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(54) Title: TAMPER EVIDENT CONTAINER AND COVER ASSEMBLY

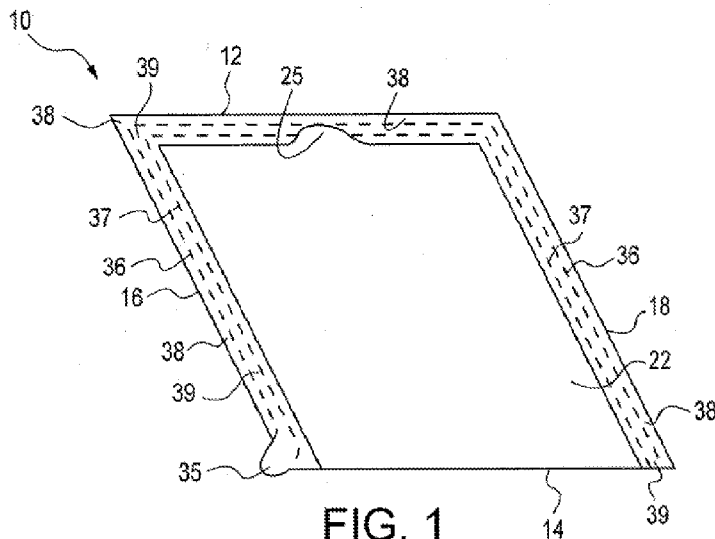


FIG. 1

(57) Abstract: A cover assembly (10) having provisions for indicating previous opening and/or tampering is described. The cover assembly (10) includes a tear off tab (35) which must be separated from the cover assembly (10) in order to access a pull tab (25) for opening the cover. Also described are containers using such cover assemblies, and methods for indicating previous opening attempts and/or container tampering.



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TAMPER EVIDENT CONTAINER AND COVER ASSEMBLY

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] This application claims priority from US provisional application serial No. 61/454,607 filed March 21, 2011.

FIELD OF THE INVENTION

[0002] The present invention relates to containers with provisions that indicate tampering and/or previous attempts to open the container. The invention also relates to methods of indicating container tampering.

BACKGROUND OF THE INVENTION

[0003] Containers or packaging systems that provide indication of tampering are well known in the art. Typically, such provisions are in the form of perforation patterns formed in overlying layers in the container. Upon separation of the layers from one another in order to open the container, it is difficult if not essentially impossible to re-align the patterns in their original configuration prior to opening. However, in certain situations, perforation patterns can be sufficiently re-aligned such that without close inspection, a pattern may appear to have never undergone an initial separation or container opening. Accordingly, a need exists for an improved container tampering indicator, and particularly which more dramatically indicates a previous opening, opening attempt, and/or tampering.

[0004] Although a variety of other tamper indicating provisions are known in the art, each suffers from one or more drawbacks. A common disadvantage to many known tamper indication systems is the cost of providing and/or incorporating such in a container or package. Often intricate and complex structures or configurations must be formed or incorporated in the container. These increase container cost and/or manufacturing complexity. Therefore, a need exists in the art for a tamper evident container which provides clear indication of tampering or previous attempts at opening, and yet which is relatively inexpensive to produce and incorporate in a container or package.

SUMMARY OF THE INVENTION

[0005] The difficulties and drawbacks associated with previously known containers and packaging systems are addressed in the present invention for a unique cover assembly, container using the cover assembly, and method involving the cover assembly.

[0006] In one aspect, the present invention provides a cover assembly comprising a cover inner support having a pull tab defined along an outer edge of the inner support. The cover assembly also comprises a cover outer support having at least one region of weakened material that defines a removable strip. The strip extends to a tear off tab defined along an outer edge of the outer support. The pull tab is entirely covered by the outer support.

[0007] In another aspect, the invention provides a cover assembly defining an outer face and an oppositely directed inner face. The cover assembly comprises a cover inner support defining an outer peripheral edge and a pull tab defined along the outer edge. The cover assembly also comprises a cover outer support disposed on the cover inner support and defining an outer peripheral edge. The outer edge of the cover outer support extends over the pull tab of the cover inner support. The cover outer support also defines at least one line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support, to thereby define a removable strip. The removable strip extends over the pull tab. The cover outer support includes a tear off tab along the outer edge of the cover outer layer and extending from the removable strip. The pull tab is accessible along the outer face of the cover assembly only after removal of a portion of the removable strip extending over the pull tab.

[0008] In another aspect, the invention provides a container and cover assembly comprising a container having a container wall defining an outer surface. The container wall generally encloses a hollow container interior. The container wall defines an aperture providing access to the interior. The container and cover assembly also comprises a cover assembly at least partially adhered to the container wall. The cover assembly has an outer face and an oppositely directed inner face. The cover assembly includes (i) a cover inner support having a pull tab extending from an outer edge of the cover inner support, and (ii) a cover outer support disposed on the cover inner support and defining an outer edge of the cover outer support. The cover outer support extends over the pull tab. The cover outer support also defines at least one line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support to thereby define a removable strip. The removable strip extends over the pull tab. The cover outer support includes a tear off tab along the

outer edge of the cover outer layer. Prior to removal of the removable strip from the cover, the pull tab is inaccessible from the outer surface of the container.

[0009] In still another aspect, the invention provides a method of indicating at least (i) a previous container opening attempt, and (ii) container tampering. The container has a container wall defining an outer surface. The container wall generally encloses a hollow interior. The container wall defines an aperture providing access to the interior. The method comprises providing a cover assembly having an outer face and an oppositely directed inner face. The cover assembly includes a cover inner support having a pull tab extending from an outer edge of the cover inner support and a cover outer support disposed on the cover inner support and defining an outer edge. The cover outer support extends over the pull tab. The cover outer support also defines at least one line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support to thereby define a removable strip. The removable strip extends over the pull tab. The cover outer support includes a tear off tab along the outer edge of the cover outer layer. The method also comprises positioning and adhering the cover assembly over the aperture defined in the container. The pull tab of the cover assembly is inaccessible without removing the removable strip from the cover assembly, and upon removal of the removable strip from the cover outer support, a portion of the cover outer support remains adhered to the container wall thereby indicating at least one of (i) and (ii).

[0010] As will be realized, the invention is capable of other and different embodiments and its several details are capable of modifications in various respects, all without departing from the invention. Accordingly, the drawings and description are to be regarded as illustrative and not restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a schematic view of the underside of a preferred embodiment tamper evident cover assembly in accordance with the invention.

[0012] Figure 2 is an exploded schematic view of the preferred embodiment tamper evident cover assembly of Figure 1.

[0013] Figure 3 is a perspective view of a container and the preferred embodiment cover assembly of Figure 1 affixed thereto prior to an initial opening.

[0014] Figure 4 is a perspective view of the container and the preferred embodiment cover assembly of Figure 3 after an initial opening, the cover being in a closed position.

[0015] Figure 5 is a perspective view of the container and the preferred embodiment cover assembly of Figure 3 after an initial opening, the cover being in an open position.

[0016] Figure 6 is a schematic view of the underside of another preferred embodiment tamper evident cover assembly in accordance with the invention.

[0017] Figure 7 is a schematic view of the underside of still another preferred embodiment tamper evident cover assembly in accordance with the invention.

[0018] Figure 8 is a perspective view of a container and the preferred embodiment cover assembly of Figure 7 after an initial opening, the cover being in an open position.

[0019] Figure 9 is a perspective view of a container and another preferred embodiment cover assembly in accordance with the invention affixed thereto prior to an initial opening.

[0020] Figure 10 is a perspective view of the container and the preferred cover assembly of Figure 9 after an initial opening, the cover being in a closed position.

[0021] Figure 11 is a perspective view of the container and the preferred embodiment cover assembly of Figure 9 after an initial opening, the cover being in an open position.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0022] Generally, the present invention provides various containers and cover assemblies having provisions for indicating tampering, previous opening, or attempts thereof. The invention also provides methods of indicating previous openings, opening attempts and/or tampering of containers by use of the particular provisions and strategies described herein.

[0023] The term "container" as used herein refers to an enclosure, housing, or package that provides an interior hollow region within which for example food or other items can be stored. The interior of the container is typically accessed by removing, partially removing, or at least separating a cover layer from a corresponding substrate or layer. Typically an opening or aperture is provided in the container. The cover can be selectively opened and closed to govern access to the interior of the container through the aperture. Typically, the aperture and thus container is closed by positioning the cover to lie over the aperture. The aperture and thus access to the container interior is opened by positioning the cover away from the aperture. The container can be formed from a relatively rigid shape-retaining material such that the container defines a recessed open interior region that is accessible by separation of a cover layer therefrom. Alternatively, the container is a flexible wall enclosure such as a bag, pouch, or packet.

[0024] The term "cover" as used herein refers to any single layer or multilayer laminate that is used to overlie one or more interior regions defined in a corresponding container or substrate and which can be effectively secured to the container to thereby enclose and seal the interior of the container. In the

preferred embodiments described herein, covers are configured to selectively extend over an opening in the container. Typically, the cover can be opened or closed relative to the opening and thereby govern access to the interior of the container.

