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(54) **VENTED PACKAGE**

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(57) **ABSTRACT**

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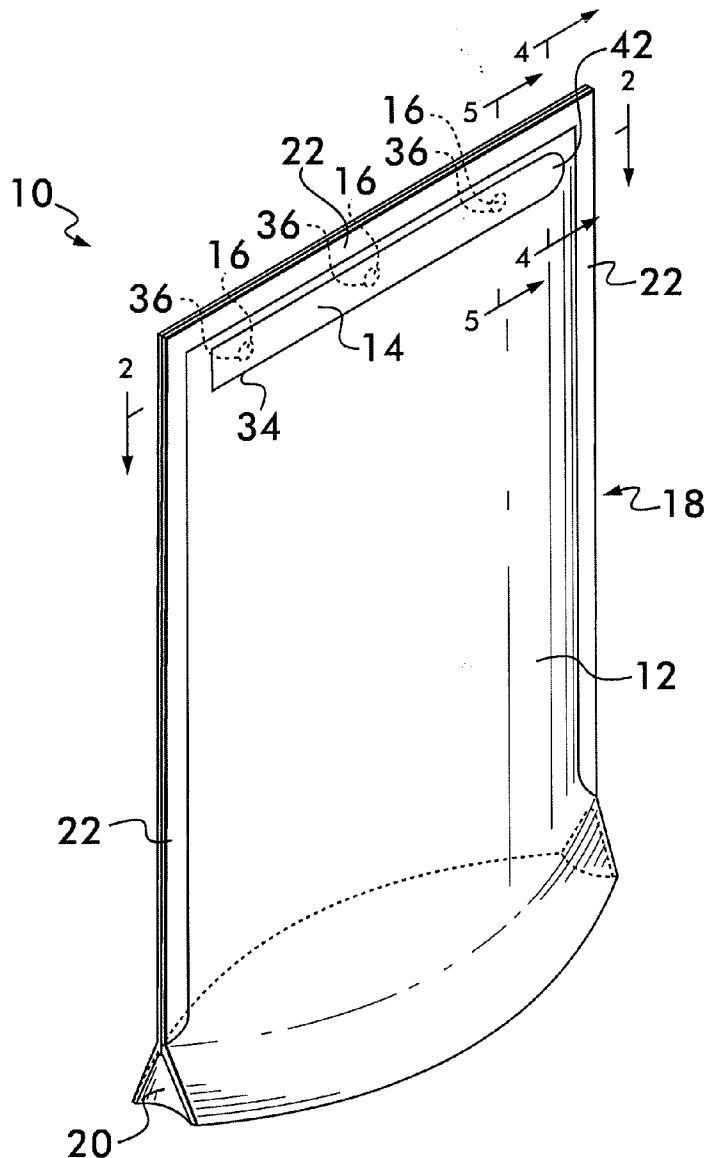
A package is provided having at least one panel formed from a laminate having an inner sealing layer, an outer web layer and an adhesive layer provided between the inner and outer layers. The outer web layer includes a removable tab portion defined by a first line of weakness in the layer. The inner sealing layer contains at least one removable plug portion defined by a second line of weakness. The first line of weakness is in registration with and surrounds the second line of weakness. The adhesive layer includes a permanent adhesive provided directly between at the tab and the plug portion and a non-permanent adhesive within the remainder of the area defined by the first line of weakness. Removal of the tab from the outer web causes separation of the plug from the inner layer, opening a vent within the package.

