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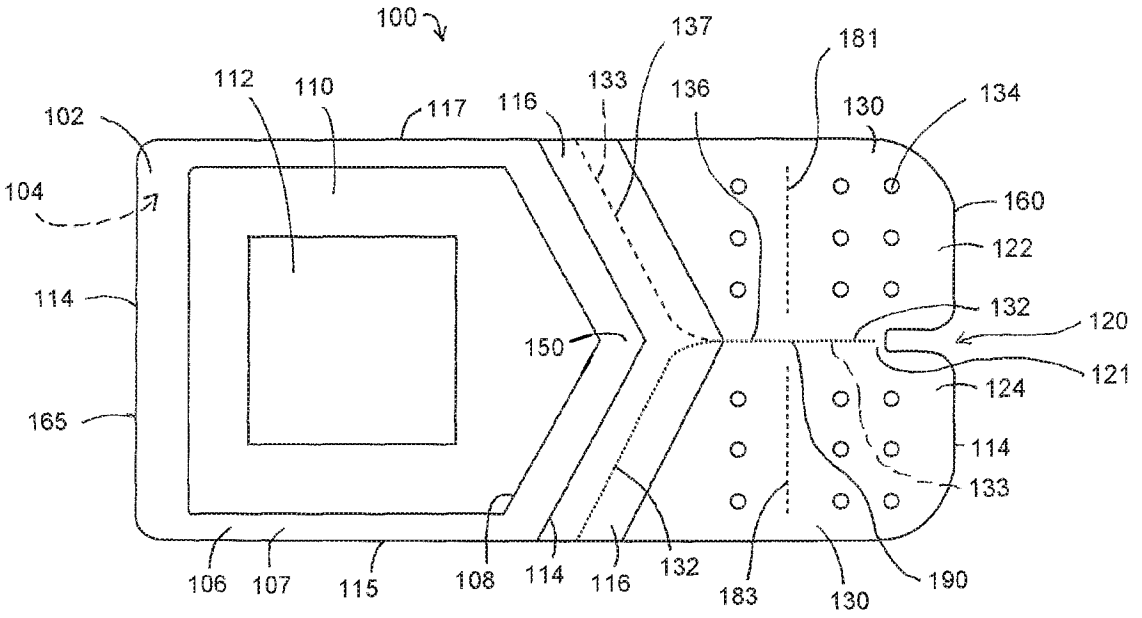

FIG. 1

(57) Abrégé/Abstract:
Disclosed are packages for dispensing a product, the package including: a first layer; a second layer; a tab seal zone in which the first layer is joined to the second layer by a seal, the tab seal zone defining a first tab and a second tab; a first perforation in the first layer and a second perforation in the second layer, the first perforation defining a tear path in the first layer and the second perforation defining a tear path in the second layer, wherein at least one of the first and second perforations at least partially defines a boundary separating the first tab and the second tab; and a fold guide located in the tab seal zone, the fold guide indicating a fold line that intersects the first perforation and the second perforation across the boundary separating the first tab and the second tab.

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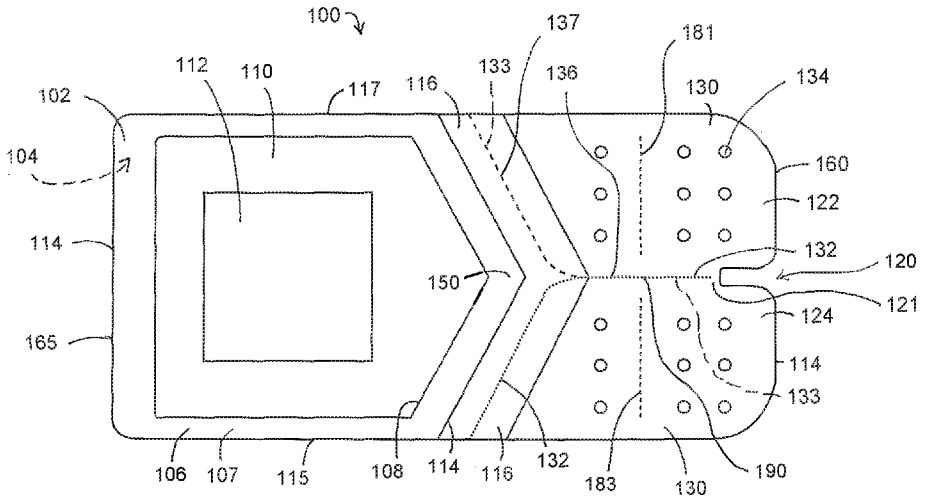

FIG. 1

(57) Abstract: Disclosed are packages for dispensing a product, the package including: a first layer; a second layer; a tab seal zone in which the first layer is joined to the second layer by a seal, the tab seal zone defining a first tab and a second tab; a first perforation in the first layer and a second perforation in the second layer, the first perforation defining a tear path in the first layer and the second perforation defining a tear path in the second layer, wherein at least one of the first and second perforations at least partially defines a boundary separating the first tab and the second tab; and a fold guide located in the tab seal zone, the fold guide indicating a fold line that intersects the first perforation and the second perforation across the boundary separating the first tab and the second tab.

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CHILD RESISTANT PEEL POUCH

CROSS-REFERENCE TO RELATED APPLICATIONS

Co-pending U.S. Patent Application No. 15/616,666, filed June 7, 2017 and entitled Easy-Open Peel Pouch, is incorporated herein by reference in its entirety. Published U.S. Patent Application 2013-0308882, filed May 17, 2013 and also entitled Easy-Open Peel Pouch, is incorporated herein by reference in its entirety.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a semi-transparent view of a child resistant pouch according to some examples.

FIG. 2 is a top view of the child resistant pouch of FIG. 1.

FIG. 3 is a semi-transparent view of an alternative example of a child resistant pouch.

FIG. 4 is a top view of the child resistant pouch of FIG. 3.

FIG. 5 is a semi-transparent view of an alternative example of a fold guide for a child resistant pouch.

FIG. 6 is a semi-transparent view of an alternative example of a fold guide for a child resistant pouch.

FIG. 7 is a semi-transparent view of an alternative example of a child resistant pouch.

FIG. 8 is a semi-transparent view of an alternative example of a child resistant pouch.

FIG. 9 is a partial side view of a child resistant pouch according to some examples.

FIG. 10 is a perspective view showing a method for opening a child resistant pouch according to some examples.

FIG. 11 is a top view of a web of child resistant pouches during an assembly process, according to some examples.

While embodiments herein are susceptible to various modifications and alternative forms, specifics thereof have been shown by way of example and drawings, and will be described in detail. It should be understood, however, that the scope herein is not limited to the particular examples described. On the contrary, the intention is to cover modifications, equivalents, and alternatives falling within the spirit and scope herein.

DETAILED DESCRIPTION

Disclosed herein are examples of child resistant pouches. The pouches are configured to be difficult for a child to open.

FIG. 1 shows a pouch 100 for containing and dispensing a product 112. In some examples, the pouch 100 includes tactile features 134. The tactile features 134 may be, for example, an aperture, one or more slits, grooves, bumps, recesses, embossing, or debossing on the surface of the pouch 100. The tactile features 134 provide grip for opening the pouch 100. In alternative examples, the tactile features 134 may be omitted.

The pouch 100 is constructed from a first layer 102, a second layer 104 (on the back side of the first layer 102 in FIG. 1). The first layer 102 and the second layer 104 are joined together in a product seal zone 106 where the first layer 102 is joined to the second layer 104 by a seal 107. The product seal zone 106 can be configured such that the first layer 102 and the second layer 104 are joined until one layer is peeled away from the other layer. The product seal zone 106 can be configured such that when the first layer 102 is separated from the second layer 104, the seal 107 is broken but each of the layers 102, 104 remains relatively intact.

The product seal zone 106 has an inner perimeter 108 and an outer perimeter 114 that define the bounds of the product seal zone 106. The inner perimeter 108 of the product seal zone 106 defines an unsealed pouch area 110 for containing the product 112. The seal 107 shields the product 112 from exposure. The pouch 100 has a tab end 160 and a product end 165 that define first and second ends of the pouch 100. The pouch 100 has a first side 115 and a second side 117 that define a first side edge and a second side edge of the pouch 100.

In the example of FIG. 1, the first layer 102 and the second layer 104 are sealed in the product seal zone 106 and in a tab seal zone 130. In some examples, the first layer 102 and the second layer 104 are joined by a peelable seal. In some examples, the first layer 102 and the second layer 104 are not sealed in an unsealed portion 116 situated between the product seal zone 106 and the tab seal zone 130. The first layer 102 and the second layer 104 are also not sealed in the unsealed pouch area 110.

The pouch 100 has an outer perimeter 114 that defines the edges of the pouch 100. The outer perimeter 114 of the tab seal zone 130 at least partially defines a first tab 122 and a second tab 124.

The pouch 100 also includes at least one fold guide in the tab seal zone 130. In some examples, the pouch 100 includes a first fold guide 181 in the first tab 122 and a second fold guide 183 in the second tab 124. The first and second fold guides 181, 182 indicate a fold line that extends across the

pouch 100, which passes through both the first tab 122 and the second tab 124. As will be discussed further in relation to FIG. 10, opening the pouch 100 requires folding the pouch 100 at the fold line and severing the first tab 122 from the second tab 124, for example by tearing the first layer 102 and the second layer 104. The fold line intersects a first perforation 132 in the first layer 102 and a second perforation 133 in the second layer 104 across a boundary separating the first tab 122 and the second tab 124, which will be discussed below.

The fold guides 181, 182 can comprise at least one of a number of different indicators. For example, the fold guides 181, 182 can comprise at least one of a cut in the first or the second layer 102, 104 in which the cut does not intersect the perimeter 114 of the pouch 100; a crease; a perforation in at least one of the first layer 102 and the second layer 104; a debossed or embossed pattern in a surface of at least one of the first layer 102 and the second layer 104; and a printed graphic or text on the surface of at least one of the first layer 102 and the second layer 104. It is anticipated that other indicators could alternatively be used to indicate the fold line, and the examples listed here of different types of fold guides is not exhaustive.