[0025] In accordance with the invention, containers are provided with provisions that indicate a previous opening, opening attempt, and/or tampering of the container. In order to access an interior hollow region of the container and the contents therein, one or more cover layers must be separated from an underlying container substrate. Such separation is performed by initial pulling and/or engagement of a pull tab, generally formed as part of the cover layer. In order to access the pull tab, a separate member referred to herein as a “tear off tab” must be at least partially torn or separated along one or more regions or lines of weakened material defined in the cover layer. Removal or at least partial tearing or separation of the tear off tab from the remainder of the cover layer provides indication of opening, attempt at opening, and/or tampering of the container. The indication is typically in the form of a visual indication and/or a tactile indication.

[0026] The one or more regions or lines of weakened material in the cover assembly can be provided or incorporated in a variety of ways. For example, lines of weakened material can be produced by forming lines of perforations or partial perforations in all or some of the layers of the cover assembly. Lines of weakened material can also be formed by creating scores, cuts, or lines of severing in one or more of the layers constituting the cover assembly. It is also contemplated that lines of weakened material can be formed by impacting, die cutting, or other processing techniques. In addition, selective incorporation of low strength materials within desired regions of the cover assembly can also serve to provide the one or more lines of weakened material.

[0027] As will be understood, the container is initially opened by use of the pull tab. That is, a user wishing to open the container by pulling the cover away from its closed position over the container aperture, typically grasps the pull tab and pulls the cover away from the container. However, the pull tab can only be accessed by removal, or at least partial removal, of the tear off tab. As explained in greater detail herein, both of the pull tab and the tear off tab are provided by the cover or cover assembly. Upon attaching the cover assembly to a container, and initially sealing or closing the cover over the container aperture, preferably, the pull tab is initially covered and most preferably entirely covered by one or more outer layers of the cover assembly. Since the pull tab is covered, the pull tab is not accessible. Therefore, the cover is not easily removable from the container. In order to gain access to the pull tab, the tear off tab is grasped and at least partially torn or separated from the cover. Preferably, one or more lines of weakened cover material are provided to facilitate removal and

separation of the tear off tab from the cover. Removal of the tear off tab from the cover and the container to which the cover is attached is readily apparent and thereby provides visual and/or tactile indication that the container has been previously opened. As will be appreciated, this configuration provides a simple, convenient, and inexpensive strategy for evidence of container tampering.

[0028] The present invention tamper evident container can also include additional provisions for signaling a previous container opening. For example, providing particular colors, color combinations, indicia, and/or marking on one or more layers of the cover and/or container may provide even greater indication to a user that the container has been previously opened or attempts at opening the container have been undertaken. A wide assortment of other strategies and techniques could be used to further promote or enhance indication of a previous opening operation or attempt having occurred.

[0029] In addition to various tamper evident containers, the present invention also provides methods of providing indication of container opening attempts having occurred. Preferably, these methods involve providing a container as described herein which includes provisions for a tear off tab formed by one or more lines of weakened material and a pull tab and which are configured such that the pull tab can only be accessed after separation of at least a portion of the tear off tab from an underlying container or cover substrate. Upon separating at least a portion of the tear off tab from the substrate, at least a portion of the line of weakened material is severed thereby providing indication of occurrence of an attempt to open the container.

[0030] The container and/or cover assembly can include any or all of the previously described features such as but not limited to the provision of a pair of spaced apart parallel lines of weakened material to thereby define a tear off tab therebetween, a colored region proximate the tear off tab which is visible upon separating the tear off tab from the substrate, forming the line(s) of weakened material by perforating or scoring the cover layer, and the use of a multilayer laminate for the cover assembly. In other configurations, the tear off tab can be formed between an outer edge of a cover assembly and a line of weakened material in the cover assembly generally extending parallel to the outer edge but spaced inward therefrom.

[0031] As previously noted, the present invention includes the use of cover layers that are in the form of a single layer or a multilayer laminate.

[0032] Preferably, the cover laminate comprises (without regard to any order of the layers) an outer support film or layer, a barrier material layer, an adhesive layer, an optional release layer (which may be pressure sensitive), an inner support film or layer, and a heat sealing layer. An optional printing layer may also be used. In describing several preferred embodiment cover assemblies, primary

attention will be provided to an outer support layer which generally provides a tear off tab, and an inner support layer which generally provides a pull tab. Each of these layers within the multilayer cover laminates is described as follows.

Cover Outer Support

[0033] The preferred multilayer cover laminates include an outer support film to provide support for the cover and particularly for an outermost portion of the cover resulting from initial opening of the container and thus at least partial separation of the cover from the underlying container substrate. The outer support can be formed from a wide array of materials such as polyethylene terephthalate film, polyolefin film materials or paper, cardboard, or other paper-based materials. Representative materials for the outer support include, but are not limited to, polyethylene terephthalate (PET), polyethylene (PE), polypropylene (PP), both oriented and nonoriented, and copolymers thereof. Another example of a potentially suitable film for the cover outer support is a layer of polyvinyl chloride (PVC) and copolymers thereof. Additional materials include, but are not limited to, polyvinyl chloride (PVC), and ortho-phthalaldehyde (OPA). For many applications, PET is preferred.

[0034] The cover outer support can be utilized at various thicknesses in the cover laminate. The outer support can have a typical thickness of from about 12 to about 60 microns, and a preferred thickness of from about 12 to about 25 microns.

[0035] Since the outer face of the outer support will likely constitute the outermost surface of the cover, it is desirable that the material selected for the outer support, at least along this outwardly directed face, exhibit attractive printability characteristics.

[0036] Printability is typically defined by the sharpness and brightness of the image and by ink anchorage. The sharpness is closely related to the surface tension of the print surface. The ink anchorage is often tested by a tape test (Finat test: FTM21). In general, PVC is printable with a variety of inks intended to be used with PVC. In most occasions the inks are water-based (especially in the US) or designed for UV drying (especially in Europe). In general, all polyolefin films can be printed with UV inks after on-press corona treatment, PE being better than PP mainly on ink adhesion. For waterbased inks an additional primer or topcoat is preferred to achieve good ink anchorage.

[0037] As explained herein, the cover laminate may include an optional printing layer disposed on an outer face of the cover or below the outer support film or layer on an inner surface of the outer support.

Cover Barrier Material Layer

[0038] According to one embodiment, the preferred multilayer cover laminate includes a barrier material layer to promote the sealing characteristics of the cover and resulting sealed cover and container assembly. Typically, it is desirable for the barrier material to exhibit resistance to oxygen transport or diffusion through the material. This is particularly desirable for sealing applications involving certain foods. A wide range of barrier materials can be used for the barrier material layer. The selection of the barrier material(s) is largely dictated by the degree of sealing required and hence, by the contents for which the sealing assembly is to house. Representative materials for use in the barrier material layer include, but are not limited to, polyvinyl alcohol (PVOH) and ethylene vinyl alcohol (EVOH) polymers. A well known and preferred barrier material is polyvinylidene chloride (PVDC). It is also contemplated that nylon and various nylon-based polymers known in the art could be used. It is further contemplated that combinations of these materials could be used, and in particular, multiple films of these materials could be utilized. An excellent discussion of barrier materials and their characteristics is provided in US Patent Application Publication 2004/0033379, owned by the assignee of the present application. Preferred materials for the barrier material include PVDC, PVOH, EVOH, and combinations thereof.

[0039] The barrier material is typically utilized at relatively small thicknesses in the preferred cover laminate. For example, the barrier material layer thickness is preferably from about 1 to about 5 microns, and preferably from about 1 to about 3 microns in thickness.

[0040] As noted, preferably the barrier material exhibits relatively low oxygen permeability. Preferred maximum oxygen permeability is approximately 50 cc/m²/24 hours. Most preferably, the oxygen permeability is 0.5 to 7 cc/m²/24 hours.

[0041] For certain applications, it is contemplated that the cover laminate of the present invention can be free of a barrier layer. However, in certain versions of the invention the preferred embodiment includes a barrier layer.

Cover Adhesive Layer

[0042] The preferred multilayer cover laminate includes an adhesive layer. In one embodiment, the adhesive layer is a pressure sensitive adhesive layer and the adhesive provides a tacky surface allowing a bond to another contacting surface. Preferably, the properties of the adhesive are such that the bond also provides a seal to prevent or at least significantly prevent the flow of air or other agents

across the region of the adhesive. The adhesive layer may be a single adhesive layer or may be a multilayer adhesive.

[0043] A wide range of adhesives can be used in this layer so long as their properties and characteristics are consistent with the packaging requirements of the resulting assembly. The adhesive could be a hot melt pressure sensitive adhesive, such as for example a rubber-based or acrylic-based pressure sensitive adhesive. The adhesive could be a UV cured hot melt. The adhesive could be based on a rubber-based hot melt composition, a solvent rubber adhesive, a solvent acrylic adhesive, or a solvent polyurethane adhesive. The adhesive could be emulsion-based such as an emulsion acrylic adhesive. As noted, a wide array of adhesives could be used. Each of the aforementioned adhesives are preferably in the form of a pressure sensitive adhesive (PSA). An extensive selection of various pressure sensitive adhesives are disclosed in US Patents 5,623,011; 5,830,571; and 6,147,165; owned by the assignee of the present application, and incorporated herein by reference.

