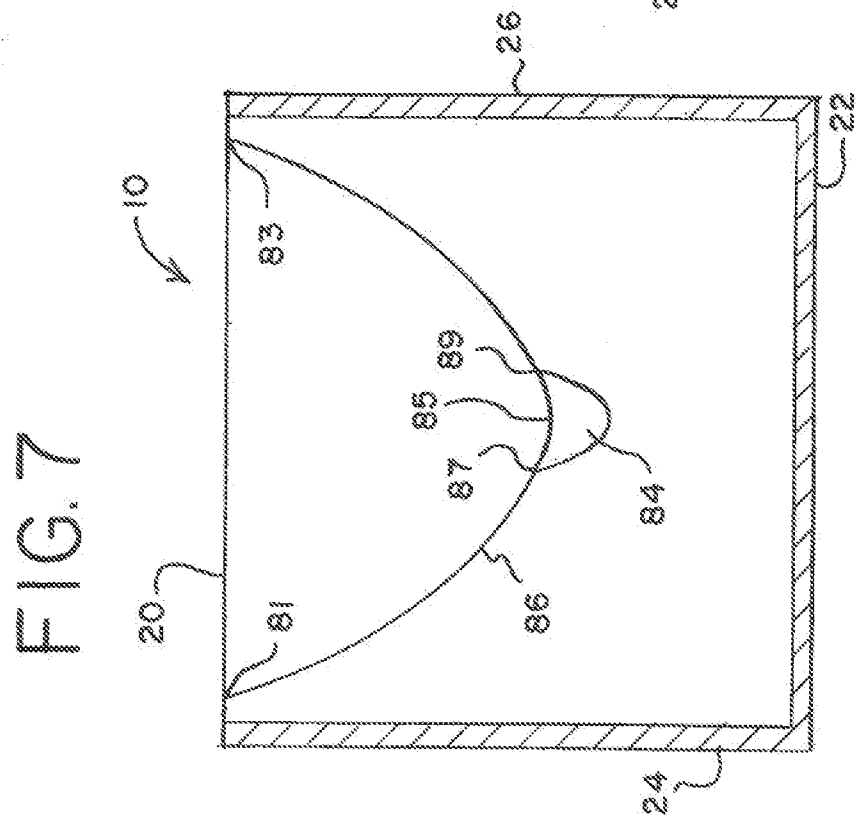
9. The reclosable package of claim 8 wherein the outer layer comprises a laminate of an opaque first layer and a transparent second layer wherein the transparent second layer is oriented toward the outside of the package and wherein the opaque first layer is delaminated from the transparent second layer in the portion of the marginal region where the laminating adhesive has been applied when the opening panel is opened for the first time.

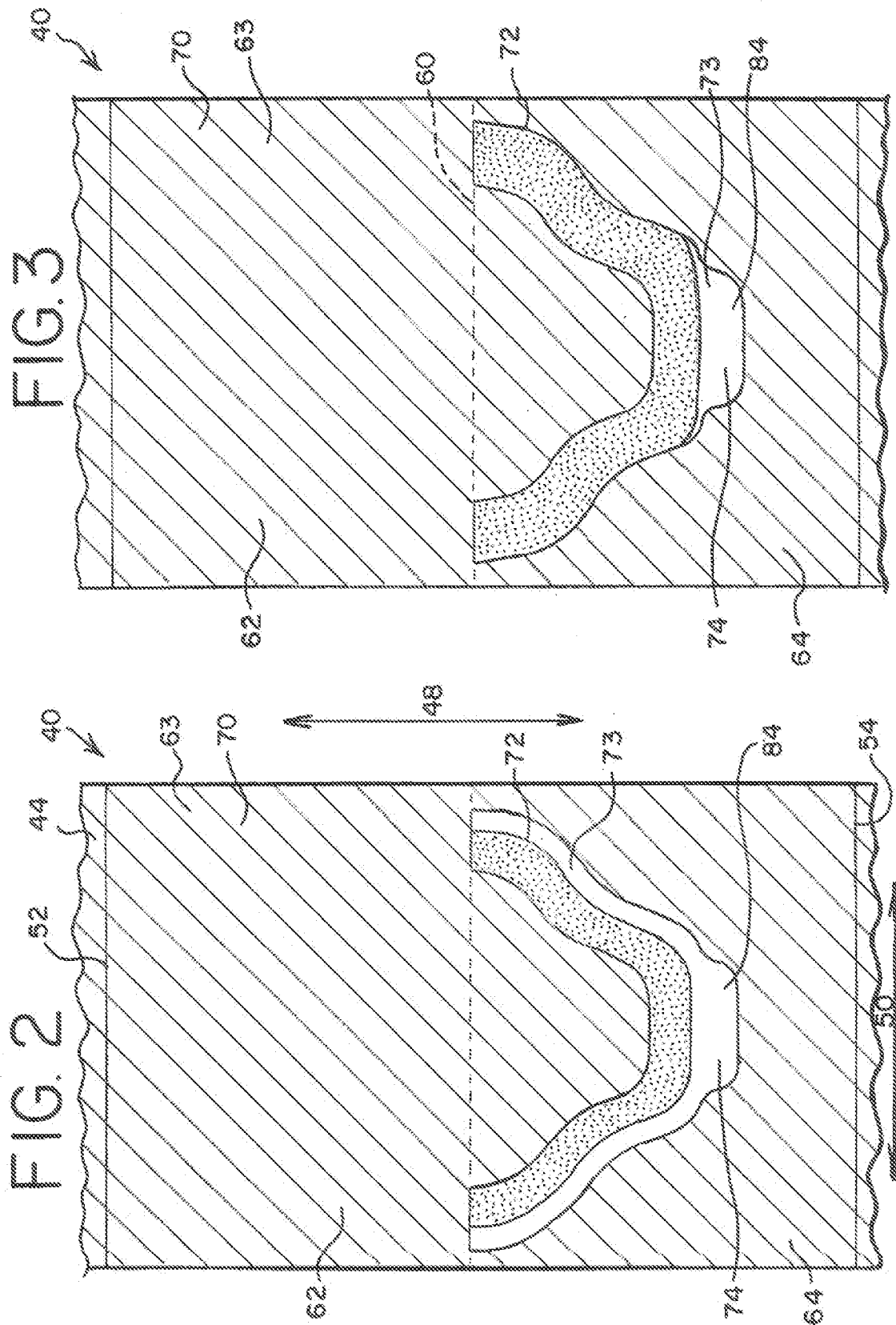
10. The reclosable package of claim 1 wherein the tamper indicator is a security tape that breaks when the opening panel is being opened for the first time.