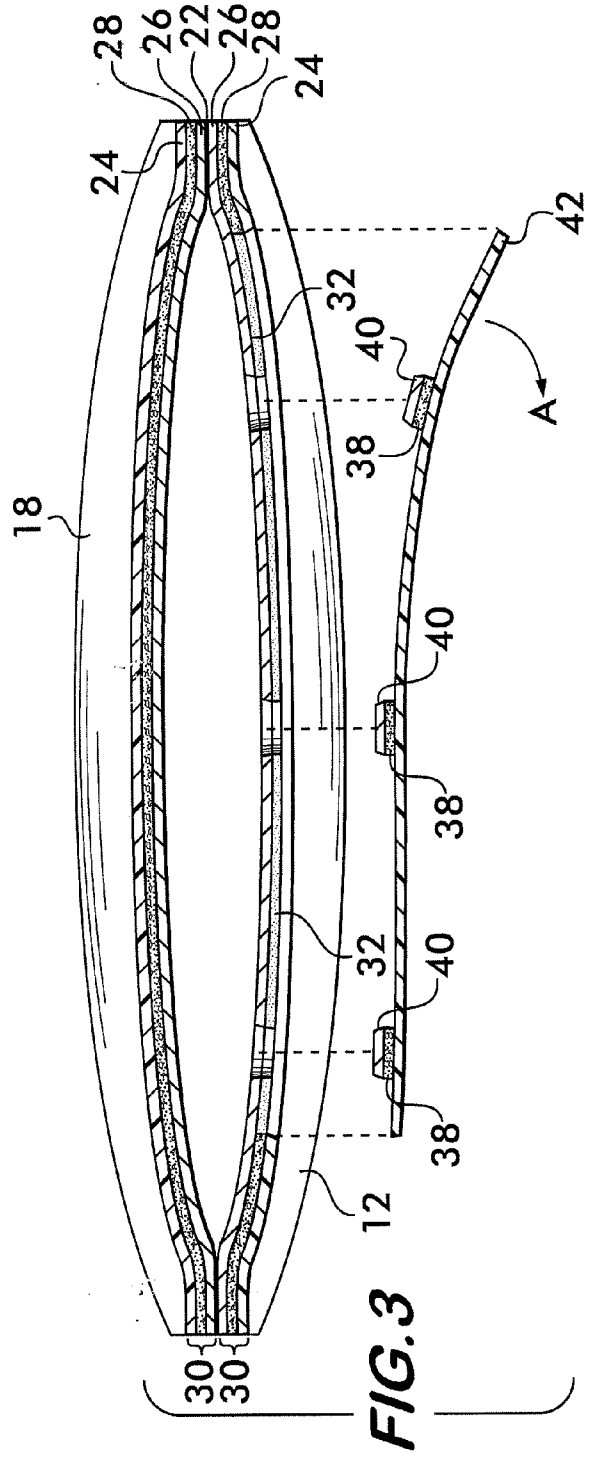
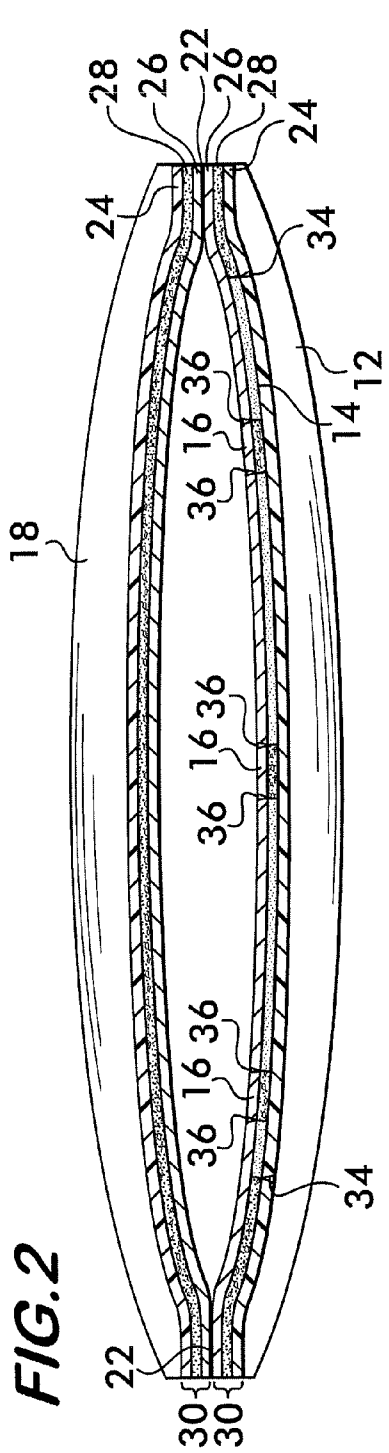
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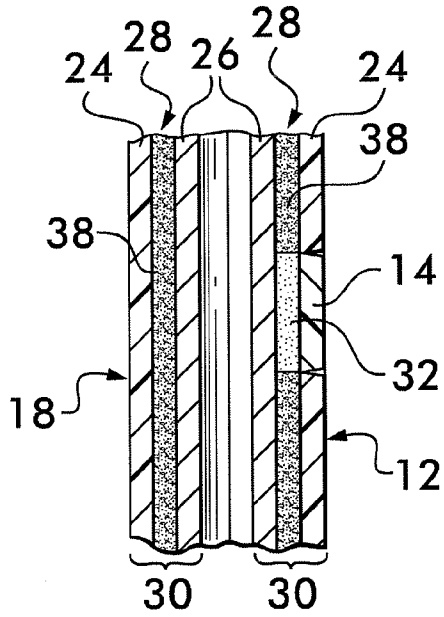