[0044] A preferred pressure sensitive adhesive for use in the pressure sensitive adhesive layer is commercially available under the designation Fasson[®] S692N. The S692N adhesive is an acrylic emulsion based adhesive. Generally, this adhesive is a polymeric blend of butyl acrylate and 2-ethyl-hexyl acrylate monomers with various tackifiers and processing acids. Other preferred pressure sensitive adhesives include, but are not limited to, emulsion acrylic adhesives and rubber-based hot melt adhesives.

[0045] The thickness of the pressure sensitive adhesive layer typically ranges from about 3 to about 40 microns and preferably from about 12 to about 20 microns. It will be understood however that the present invention includes cover laminates using thicknesses greater than or lesser than these thicknesses for the pressure sensitive adhesive layer.

Cover Release Layer

[0046] In accordance with another embodiment of the invention, the multilayer cover laminate includes a release layer. Preferably, the release layer is disposed immediately adjacent to the pressure sensitive adhesive layer in the cover laminate. Most preferably, the release layer is disposed between the pressure sensitive adhesive layer and the inner support layer. The release layer provides a release surface which, as previously noted, is immediately adjacent to, and in contact with, the pressure sensitive adhesive layer.

[0047] A wide variety of release materials such as those typically used for pressure sensitive tapes and labels are known, including silicones, alkyds, stearyl derivatives of vinyl polymers (such as polyvinyl stearyl carbamate), stearate chromic chloride, stearamides and the like. Fluorocarbon polymer coated

release liners are also known but are relatively expensive. For most pressure sensitive adhesive applications, silicones are by far the most frequently used materials. Silicone release coatings have easy release at both high and low peel rates, making them suitable for a variety of production methods and applications.

[0048] Known silicone release coating systems consist of a reactive silicone polymer, e.g., an organopolysiloxane (often referred to as a "polysiloxane," or simply, "siloxane"); a cross-linker; and a catalyst. After being applied to the adjacent layer or other substrate, the coating generally must be cured to cross-link the silicone polymer chains, either thermally or radiatively (by, e.g., ultraviolet or electron beam irradiation).

[0049] Based on the manner in which they are applied, three basic types of silicone release coatings used in the pressure sensitive adhesive industry are known: solventborne, waterborne emulsions, and solvent free coatings. Each type has advantages and disadvantages. Solvent borne silicone release coatings have been used extensively but, because they employ a hydrocarbon solvent, their use in recent years has tapered off due to increasingly strict air pollution regulations, high energy requirements, and high cost. Indeed, the energy requirements of solvent recovery or incineration generally exceed that of the coating operation itself.

[0050] Water borne silicone emulsion release systems are as well known as solvent systems, and have been used on a variety of pressure sensitive products, including tapes, floor tiles, and vinyl wall coverings. Their use has been limited, however, by problems associated with applying them to paper substrates. Water swells paper fibers, destroying the dimensional stability of the release liner backing and causing sheet curling and subsequent processing difficulties.

[0051] Solventless silicone release coatings have grown in recent years and now represent a major segment of the silicone release coating market. Like other silicone coatings, they must be cured after being applied to the flexible liner substrate. Curing produces a cross-linked film that resists penetration by the pressure sensitive adhesive.

[0052] Informative descriptions of various release materials, their characteristics, and incorporation in laminate assemblies are provided in US Patents 5,728,469; 6,486, 267; and US Published Patent Application 2005/0074549, owned by the assignee of the present application. It is also contemplated that various waxes known in the art could be used for the release material or utilized in the release layer.

[0053] The preferred cover laminates utilize release layers that are relatively thin. For example, a typical release layer thickness is from about 1 to about 4 microns. Preferably, the thickness of the release layer is from about 1 to about 2 microns.

Cover Inner Support

[0054] The preferred multilayer cover laminate includes an inner support or film layer. The inner support provides support for the cover laminate and particularly for the layers disposed adjacent to the inner support. Representative materials for the inner support include those noted herein for the outer support. In addition, it may be preferred to utilize a biaxially-oriented polypropylene (BOPP) material. These materials provide cost savings as they are relatively inexpensive, and they have sufficient stiffness to dispense well. Another preferred material for use in the inner support layer is polyethylene terephthalate (PET). The previously noted PVC and OPA polymeric materials may also be suitable for use in this layer.

[0055] The inner support thickness typically ranges from about 12 to about 60 microns, and preferably from about 12 to about 25 microns. The present invention includes the use of thicknesses greater than or lesser than these thicknesses.

[0056] Optionally, the inner support can incorporate a slip agent therein or thereon. The slip agent, when incorporated as a separate coating, can be very thin, preferably around 1 micron in thickness and can comprise, for example, silicon based slip agents.

Cover Heat Sealing Layer

[0057] The preferred multilayer cover laminate includes a heat sealing layer. Preferably, the heat sealing layer is disposed along the underside or inner face of the cover laminate that contacts a corresponding face of the container upon thermal bonding of the cover to the container.

[0058] The heat sealing layer is a layer which is activated by heat to allow the layer to bond to a plastic substrate. Materials for the heat sealing layer include, but are not limited to, the following film-forming materials used alone or in combination such as polyethylene (PE), metallocene catalyzed polyolefins, syndiotactic polystyrene, syndiotactic polypropylene, cyclic polyolefins, polyethylene methyl acrylic acid, polyethylene ethyl acrylate, polyethylene methyl acrylate (or sometimes referred to herein as ethylene vinyl acetate (EVA)), acrylonitrile butadiene styrene polymer, polyethylene vinyl alcohol, polyethylene vinyl acetate, nylon, polybutylene, polystyrene, polyurethane, polysulfone, polyvinylidene chloride, polypropylene, polycarbonate, polymethyl pentene, styrene maleic anhydride polymer,

styrene acrylonitrile polymer, ionomers based on sodium or zinc salts of ethylene/methacrylic acid, polymethyl methacrylates, cellulose, fluoroplastics, polyacrylonitriles, and thermoplastic polyesters. Preferably, PE is used in the heat sealing layer, more preferably, a blend of PE and EVA, such as for example, a blend of PE and EVA with special antiblock and antistatic additives. Another preferred material for use in the heat sealing layer is glycol-modified polyethylene terephthalate (PETG). A most preferred material for the heat sealing layer is linear low density polyethylene (LLDPE).

[0059] The thickness of the heat sealing layer may vary according to requirements of the packaging assembly. Typical thicknesses of this layer are from about 15 to about 90 microns and preferably from about 30 to about 60 microns.

[0060] The heat sealing layer is designed to be activated at temperatures known to those skilled in the art. While the heat sealing layer may activate at temperatures below those specified for activation, the heat sealing layer is designed to activate at certain temperatures based on the substrate material. Preferably, the heat sealing layer activates at temperatures between about 90°C to about 150°C, more preferably the heat sealing layer activates at temperatures between about 110°C to about 140°C, and most preferably the heat sealing layer activates at temperatures between about 120°C to about 130°C. Preferably, pressure is also applied to the respective surfaces during heat sealing.

Cover Printing Layer

[0061] An optional printing layer may be disposed on the previously described cover outer support. The printing layer serves to receive and retain one or more inks deposited on the printing layer. The ink(s) constitute indicia or other markings for the cover laminate and package assembly. The printing layer can be formed from a wide range of materials typically known to those skilled in the art. For example, a variety of polyvinyl alcohol (PVA) and cellulose-based materials can be used for the printing layer.

[0062] The printing layer typically ranges from about 3 to about 20 microns in thickness and preferably, from about 3 to about 8 microns in thickness.

[0063] Figures 1 and 2 illustrate an underside of a preferred embodiment cover assembly 10 in accordance with the invention. The cover assembly 10 comprises a cover inner support 20 and a cover outer support 30. The inner support 20 defines an inner face 22 and an oppositely directed outer face 24. The outer support 30 defines an inner face 32 and an oppositely directed outer face 34. The inner support 20 and the outer support 30 are preferably oriented relative to one another such that the outer face 24 of the inner support 20 is directed toward the inner face 32 of the outer support 30. The cover

assembly may include one or more additional layers such as a cover barrier material layer (not shown), a cover heat sealing layer (not shown), and other layers as described herein.

[0064] The cover assembly 10 generally defines a proximal end 14, a distal end 12, and one or more sides 16 and 18 extending therebetween. Typically, as described in greater detail herein, after an initial opening of a container having the cover assembly 10 attached hereto, the cover 10 remains at least partially attached to the container along its proximal end 14.

[0065] The cover assembly 10 includes a pull tab 25 which, upon incorporation or attachment of the cover assembly to a container (described in detail herein), can only be accessed upon removal or at least partial removal of a tear off tab 35 from the cover assembly 10. Preferably, the pull tab 25 is provided by the cover inner support 20 and extends along an outer edge of the inner support 20. Preferably, the tear off tab 35 is provided by the cover outer support 30 and extends along or from an outer edge of the outer support 30. Preferably, the pull tab 25 and the tear off tab 35 are sized, shaped and configured so that the pull tab 25 can only be accessed from the exterior of the container, by first separating or at least partially removing the tear off tab 35 from the cover assembly 10. Preferably, the pull tab 25 is initially covered and most preferably entirely covered by one or more outer layers of the cover assembly, such as the cover outer support 30.

