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(54) **TAMPER EVIDENT POLYMERIC PACKAGE WITH ZIPPER CLOSURE AND VALVE, AND METHODS**

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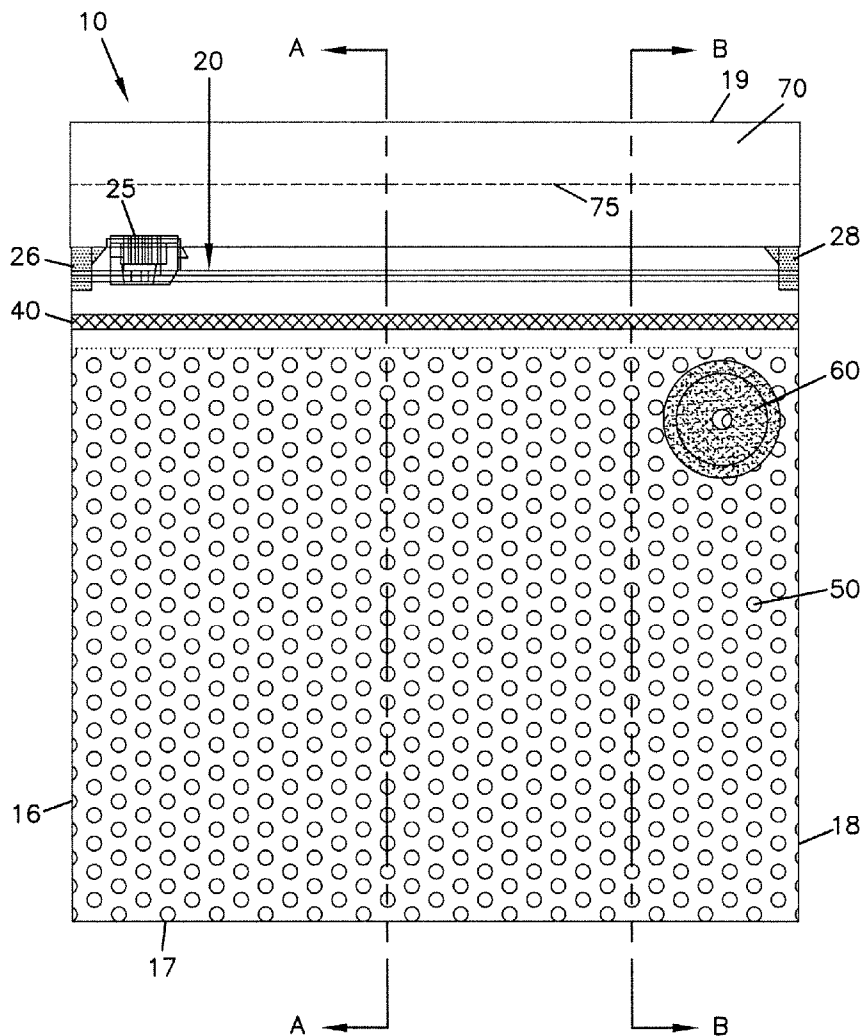
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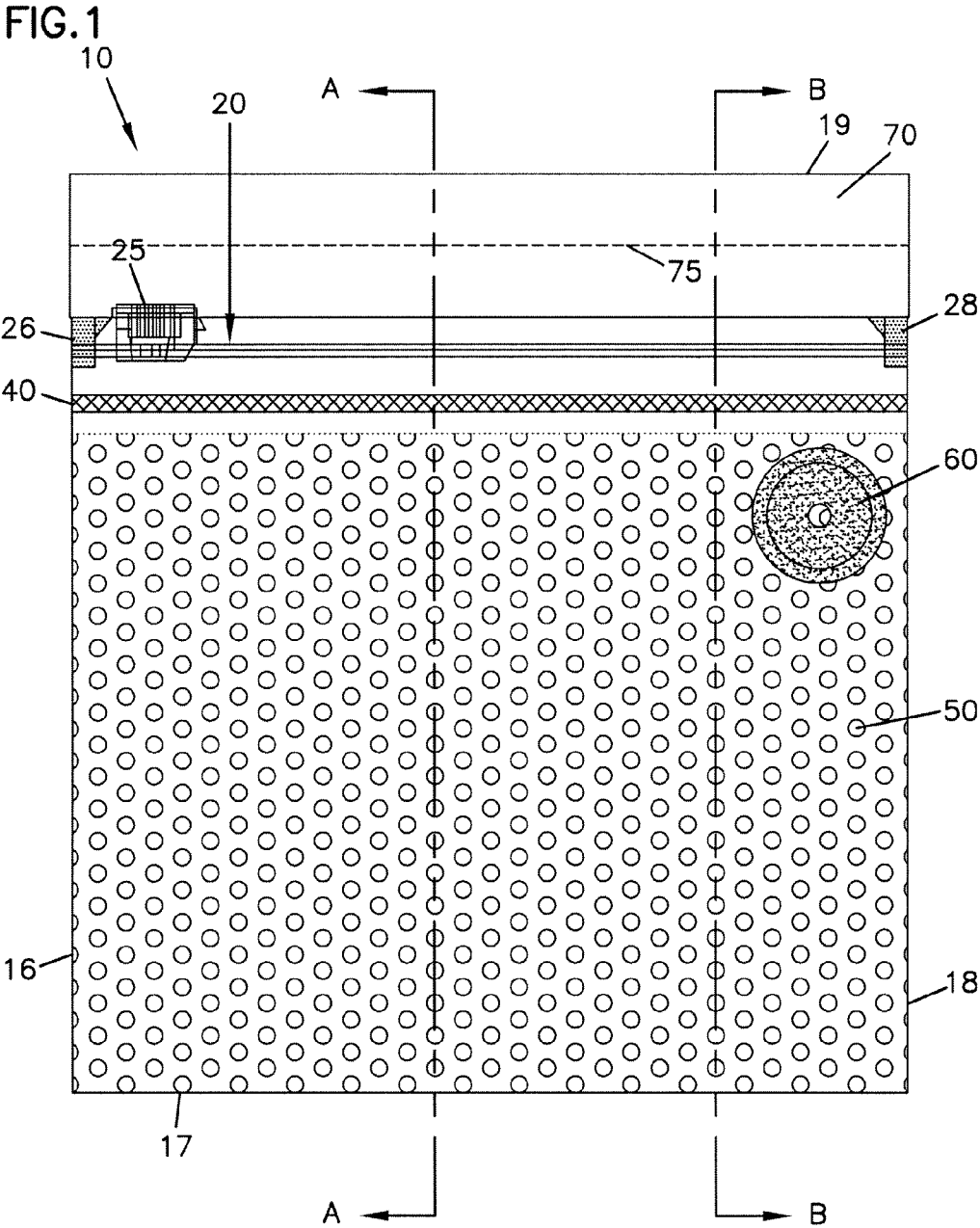
Related U.S. Application Data

(60) Provisional application No. 60/737,872, filed on Nov. 17, 2005.

(57) **ABSTRACT**

A reclosable package having a zipper closure, and optionally a slider device to open and close the zipper closure, and a one-way valve. The package can include an internal seal, which can be a peel seal. In use, the valve is used to remove air from the interior of the package, and the sealant strip, in combination with the zipper closure, provides a better seal than the zipper alone.