FIG. 4

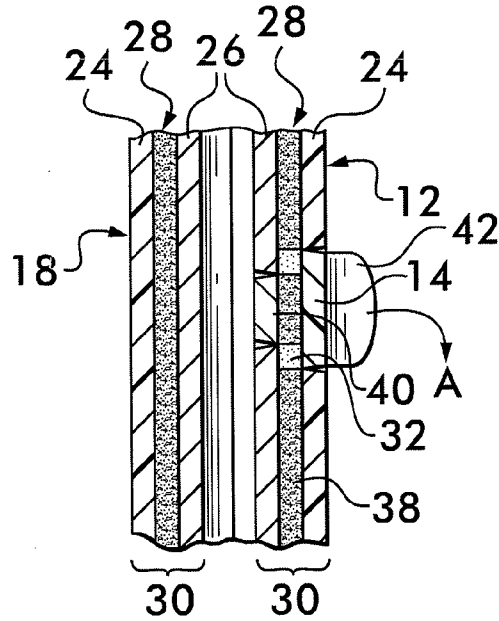


FIG. 5

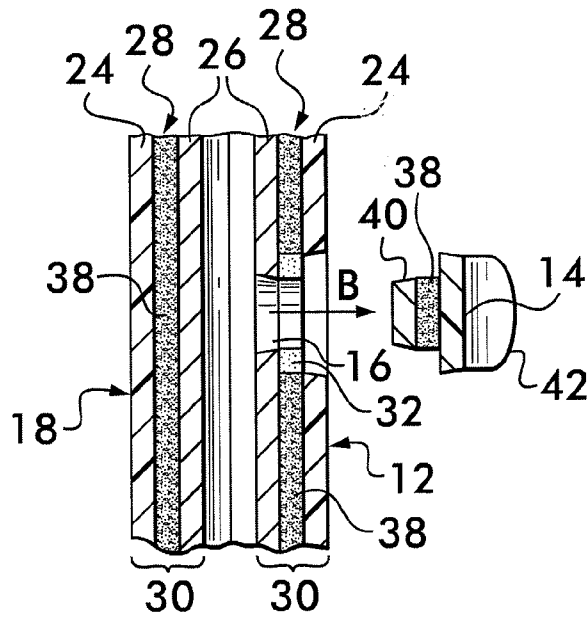


FIG. 6

VENTED PACKAGE

TECHNICAL FIELD

[0001] The present disclosure relates to a flexible packaging formed from a material laminate. More specifically, the present disclosure relates to providing a sealed package with a removable vent feature.

BACKGROUND

[0002] Flexible packaging, such as plastic bags or pouches, for containment and storage of food products is known. In some instances, it is desirable to store and cook food products in the same packaging. One efficient way of cooking food within a flexible package is by a microwave oven. However, sealed containers typically experience increases in internal pressure during heating of many food products. The increase in pressure within the package results from the conversion of liquids to a gaseous state when heated. Without means for allowing the escape of increased pressure, the package may be subject to failure; causing a need for clean-up or potentially harmful effects on the oven or its environment. As a result, various types of flexible packaging for food products include an opening or similar feature for the venting of gases during heating.