11. The reclosable package of claim 10 wherein the security tape includes printing.

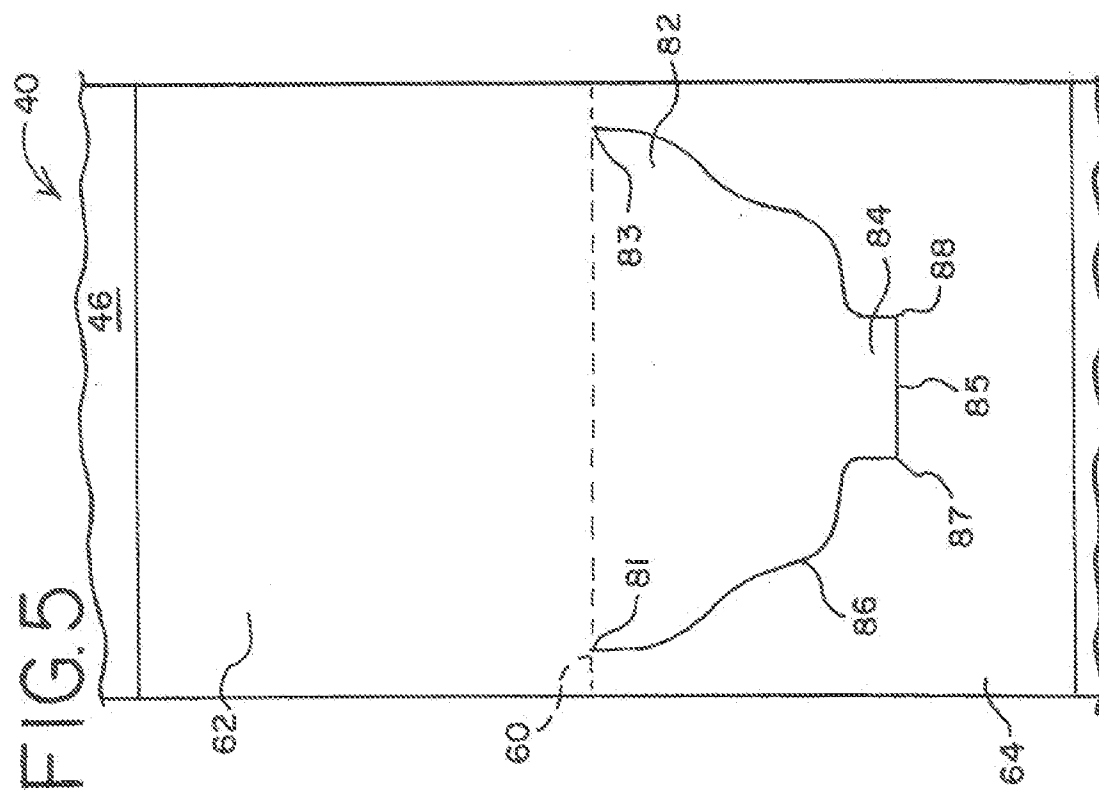
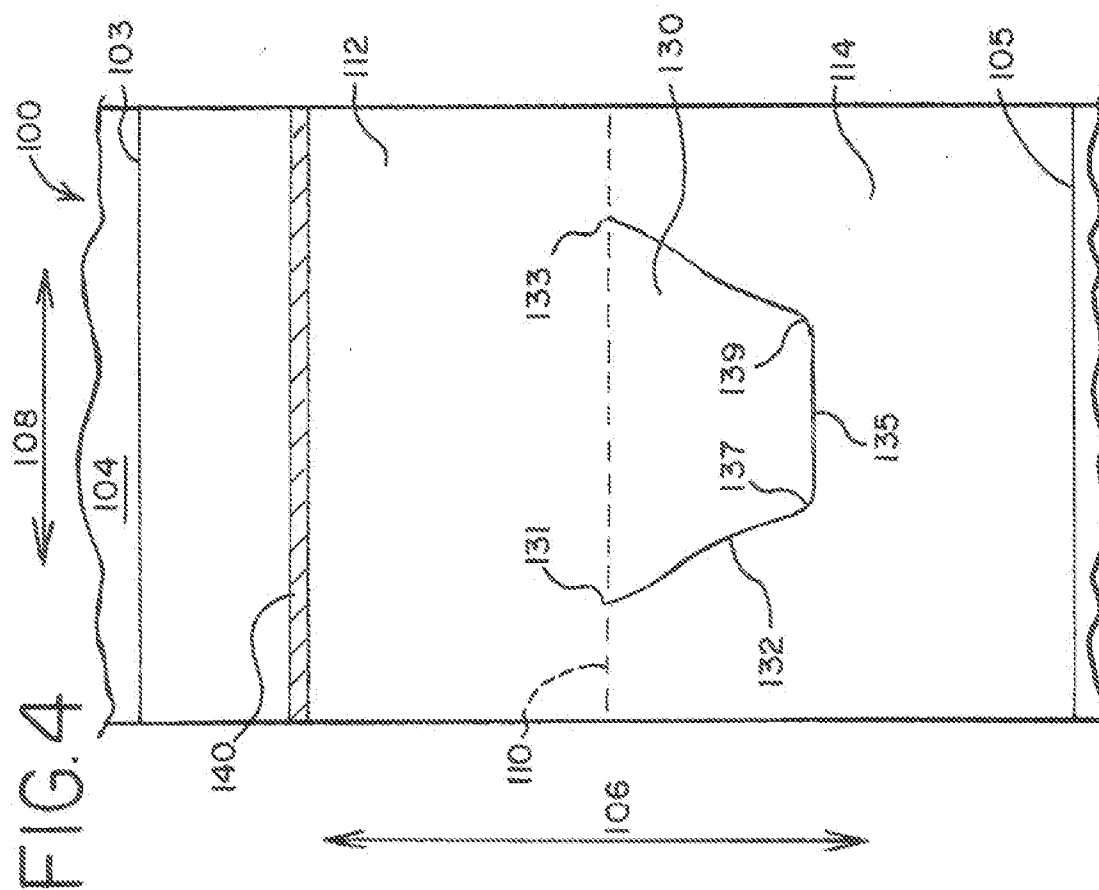
12. The package of any of claims 1 to 11 wherein the package contains confectionery product.