In the example of FIG. 1, the fold guides 181, 182 are shown as microperforations in at least one of the first layer 102 and the second layer 104. In some examples, both the first layer 102 and the second layer 104 contain these microperforations. In some examples, the microperforations of the first fold guide 182 and the second fold guide 182 in the first layer 102 and the second layer 104 overlap; in alternative examples, a fold guide in the first layer 102 can be non-overlapping with a fold guide in the second layer 104.

A first perforation 132 in the first layer 102 at least partially defines a boundary separating the first tab 122 and the second tab 124. The first perforation 132 defines a tear path 136 in the first layer 102. The tear path 136 is the line along which a user will tear open the first layer 102 of the pouch 100 in order to break the seal 107 to expose the product 112 inside of the pouch 100. In the example of FIG. 1, the tear path 136 in the first layer 102 is nonlinear. The first perforation 132 is, for example, a microperforation, which is made using a die cut process by a die having very fine nicks in the blade that are very close together.

The second layer 104 comprises a second perforation 133 that may be a microperforation similar to the first perforation 132. In the drawing of FIG. 1, the second perforation 133 in the second layer 104 is depicted as a dashed line in the area of the unsealed portion 116. The second perforation 133 also extends into the tab seal zone 130. The second perforation 133 in the second layer 104 at least partially

defines the boundary separating the first tab 122 and the second tab 124. The second perforation 133 defines a tear path 137 in the second layer 104. The tear path 137 is the line along which a user will tear open the second layer 104 of the pouch 100 in order to break the seal 107 to expose the product 112 inside of the pouch 100. In the example of FIG. 1, the second tear path 137 is nonlinear. In the example of FIG. 1, the nonlinear portion of the tear path 136 in the first layer 102 does not overlap the nonlinear portion of the tear path 137 in the second layer 104.

In the example of FIG. 1, the first perforation 132 of the first layer 102 overlaps the second perforation 133 of the second layer 104 in the tab seal zone 130, such that the first perforation 132 and the second perforation 133 are aligned in the tab seal zone 130. In some examples, the first perforation 132 overlaps the second perforation 133 along a line segment.

In some examples, there is a non-perforated portion 121 of the tab seal zone 130 that separates the first perforation 132 from the perimeter 114. In other words, the first perforation 132 does not extend to the perimeter 114 of the pouch 100.

In some examples, the first perforation 132 extends from the tab seal zone 130 through the unsealed portion 116 to a first edge 115 of the perimeter 114 of the pouch 100. In some examples, the second perforation 133 extends from the tab seal zone 130 through the unsealed portion 116 to a second edge 117 of the perimeter 114. In some examples, the first perforation 132 and the second perforation 133 overlap in the tab seal zone 130, and do not overlap in the unsealed portion 116 of the pouch 100. In some examples, the first perforation 132 extends from the tab seal zone 130 into the unsealed portion 116 without extending to the outer perimeter 114 of the pouch 100; in other words, non-perforated portions of the first layer 102, adjacent to the first edge 115 and a tab end 160 of the pouch 100, separates the first perforation 132 from the perimeter 114 of the pouch 100 at each end of the first perforation 132. Similarly for the second perforation 133, in some examples, non-perforated portions of the second layer 104 separate the second perforation 133 from the perimeter 114 of the pouch 100 at each end of the second perforation 133. In the example of FIG. 1, the first perforation 132 does not extend to the second edge 117 of the perimeter 114, and the second perforation 133 does not extend to the first edge 115 of the perimeter 114. In alternative examples, the first perforation 132 and the second perforation 133 could overlap entirely.

In some examples, there is a void 120 between the first tab 122 and the second tab 124. The shape of the void 120 is defined by the perimeter 114. In alternative examples, the void 120 is omitted, in which case the outer perimeter 114 is a straight line across a tab end 160 of the tab seal zone 130.

In one embodiment of the manufacturing process, the first and second perforations are formed during a single die-cutting step. In another embodiment of the manufacturing process, separate steps are used for different portions of the perforations. The first and second perforations overlap along the straight line segment that divides the tabs. The first and second perforations have non-overlapping segments that include the non-linear portions. In one embodiment, the non-overlapping segments are cut into the respective layers in one die-cutting step, while the overlapping segments that divide the tabs are cut into the layers in a subsequent die-cutting step. In one embodiment, the subsequent die-cutting step is the same step where the outer perimeter of the package is cut.

Turning to FIG. 10, the pouch 100 of FIGS. 1 and 2 is shown in the process of opening the pouch 100. A user opens the pouch 100 to expose the product 112 by first folding over the pouch 100 at the fold line 1001 indicated by the fold guides 181, 182. The fold line 1001 overlaps the first perforation 132 and the second perforation 133 at an intersection point 190. In the example of FIG. 10, the fold line 1001 is approximately perpendicular to the first perforation 132 and the second perforation 133 at the intersection point 190 where the perforations 132, 133 overlap.

Folding over the pouch 100 along the fold line 1001 defines a first flap portion 1022 in the first tab 122 and a second flap portion 1024 in the second tab 124 at the tab end 160 of the pouch 100. Folding the pouch 100 along the fold line 1001 also defines a product portion 1050 of the pouch 100 on the opposite side of the fold line 1001. Initially, before opening the pouch 100, the first flap portion 1022 and the second flap portion 1024 are joined together, with the first tab 122 adjoining the second tab 124. Opening the pouch 100 requires a user to exert force on the first tab 122 in a first direction, and to exert force in an opposite direction on the second tab 124. This shear force causes the first perforation 132 and the second perforation 133 to be severed at the intersection point 190. (In FIG. 10, the perforation 133 in the second layer 104 is depicted as a dashed line; if the pouch 100 is opaque, this would not be visible when viewed from the direction of the first layer 102.) Then, the opposing forces on the first tab 122 and the second tab 124 cause the perforations 132, 133 to be severed along the tear path 136 of the first layer 104 and the tear path 137 of the second layer 104. In some examples, the perforations 132, 133 tear in two directions: the perforations tear along a force vector directed from the intersection point 190 toward the tab end 160, and at the same time, the perforations 132, 133 tear along a force vector directed from the intersection point 190 toward the product end 165. As the first tab 122 and the second tab 124 are pulled farther and farther apart, the first tear path 136 of the first layer 102 veers in the direction of the first edge 115, causing the first layer 102 to be severed along a first segment 1030 of the first perforation

132 that does not overlap the second perforation 133. Similarly, the second tear path 137 of the second layer 104 veers in the direction of the second edge 117, causing the second layer 104 to be severed along a second segment 1033 of the second perforation 133 that does not overlap the first perforation 132.

Pulling the first tab 122 and the second tab 124 apart, combined with severing the first perforation 132 and the second perforation 133, allows the seal 107 of the product seal zone 106 to be peeled apart, exposing the products 112 inside of the pouch 100. At first, the seal 107 resists separation. When the user applies a sufficient force against the resistance of the seal 107, the force causes the seal 107 to be broken first at an apex 150 of the product seal zone 106. The first layer 102 then begins peeling apart from the second layer 104. As the first tab 122 and the second tab 124 are pulled farther and farther apart, more of the seal 107 is broken. Eventually, the seal 107 of the product seal zone 106 will be broken as the first layer 102 and the second layer 104 are peeled apart. This allows the product 112 to be removed from the pouch 100.

Returning to FIG. 1, in some examples, the tear path 136 in the first layer 102 starts at a longitudinal centerline of the package and extends to a first edge 115 of the pouch 100, and the tear path 137 in the second layer 104 starts at the longitudinal centerline of the pouch 100 and extends to the second edge 117 of the pouch 100. In some examples, the tear path 136 overlaps the tear path 137 at the centerline in the tab seal zone 130.

The first layer 102 and the second layer 104 can include a variety of materials and combinations of materials that are generally known in the art, such as a polyester film, spunbonded olefin, DuPont TYVEK® brand spunbonded olefin, linear low density polyethylene with polybutylene, biaxially oriented polyester film, polypropylene film, high density polyethylene film, acrylonitrile co-polymer film, BAREX ® brand acrylonitrile co-polymer film available from BP Chemicals, Inc., cast polyethylene terephthalate (PET) or polyethylene terephthalate glycol (PETG) film, metal foil, aluminum foil, poly-vinylidene dichloride (PVDC) film, co-extruded films containing ethylene vinyl alcohol polymer (EVOH), polyvinyl alcohol (PVA) film, polyamide film, vinyl film, high density polyethylene (HDPE) , ACLAR ® brand film, cold or thermo forming films, multilayer heat sealable pouch films, or composite laminations or coatings that contain the same. In a variety of examples, the first layer 102 and the second layer 104 are heat sealable or sealable using ultrasonic welding, pressure or vibration. In some examples, only one of the first layer 102 and second layer 104 is heat sealable, and the other is a compatible material to create a peelable seal. In one example, each of the first and second layers 102, 104 includes a polyester layer,

such as a DuPont TYVEK® brand spunbonded olefin, a tie layer and a sealant layer. In one example, the polyester film, tie layer and sealant layer are coextruded or laminated to form a single film. One example of an appropriate sealant layer is linear low density polyethylene with polybutylene, which is activated by heat to bond to the other layer. In some examples, the layers 102, 104 are joined by methods other than heat sealing. For example, the layers 102, 104 may be joined by ultrasonic welding in some examples. In some examples, the layers 102, 104 may be joined by more than one method, such as both heat sealing and ultrasonic welding.

In a variety of examples, the first layer 102 and the second layer 104 are substantially non-permeable. In a variety of examples, the first layer 102 and the second layer 104 are substantially permeable. For example, a layer that includes a metal foil layer will be substantially non-permeable, while a layer that includes a DuPont TYVEK® brand spunbonded olefin will be permeable. In a variety of examples, the first layer 102 and the second layer 104 are substantially flexible, although in some examples one of the first layer 102 or the second layer 104 or both are substantially rigid. In some examples, one or both of the layers is transparent so that the product 112 is visible through the transparent layer. Alternative terms that can be used to describe the first layer 102 and the second layer 104 include film, sheet, web, and the like.