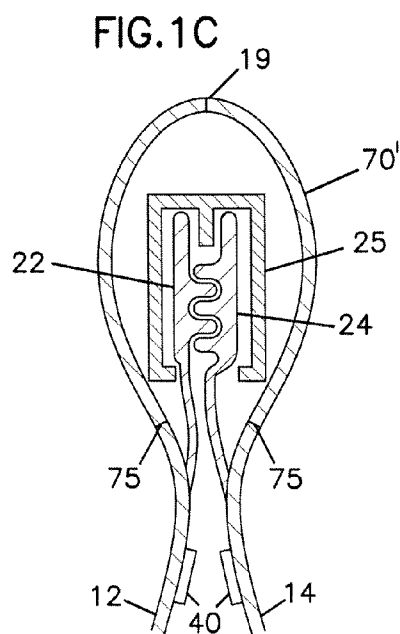
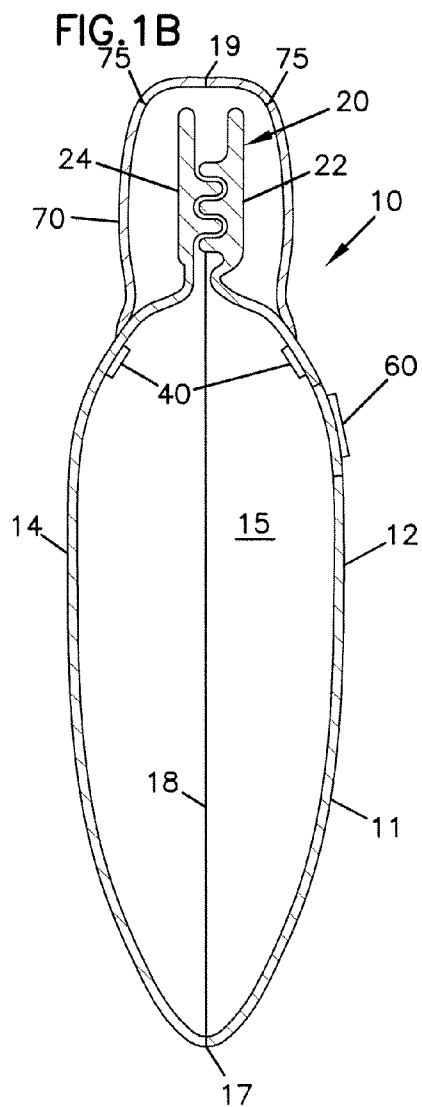
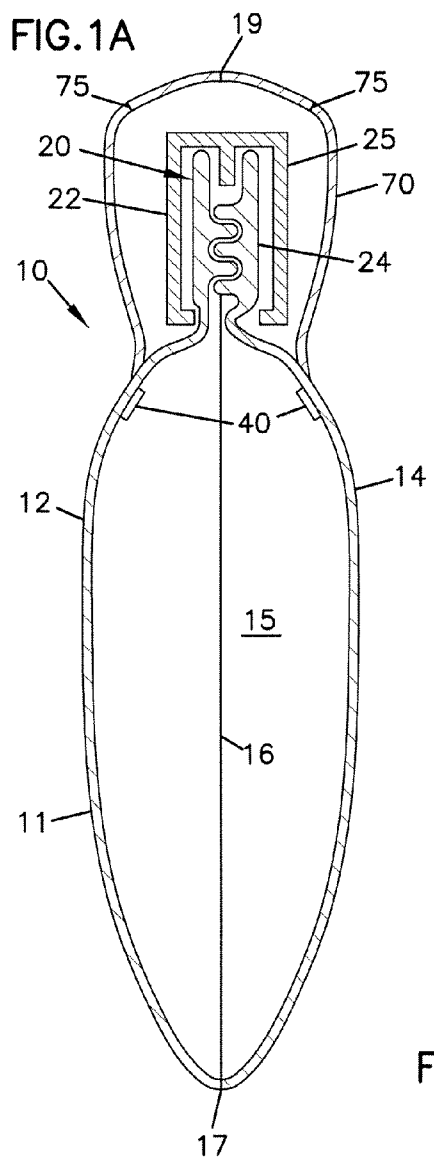