13. The package of claim 12 wherein the confectionery product is a chewing gum product.





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FIG. 6

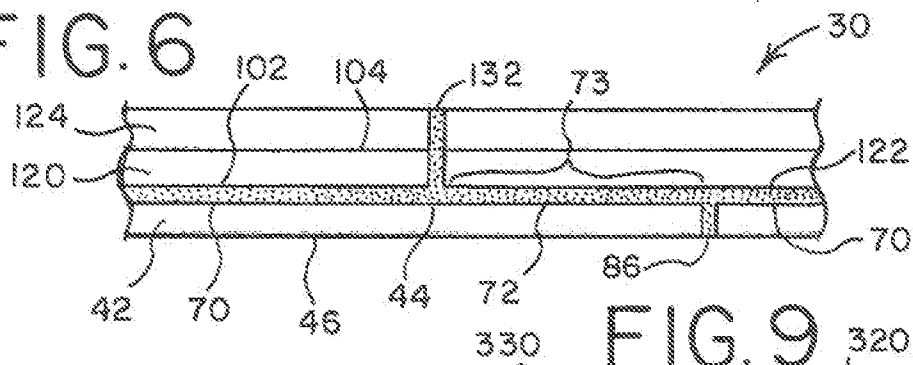


FIG. 9

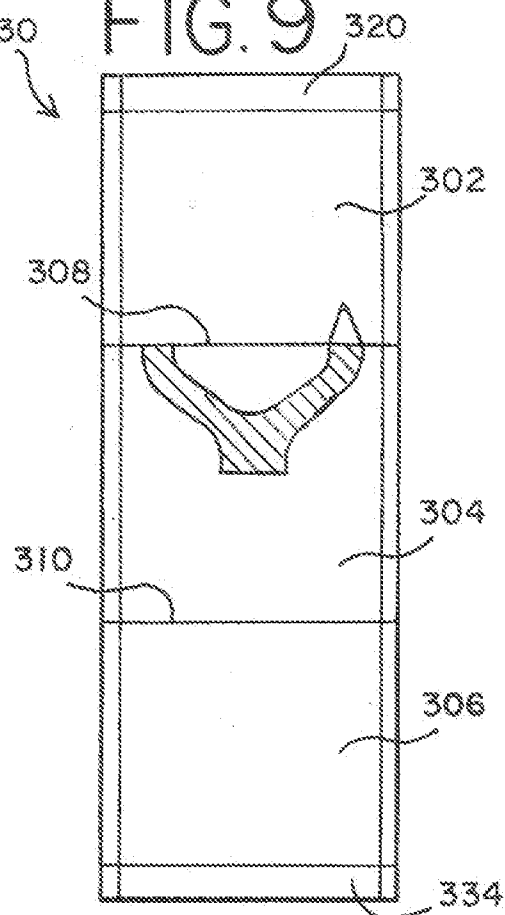


FIG. 8

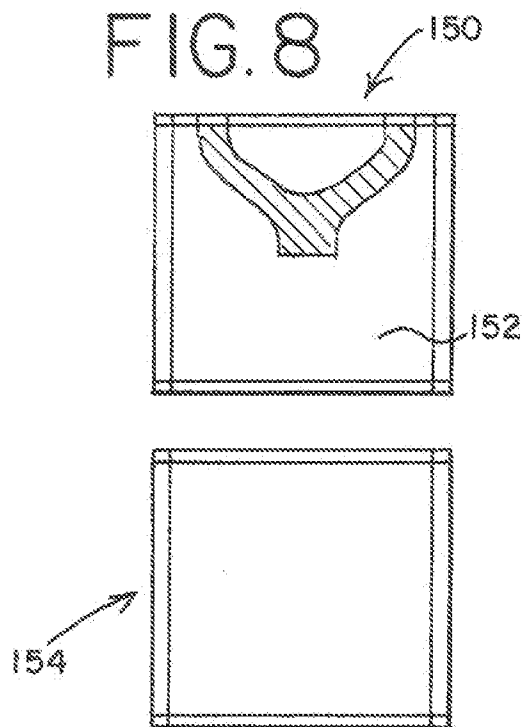