[0066] Although the preferred embodiment cover assembly 10 may be provided in various configurations and arrangements, a preferred configuration is depicted in Figure 1. There, two generally parallel perforation lines 36 and 37 extend around at least a majority of the perimeter of the cover assembly 10. Preferably, an outwardly disposed perforation line 36 extends from the tear off tab 35 at a first corner at the proximal end 14 of the cover 10, towards the distal end 12 of the cover. The perforation line 36 preferably extends parallel to the first side 16 and continues along the distal end 12, and along the second side 18 to the other corner along the proximal end 14. Preferably, an inwardly disposed perforation line 37 also extends in a parallel fashion generally alongside the outer perforation line 36. The two perforation lines 36 and 37 are preferably spaced apart from one another, and most preferably by a distance corresponding to the width of the tear off tab 35. The portion of the outer cover support 30 between the perforation lines 36 and 37 generally constitutes a removable strip 39. As described in greater detail herein, after attachment or incorporation of the cover 10 to a container, and upon pulling the tear off tab 35, the tear off tab 35 separates from the cover assembly 10 along with the strip 39. Upon continued separation of the tear off tab 35 and the strip 39 from the cover 10, a remaining U-shaped edge portion 38 of the outer cover support 30 remains with the container. The tear off tab 35 and the strip 39 can be completely separated from the cover assembly 10 during an initial

container opening. The remaining edge portion 38 provides indication as to a previous container opening.

[0067] As evident from Figures 1 and 2, the outer and inner cover supports 30 and 20, respectively, are preferably sized such that the edges of the outer cover support 30 overlies and extend outward beyond the edges of the inner cover support 20. Preferably, the outward extension of the outer cover support 30 exists along at least one edge or side of the cover assembly 10, and most preferably along the distal edge 12 and the sides 16 and 18.

[0068] The pull tab 25 is preferably formed or provided in conjunction with the cover inner support 20. Preferably, the outer cover support 30 extends over the pull tab 25 as shown in the underside view of Figure 1. Although the cover assembly 10 depicted in Figures 1 and 2 is shown having the pull tab 25 disposed near the distal edge 12, it will be appreciated that the invention includes alternative arrangements. Similarly, the tear off tab 35 could be provided near other or different regions of the cover 10 rather than along the proximal end 14 shown on Figure 1.

[0069] Preferably, the perforation lines 36 and 37 and thus the strip 39, are located such that they extend over the pull tab 25. Thus, upon removal or separation of the strip 39 from the cover assembly 10, the pull tab 25 is exposed and can be accessed from the outer face of the outer cover support 30.

[0070] The cover assembly 10 may further include one or more additional layers between the cover inner support 20 and the cover outer support 30. The cover assembly 10 may also include one or more regions of a pressure sensitive adhesive, typically disposed on the inner face 22 of the inner support 20. The cover assembly 10 may also include one or more regions of a release material, typically disposed on the inner face 22 of the inner support 20. The cover assembly 10 can also include one or more regions of visible indicia, text, or markings, typically disposed on the outer face 34 of the outer support 30. In addition, one or more regions of a heat sealing material can be provided along the underside of the cover assembly 10. Preferably, the heat sealing material is provided along the proximal end 14 of the cover assembly 10.

[0071] Figure 3 is a perspective view of a container 100 and the preferred embodiment cover assembly 10 in a sealed and initially unopened state. The cover assembly 10 is disposed over and overlies an opening or aperture (not shown) which provides access into the interior of the container 100. The cover assembly 10 is preferably affixed or otherwise secured to the container 100 by adhesive or by use of other sealing or affixment techniques such as welding or heat sealing operations. In this initially unopened state, the tear off tab 35 of the cover assembly 10 is visible and accessible along the exterior of the container 100 and cover assembly 10. It will be noted that the pull tab 25 is not

accessible. Preferably, the pull tab 25 is entirely covered by the outer cover support 30. Referring further to Figure 3, a user initially opens the cover 10 by grasping the tear off tab 35 and pulling the tab 35 away from the cover 10 and the container 100 to which the cover 10 is attached. The lines of weakened material, i.e. perforation lines 36 and 37, facilitate separation of the tear off tab 35 and a removable strip 39 defined between the perforation lines 36 and 37 from the cover 10. Pulling is continued until the tear off tab 35 and associated strip 39 are entirely separated from the cover 10.

[0072] Figure 4 illustrates the container 100 and the cover assembly 10 after an initial opening operation in which the tear off tab 35 and associated strip 39 (see Figures 1 and 3) are separated from the cover assembly 10. After such separation, an edge portion 38 remains on the container. This provides an indication that one or more opening attempts were undertaken with respect to the cover assembly 10 by removal of the tear off tab 35 and associated strip 39. After removal or at least partial separation of the tear off tab 35 and associated strip 39, the pull tab 25 is accessible as shown in Figure 4.

[0073] Figure 5 illustrates the container 100 and the cover assembly 10 after an initial opening operation in which the tear off tab 35 and the strip 39 have been removed, and the cover assembly 10 is positioned in an open state so that the interior of the container 100 can be accessed through an aperture 150 defined in the container 100. Upon opening of the cover assembly 10 by grasping and pulling the pull tab 25, the remaining edge portion 38 is retained to the outer surface of the container 100, thereby providing indication that the cover assembly 10 was previously opened by removal of the tear off tab 35 and the associated strip 39. Preferably, at least a portion of the outer surface of the container 100 underlying and corresponding to the inner face 22, 32 of the cover assembly 10, such as surface 140, includes a region of a pressure sensitive adhesive and/or a release material. For example, if the inner face (or underside) of the cover assembly 10 includes a pressure sensitive adhesive, it is preferred that surface 140 includes a release material. Similarly, if the inner face of the cover assembly 10 includes a release material, it is preferred that surface 140 includes a pressure sensitive adhesive. These aspects are described in greater detail herein.

[0074] The present invention includes numerous versions of cover assemblies having initially inaccessible pull tabs and exposed tear off tabs for accessing a pull tab. For example, cover assemblies may include tear off tabs that extend from a removable strip that is formed from only a single line of weakened material. Figure 6 is a schematic underside view of another preferred embodiment cover assembly 210 in accordance with the invention. The cover assembly 210 comprises an outer cover support 230 and an inner cover support 220. In this alternative embodiment, instead of providing two

perforation lines such as lines 36 and 37 in Figure 1, only a single perforation line 237 is provided. After separation of a tear off tab 235 and an associated strip 239 from the cover assembly 210, the perforated edge extending along line 237 provides indication of removal of the tear off tab 235 and the strip 239 from the cover assembly 210. The cover assembly 210 includes a pull tab 225 that can only be accessed after removal of the strip portion 239.

[0075] The invention includes numerous versions of cover assemblies. That is, the invention is not limited to cover assemblies having pull tabs and/or tear off tabs at the particular locations in the cover assembly depicted in Figures 1-6. For example, Figure 7 illustrates a cover assembly 310 having a pull tab 325 that can only be accessed after separation of a tear off tab 335 and associated strip 339 from the cover assembly 310. The tear off tab 335 and the removable strip 339 are defined between two lines of weakened material, i.e. perforation lines 336 and 337. Again, as previously described, the cover assembly 310 generally comprises an outer cover support 330 and an inner cover support 320. The tear off tab 335 is preferably located along a side 316 or adjacent a distal edge 312 of the cover assembly 310.

[0076] Figure 8 illustrates the container 100 and the cover assembly 310 after an initial opening operation in which the tear off tab 335 and the strip 339 have been removed, and the cover assembly 310 is positioned in an open state so that the interior of the container 100 can be accessed through an aperture 150 defined in the container 100. Upon opening of the cover assembly 310 by grasping and pulling the pull tab 325, the remaining edge portion 338 is retained to the outer surface of the container 100, thereby providing indication that the cover assembly 310 was previously opened by removal of the tear off tab 335 and the associated strip 339. Figures 7 and 8 also depict another aspect of the various preferred cover assemblies. One or both of the lines of weakened material, i.e. the perforation lines 336 and 337 (see Figure 7) can include one or more nonlinear regions. For example, Figures 7 and 8 illustrate that the outermost perforation line 336 includes an arcuate region which extends around the pull tab 325.