FIG. 2

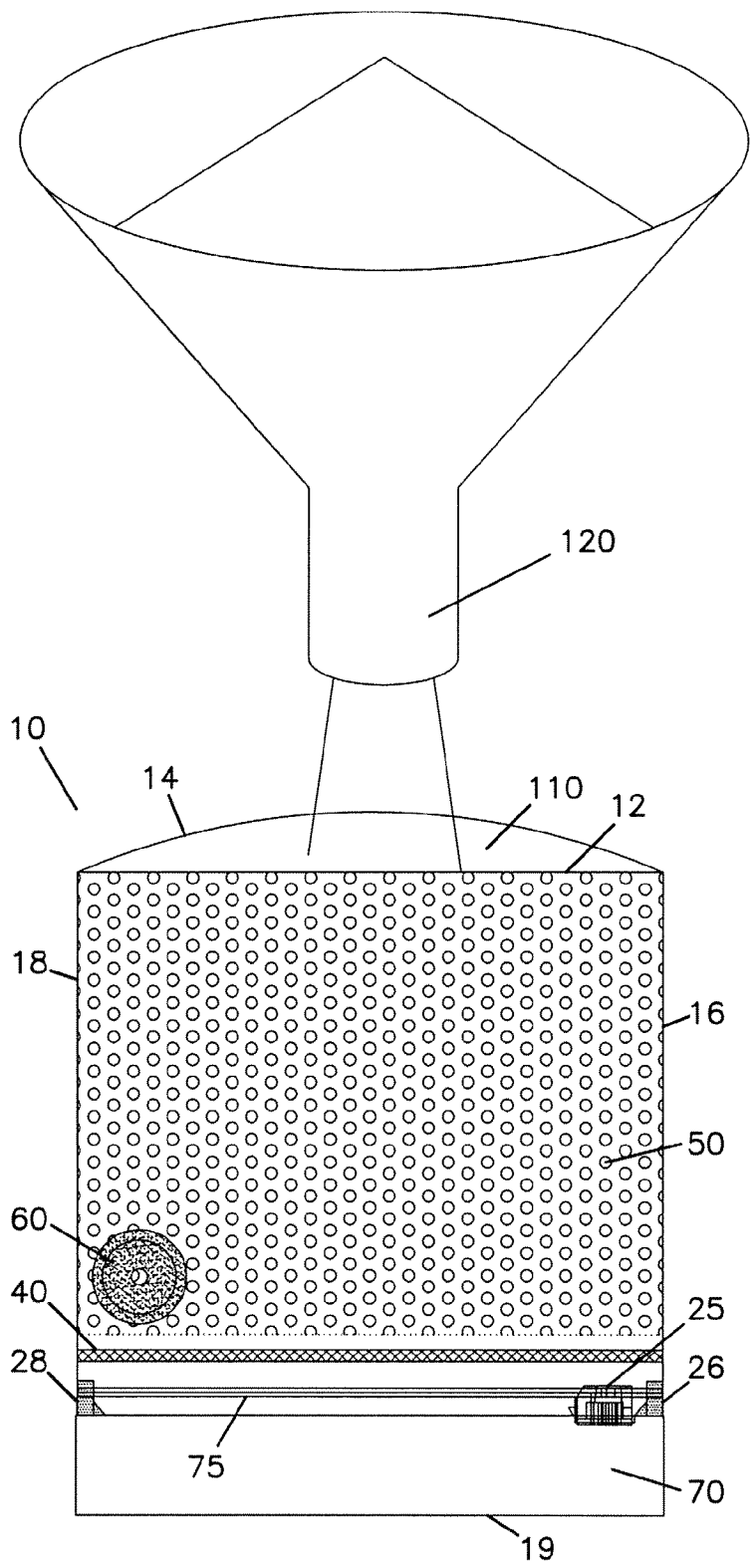


FIG.3

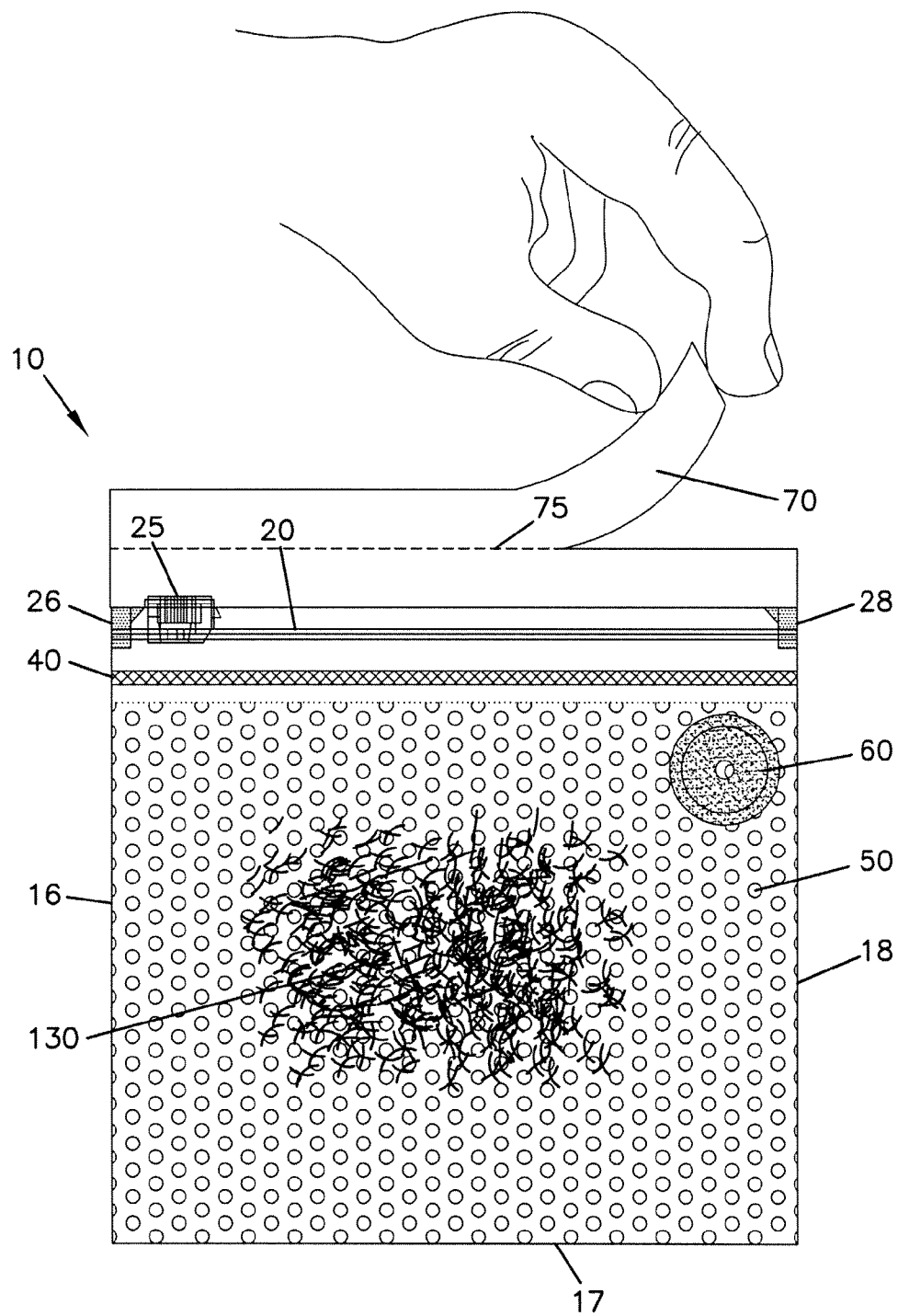


FIG.4

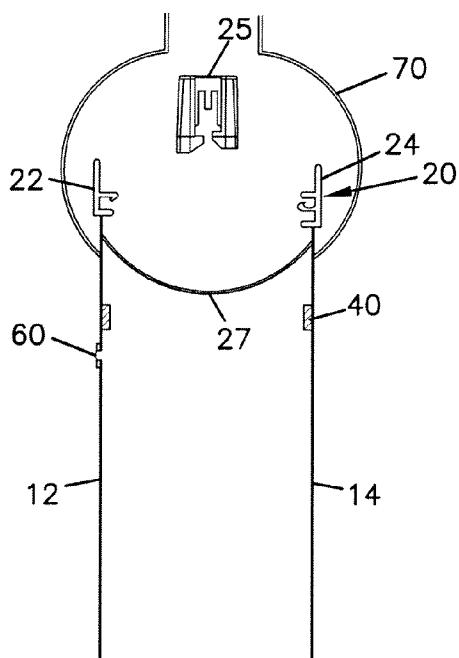


FIG.5

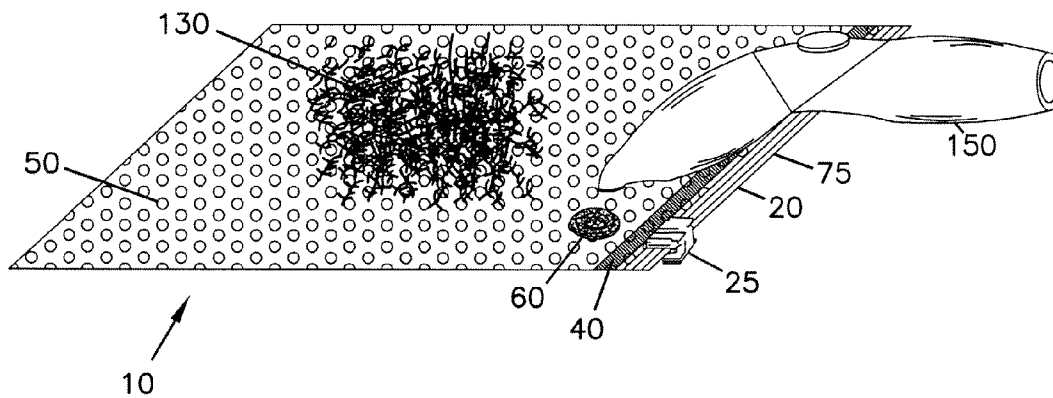


FIG.6

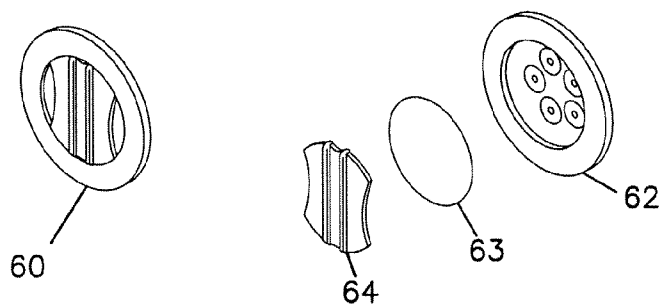


FIG.7

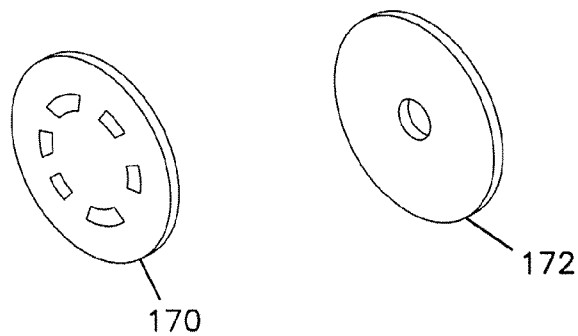