FIG. 10a

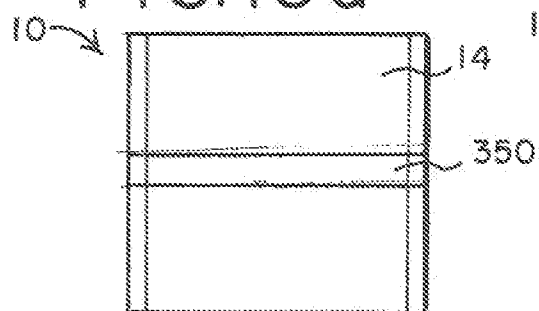
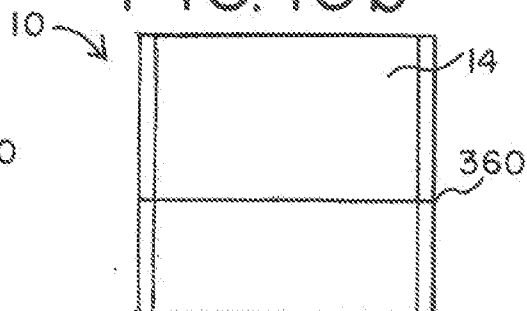
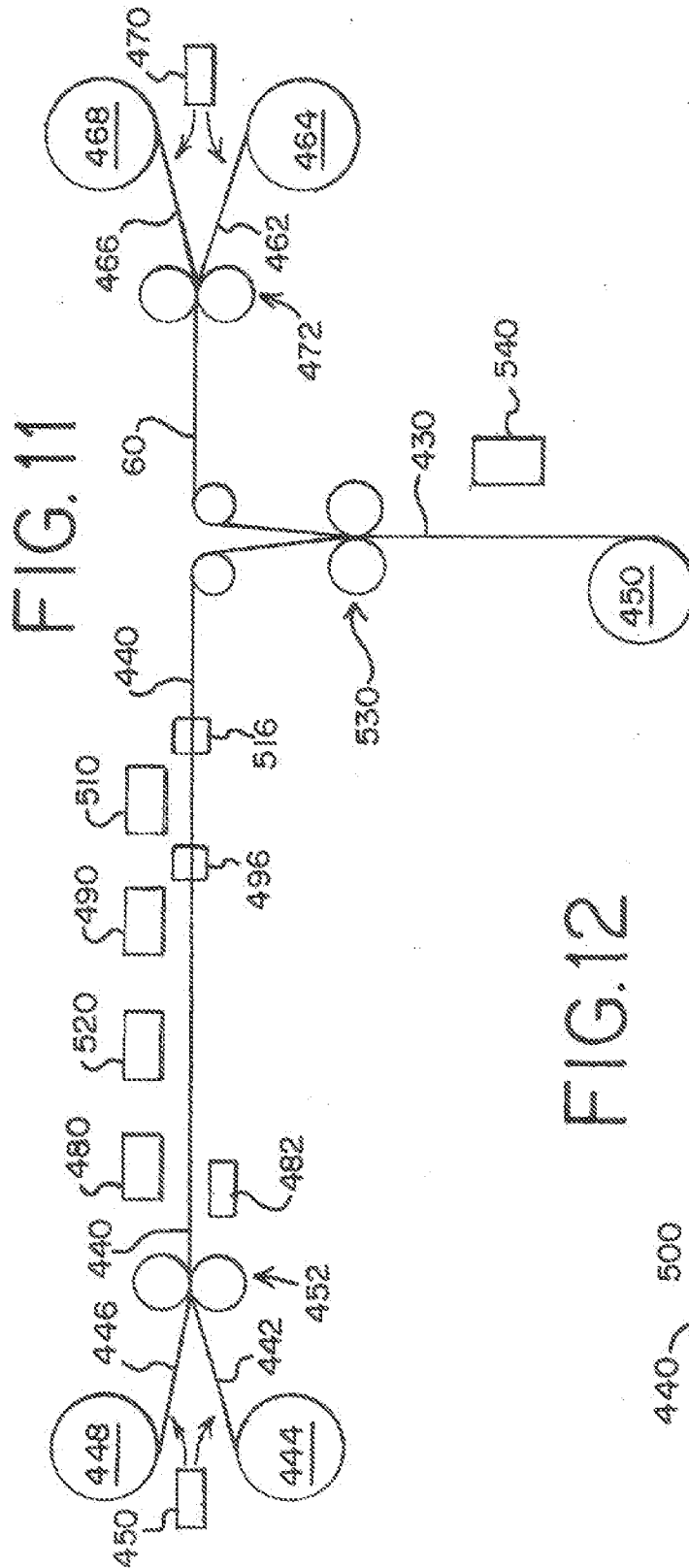
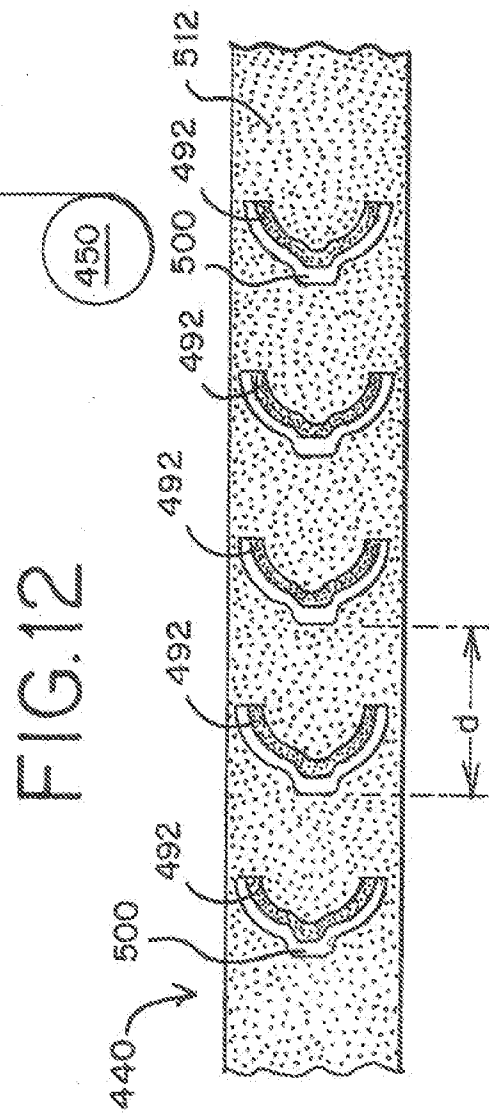
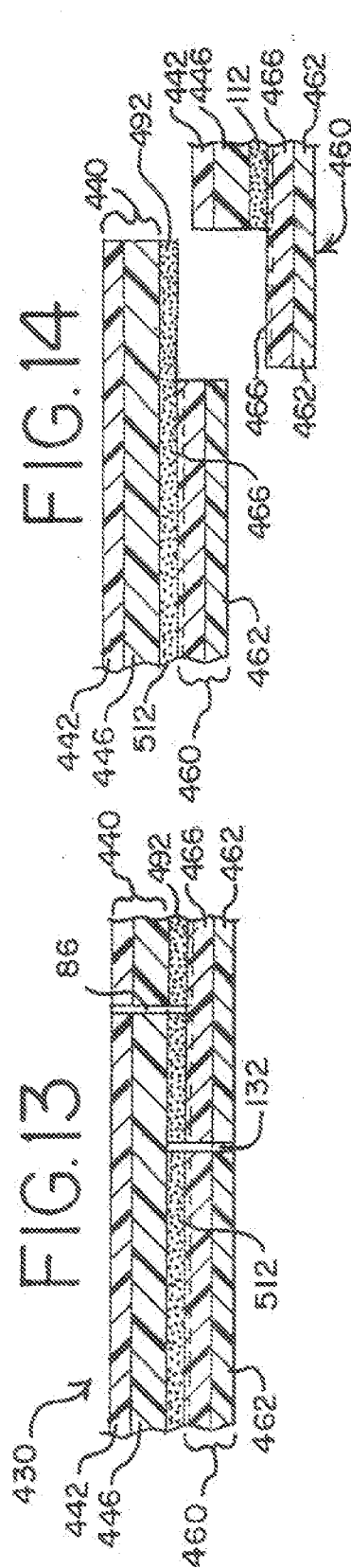
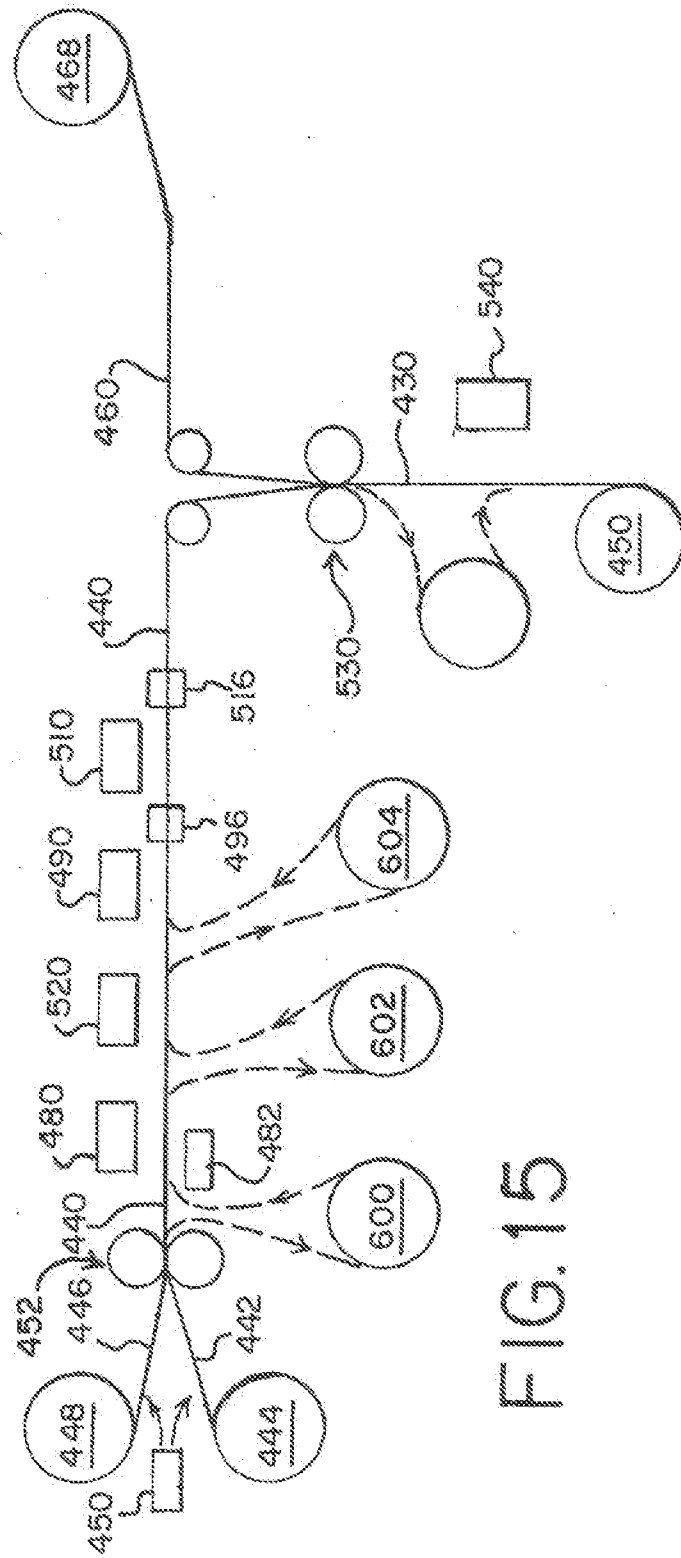