[0003] One form of known vent is the use of a removable tape to cover vent holes formed in the body of the package. The tape forms an additional layer on the outside surface of the package material. This requires an extra manufacturing step and affects the appearance of the outer surface of the package.

[0004] U.S. Pat. No. 4,904,489 describes a system for convective heating of food within a flexible package. In use, heated air is forced through an inlet port and circulates around a separate pouch contained within the bag. The forced air escapes the bag through separate vent holes. During shipping, the vent holes are covered by a removable tape.

[0005] U.S. Pat. No. 6,120,817 shows a flexible package having ports that are separated from the contents of the package during shipment. A zipper mechanism is heat sealed to the internal surfaces of a package to provide the desired separation.

[0006] U.S. Pat. No. 6,637,939 shows a resealable package having a zipper provided at the package opening. A sliding closing device is provided on the zipper that includes a valve for controlled venting of the bag during microwave cooking or the like.

SUMMARY

[0007] A package is provided having first and second panels that are formed to define an interior volume for retaining a product, such as food. At least one of the panels is constructed from a laminate material having an inner sealing layer and an overlying outer web layer. An adhesive layer is provided between the inner and outer layers. The outer web layer contains an integrally formed removable tab portion defined by a first line of weakness in the wall of the web. The inner sealing layer contains at least one integrally formed removable plug portion defined by a second line of weakness in the wall of the layer. The first and second lines of weakness are preferably in registration with one another, such that the first line of weakness surrounds the area defined by second line of weakness. In the registration area, the adhesive layer comprises a permanent adhesive positioned between the por-

tion of the tab overlapping the plug and a removable or non-permanent adhesive within the remainder of the registration area. The removable plug portion in the inner sealing layer is permanently adhered to the removable tab portion of the outer web.

[0008] During removal of the tab from the outer web, the tab separates from the sealing layer due to the non-permanent adhesive. In addition, the plug portion is adhered to the inner surface of the tab, such that the removable of the tab also separates the plug from the inner sealing layer, and opens a vent through the wall of the package. The vent opening is defined by the position of the outer web and inner sealing layer that are removed from the package by the removal of the tab. Prior to removal, the two-ply laminate seals the foodstuff or the like within the inner volume of the package.

[0009] A base panel may also be provided, connected to a portion of the first and second panels. The base panel may serve as a bottom gusset to facilitate standing of the package.

[0010] Further features and advantages of the present invention will become apparent by a review of the description below and a review of the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For the purpose of illustrating the invention, the drawings show forms that are presently preferred. It should be understood that the invention is not limited to the precise arrangement and instrumentality shown in the drawings.

[0012] FIG. 1 is a perspective view of a first exemplary embodiment of a package having a vent.

[0013] FIG. 2 is a cross-sectional view of the package of FIG. 1, taken along the line 2-2.

[0014] FIG. 3 is a cross-sectional view of the package of FIG. 1, taken along the line 2-2, with a tab portion removed from the wall of the package a vent being defined.

[0015] FIG. 4 is a cross-sectional view of the package of FIG. 1, taken along the line 4-4.

[0016] FIG. 5 is a cross-sectional view of the package of FIG. 1, taken along the line 5-5.

[0017] FIG. 6 is a cross-sectional view of the package of FIG. 1, taken along the line 5-5 with a vent portion defined within the package.

DETAILED DESCRIPTION

[0018] Referring to the figures, like numerals are used to indicate like elements throughout. FIGS. 1-6 show an embodiment of a flexible package generally identified by reference numeral 10. The package 10 is shown as having a generally rectangular construction, but may have any desired shape. As illustrated, the package 10 includes a first panel 12 having a removable tab 14, which covers formed vents 16.