The first layer 102 is generally coextensive with the second layer 104 and, as mentioned above, the first layer 102 and second layer 104 are at least partially joined with a peelable seal. Generally, the peelable seal is a hermetic bond between the contacting surfaces of the first layer 102 and second layer 104. The peelable seal can be formed by any appropriate method known in the art. In a variety of examples, peelable seal is a heat seal or melt bonded relationship caused by the application of heat and pressure. In an alternative example, peelable seal is formed with a suitable adhesive applied to at least one of the contacting surfaces of the first layer 102 and second layer 104. In at least one example, the peelable seal is re-sealable, thereby allowing a user to reclose the pouch 100.

In general the peelable seal is configured to have strength conducive to allowing a user to peel the first layer 102 and the second layer 104 apart without the use of tools, to access the product 112 there between. In one example, the peelable seal strength is in the range of 1.25 to 2 pounds per linear inch of seal when pulled apart at 180 degrees at 12 inches per minute travel rate according to testing procedure TAPPI T-494 as published by the Technical Association of the Pulp and Paper Industry. In some examples the peelable seal strength is in the range of 1.0 to 2.5 pounds per linear inch of seal. In a

variety of examples the peelable seal has strength in the range of 0.25 to 3.5 pounds per linear inch of seal.

FIG. 2 is a top view of the child resistant pouch of FIG. 1. FIG. 2 shows only the first layer 102 of the pouch 100. The pouch 100 has a longitudinal centerline. The tear path 136 of the first layer 102 starts along the longitudinal centerline toward the end 160 of the pouch 100. In the example of FIGS. 1 and 2, the tear path 136 for the first layer 102 would begin at the intersection point 190 and extend in two directions: first, along the longitudinal centerline toward the tab end 160, and also in the opposite direction along the longitudinal centerline toward the product end 165. A non-linear portion of the tear path 136 then directs the first layer 102 two sever along a diagonal path extending from the centerline to the first edge 115 of the pouch 100. FIG. 2 shows an alternative example of a fold guide, in which the fold guides comprise a continuous cut in at least one of the first layer 102 and the second layer 104, instead of the microperforated fold guides of FIG. 1.

As shown in FIG. 2, the non-linear portion of the perforation 132 has a radius of curvature. The non-linear portion of the perforation 133 also have a radius of curvature. This radius of curvature reduces the likelihood of the layer that defines the perforation from ripping along a line other than along the tear path 136. A small radius of curvature is more likely to rip the layer in an unwanted location than a large radius of curvature. Although the example of FIG. 2 shows one particular radius of curvature, it is anticipated that other examples could incorporate a larger or smaller radius of curvature, depending upon the particular application of the technology.

FIG. 3 is a semi-transparent view of an alternative example of a child resistant pouch. In this example, the pouch has a first layer and a second layer, where the first layer and the second layer are joined in at least a product seal zone and a tab seal zone, as in the example of FIG. 1. FIG. 3 shows fold guides cut in the first tab and the second tab.

The alternative example of FIG. 3 has a first perforation and a second perforation; however, the first perforation in the first layer 102 comprises a first segment and a second segment. In the example of FIG. 3, the first segment of the first perforation intersects the second segment of the first perforation in the first layer 102, as opposed to the example of FIG. 1, in which the first perforation 132 comprises a continuous segment. The first and second segments each have two endpoints, unlike the example of FIG. 1 where the first perforation is a continuous segment. In the example of FIG. 3, the first segment of the second perforation in the second layer 104 overlaps the first segment of the first perforation in the first layer 102.

In FIG. 3, the second perforation also includes a first segment and a second segment. The first segment of the second perforation intersects the second segment of the second perforation at an intersection point in the second layer 104. The second segment of the first perforation and the second segment of the second perforation each have a non-linear end that intersects their first respective segments. The non-linear portions of these segments are provided in order to reduce the likelihood that the layers tear through the centerline of the package. It has been found that when these non-linear portions are omitted, the perforations have an increased likelihood of not tearing properly, if other factors remain the same.

The second segment of the first perforation A and the second segment of the second perforation B are not intended to meet the end of the first segments C of the first and second perforations. In one manufacturing embodiment, the second segments A and B are formed during the die cutting process in one step, while the first segments C are formed during a later. In one embodiment, the first segments C are cut at the same time as the outer perimeter of the pouch. Because the second segments A and B are not intended to form a continuous segment with the first segments C, the manufacturing process can have more permissive tolerances for a re-registration process between the die-cutting steps when making the package of FIGS. 3 and $, compared to the package of FIGS. 1 and 2.

FIG. 4 is a top view of the child resistant pouch of FIG. 3, with only the first layer showing. FIG. 4 demonstrates force vectors V1 and V2 that represent the directions along which the first layer is torn when the package is opened. In particular, the first layer is severed beginning at the intersection point, and then is severed along the direction of V1 and along the direction of V2. The tear path of the first layer then veers toward the side edge of the package along the second perforation segment of the first perforation.

FIG. 5 is a semi-transparent view of an alternative example of a fold guide for a child resistant pouch. In this example, the fold guide is a pattern of dimples that may be created by embossing or debossing. The dimples may be the same as the tactile features present in the first tab and the second tab. The pattern of dimples extends along the fold line, indicating the line along which the user should fold the first and second tabs. FIG. 5 also shows that the fold line intersects the perforation, and that the perforation defines the boundary between the first and second tabs. Furthermore, in the example of FIG. 5, the perforation extends to the perimeter of the package.

Turning to FIG. 6, the example of FIG. 6 shows a fold guide with a printed graphic and printed text on the surface of the package. In this alternative example, the first and second perforations do not

extend to the perimeter of the pouch. Instead, a non-perforated portion of the pouch separates the perforation from the perimeter of the pouch.

Turning to FIG. 7, an alternative example of a child resistant pouch includes both perforations and continuous cuts. A perforation in the first layer extends along the lateral centerline of the pouch. The perforation defines a tear path in the first layer. A full guide, comprising perforations, intersects the perforation at an intersection point. The fold guide indicates a fold line along which a user should fold the package. Instead of micro perforations extending across the width of the pouch, FIG. 7 uses a continuous cut in the first layer and a continuous cut in the second layer. A radial cut in at least one of the first layer and the second layer prevents the layer from tearing down the center of the pouch when the first layer and second layer are being pulled apart.

Turning to FIG. 8, an alternative example of a child resistant pouch includes a perforation and full guide similar to that of FIG. 7. However, no tactile features are present along the fold line. A perforation in the first layer and a perforation in the second layer overlap in the tab seal zone, and do not overlap in an unsealed portion of the pouch. A radial cut at the base of the first and the second tabs prevents the first layer from tearing anywhere other than along the tear path defined by the perforation in the first layer.

FIG. 9 is a partial side view of a child resistant pouch according to some examples such as FIG. 2. FIG. 9 is a schematic view to aid in explaining some aspects of the various examples; for example, the two seals defining the product seal zone and the tab seal zone are depicted as being separate structures. But in reality, this represents a bond between the first and second layers that is not a separate structure.

This side view of FIG. 9 shows the product seal zone, the tab seal zone, and an unsealed portion of the package disposed between the product seal zone and the tab seal zone. In this example, the fold guide is a cut in the first layer and a cut in the second layer. The package is shown being folded over. The fold defines a flap portion of the pouch on one side of the fold, and a product portion on the opposite side of the fold. The perforation in the first layer ends at the side edge of the pouch at the unsealed portion of the pouch.

FIG. 11 shows a combined web which includes a first layer web and a second layer web. The combined web includes a plurality of individual pouches, having one example configuration, each having an unsealed pouch area and a product in the unsealed pouch area. The individual pouches are separated from each other by a web matrix.

The first layer web and the second layer web are sealed to form a combined web by sealing the first layer web to the second layer web at least at one of a plurality of product seal zones and a plurality of tab seal zones, such that the first layer is joined to the second layer by a peelable seal.

The webs are generally sized to create multiple pouches; the webs may be very long, also referred to as continuous, in the machine direction and have a cross-machine direction of one to five packages, or more. In the example of FIG. 11, the combined web holds four pouches in the cross-machine direction, and is very long in the machine direction. The phrase "very long in the machine direction" is used to mean a web that is typically substantially longer than it is wide, such as one-hundred or one-thousand times longer than its width, and is often processed on rolls.

In at least one example implementation, sealing the webs is accomplished along a line in a continuous motion. A seal plate can be used for joining a first layer web and a second layer web with a heat seal or other seal at a seal zone to form the combined web. In such an implementation, the seal plate itself defines a product seal zone having an inner perimeter and an outer perimeter, as well. Such a seal plate also defines a tab seal zone within individual pouches.

During the manufacturing process, at least one of the first layer web and the second layer web is provided with a perforation. The perforation defines first and second tabs of the individual pouches. The individual pouches are furthermore provided with at least one fold guide. The fold guides are indicative of a fold line along which the finished pouch should be folded. A number of techniques are suitable for the fold guides. For example, the fold guides can comprise at least one of a cut in the first or the second layer in which the cut does not intersect the perimeter of the pouch; a crease; a perforation in at least one of the first layer and the second layer; a debossed or embossed pattern in a surface of at least one of the first layer and the second layer; and a printed graphic or text on the surface of at least one of the first layer and the second layer.

The combined web is then cut to produce at least one individual pouch. The pouch is cut along center machine-direction cut lines, cross-machine direction cut lines and outer machine direction cut lines to separate the individual pouch from a matrix. A web matrix allows for some tolerance in the sealing and cutting steps.

In some examples, each individual pouch is cut on two or more passes. In some examples, perforation lines are made in a first die cutting process, and in a second die cutting process, the individual pouches are cut along their perimeter from the web matrix to form the individual pouches. In some cases, cuts or perforations created in the first die process must be aligned precisely with the cuts in the second

die process. In these cases, if the first die cut pass is not aligned with the second die cut pass, the pouches will not open correctly. A process of re-registration is used to ensure that the second die cut will precisely align with the first die cut.

In a variety of examples, each individual package is die cut around its respective outer perimeter. In at least one example implementation, the die cutting is accomplished in a rotary die cutting station. In such an example, the rotary die can cut against an anvil roll, for example. In other examples, the packages are knife cut or guillotine cut at their outer perimeters.