FIG. 10b



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FIG. 16

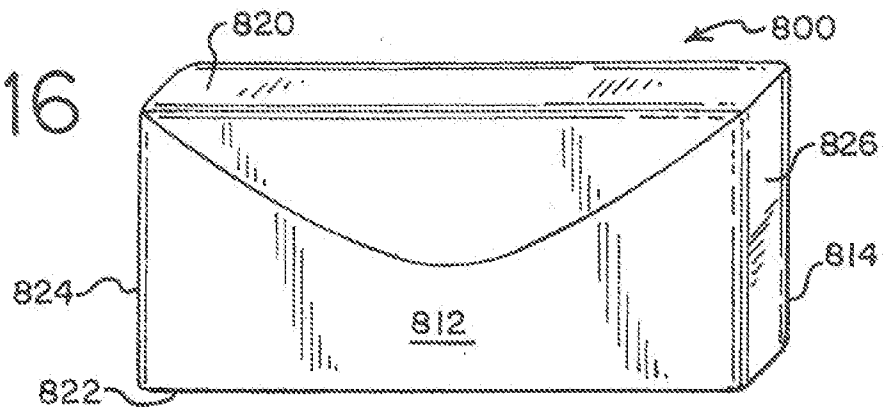


FIG. 17

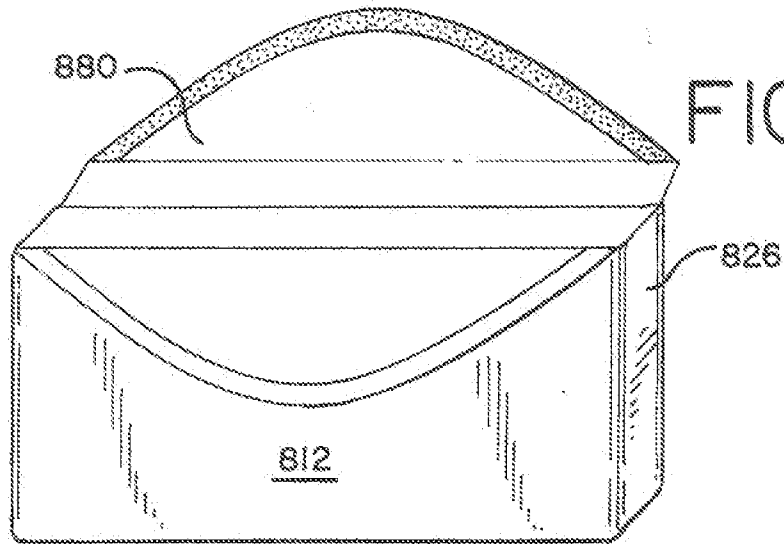


FIG. 18

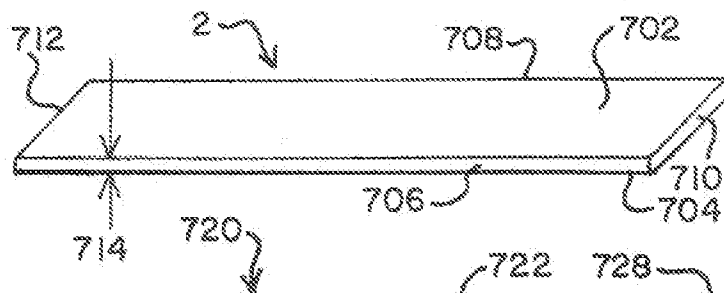


FIG. 19

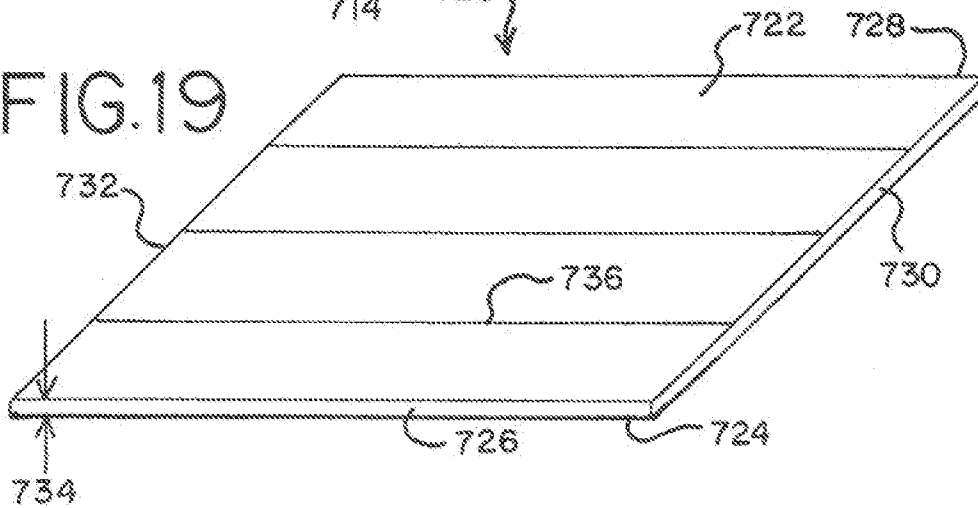


FIG.20