[0077] Figure 9 is a perspective view of a container 100 and another preferred embodiment cover assembly 410 in a sealed and initially unopened state. The cover 410 is configured to include a removable strip which extends around the perimeter of the cover 410, or substantially so. The cover assembly 410 is disposed over and overlies an opening or aperture (not shown) which provides access into the interior of the container 100. The cover assembly 410 defines a proximal end 414, an opposite distal end 412, and one or more sides 416 and 418 extending therebetween. The cover assembly 410 also defines an outer face 434 and an oppositely directed inner face (not shown). The cover assembly

410 is preferably affixed or otherwise secured to the container 100 by adhesive or by use of other sealing or affixment techniques such as welding or heat sealing operations. In this initially unopened state, the tear off tab 435 of the cover assembly 410 is visible and accessible along the exterior of the container 100 and cover assembly 410. It will be noted that a pull tab 425 (not shown in Figure 9) is not accessible. Preferably, the pull tab 425 is entirely covered by the outer cover support 430. Referring further to Figure 9, a user initially opens the cover 410 by grasping the tear off tab 435 and pulling the tab 435 away from the cover 410 and the container 100 to which the cover 410 is attached. The lines of weakened material, i.e. perforation lines 436 and 437, facilitate separation of the tear off tab 435 and a removable strip 439 defined between the perforation lines 436 and 437 from the cover 410. Pulling is continued until the tear off tab 435 and associated strip 439 are entirely separated from the cover 410.

[0078] Figure 10 illustrates the container 100 and the cover assembly 410 after an initial opening operation in which the tear off tab 435 and associated strip 439 (not shown in Figure 10) are separated from the cover assembly 410. After such separation, an edge portion 438 remains on the container. This provides an indication that one or more opening attempts were undertaken with respect to the cover assembly 410 by removal of the tear off tab 435 and associated strip 439. After removal or at least partial separation of the tear off tab 435 and associated strip 439, the pull tab 425 is accessible as shown in Figure 10.

[0079] Figure 11 illustrates the container 100 and the cover assembly 410 after an initial opening operation in which the tear off tab 435 and the strip 439 have been removed (and thus not shown in Figure 11), and the cover assembly 410 is positioned in an open state so that the interior of the container 100 can be accessed through an aperture 150 defined in the container 100. Upon opening of the cover assembly 410 by grasping and pulling the pull tab 425, the remaining edge portion 438 is retained to the outer surface of the container 100, thereby providing indication that the cover assembly 410 was previously opened by removal of the tear off tab 435 and the associated strip 439. As previously described with regard to the cover assembly 10, the cover assembly 410 comprises a cover inner support 420 and a cover outer support 430. Preferably, at least a portion of the outer surface of the container 100 underlying and corresponding to the inner face 422, 432 of the cover assembly 410, such as surface 140, includes a region of a pressure sensitive adhesive and/or a release material. For example, if the inner face (or underside) of the cover assembly 410 includes a pressure sensitive adhesive, it is preferred that surface 140 includes a release material. Similarly, if the inner face of the cover assembly 410 includes a release material, it is preferred that surface 140 includes a pressure sensitive adhesive.

[0080] In all of the preferred embodiments, it is preferred to initially seal the cover assembly to its corresponding container by providing one or more regions of adhesive along the interface of container and cover. For example and as previously noted, referring to Figure 5, one or more regions of a pressure sensitive adhesive are provided along the inner face 22 of the inner cover support 20, and/or along the exposed region of the inner face 32 of the outer cover support 30, for contacting and adhesively adhering the cover 10 to an exposed outer surface 140 of the container 150. Regions of an appropriate release material can be provided along the outer surface 140 for contacting the adhesive. Alternatively, adhesive can be provided on select regions of the outer surface 140 of the container and release material provided on the inner faces 22 and/or 32 of the cover assembly 10.

[0081] In addition, all embodiments may include one or more regions or areas that are "deadened." For example, the surface along the underside of the pull tab 325 in Figure 8 or under the pull tab 425 in Figure 11 may include a region of deadened adhesive. As will be understood, providing a deadened region along the underside of the pull table will facilitate grasping of the pull tab by a user.

[0082] The present invention also provides various methods using the cover assemblies. For example, methods of indicating container opening, attempts of container opening, and/or tampering are provided in which a preferred embodiment cover assembly as described herein is provided. The cover assembly is then positioned over one or more apertures in a container wall. The cover assembly is then attached to the container preferably by heat sealing or adhesive. As explained herein, the cover is configured so that in order to access and grasp a pull tab, a tear off tab must be at least partially separated from the cover assembly. Preferably, removal or partial separation of the tear off tab from the cover assembly results in removal or partial removal of a strip portion from the cover, with a remainder portion of the cover left adhered to the container. The presence of the remainder portion and particularly in conjunction with removal of the strip portion provides indication of a previous opening, opening attempt, and/or tampering of the cover and/or container.

[0083] The various containers and methods described herein find wide application and use. For example, the containers can be used for packaging food products, medical goods and related products, and an assortment of personal care and/or cosmetic products. Representative examples of food products include but are not limited to lunch meats, poultry, red meats, cheese products, vegetable goods, and other prepared foods. Representative examples of medical goods include but are not limited to sterilized pads, wound aid agents or the like; contact lenses; pills and other pharmaceutical agents and the like. It is also contemplated that the containers can be used for packaging electronic components, machined parts, and industrial parts.

[0084] The various tamper indication provisions described herein can be utilized in a wide array of packaging and container systems, for example the containers disclosed in PCT application US2010/29352 filed March 31, 2010.

[0085] Many other benefits will no doubt become apparent from future application and development of this technology.

[0086] All patents, published applications, and articles noted herein are hereby incorporated by reference in their entirety.

[0087] It will be understood that any one or more feature or component of one embodiment described herein can be combined with one or more other features or components of another embodiment. Thus, the present invention includes any and all combinations of components or features of the embodiments described herein.

[0088] As described hereinabove, the present invention solves many problems associated with previously known containers and packaging systems. However, it will be appreciated that various changes in the details, materials and arrangements of components, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art without departing from the principle and scope of the invention, as expressed in the appended claims.

Claims

What is claimed is:

1. A cover assembly comprising:
A cover inner support having a pull tab defined along an outer edge of the inner support;
a cover outer support having at least one region of weakened material that defines a removable strip, the strip extending to a tear off tab defined along an outer edge of the outer support;
wherein the pull tab is entirely covered by the outer support
2. The cover assembly of claim 1 wherein the removable strip extends over the pull tab.
3. The cover assembly of any one of claims 1-2 wherein at least one region of weakened material includes a first perforation line and a second perforation line in the cover outer support.
4. The cover assembly of claim 3 wherein the first perforation line and the second perforation line are parallel to each other.
5. The cover assembly of claim 3 wherein the removable strip is defined between the first perforation line and the second perforation line.
6. A cover assembly defining an outer face and an oppositely directed inner face, the cover assembly comprising:
a cover inner support defining an outer peripheral edge and a pull tab defined along the outer edge;
a cover outer support disposed on the cover inner support and defining an outer peripheral edge, the outer edge of the cover outer support extending over the pull tab of the cover inner support, the cover outer support also defining at least one line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support, to thereby define a removable strip, the removable strip extending over the pull tab, the cover outer support including a tear off tab along the outer edge of the cover outer layer and extending from the removable strip;
wherein the pull tab is accessible along the outer face of the cover assembly only after removal of a portion of the removable strip extending over the pull tab.

7. The cover assembly of claim 6 wherein the cover outer support defines a single line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support.

8. The cover assembly of any one of claims 6-7 wherein the cover outer support defines two lines of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support.

9. The cover assembly of claim 8 wherein the two lines of weakened material are parallel to each other.

10. The cover assembly of any one of claims 6-9 further comprising:
at least one layer disposed between the cover inner support and the cover outer support.

11. The cover assembly of any one of claims 6-10 wherein the inner face of the cover assembly includes at least one region of a pressure sensitive adhesive.

12. The cover assembly of any one of claims 6-11 wherein the outer face of the cover assembly includes at least one region of visible indicia, text, or markings.

13. The cover assembly of any one of claims 6-12 wherein the cover outer support extends entirely over the pull tab of the cover inner support.

14. A container and cover assembly comprising:
a container having a container wall defining an outer surface, the container wall generally enclosing a hollow interior, the container wall defining an aperture providing access to the interior;
a cover assembly at least partially adhered to the container wall, the cover assembly having an outer face and an oppositely directed inner face, the cover assembly including (i) a cover inner support having a pull tab extending from an outer edge of the cover inner support, and (ii) a cover outer support disposed on the cover inner support and defining an outer edge of the cover outer support, the cover outer support extending over the pull tab, the cover outer support also defining at least one line of

weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support to thereby define a removable strip, the removable strip extending over the pull tab, the cover outer support including a tear off tab along the outer edge of the cover outer layer;

wherein prior to removal of the removable strip from the cover, the pull tab is inaccessible from the outer surface of the container.

15. The container and cover assembly of claim 14 wherein after removal of the removable strip from the cover assembly, a portion of the cover outer support remains adhered to the container wall.

16. The container and cover assembly of any one of claims 14-15 wherein the cover outer support defines a single line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support.

17. The container and cover assembly of any one of claims 14-16 wherein the cover outer support defines two lines of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support.

18. The container and cover assembly of claim 17 wherein the two lines of weakened material are parallel to each other.

19. The container and cover assembly of any one of claims 14-18 further comprising:
at least one layer disposed between the cover inner support and the cover outer support.

20. The container and cover assembly of any one of claims 14-19 wherein the inner face of the cover assembly includes at least one region of a pressure sensitive adhesive.