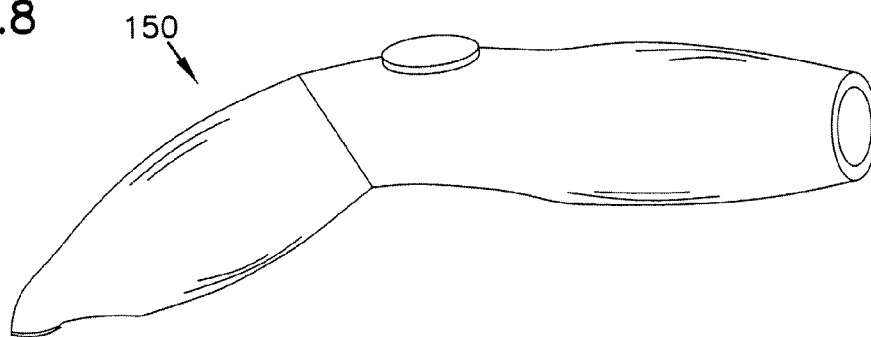


FIG.8



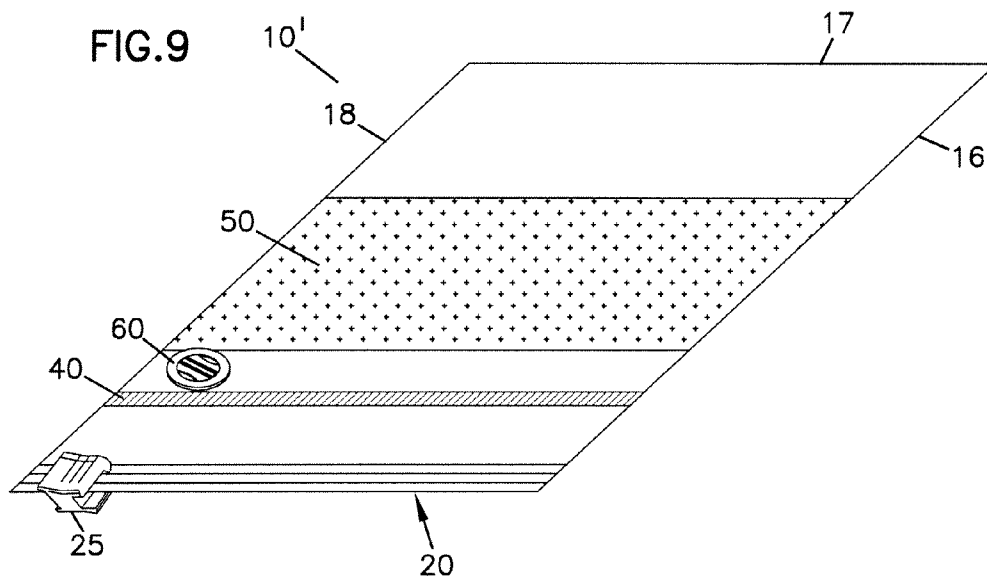


FIG. 10

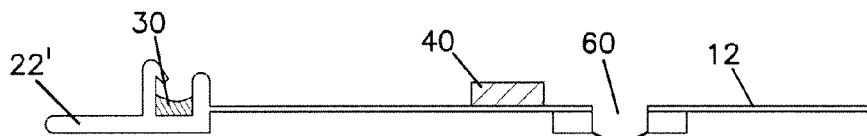
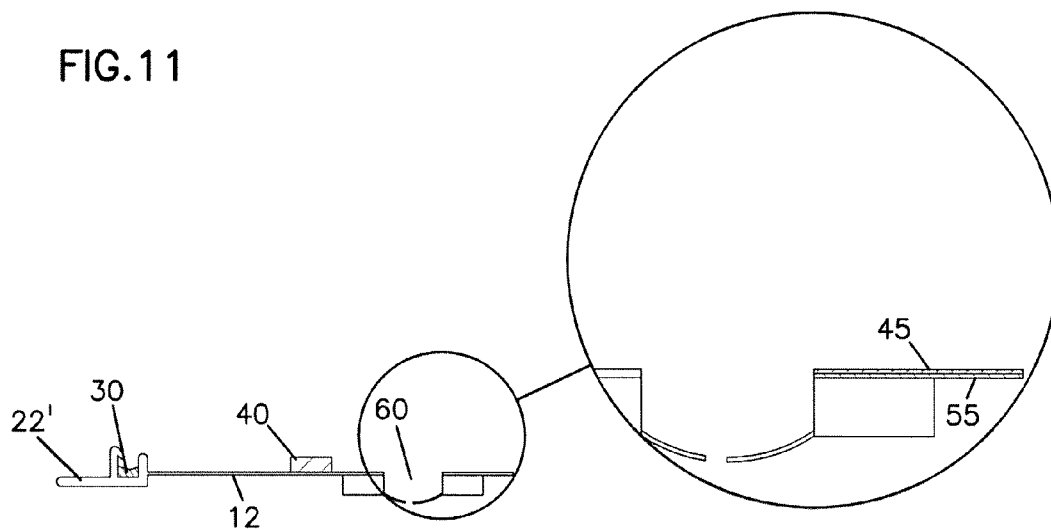
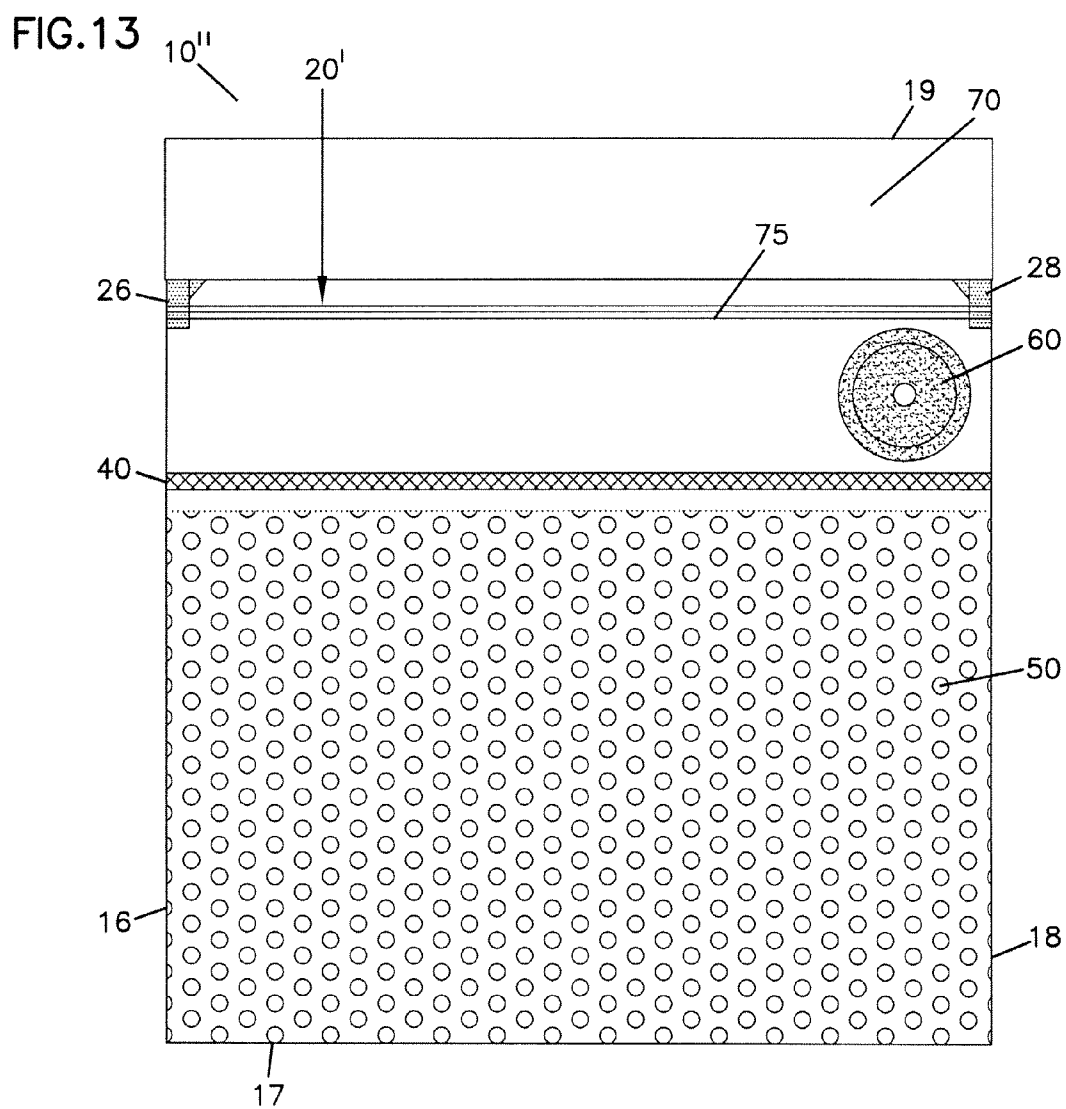
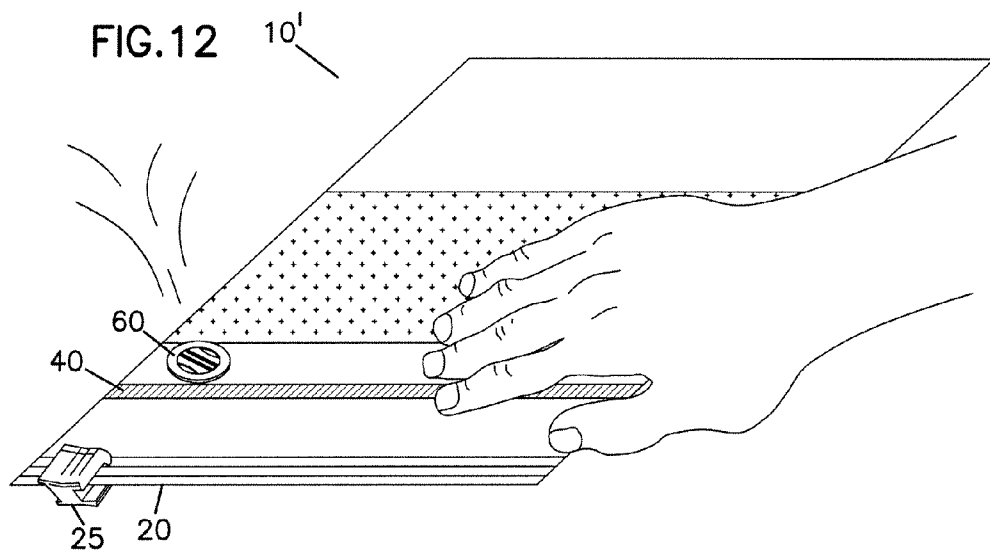