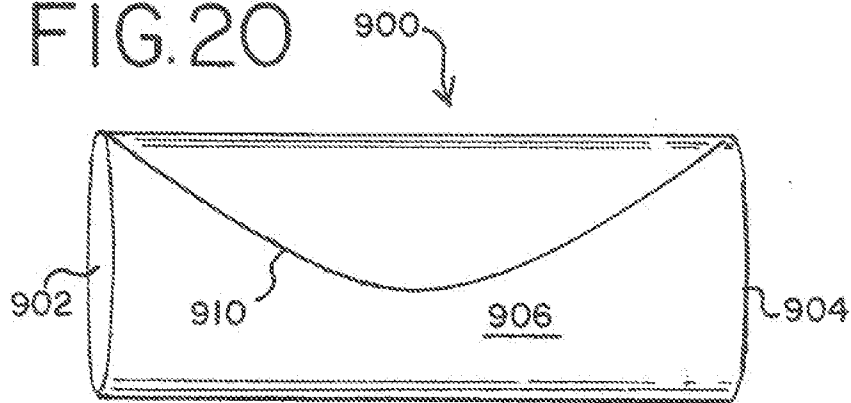


FIG.21

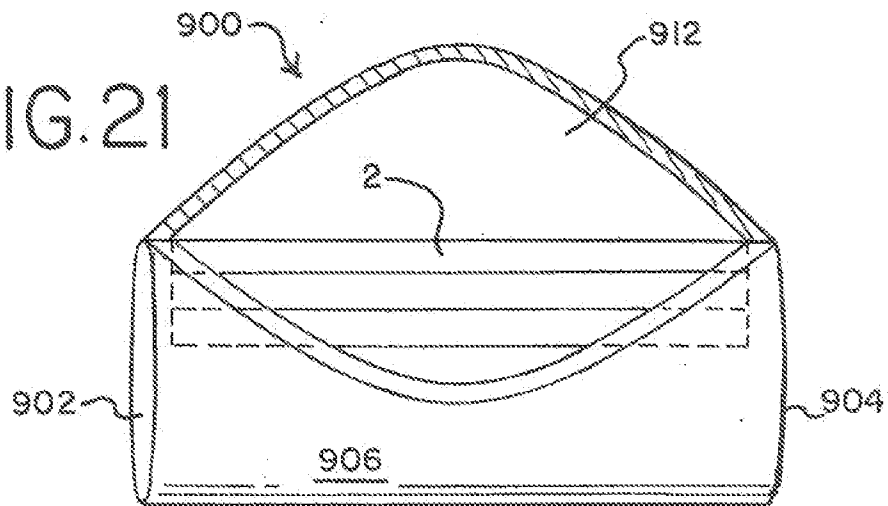


FIG.22

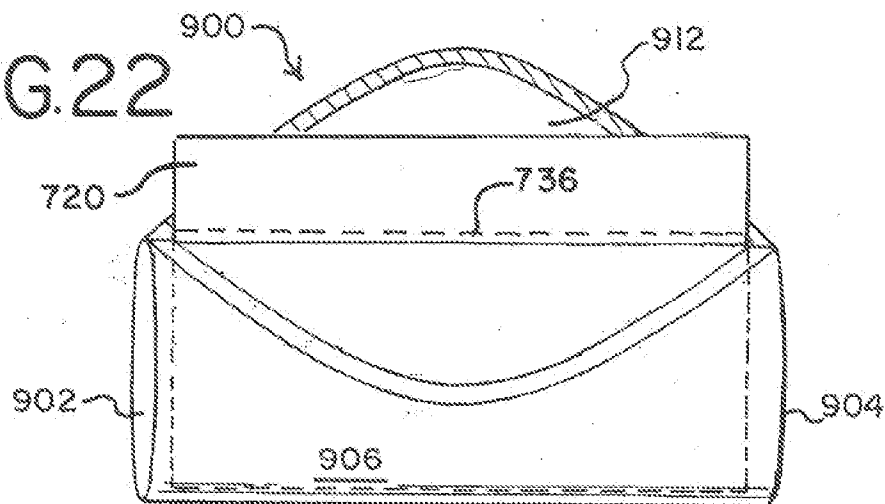


FIG. 25

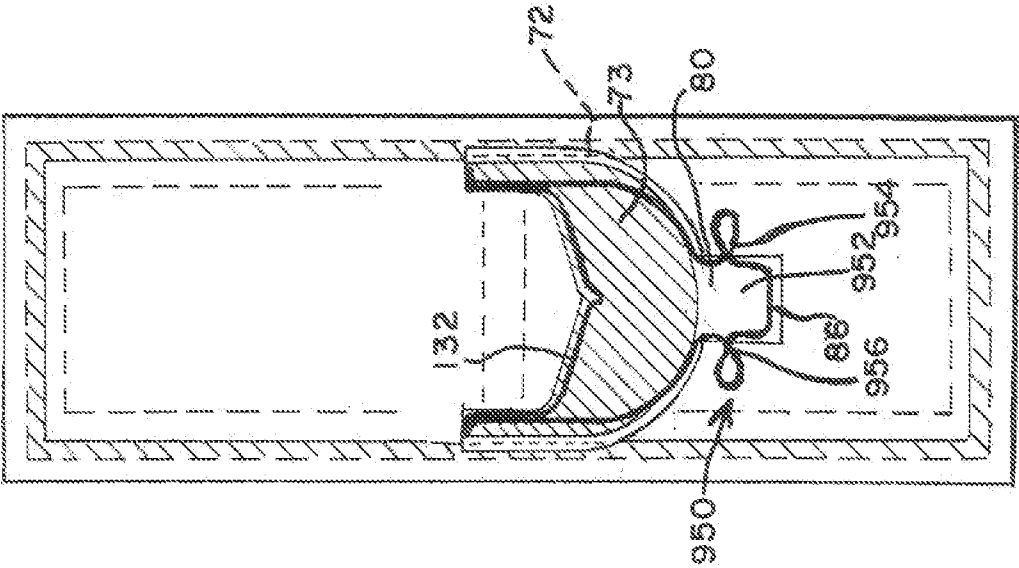


FIG. 24

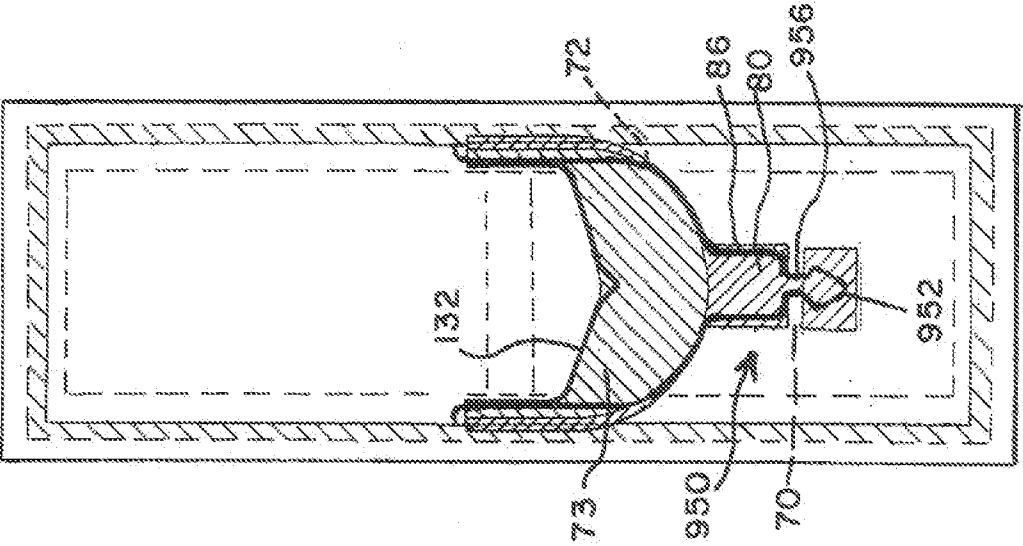
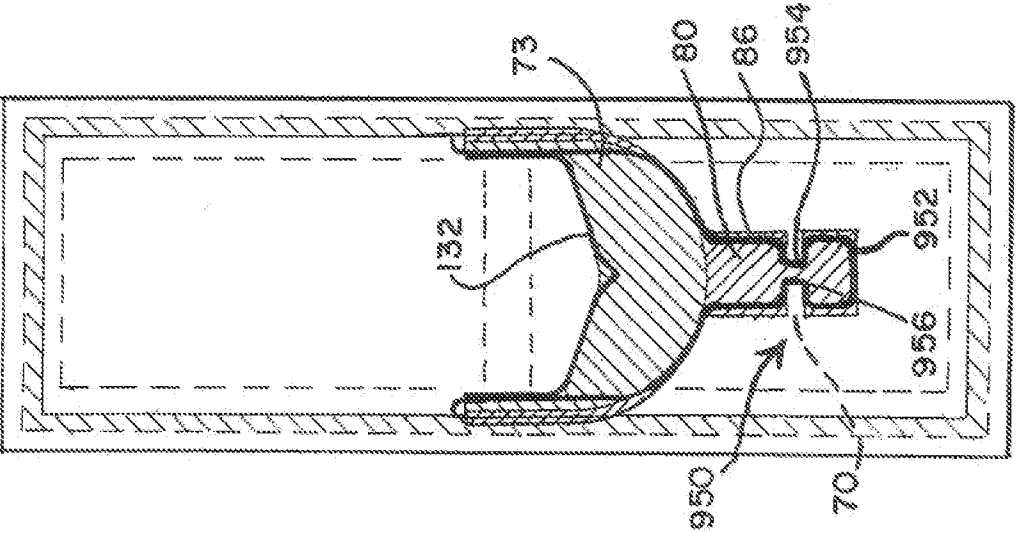