If the pouch includes embossing or debossing, such as to form the fold guide or tactile features on the tabs, the embossing step can happen during the manufacturing process. Embossing is a technique in which a male die and a female die are used on two sides of a web to create a raised pattern on the web. The inverse technique, called debossing, uses a male die and a female die on two sides of a web to create an indentation on the web. The steps of embossing or debossing can happen simultaneously with providing perforations, or separately.

It should be noted that, as used in this specification and the appended claims, the singular forms include the plural unless the context clearly dictates otherwise. It should also be noted that the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

All publications and patent applications referenced in this specification are herein incorporated by reference in their entirety.

The invention has been described with reference to various specific and preferred embodiments and techniques. However, it should be understood that many variations and modifications may be made while remaining within the spirit and scope of the invention.

DEFINITIONS

Perforation: an intentionally damaged portion of the layer that weakens the layer at a point or along a line segment. Although this specification uses the word "perforation," it is not intended to limit the scope of the present technology. Perforations can include microperforations, holes, a series of cuts or punctures, a scored area that does not cut entirely through a layer, etc. A perforation does not sever the layer into two pieces at the perforation location. In contrast to a perforation, a continuous cut severs a layer into two distinct pieces.

Fold guide: a physical or printed mark indicating a location along which the user should fold the packaging. The fold guide could use a number of different indicators, e.g., a perforation, a continuous cut

though a portion of the package, debossing, embossing, or a graphic or text indicating where to fold. Other types of fold guides are suitable and are within the scope of the present technology.

Overlap: refers to spatial relationships between elements on the first layer and elements on the second layer. For example, a perforation on the first layer overlaps a perforation on the second layer when the two perforations are aligned one on top of the other. Perforations on two different layers can overlap at a single point or along a line segment. For example, a perforation on a first layer and a perforation on a second layer can be oriented in different directions such that they overlap at a single point like an 'X.'

Intersection: refers to spatial relationships between elements on a single layer. When a first perforation segment on a first layer crosses a second perforation segment on the first layer, the two segments are said to intersect at an intersection point.

Sever: to break a connection between a first area and a second area within a single layer of packaging. Severing can refer to tearing a layer of the package along a tear path, e.g., along a perforation. When a first perforation on a first layer overlaps a second perforation on a second layer, severing the first layer and the second layer occurs simultaneously.

OTHER EMBODIMENTS

Various modifications and variations of the described invention will be apparent to those skilled in the art without departing from the scope and spirit of the invention. Although the invention has been described in connection with specific embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention that are obvious to those skilled in the art are intended to be within the scope of the invention.

The invention is also described by the following enumerated items.

1. A package for dispensing a product, the package comprising:

A first layer;

A second layer;

A tab seal zone in which the first layer is joined to the second layer by a seal, the tab seal zone defining a first tab and a second tab;

A first perforation in the first layer and a second perforation in the second layer, the first and second perforations at least partially defining a boundary separating the first tab and the second tab, the first

perforation defining a tear path in the first layer and the second perforation defining a tear path in the second layer; and

A fold guide located in the tab seal zone, the fold guide indicating a fold line that intersects the first perforation and the second perforation across the boundary separating the first tab and the second tab.

2. The package of any of items 1 and 3-22, wherein the first perforation overlaps the second perforation along a line segment.

3. The package of any of items 1-2 and 4-22, wherein the first perforation and the second perforation overlap entirely.

4. The package of any of items 1-3 and 5-22, further comprising an arc-shaped cut in at least one of the first layer and the second layer at a base of the first and second tabs.

5. The package of any of items 1-4 and 6-22, wherein at least a portion of the tear path in the first layer overlaps a portion of the tear path in the second layer, and wherein at least a portion of the tear path in the first layer does not overlap a portion of the tear path in the second layer.

6. The package of any of items 1-5 and 7-22, wherein a perimeter of the package defines a tab end adjacent to the tab seal zone and a product end opposite the tab end, wherein the first perforation and the second perforation do not extend to the perimeter at the tab end.

7. The package of any of items 1-6 and 8-22, wherein the perimeter further defines a first side edge and a second side edge opposite the first side edge, wherein the first perforation extends to the first side edge and does not extend to the second side edge, and wherein the second perforation extends to the second side edge and does not extend to the first side edge.

8. The package of any of items 1-7 and 9-22, wherein the first perforation and the second perforation do not extend to a perimeter of the package.

9. The package of any of items 1-8 and 10-22, wherein the tab seal zone comprises a non-perforated area between a perimeter of the package and the first and second perforations.

10. The package of any of items 1-9 and 11-22, wherein the tear path in the first layer starts at a longitudinal centerline of the package and extends to a first side edge of the package, and the tear path in the second layer starts at the longitudinal centerline of the package and extends to a second side edge of the package.

11. The package of any of items 1-10 and 12-22, wherein the tear path in the first layer at the centerline of the package overlaps the tear path in the second layer at the centerline of the package.

12. The package of any of items 1-11 and 13-22, wherein the first tab adjoins the second tab.

13. The package of any of items 1-12 and 14-22, wherein at least a portion of the tear path in the first layer is non-linear and at least a portion of the tear path in the second layer is non-linear.

14. The package of any of items 1-13 and 15-22, wherein the non-linear portion of the tear path in the first layer does not overlap the non-linear portion of the tear path in the second layer.

15. The package of any of items 1-14 and 16-22, wherein at least one of the first perforation and the second perforation is a single perforation segment.

16. The package of any of items 1-15 and 17-22, wherein at least one of the first perforation and the second perforation comprises two or more perforation segments.

17. The package of any of items 1-16 and 18-22, wherein at least one of the first perforation and the second perforation comprises:

a first perforation segment; and

a second perforation segment intersecting the first perforation segment.

18. The package of any of items 1-17 and 19-22, wherein the fold guide is located in a portion of the tab seal zone adjacent to an overlap of the first perforation and the second perforation.

19. The package of any of items 1-18 and 20-22, wherein the fold guide indicates a fold line that is perpendicular to the first perforation and the second perforation at a point of overlap.

20. The package of any of items 1-19 and 21-22, wherein the fold guide is at least one of:

a cut in at least one of the first and second layers, wherein the cut does not intersect a perimeter of the package;

a crease;

a perforation in at least one of the first layer and the second layer;

an embossed pattern in a surface of at least one of the first layer and the second layer;

a debossed pattern in a surface of at least one of the first layer and the second layer;

printed text; and

a printed graphic on the surface of at least one of the first layer and the second layer.

21. The package of any of items 1-20 and 22, wherein the fold guide defines a flap portion in the tab seal zone at a tab end of the package, and a product portion in a product seal zone at a product end of the package.

22. The package of any of items 1-21, further comprising: a product seal zone opposite the tab seal zone, and an unsealed portion of the package situated between the product seal zone and the tab seal zone.

23. A method of opening a child-proof package, the method comprising:

folding a portion of the package along a fold guide to define a flap portion separated from a product portion of the package by a fold, the fold intersecting a first perforation in a first layer of the package and a second perforation in a second layer of the package at an intersection point, wherein the first perforation overlaps the second perforation; and

tearing the product portion and the flap portion along a first tear line defined by the first perforation and a second tear line defined by the second perforation, the step of tearing including

severing the first layer and the second layer at the intersection point on the fold,

after severing the first layer and the second layer at the intersection point, tearing the package along a first tear vector and a second tear vector, the second tear vector oriented in a direction opposite the first tear vector,

severing the first layer along a first segment of the first perforation that does not overlap the second perforation, and

severing the second layer along a first segment of the second perforation that does not overlap the first perforation;

whereby the step of severing the first layer and the second layer causes a product inside of the package to be exposed.

24. A method of forming a package for containing and dispensing a product, the method comprising:

providing a first layer web and a second layer web;

placing a product on at least one pouch area of one of the first and second layer webs;

forming a combined web by sealing the first layer web to the second layer web at least at a product seal zone and a tab seal zone such that the first layer is joined to the second layer by a seal surrounding the at least one pouch area and a seal in the tab seal zone;

forming a perforation in the tab seal zone of at least one of the first layer web and the second layer web, the perforation defining a first tab and a second tab of the package;

forming a fold guide in the tab seal zone of at least one of the first layer web and the second layer web, the fold guide being adjacent to the perforation; and

cutting at least one individual package around an outer package perimeter to separate the individual package from the combined web.

25. The method of item 24, wherein the step of forming a combined web further comprises leaving an unsealed zone adjacent to an outer perimeter of the product seal zone where the first layer web is not sealed to the second layer web.

WHAT IS CLAIMED IS:

1. A package for dispensing a product, the package comprising:

A first layer;

A second layer;

A tab seal zone in which the first layer is joined to the second layer by a seal, the tab seal zone defining a first tab and a second tab;

A first perforation in the first layer and a second perforation in the second layer, the first perforation defining a tear path in the first layer and the second perforation defining a tear path in the second layer, wherein at least one of the first and second perforations at least partially defines a boundary separating the first tab and the second tab; and

A fold guide located in the tab seal zone, the fold guide indicating a fold line that intersects the first perforation and the second perforation across the boundary separating the first tab and the second tab.

2. The package of claim 1, wherein the first perforation overlaps the second perforation along a line segment.
3. The package of claim 1, wherein the first perforation and the second perforation overlap entirely.
4. The package of claim 3, further comprising an arc-shaped cut in at least one of the first layer and the second layer at a base of the first and second tabs.
5. The package of claim 1, wherein at least a portion of the tear path in the first layer overlaps a portion of the tear path in the second layer, and wherein at least a portion of the tear path in the first layer does not overlap a portion of the tear path in the second layer.
6. The package of claim 1, wherein a perimeter of the package defines a tab end adjacent to the tab seal zone and a product end opposite the tab end, wherein the first perforation and the second perforation do not extend to the perimeter at the tab end.
7. The package of claim 6, wherein the perimeter further defines a first side edge and a second side edge opposite the first side edge, wherein the first perforation extends to the first side edge and does not extend to the second side edge, and wherein the second perforation extends to the second side edge and does not extend to the first side edge.
8. The package of claim 1, wherein the first perforation and the second perforation do not extend to a perimeter of the package.