FIG. 11





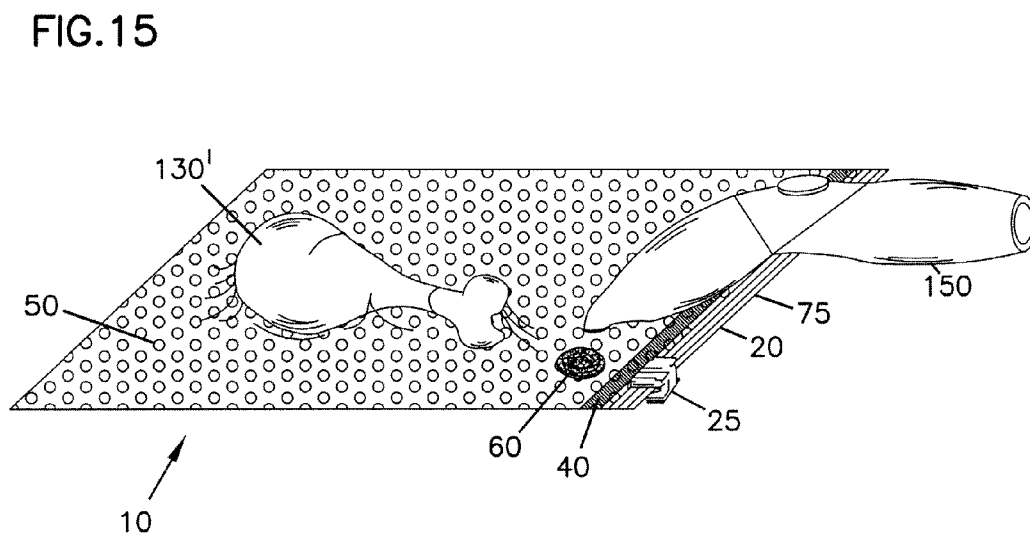
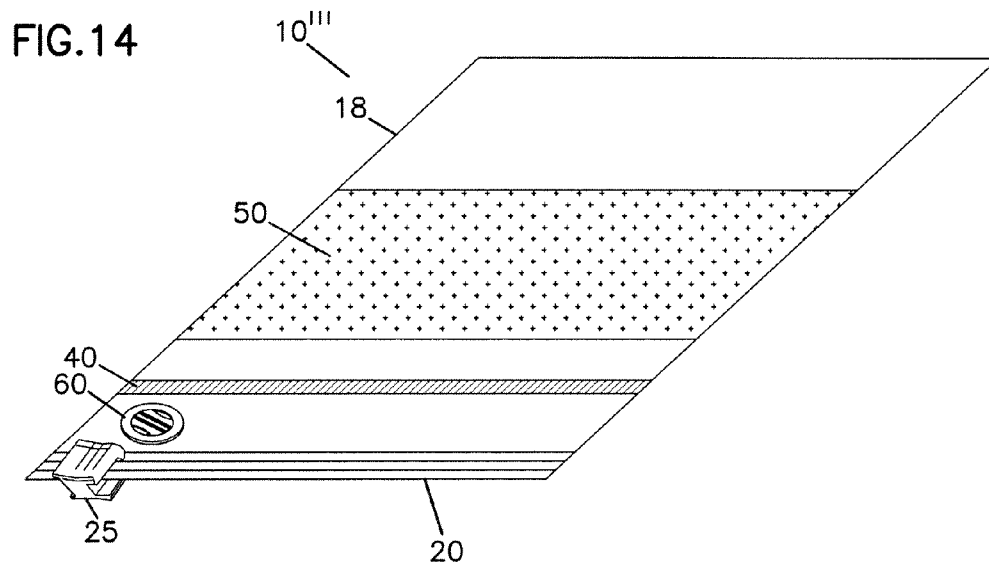