FIG. 23



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FIG. 28

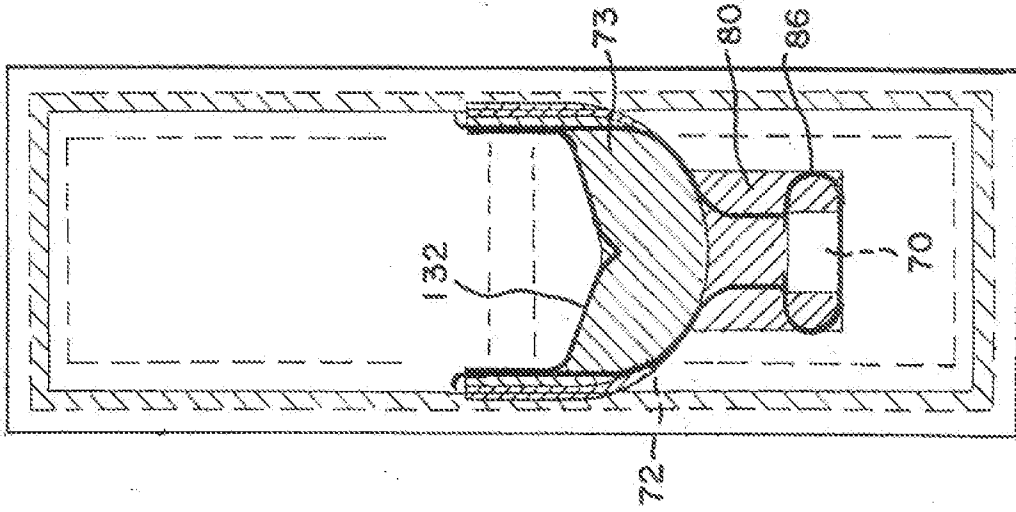


FIG. 27

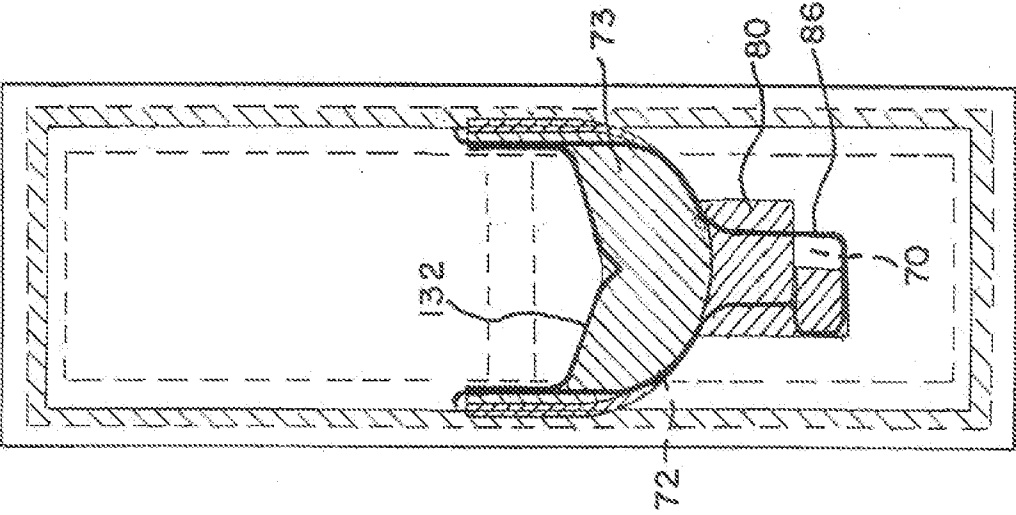
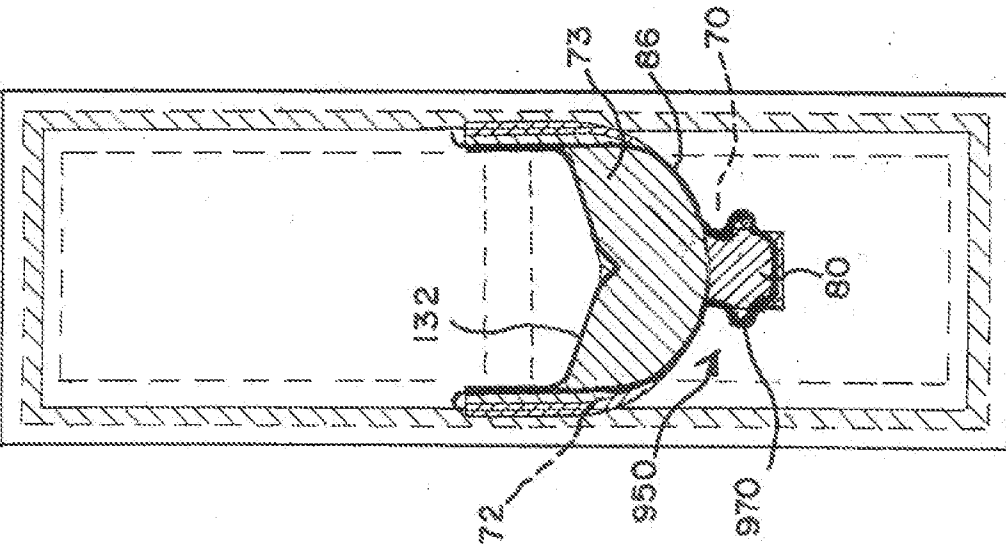