9. The package of claim 1, wherein the tab seal zone comprises a non-perforated area between a perimeter of the package and the first and second perforations.
10. The package of claim 1, wherein the tear path in the first layer starts at a longitudinal centerline of the package and extends to a first side edge of the package, and the tear path in the second layer starts at the longitudinal centerline of the package and extends to a second side edge of the package.
11. The package of claim 10, wherein the tear path in the first layer at the centerline of the package overlaps the tear path in the second layer at the centerline of the package.
12. The package of claim 1, wherein the first tab adjoins the second tab.
13. The package of claim 1, wherein at least a portion of the tear path in the first layer is non-linear and at least a portion of the tear path in the second layer is non-linear.
14. The package of claim 13, wherein the non-linear portion of the tear path in the first layer does not overlap the non-linear portion of the tear path in the second layer.
15. The package of claim 1, wherein at least one of the first perforation and the second perforation is a single perforation segment.
16. The package of claim 1, wherein at least one of the first perforation and the second perforation comprises two or more perforation segments.
17. The package of claim 1, wherein at least one of the first perforation and the second perforation comprises:

    a first perforation segment; and

    a second perforation segment intersecting the first perforation segment.
18. The package of claim 1, wherein the fold guide is located in a portion of the tab seal zone adjacent to an overlap of the first perforation and the second perforation.
19. The package of claim 18, wherein the fold guide indicates a fold line that is perpendicular to the first perforation and the second perforation at a point of overlap.
20. The package of claim 1, wherein the fold guide is at least one of:

    a cut in at least one of the first and second layers, wherein the cut does not intersect a perimeter of the package;

    a crease;

    a perforation in at least one of the first layer and the second layer;

    a debossed pattern in a surface of at least one of the first layer and the second layer;

    an embossed pattern in a surface of at least one of the first layer and the second layer;

printed text; and

a printed graphic on the surface of at least one of the first layer and the second layer.

21. The package of claim 1, wherein the fold guide defines a flap portion in the tab seal zone at a tab end of the package, and a product portion in a product seal zone at a product end of the package.

22. The package of claim 1, further comprising: a product seal zone opposite the tab seal zone, and an unsealed portion of the package situated between the product seal zone and the tab seal zone.

23. A method of opening a child-proof package, the method comprising:

folding a portion of the package along a fold guide to define a flap portion separated from a product portion of the package by a fold, the fold intersecting a first perforation in a first layer of the package and a second perforation in a second layer of the package at an intersection point, wherein the first perforation overlaps the second perforation; and

tearing the product portion and the flap portion along a first tear line defined by the first perforation and a second tear line defined by the second perforation, the step of tearing including

severing the first layer and the second layer at the intersection point on the fold,

after severing the first layer and the second layer at the intersection point, tearing the package along a first tear vector and a second tear vector, the second tear vector oriented in a direction opposite the first tear vector,

severing the first layer along a first segment of the first perforation that does not overlap the second perforation, and

severing the second layer along a first segment of the second perforation that does not overlap the first perforation;

whereby the step of severing the first layer and the second layer causes a product inside of the package to be exposed.

24. A method of forming a package for containing and dispensing a product, the method comprising:

providing a first layer web and a second layer web;

placing a product on at least one pouch area of one of the first and second layer webs;

forming a combined web by sealing the first layer web to the second layer web at least at a product seal zone and a tab seal zone such that the first layer is joined to the second layer by a seal surrounding the at least one pouch area and a seal in the tab seal zone;

forming a perforation in the tab seal zone of at least one of the first layer web and the second layer web, the perforation defining a first tab and a second tab of the package;

forming a fold guide in the tab seal zone of at least one of the first layer web and the second layer web, the fold guide being adjacent to the perforation; and

cutting at least one individual package around an outer package perimeter to separate the individual package from the combined web.

25. The method of claim 24, wherein the step of forming a combined web further comprises leaving an unsealed zone adjacent to an outer perimeter of the product seal zone where the first layer web is not sealed to the second layer web.

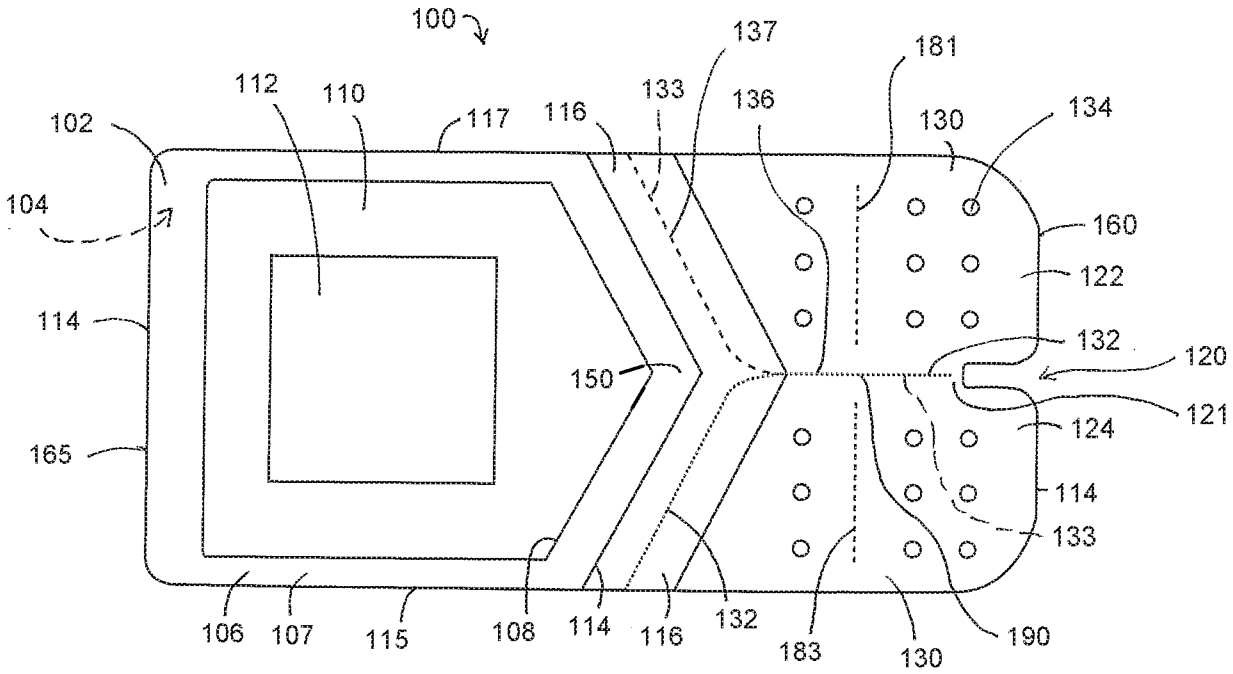
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FIG. 1

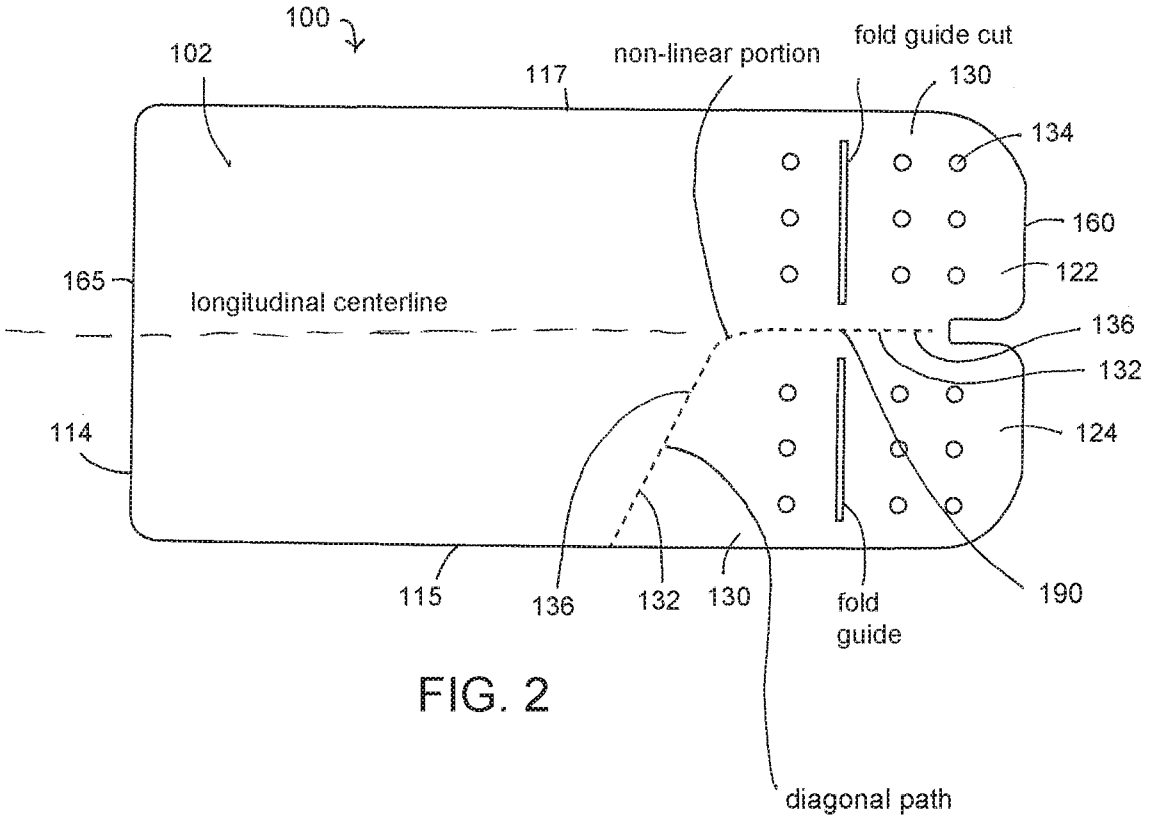
100
102
117
non-linear portion
fold guide cut
130
134
160
122
165
longitudinal centerline
136
132
114
124
115
136
132
130
fold guide
190
diagonal path