FIG.16

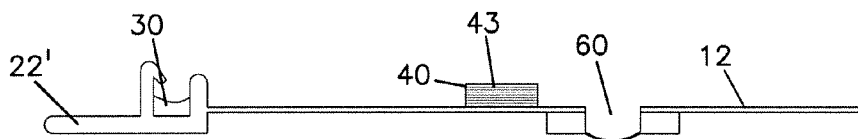


FIG.17

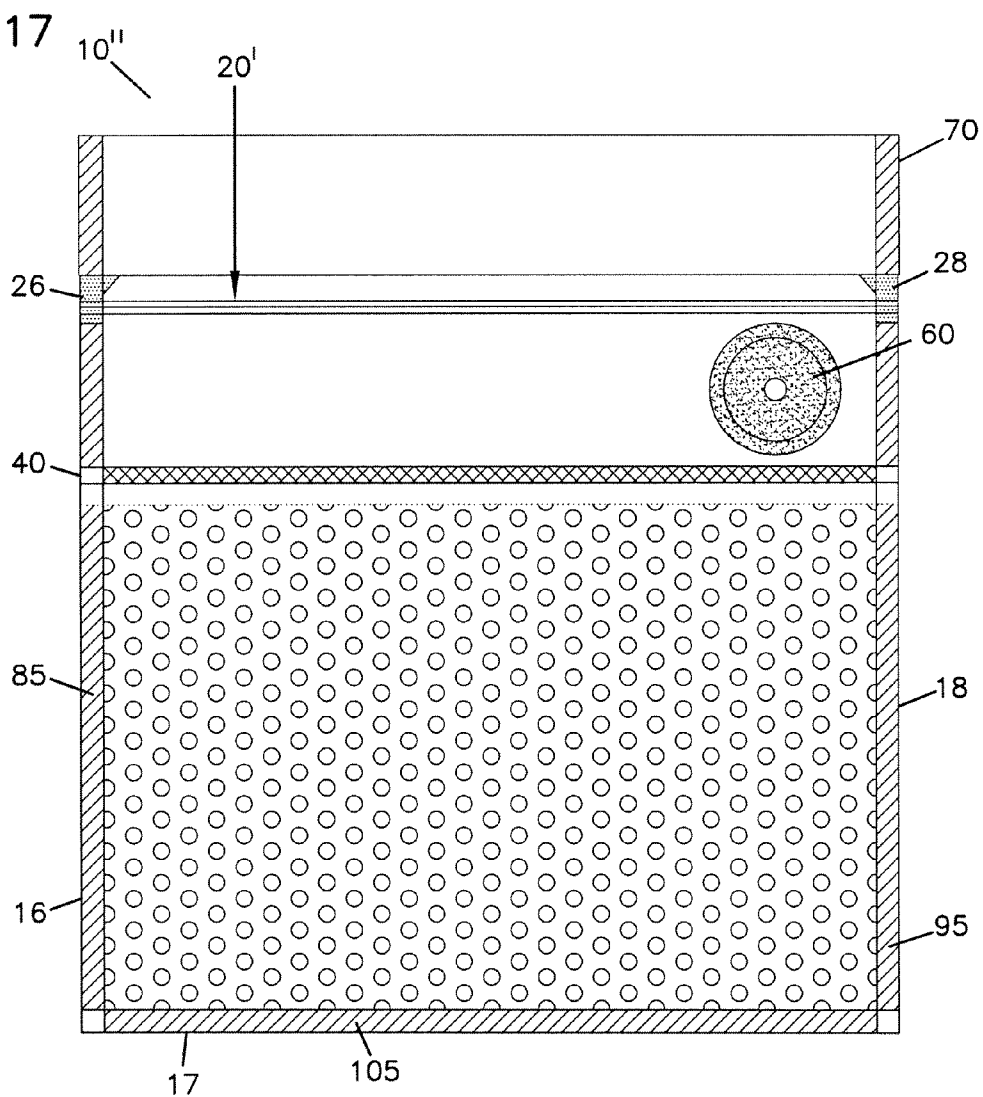


FIG.18

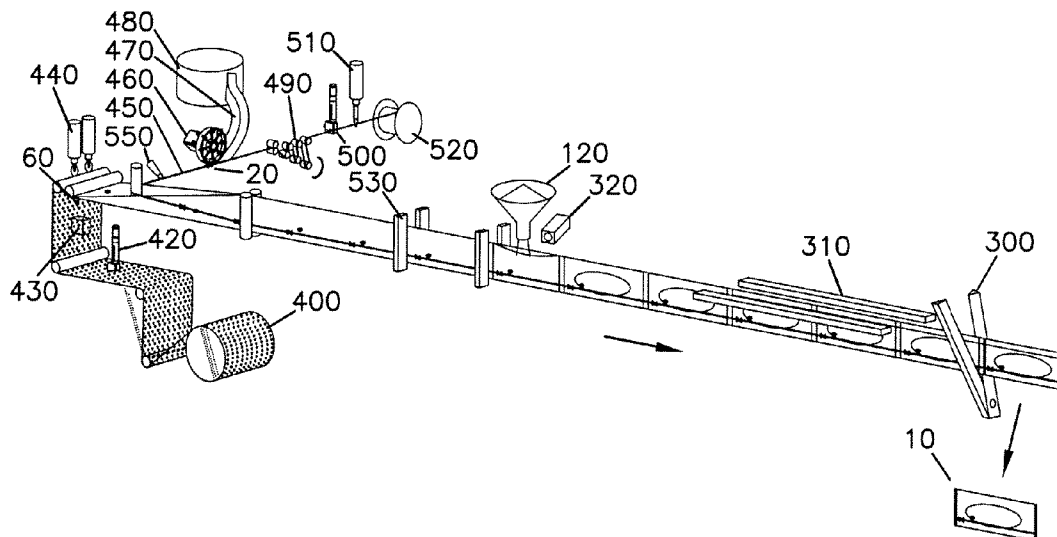


FIG.19

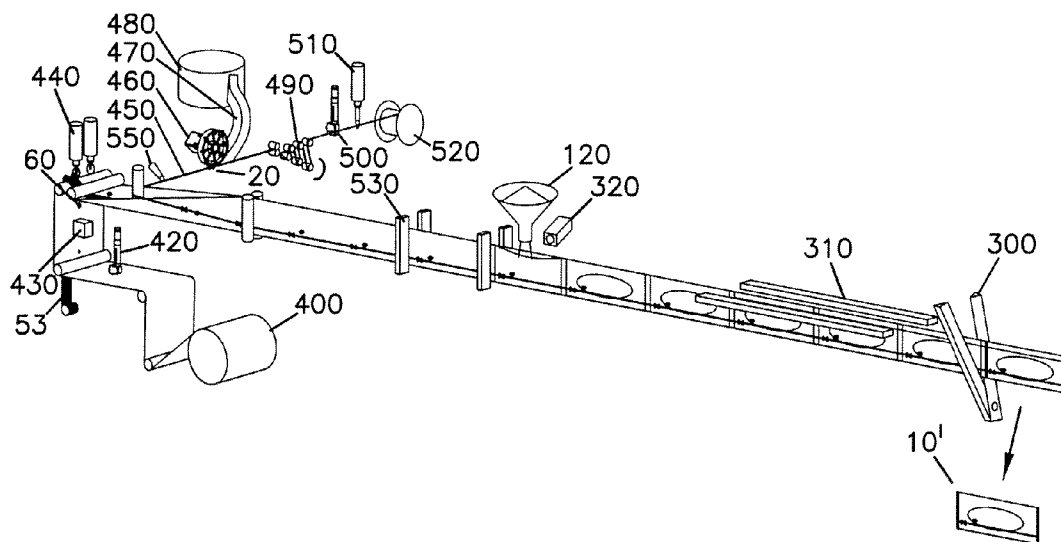
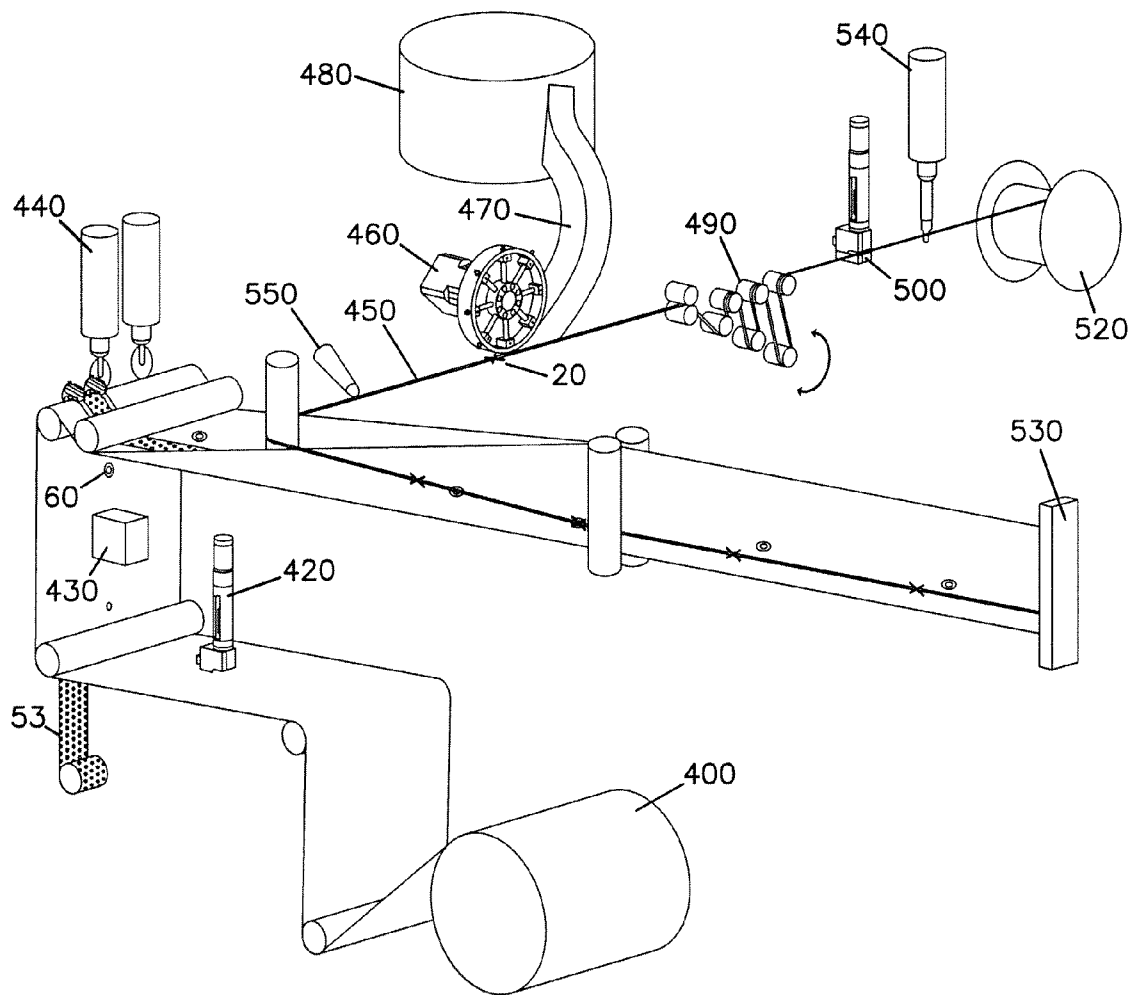


FIG.20



TAMPER EVIDENT POLYMERIC PACKAGE WITH ZIPPER CLOSURE AND VALVE, AND METHODS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Ser. No. 60/737,872, filed on Nov. 17, 2005, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure generally relates to polymeric packages, and, in particular, to a resealable closure arrangement having a zipper closure and an internal seal, and methods of manufacturing polymeric packages.

BACKGROUND

[0003] Flexible polymeric packages are used to hold a variety of products. Such products may be edible food products such as cheese, meat, crackers, granulated sugar, powdered sugar, flour, salt, and baking soda, or non-food products such as laundry detergent, sand, medical supplies, and other products. Resealable packages are convenient because they can be closed and resealed after opening to contain the enclosed contents. Resealable packages are also advantageous in that they extend the life of food products because they can be opened and closed (resealed) multiple times.

SUMMARY OF THE DISCLOSURE

[0004] The present disclosure is directed to reclosable packages from which air or other gas within the interior of the package can be removed through a feature of the package other than the mouth of the package. The packages have a zipper closure and a one-way fluid valve which allows gas (e.g., air) or other fluid to be removed from the interior of the package while the zipper closure is sealed. Prior to use by the consumer, the packages have a hermetically sealed interior volume, in which an item is contained. Upon use by a consumer, the zipper closure is opened, the hermetic seal is breached, and access is gained to the interior of the package. After the zipper is closed, the valve can be used to evacuate gas or other fluid from the interior of the package. The hermetic seal may have been formed by a peel seal, which could be resealed after evacuation of the gas or other fluid. A slider device may be used to open and close the zipper closure.

[0005] Various methods for using the packages, and of making the packages, are described.

[0006] These and various other features which characterize the packages of this disclosure are pointed out with particularity in the attached claims. For a better understanding of the packages of the disclosure, their advantages, their use and objectives obtained by their use, reference should be made to the drawings and to the accompanying description, in which there is illustrated and described preferred embodiments of the invention of this disclosure.