FIG. 26



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FIG. 31

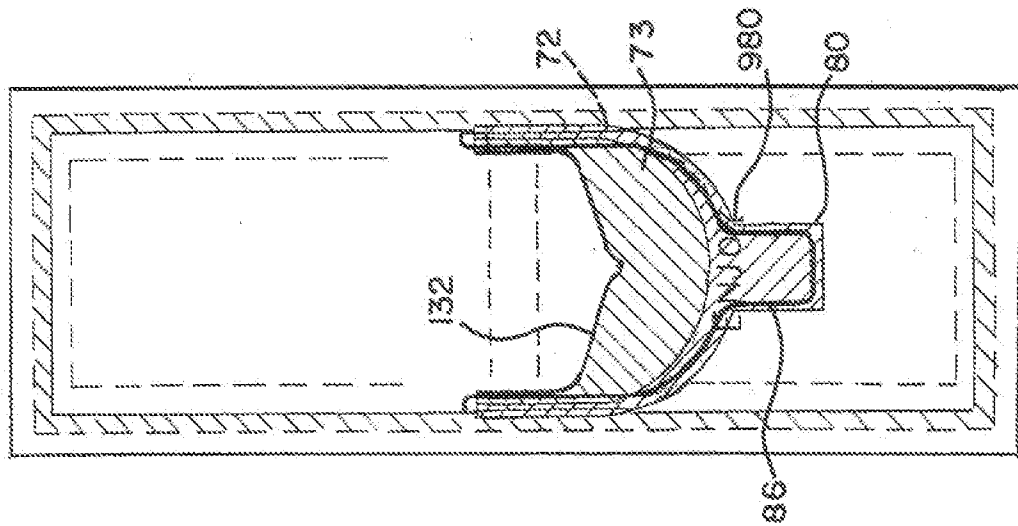


FIG. 30

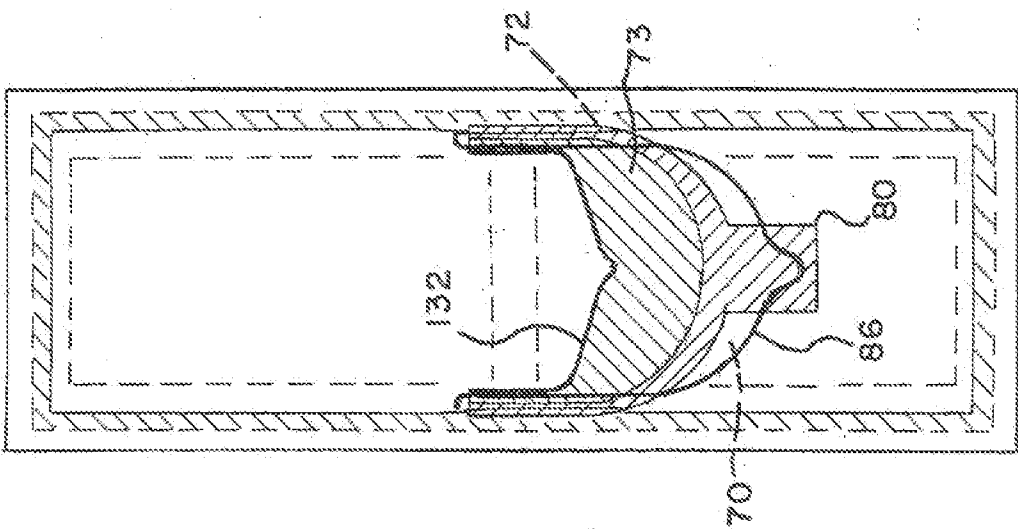


FIG. 29

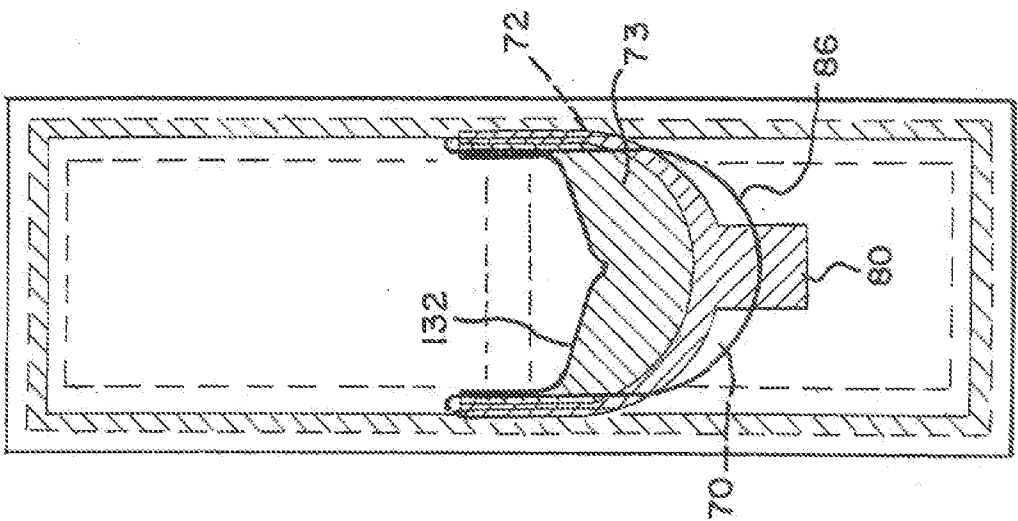


FIG. 32

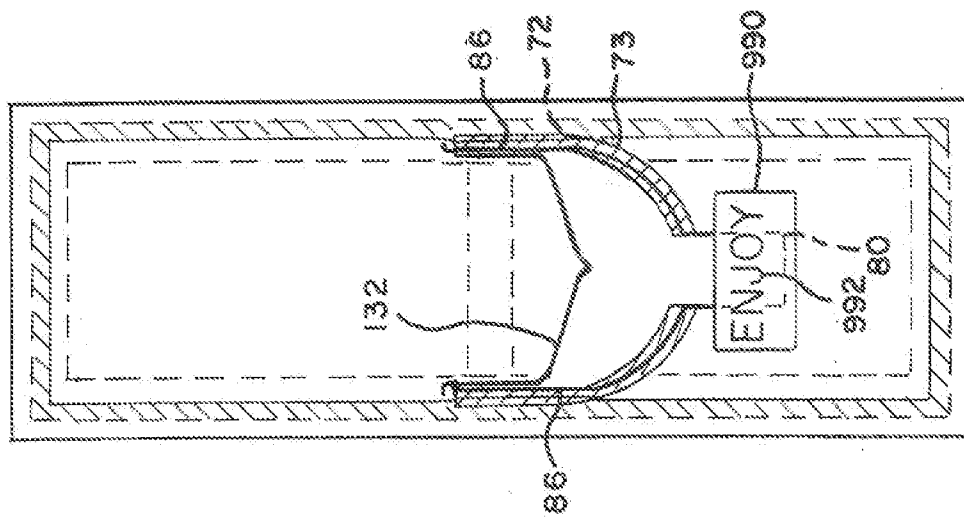
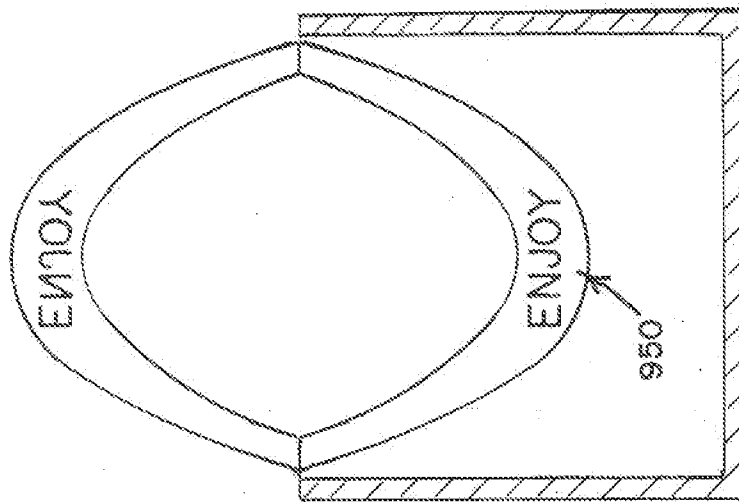


FIG. 33



INTERNATIONAL SEARCH REPORT

 International application No
 PCT/US2009/067259

A. CLASSIFICATION OF SUBJECT MATTER

 INV. B65D75/58 B65D85/60 B65D77/20
 ADD.

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)

EP0-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 1 449 789 A1 (ALCAN TECH & MAN LTD [CH]) 25 August 2004 (2004-08-25)	1-6,8,9
Y	paragraphs [0013] - [0023]; figures 4,14,16 paragraphs [0040] - [0045]	10,11
X	US 2005/276525 A1 (HEBERT ROBERT C [US] ET AL) 15 December 2005 (2005-12-15) paragraphs [0039] - [0063]; figures 4-9	1-8
X	WO 2008/089309 A2 (WRIGLEY W M JUN CO [US]; MITRA-SHAH UJJAINI [US]; HERNANDEZ KATIE J [U]) 24 July 2008 (2008-07-24) paragraphs [0062] - [0088]; figures 6-13 ----- -/--	1,6,8, 12,13



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

23 April 2010

Date of mailing of the international search report

07/05/2010

Name and mailing address of the ISA/

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Authorized officer

Jervelund, Niels

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/067259

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/067259

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