FIG. 2

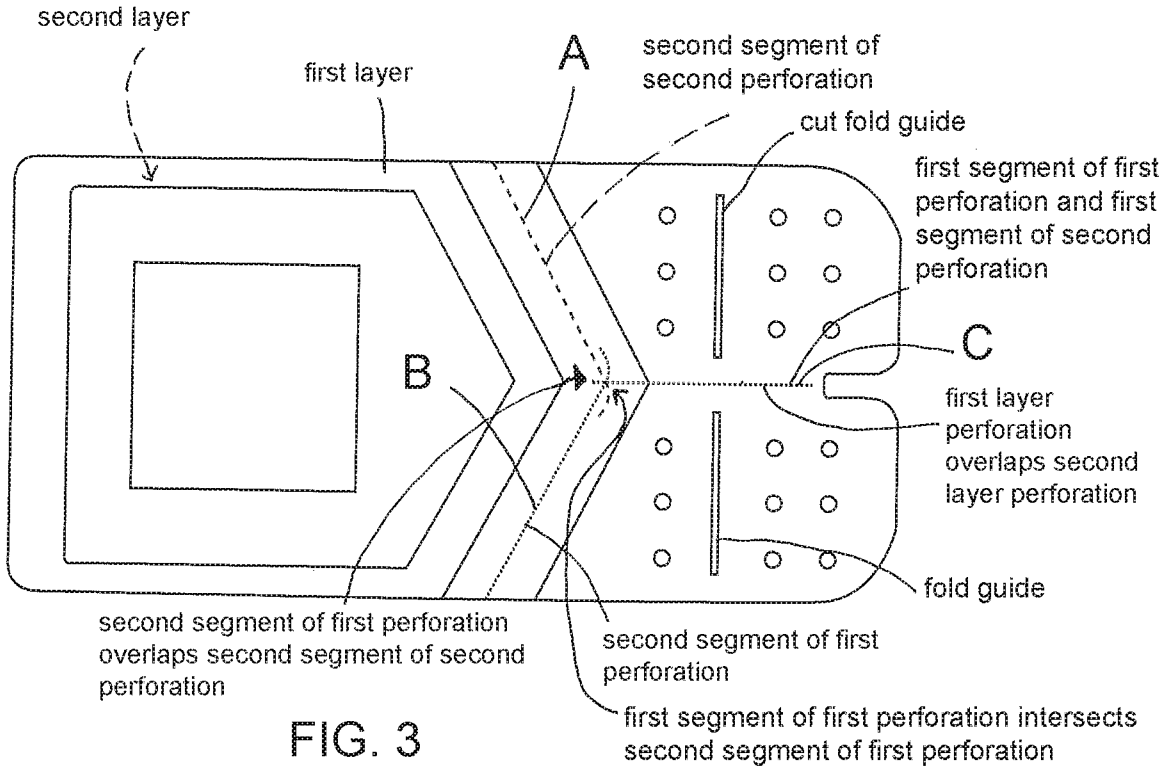
second layer
first layer
A
second segment of second perforation
cut fold guide
first segment of first perforation and first segment of second perforation
C
B
first layer perforation overlaps second layer perforation
fold guide
second segment of first perforation overlaps second segment of second perforation
second segment of first perforation
first segment of first perforation intersects second segment of first perforation

FIG. 3

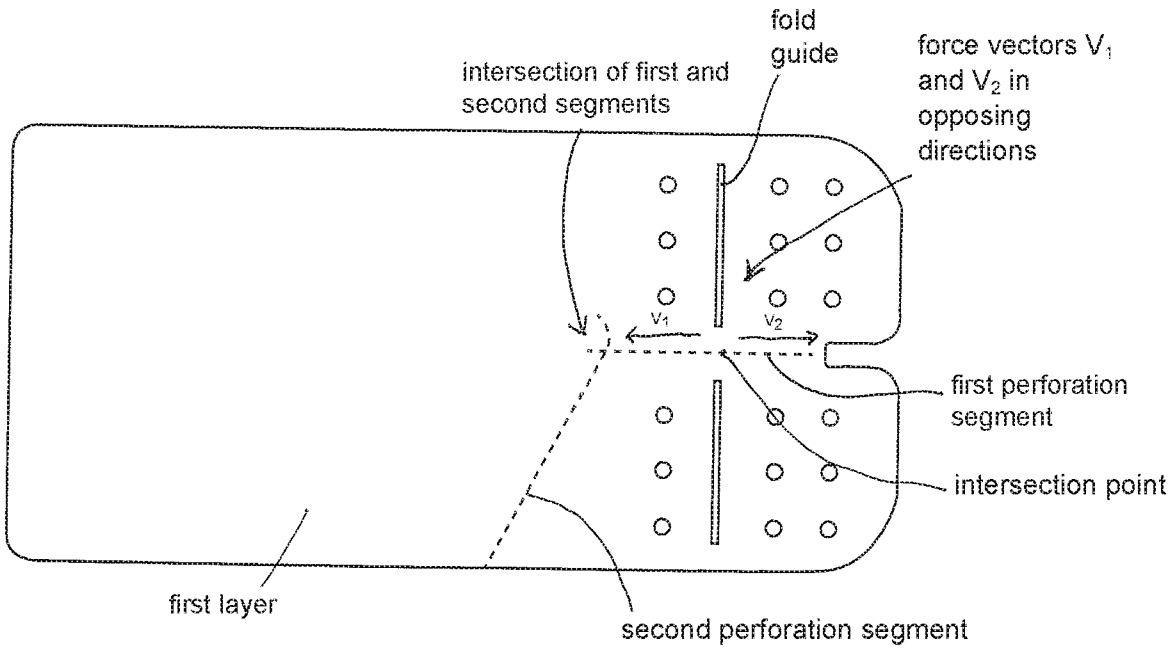
fold guide
force vectors V_1 and V_2 in opposing directions
intersection of first and second segments
V_1
V_2
first perforation segment
intersection point
first layer
second perforation segment

FIG. 4

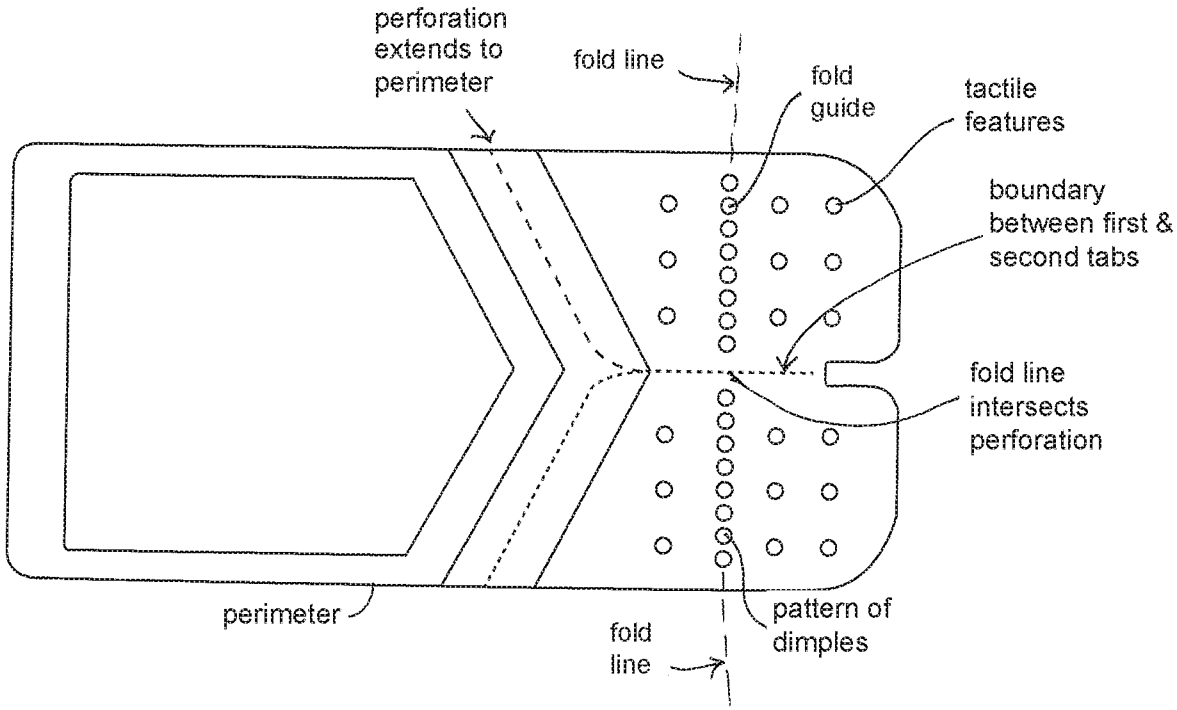
perforation extends to perimeter
fold line
fold guide
tactile features
boundary between first & second tabs
fold line intersects perforation
perimeter
fold line
pattern of dimples

FIG. 5

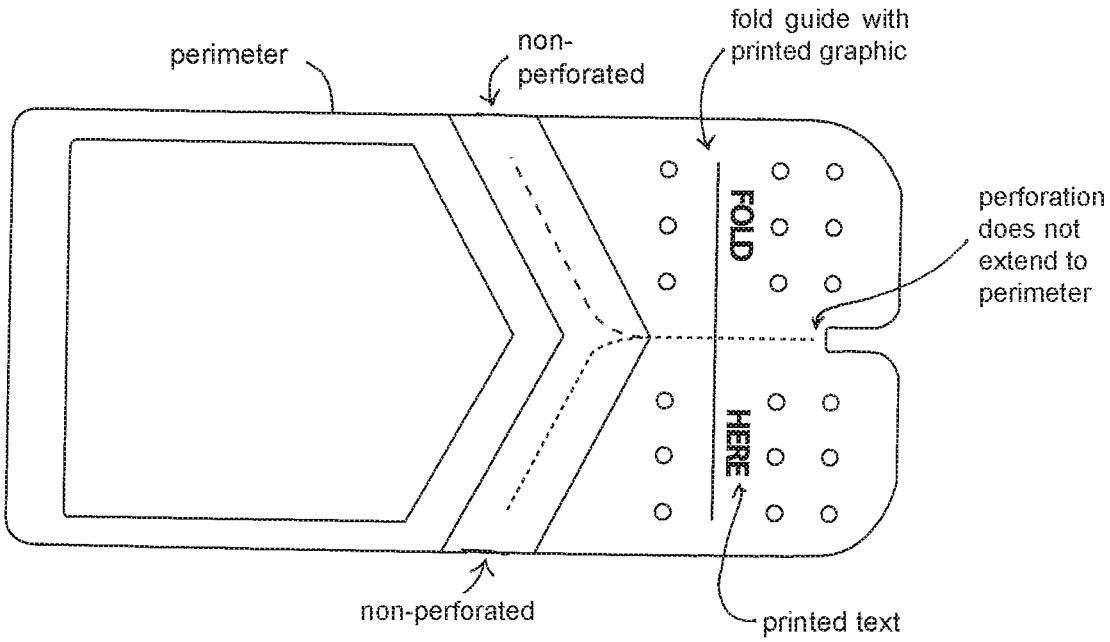
perimeter
non-perforated
fold guide with printed graphic
FOLD
HERE
perforation does not extend to perimeter
non-perforated
printed text