21. The container and cover assembly of any one of claims 14-20 wherein the outer face of the cover assembly includes at least one region of visible indicia, text, or markings.

22. The container and cover assembly of any one of claims 14-21 wherein the tear off tab extends from the removable strip.

23. The container and cover assembly of any one of claims 14-22 wherein the cover outer support extends entirely over the pull tab of the cover inner support.

24. A method of indicating at least one of (i) a previous container opening attempt, and (ii) container tampering, for a container having a container wall defining an outer surface, the container wall generally enclosing a hollow interior, the container wall defining an aperture providing access to the interior, the method comprising:

providing a cover assembly having an outer face and an oppositely directed inner face, the cover assembly including a cover inner support having a pull tab extending from an outer edge of the cover inner support, and a cover outer support disposed on the cover inner support and defining an outer edge, the cover outer support extending over the pull tab, the cover outer support also defining at least one line of weakened material extending along and spaced inwardly from at least a portion of the outer edge of the cover outer support to thereby define a removable strip, the removable strip extending over the pull tab, the cover outer support including a tear off tab along the outer edge of the cover outer layer; and

positioning and adhering the cover assembly over the aperture defined in the container, whereby the pull tab of the cover assembly is inaccessible without removing the removable strip from the cover assembly, and upon removal of the removable strip from the cover outer support, a portion of the cover outer support remains adhered to the container wall thereby indicating at least one of (i) and (ii).

25. The method of claim 24 wherein the removable strip is at least partially separated from the cover assembly by pulling the tear off tab from the cover assembly.