[0007]

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a front plan view of a resealable package according to the disclosure;

[0009] FIG. 1A is a cross-sectional view of the package taken along line A-A of FIG. 1;

[0010] FIG. 1B is a cross-sectional view of the package taken along line B-B of FIG. 1;

[0011] FIG. 1C is a partial cross-sectional view of an alternate package embodiment, similar to FIG. 1A;

[0012] FIG. 2 is a front plan view illustrating the package of FIG. 1 inverted with the bottom open for filling with items;

[0013] FIG. 3 is a front plan view of the package of FIG. 1 illustrated with an item inside the package, and with the tamper evident header being removed by a user;

[0014] FIG. 4 is an exploded cross-sectional view of an alternate package embodiment, similar to FIG. 1A;

[0015] FIG. 5 is a perspective view of the package of FIGS. 1 and 3 illustrated lying on a side, having the tamper evident header removed, and with a hand held vacuum pump shown in close proximity to the valve;

[0016] FIG. 6 is an exploded perspective view of the valve of FIG. 5 disassembled;

[0017] FIG. 7 is a perspective view of alternate valve components;

[0018] FIG. 8 is a perspective view of the hand held vacuum pump of FIG. 5;

[0019] FIG. 9 is a perspective plan view of another embodiment of a package according to the present disclosure;

[0020] FIG. 10 is an enlarged cross-sectional view of a package portion having a zipper profile with adhesive present in the profile members;

[0021] FIG. 11 is an enlarged cross-sectional view, similar to FIG. 10, showing a package portion having a multi-layered side panel;

[0022] FIG. 12 is a perspective view of the package of FIG. 9 being evacuated manually by a user;

[0023] FIG. 13 is a plan view of another package according to the disclosure, similar to FIG. 1, but having no slider device;

[0024] FIG. 14 is a perspective view of an alternate configuration of a package according to the present disclosure;

[0025] FIG. 15 is a perspective view of the package of FIG. 1 having the tamper evident header removed and with an item retained therein;

[0026] FIG. 16 is an enlarged cross-sectional view, similar to FIG. 10, showing a package portion having a multi-layered seal;

[0027] FIG. 17 is a front plan view of a package according to the disclosure, similar to FIG. 13;

[0028] FIG. 18 is a perspective view of a process for making packages according to the disclosure using a horizontal form fill seal machine;

[0029] FIG. 19 is a perspective view of an alternate process for making packages according to the disclosure using a horizontal form fill seal machine; and

[0030] FIG. 20 is an enlarged view of a portion of the process of FIG. 19.