FIG. 6

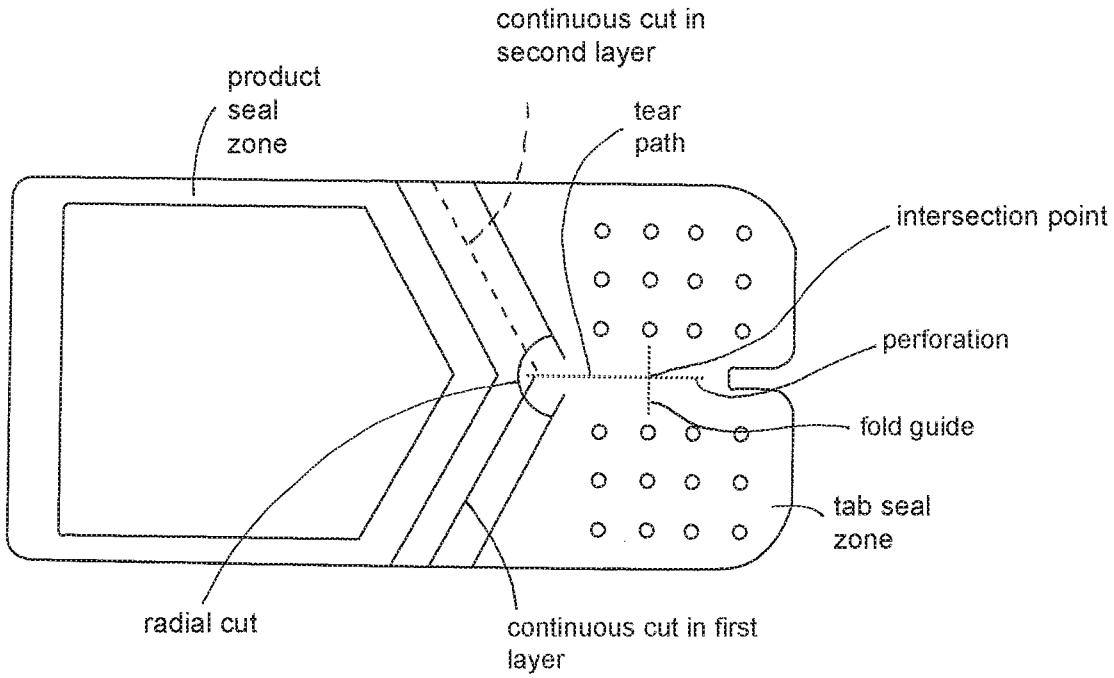
continuous cut in second layer
product seal zone
tear path
intersection point
perforation
fold guide
tab seal zone
radial cut
continuous cut in first layer

FIG. 7

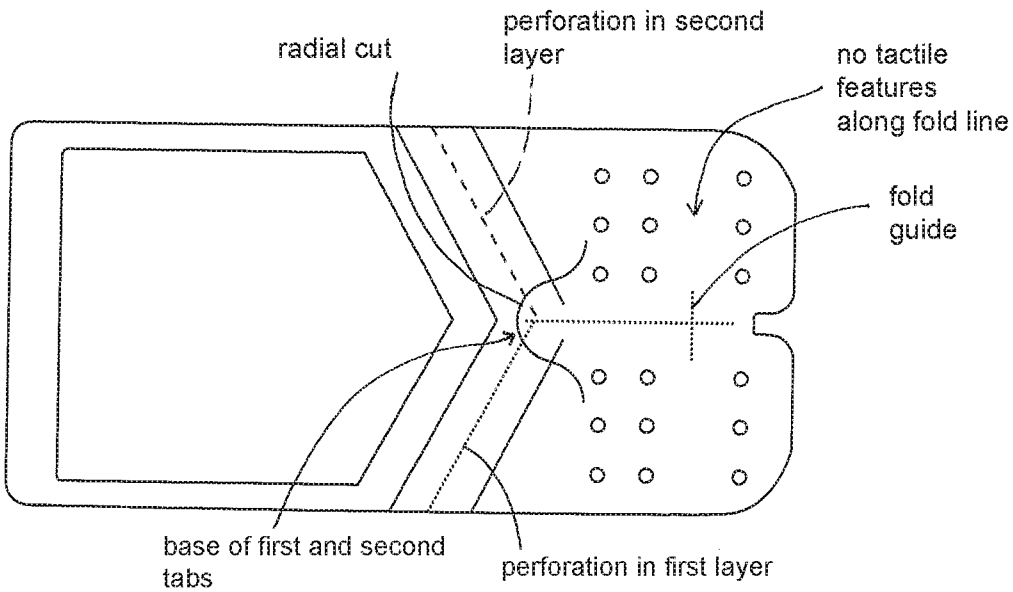
radial cut
perforation in second layer
no tactile features along fold line
fold guide
base of first and second tabs
perforation in first layer

FIG. 8

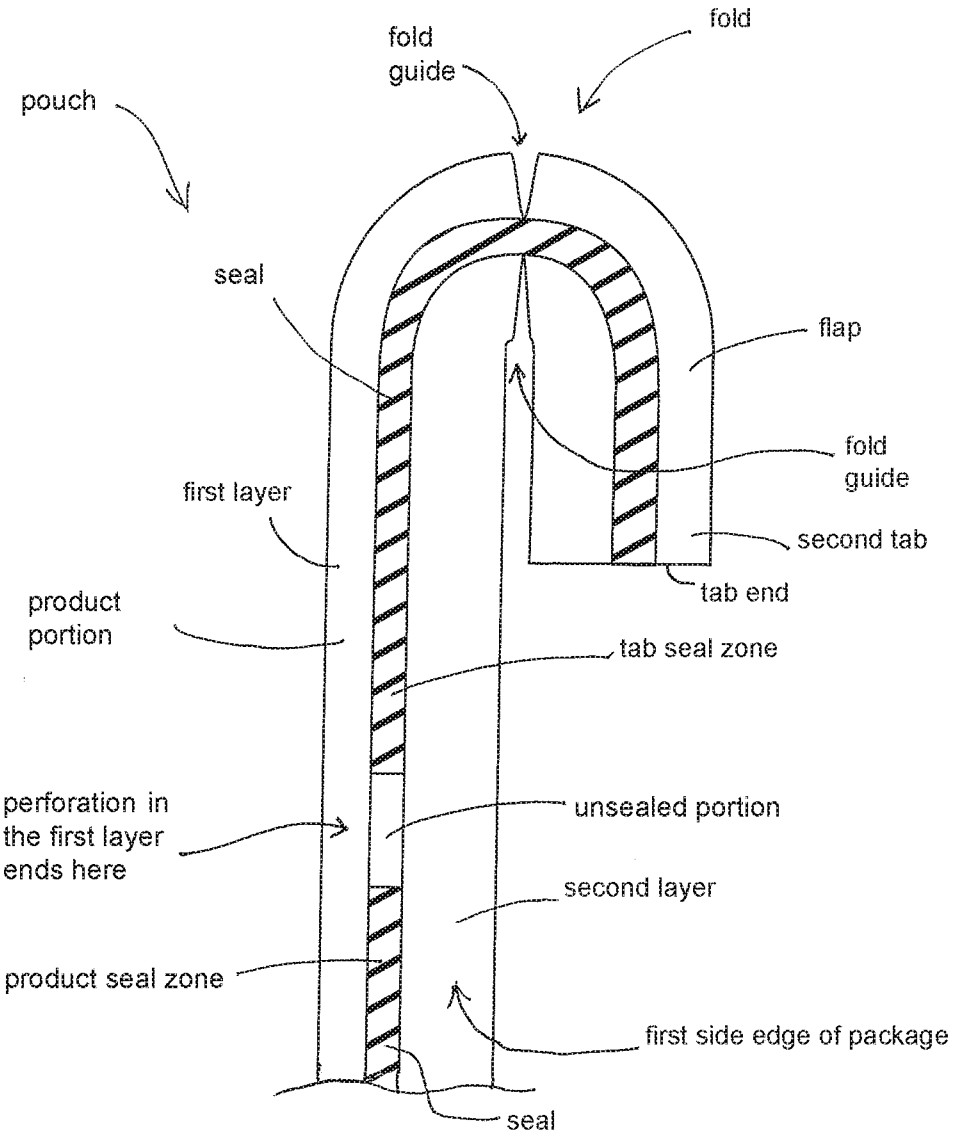
fold
fold guide
pouch
seal
flap
fold guide
first layer
second tab
tab end
product portion
tab seal zone
perforation in the first layer ends here
unsealed portion
second layer
product seal zone
first side edge of package
seal