[0019] Referring to FIG. 1, the package 10 is shown in the form of a stand up pouch having a first panel 12, an opposing second panel 18 and a bottom gusset panel 20. The first panel 12 is secured to the second panel 18 by a heat seal 22 extending along their top edges and along the upper side portions of the package 10. The gusset panel 20 is also preferably heat-sealed to the first panel 12 and second panel 18 adjacent their lower portions and along their bottom edges, providing a base for the package 10.

[0020] As shown in FIGS. 2 and 3, the first and second panels 12, 18 are constructed of a multi-layer laminate material 30, having at least a first layer 24 and a second layer 26. The first and second layers are preferably joined together by

an adhesive layer 28. The first and second layers 24, 26 respectively define inner and outer surfaces for at least a portion of the package. The first layer 24 may be an outer web, including one or more components. It is preferable that the first layer 24 be formed by a polyester material that is suitable for receiving printing, such as for labeling purposes. The second layer 26 preferably serves as the inner sealing layer for the laminate material 30 and, again, may be constructed of one or more components. It is preferable that the second layer 26 be constructed of an oriented polypropylene that is capable of being sealed to itself, or another compatible materials or layers, upon the application of heat and pressure.

[0021] A first line of weakness 34 is located in the outer web of the first layer 24 and defines the removable tab 14. Preferably, the removable tab 14 is located in an upper portion of the first panel 12. As seen best in FIGS. 2 and 3, the first line of weakness 34 preferably extends through at least a portion of the web material of the first layer 24 and does not extend into the second layer 26, thereby leaving the second layer 26 in tact and maintaining the seal and integrity of the package. Prior to adding the line of weakness 34, the material of the tab 14 is integrally formed with the remainder of the outer web 24.

[0022] Second lines of weakness 36 are provided within the second layer 26 and define the outline of vent holes 16. The material portions of the second layer 26 that are defined inside the second lines of weakness 36 are referred to as plug portions 40. There may be any number of vents 16, which may be formed by defined plugs 40 of any suitable shape. It is preferable that the plug portions 40 are covered by the tab portion 14, with the second lines of weakness 36 positioned within the defined area of the first line of weakness 34. Thus, the plugs 40 and their corresponding vents 16 are in registration with the tab 14 within the formed package.

[0023] The first and second lines of weakness 34, 36 may be foil led by laser scoring, die cut or other known method and may be a continuous score line or a perforation pattern. The goal of the pattern is to maintain the integrity of the layers and the integrally defined tab portion 14 and plugs 40, while also providing for clean separation of the tab and plugs during removal.

[0024] The adhesive layer 28 joins the first and second layers 24, 26 and is preferably pattern applied during the formation of the laminate. In the preferred embodiment, the adhesive layer 28 includes multiple types or strengths of adhesive. A layer of non-permanent or releasable adhesive 32 is providing in the area of the tab 16, defined by the first line of weakness 34. Thus, the tab 14 may be removed from the package wall using a moderate peeling force. The non-permanent adhesive 32 may be a pressure-sensitive adhesive or any other relatively weak or releasable adhesive that will provide sufficient integrity to the package layers while permitting separation of the outer web 24 upon the application of the peeling or separation force.

[0025] A permanent adhesive 38 is provided in certain areas where a relatively stronger bond is desired, as compared to that created by the non-permanent adhesive. Thus, the permanent adhesive 38 is contemplated to secure the adjacent materials together, requiring a destructive force for the separation of the materials. As shown in FIGS. 2 and 3, the permanent adhesive 38 is provided between the plug portions 40 and the inside surface of the tab portion 14. Thus, the plug portions 40 are permanently adhered to the inside of the tab 14. The permanent adhesive 38 may also be used to secure the

remainder of the web layer 24 to the sealing layer 26, outside of the first line of weakness 34.

[0026] Although not specifically identified in the drawings, a vacancy in the adhesive pattern may be located near a first end 42 of the tab 14 to facilitate lifting and separation of the tab 14 from the remainder of the outer web 24. The lack of an adhesive may make it easier to start peeling the tab 14 away from the inner layer 26. The adhesive vacancy may be formed by a gap in the pattern adhesive or by blocking the adhesive provided in the area of the end 42 of the tab 14.