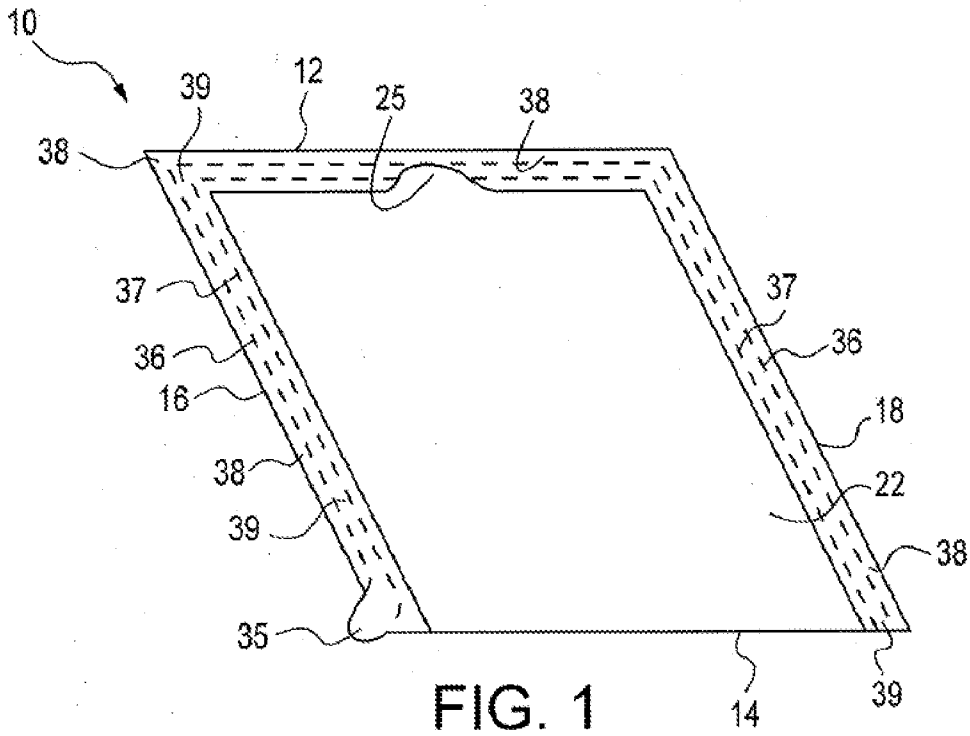


FIG. 1

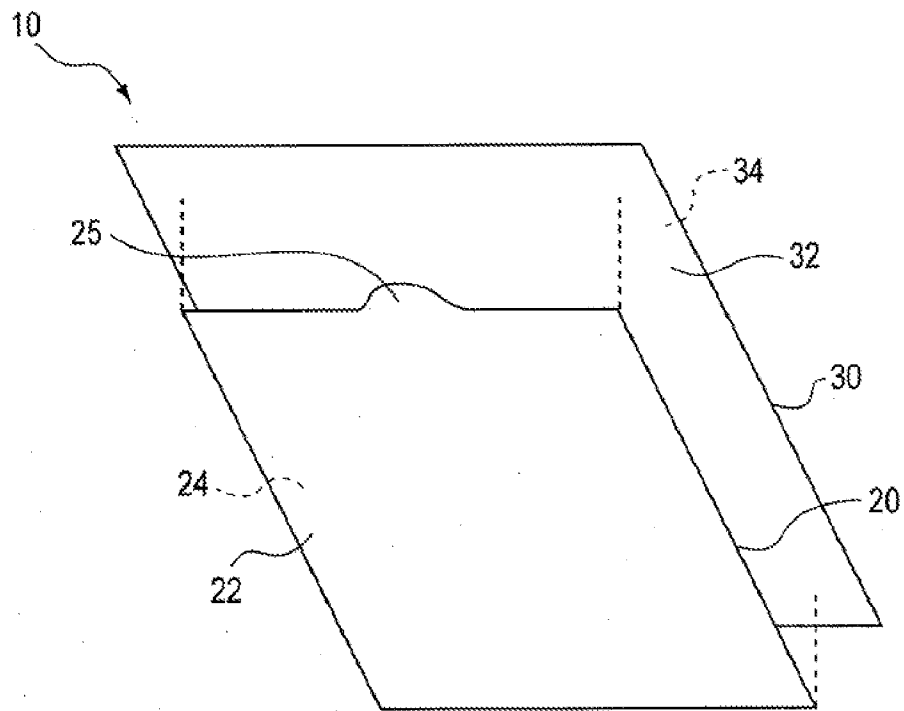


FIG. 2

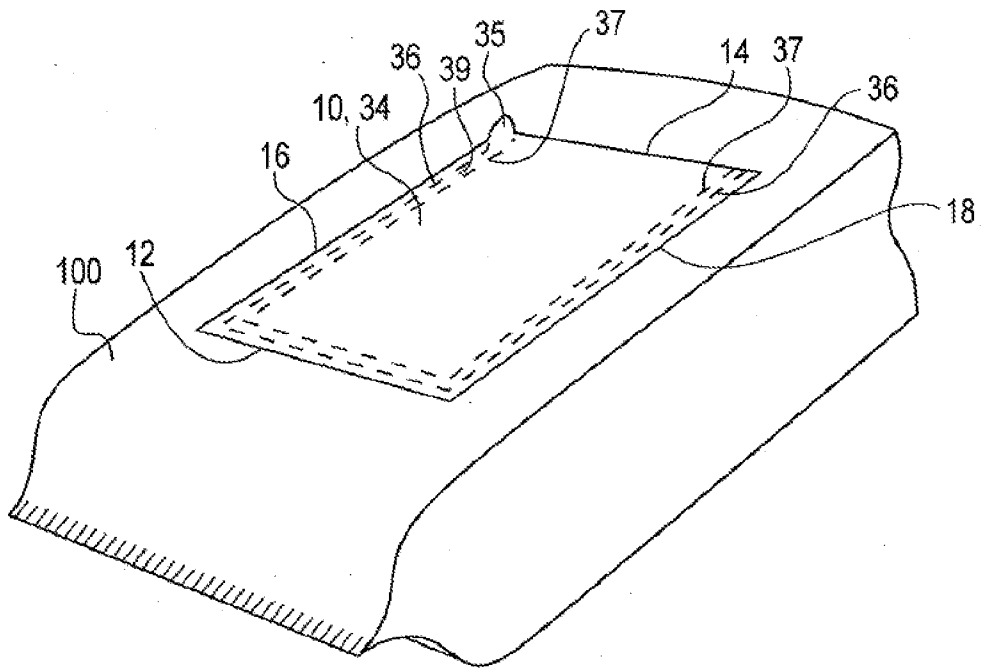


FIG. 3

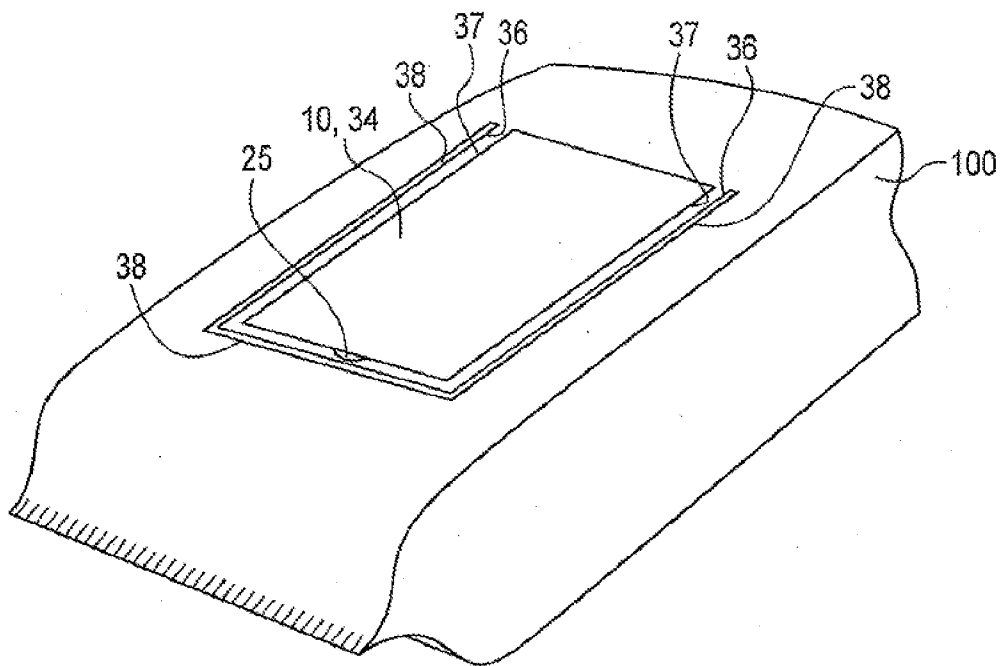


FIG. 4

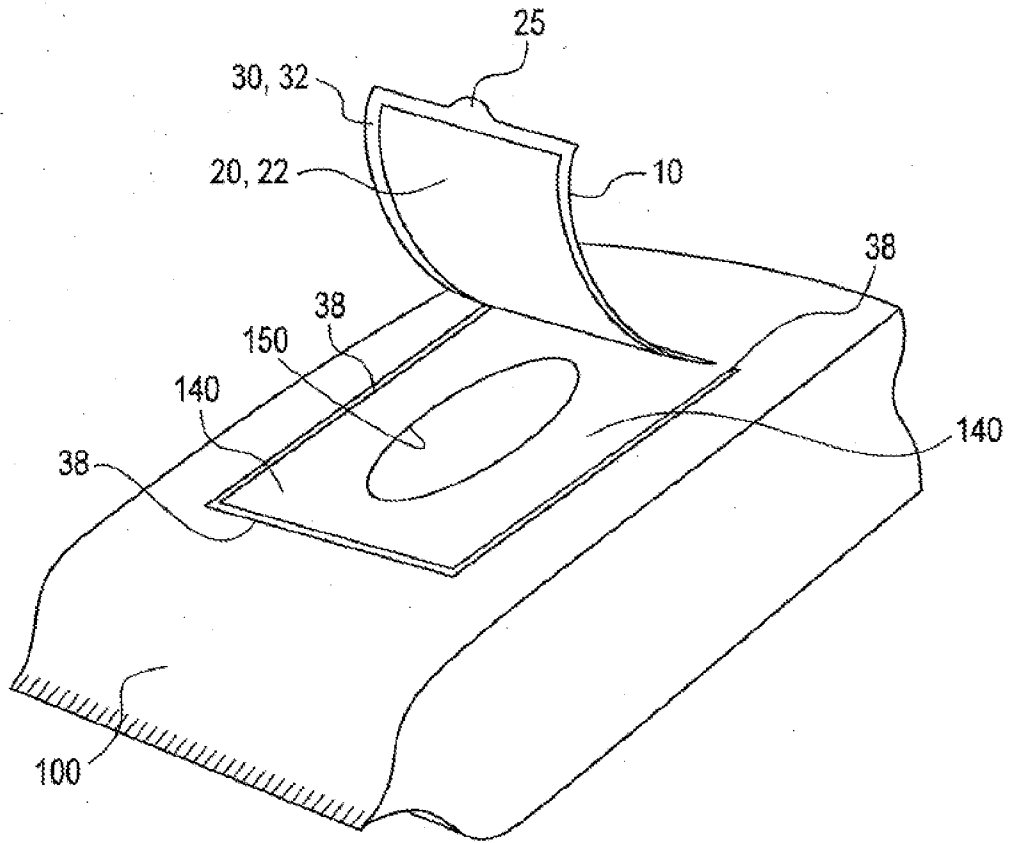


FIG. 5

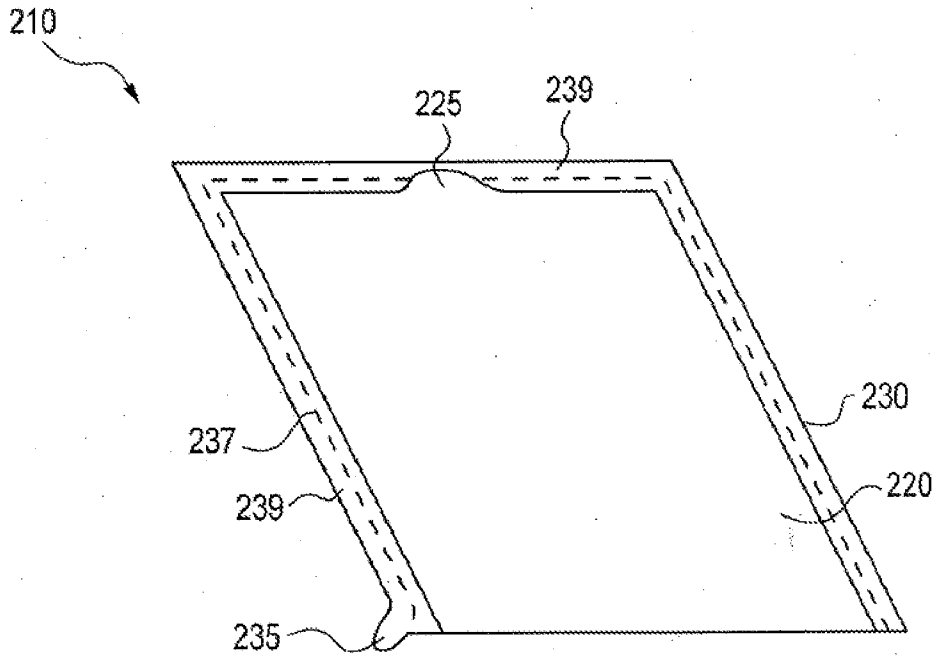


FIG. 6

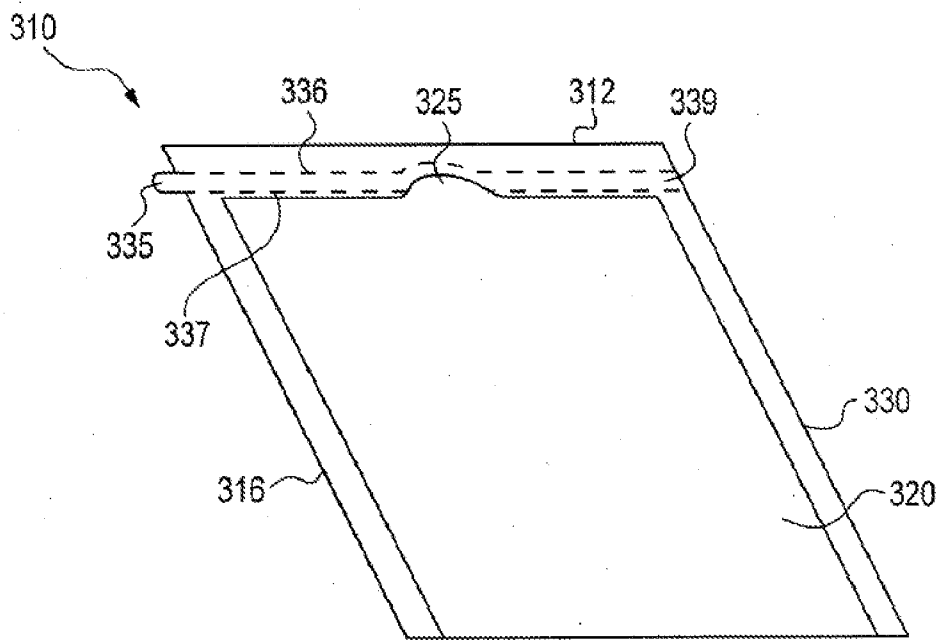


FIG. 7

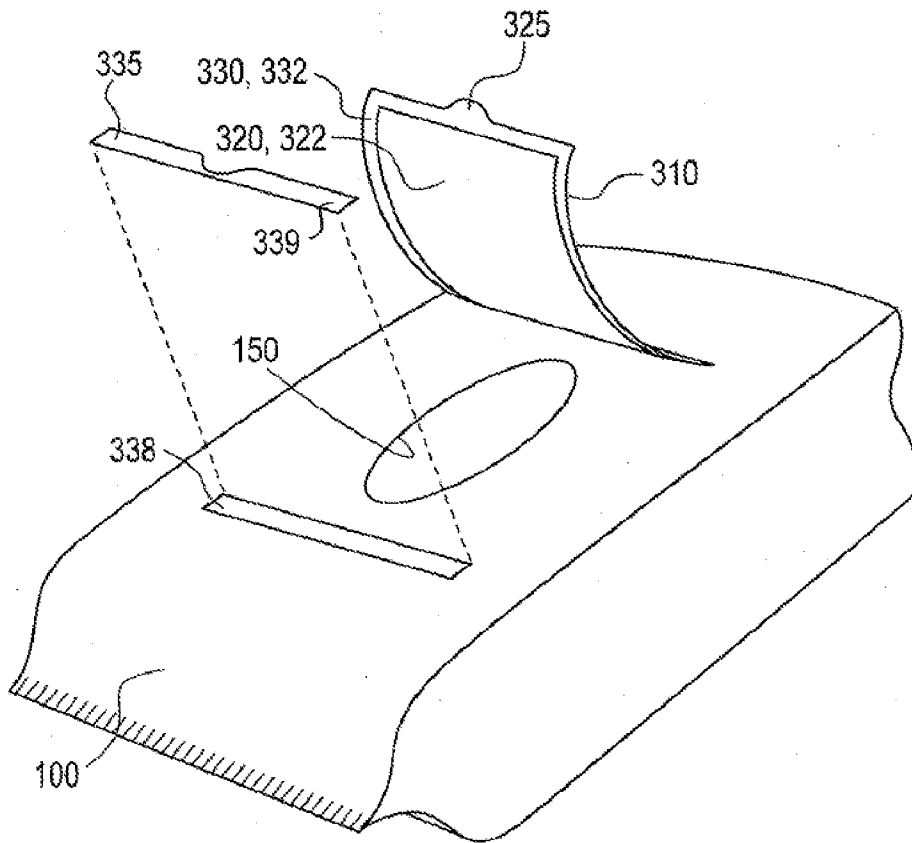


FIG. 8

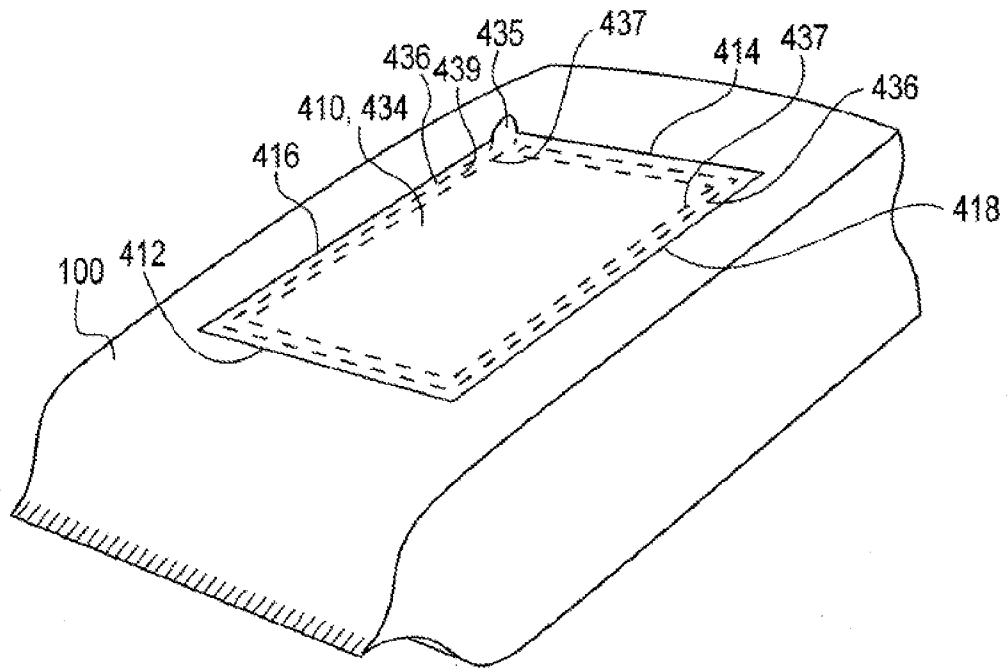


FIG. 9

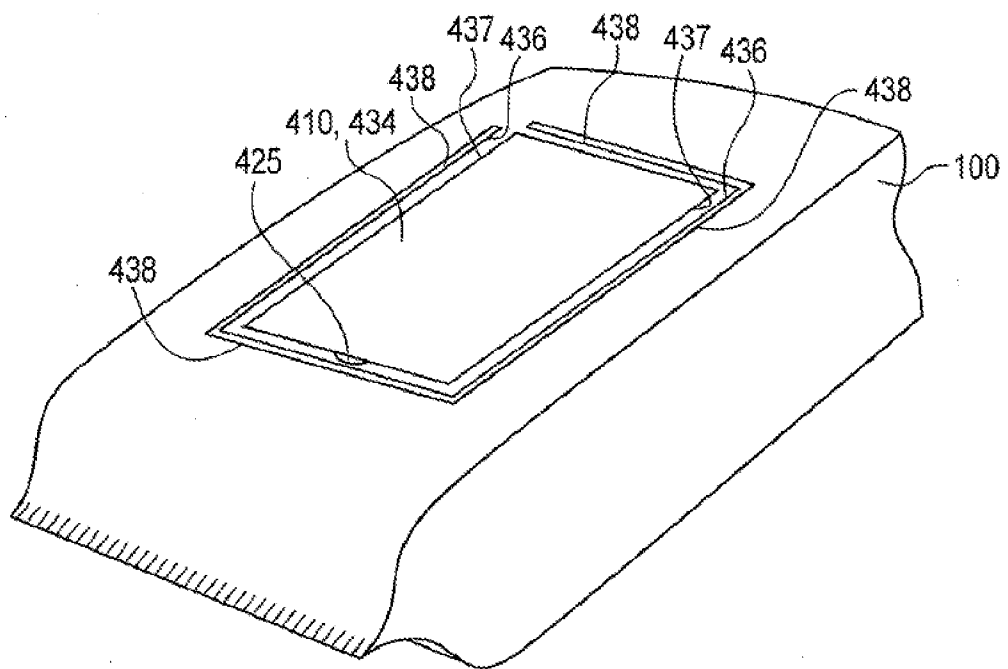


FIG. 10

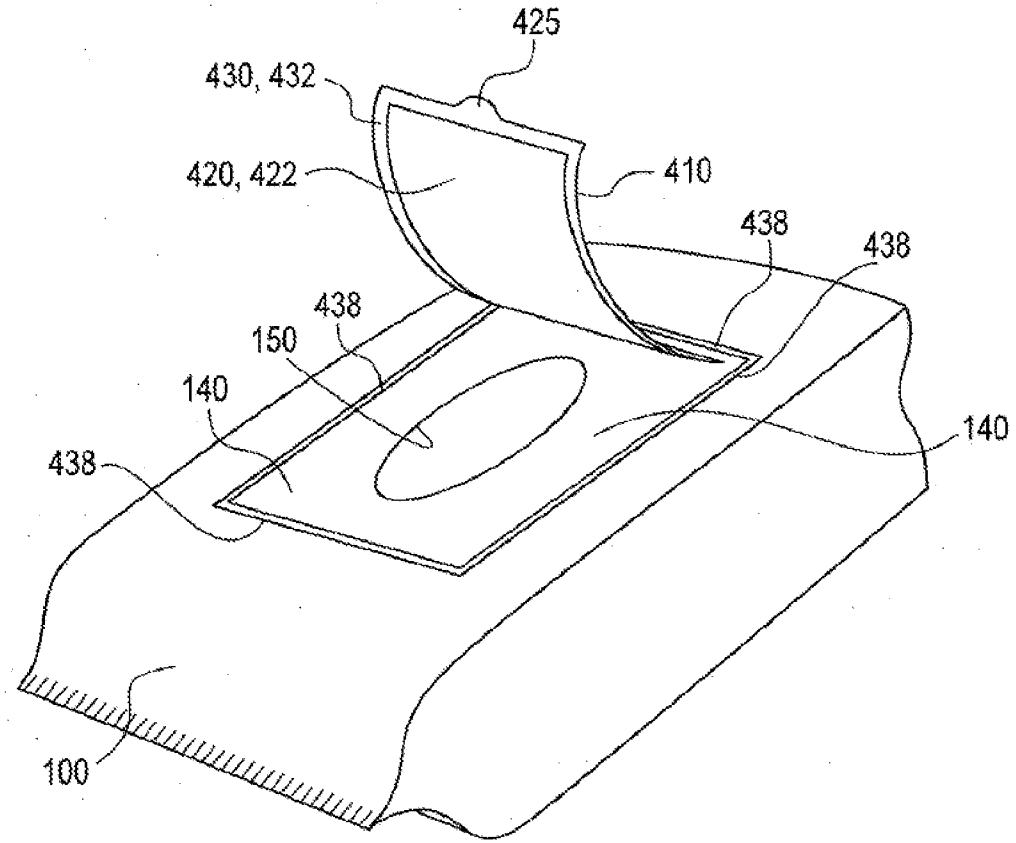


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/028703

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B65D75/58 G09F3/03
 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 G09F

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 practicable, search terms used)

EPO-Internal, WPI Data

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	figures 6,7 -----	
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search

22 June 2012

Date of mailing of the international search report

02/07/2012

Name and mailing address of the ISA/

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Authorized officer

Fournier, Jacques

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/028703

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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International application No

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