FIG. 9

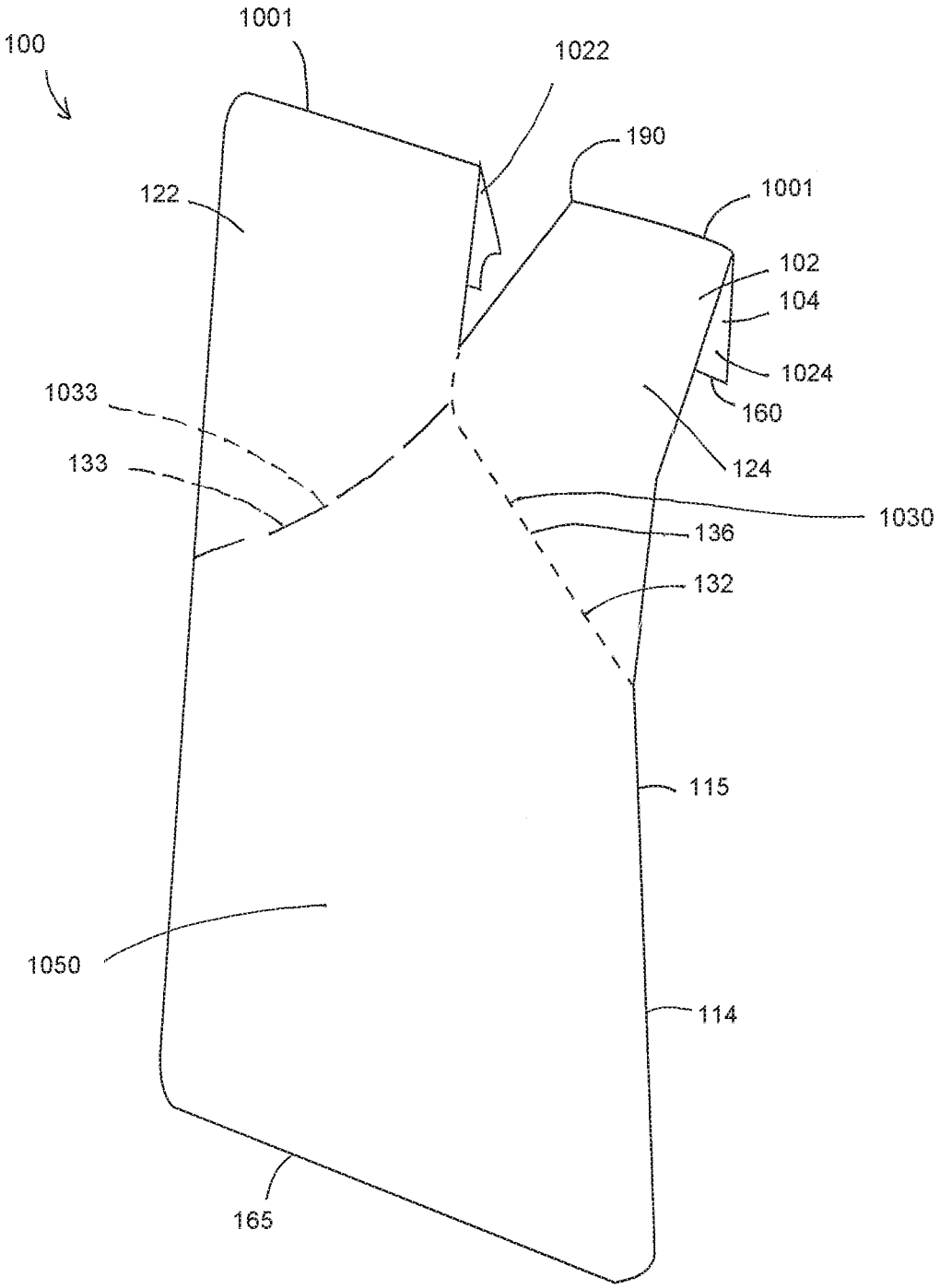
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FIG. 10

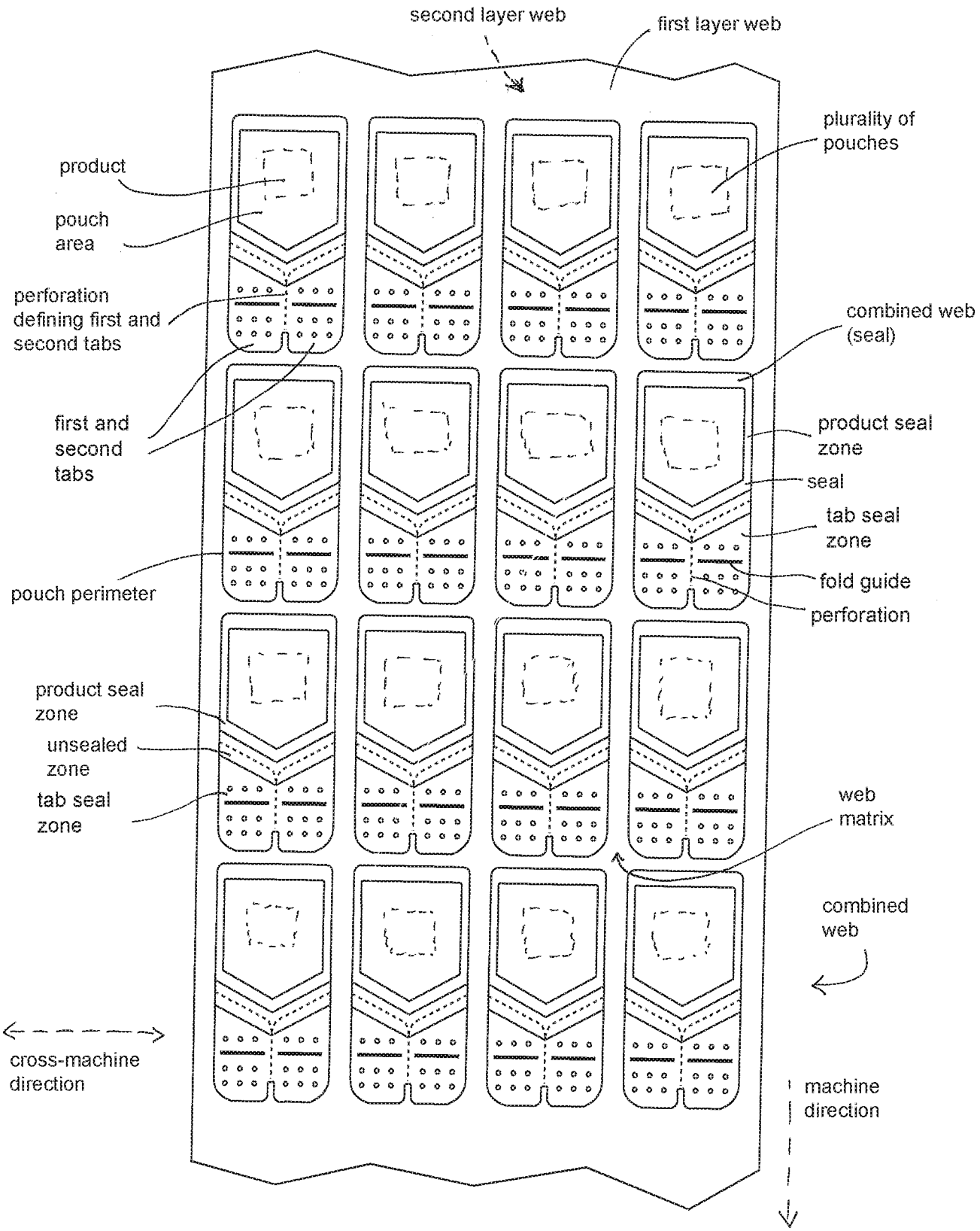
second layer web
first layer web
plurality of pouches
product
pouch area
perforation defining first and second tabs
first and second tabs
pouch perimeter
combined web (seal)
product seal zone
seal
tab seal zone
fold guide
perforation
product seal zone
unsealed zone
tab seal zone
web matrix
combined web
cross-machine direction
machine direction

FIG. 11

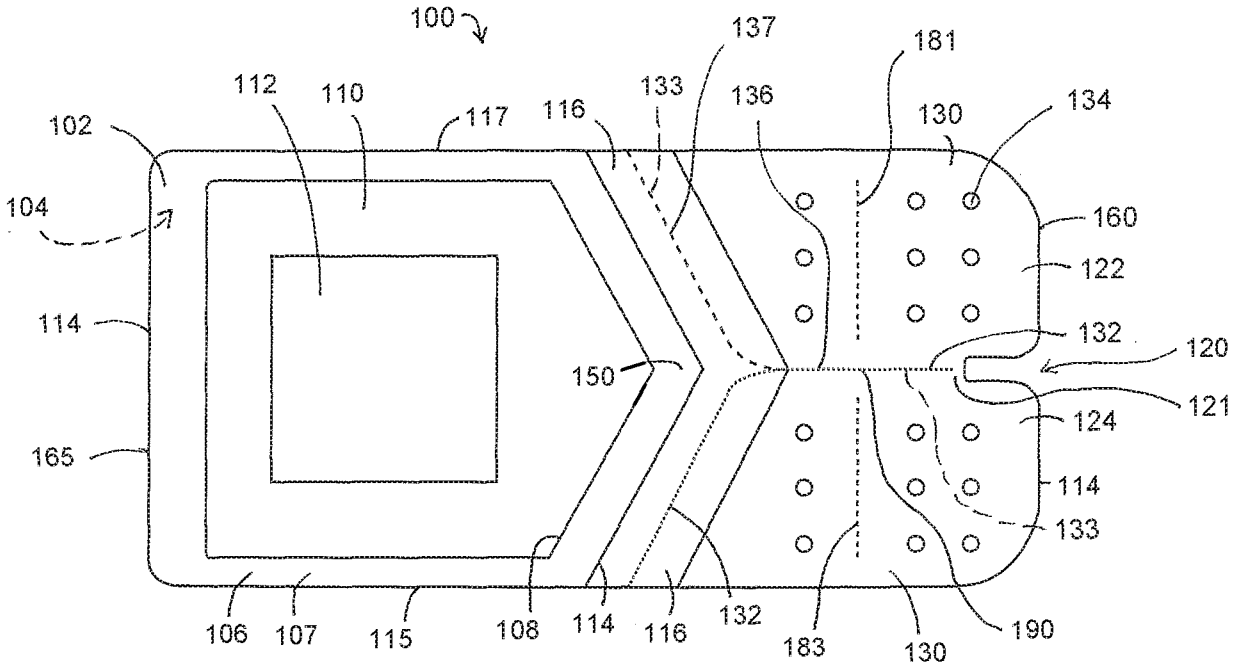
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FIG. 1