[0027] FIGS. 4-6 show side cross-sectional views of the area of the package 10 around the removable tab 14 and the defined vents 16. FIG. 4 shows a cross-sectional view of the package 10 taken in an area of the tab 14 defined in the outer web layer 24, where the tab 14 does not cover a plug portion 40 in the adjacent portion of the second layer 26. The tab portion 14, defined by the first line of weakness 34, is shown connected to the outer web 24 and adhered to the underlying sealing layer 26 by a non-permanent adhesive 32. FIG. 5 shows a cross-sectional view taken across the removable tab 14 in the area of one of the plug portions 40, which is defined by the second lines of weakness 36 in the sealing layer. The first end 42 of the removable tab 14 is shown as partially peeled away from the first panel 12. The portion of the tab 14 that is overlying the plug portion 40 is joined to the plug by a permanent adhesive 38. In FIG. 5, the vent hole 16 is closed by the plug, formed from the material of the sealing layer 26. FIG. 6 shows the tab 14 removed from first panel 12. A vent hole 16 is defined by the removal of the plug 40, which remains adhered to the tab 14 and is removed along with the tab due to the permanent adhesive 38. The vent 16 extends through the inner layer 26 and is open to the atmosphere outside the package, by the removal of tab portion 14 of the outer web layer 24. In FIG. 6, the gas within the package is permitted to escape "B" through the panel 12.

[0028] In use, the package 10 may be stored in any position (i.e. upright, on its side or housing). The package 10 may be stored at room temperature, refrigerated or frozen, depending on the contents and desires of the user. Prior to heating the contents of the package 10, such as by using a microwave oven (not shown), the tab 14 and plug portions 40 may be removed by peeling the tab 14, starting at "A" in FIGS. 3 and 5. As the tab 14 is removed from the outer web 24, the plug portions 40 are also removed from the inner layer 26 as shown by FIG. 3. During heating, the steam and gas pressure that builds within the package 10 may escape through the open vents 16, as shown by "B" in FIG. 6.

[0029] The non-permanent adhesive 32 may be one of any known compositions. By way of example 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 used and may be 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 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.

[0030] As one primary use of the package **10** is for containing food, it is preferable that the non-permanent adhesive **32** be a food-grade composition. By way of example, various pressure-sensitive adhesives are approved by the US Food and Drug Administration, as regulated by 21 CFR Part 175.300. A preferred food-grade pressure-sensitive adhesive for use in the present invention is Jonbond 743, available from Bostik Findley. Additives (e.g., particulates or the like) can be included in the non-permanent adhesive **32** to reduce the tenacity of the bond to either of the laminate layers, if desired, so that the non-permanent adhesive **32** readily detaches from one of the laminate layers, upon removal of the tab **14**.

[0031] The permanent adhesive may be of any known composition. A suitable example includes two-component polyurethane adhesive systems, such as Tycel 7900/7283 available from Henkel.

[0032] Polyester is mentioned above as the preferred material of the two laminate layers. Various materials may also be used within the laminate layers, including polyesters, polyolefins (including homopolymers and copolymers), polyamides, paper and the like.

[0033] In addition, the inner layer may include a barrier layer (not shown) including barrier polymer films, such as ethylene vinyl alcohol copolymer (EVOH), polyamide and the like.

[0034] Preferably, the inner and outer layers have the same surface area and are continuous within the formation of a package panel. An ink layer (not shown) may be provided between the laminate layers. For example, page indicia and graphics may be reverse printed on the inside surface of the outer web layer. The ink layer would then be brought into contact with the adhesive layer **28** when forming the package laminate. A number of package forms are contemplated. The stand-up pouch in FIG. 1 is one potential embodiment. A bottom gusset panel **20** is not required to form a package having the contemplated invention. Side gussets (not shown) may be provided within the package, if desired. As such, the flexible laminate of the present invention may be formed as part of other packaging arrangements, including vertical form-fill-seal packages, flow wraps, pillow packs, etc.

[0035] Although the invention has been described and illustrated with respect to the exemplary embodiments thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions and additions may be made therein and thereto, without parting from the spirit and scope of the present invention. Accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

What is claimed is:

1. A flexible package comprising:

- a first panel having an upper and lower portion;
 - a second panel having an upper and lower portion, the first panel connected to the second panel along side edges of the upper and lower portions; and
 - a base panel connected to the lower portions of the first and second panels and forming a bottom gusset, the first, second and base panels defining an interior package volume,
- at least one of the panels constructed from a laminate material having an inner sealing layer, an outer web, and an adhesive layer,
- the adhesive layer provided between the sealing and outer web layers for joining the layers to one another,

the outer web having an integral tab portion defined by a first line of weakness,

the inner sealing layer having at least one integrally formed plug portion defined by a second line of weakness, the plug portion in registration with the area of the tab portion defined by the first line of weakness, such that the tab portion covers and surrounds the plug portion, and

the adhesive layer having a patterned permanent adhesive between the tab portion and the plug portion and a patterned non-permanent adhesive in the registration area outwardly of the second line of weakness and inwardly of the first line of weakness.

2. The flexible package according to claim 1, further comprising a plurality of plug portions defined by a plurality of second lines of weakness within the sealing layer, the plurality of plug portions in registration with and covered by the tab portion in the outer web layer.

3. The flexible package according to claim 1, further comprising a vacancy in the pattern applied adhesive layer located between the tab of the outer web layer and the inner sealing layer, the vacancy positioned adjacent an end portion of the tab as defined by the first line of weakness, thereby forming a detached gripping portion on the tab.

4. The flexible package according to claim 1, wherein the second line of weakness defines a generally round vent opening, upon removal of the tab along with the adhered plug portion.

5. The flexible package according to claim 1, wherein the first line of weakness defines a generally elongated tab within the outer web layer.

6. The flexible package according to claim 1, wherein the first line of weakness comprises a perforation pattern within the outer web layer.

7. The flexible package according to claim 1, wherein at least one of the first or second lines of weakness is a die cut.

8. The flexible package according to claim 1, wherein at least one of the first or second lines of weakness is a laser scoring.

9. The flexible package according to claim 1, wherein the tab portion is located within the upper portion of the first panel.

10. The flexible package according to claim 1, wherein the pattern of non-permanent adhesive is a pressure sensitive adhesive.

11. The flexible package according to claim 1, wherein the outer web layer is polyester.

12. The flexible package according to claim 11, wherein the inner sealing layer is a heat-sealable material.

13. The flexible package according to claim 12, wherein the inner sealing layer comprises a barrier against passage of at least one of moisture and oxygen.

14. A package comprising:

- a flexible laminate forming an outer surface of at least a portion of the package, the flexible laminate having a continuous outer web layer
- an inner sealing layer conforming to the outer web layer, an adhesive layer adhering the outer web to the inner sealing layer, and
- a removable vent feature formed in the laminate layers, the removable vent comprising an outer tab portion defined by a first line of weakness in the outer web layer, the tab portion of the outer

web being releaseably adhered by the adhesive layer to the underlying area of the inner sealing layer; and

at least one removable plug portion formed by a second line of weakness in the inner sealing layer, the plug portion fixedly adhered to tab portion, removal of the outer tab portion along with the adhered plug portion creating a vent opening in the package.

15. A package as in claim **14** wherein the region of the adhesive layer located in the area between the first and second lines of weakness comprises a pressure sensitive adhesive.

16. The package as in claim **14** wherein the first line of weakness is a die cut line.

17. The package as in claim **14** wherein the first line of weakness is a laser scoring.

18. The package as in claim **14** wherein the outer tab portion has an elongated shape.

19. The package as in claim **14**, further comprising multiple removable plug portions, spaced from one another within the inner sealing layer and each fixedly adhered to the tab portion of the outer web layer.

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