DETAILED DESCRIPTION

[0031] The present disclosure is directed to a variety of packaging arrangements (e.g., packages), particularly, resealable packaging arrangements, and methods of making and using those packaging arrangements.

[0032] Referring now to the figures, various packages according to the present disclosure are illustrated. FIGS. 1, 1A, 1B, 2, 3, 5 and 15 illustrate package 10 in various orientations; FIGS. 9 and 12 illustrate package 10'; FIGS. 13 and 17 illustrate package 10"; and FIG. 14 illustrates package 10". It is understood that features illustrated and/or described in respect to any one of packages 10, 10', 10", 10" are suitable for and may be used in any of the other packages 10, 10', 10", 10". Like reference numerals are used throughout the various embodiments to designate the same or similar elements or features.

[0033] Referring now in particular to FIGS. 1, 1A, and 1B, package 10 has a first side panel 12 and an opposite side panel 14 that are connected by side edges 16, 17, 18. For clarity herein, side edge 17 can be referred to as a bottom edge 17. Side panels 12, 14 and side edges 16, 17, 18 define a surrounding wall 11 with a storage interior 15 therebetween. Various other configurations of surrounding walls 11 are known and are suitable for packages in accordance with the principles of this disclosure. Storage interior 15 is configured for receiving an item, such as a foodstuff item or other item(s), for storage within package 10.

[0034] Package 10 has a sealed top end 19, which is the side of package 10 opposite bottom edge 17. Sealed top end 19 is defined by tamper evident header 70, which is described below. Close to top end 19, a resealable zipper closure 20 is present.

[0035] Zipper closure 20 is present across a mouth of package 10 that provides access to interior 15. Zipper closure 20 usually extends from side edge 16 to side edge 18, and includes a first zipper profile 22 having a first profile member and a second zipper profile 24 having a second profile member; first and second zipper profiles 22, 24 are configured to engage and disengage with each other. In other words, first and second zipper profiles 22, 24 are selectively sealable and resealable.

[0036] First zipper profile 22 is connected to first side panel 12, and second zipper profile 24 is connected to second side panel 14. In the embodiment illustrated in FIGS. 1A and 1B, zipper profiles 22, 24 are integral with their respective side panel 12, 14. Alternately, zipper profiles 22, 24 could be attached to side panels 12, 14, for example, by a heat seal or adhesive; see for example, FIG. 1C. Zipper closures 20, zipper profiles 22, 24 and profile members are well known, and a variety of configurations are useable in accordance with the principles of this disclosure; see for example, U.S. Pat. Nos. 6,524,002; 6,152,600; 5,839,831, and 5,252,281, each of which is incorporated herein by reference.

[0037] Opening and closing of zipper closure 20 of package 10 is facilitated by slider device 25, which is operably mounted on zipper profiles 22, 24 in a manner to mate and unmate, engage and disengage, etc., profiles 22, 24. Examples of suitable slider devices are disclosed, for example, in U.S. Pat. Nos. 6,679,027; Des. 480,988; Des. 479,467, and 6,450,686, each of which is incorporated herein by reference.

[0038] In the embodiment illustrated, zipper closure 20, at each side edge 16, 18, includes an area 26, 28, respectively, where zipper profiles 22, 24 are sealed together and may be partially crushed, melted or deformed.

[0039] At top edge 19, package 10 has a header 70, which extends from side panel 12 to side panel 14 and envelopes zipper closure 20 and slider device 25. Header 70 extends the width of package 10 from side edge 16 to side edge 18. In this particular embodiment, header 70 is detachable from package 10 via weakness 75. Weakness 75 may be a perforation, a tear-strip, string or thread, a laser score, a die line, a thinner area, or other configuration that allows header 70 to be readily removed or disconnected from at least one of side panels 12, 14, preferably from both side panels 12, 14, to gain access to zipper closure 20 and slider device 25. Header 70 is an element that provides a quick indication whether or not access has been gained to zipper closure 20. That is, access is not readily gained to interior 15 (FIG. 1A) of surrounding wall 11, without breaching header 70 or side panels 12, 14.

[0040] Package 10 also includes seal 40, which is positioned between bottom edge 17 and zipper closure 20. Seal 40 is present on the interior of at least one of side panels 12, 14 and allows panels 12, 14 to be sealed together, preferably with a fluid-impermeable or hermetic seal. Seal 40 may be a repeatably reclosable seal, often referred to as a peel seal, or a one-time seal, such as an adhesive seal or a mechanical seal. Illustrated in FIGS. 1A and 1B, seal 40 is composed of a material on each of panels 12, 14. Additional details regarding seal 40 are provided below.

[0041] Package 10 also includes a valve 60, positioned in one of side panels 12, 14 to allow escape of air, gas or other fluid from storage interior 15 to the exterior of package 10. In FIG. 1B, valve 60 is illustrated in side panel 12. Valve 60 is preferably a one-way evacuation valve, allowing fluid flow therethrough in only one direction; preferably, that direction is from storage interior 15 of package 10 to the exterior of package 10. The fluid to pass through valve 60 can be either or both gaseous or liquid. In most uses of package 10, the fluid passing through valve 60 will be air, and the following description will refer to "air", although it is understood other fluids may pass through valve 60. Valve 60 may be a manually activated valve or may be configured for use with an external device, such as a vacuum pump, as will be described below. In package 10, valve 60 is positioned between bottom edge 17 and seal 40; also, seal 40 is positioned between valve 60 and zipper closure 20. An alternate embodiment, package 10" in FIG. 13, has valve 60 positioned between seal 40 and zipper closure 20.

[0042] Referring still to FIG. 1, present on at least one of side panels 12, 14 is preferably a textured standoff material 50, in locations where it is desired to maintain a slight distance, gap or spacing, between side panel(s) 12, 14 and, for example, an item within interior 15 of package 10, or,

from valve 60. Textured standoff material 50 may extend the width of package 10 between side edges 16, 18, as illustrated in FIG. 1, or may stop short of edges 16, 18. Additionally or alternatively, textured standoff material 50 may extend from bottom edge 17 to seal 40, or stop short of either. Textured standoff material 50 may be integral with side panel(s) 12, 14 (e.g., standoff material 50 is side panel(s) 12, 14) or may be attached to an interior surface of side panel(s) 12, 14.

[0043] Returning to package 10, in detail, various specific details of package 10 will now be described. It is understood however, that the following descriptions are not limiting to features of package 10; alternate materials, elements, configurations, constructions, and the like could be used to provide a package according to the present invention.

[0044] Package 10 has side panels 12, 14, which form the overall package 10. Side panels 12, 14 are flexible sheets, typically polymeric film. Examples of suitable films for use as panels 12, 14 are well known, and include polyethylene, polypropylene, and the like. Multi-layered or laminated materials may also be used, which can include, but are not limited to, low density polyethylene (LDPE) and nylon or LDPE and polypropylene. FIG. 11 illustrates a portion of side panel 12 that has a first layer 45 (e.g., polyethylene) and a second layer 55 (e.g., polyester). In this embodiment, first layer 45 is an interior layer of package 10 and second layer 55 is an outer or exterior layer of package 10.

[0045] As provided above, side panels 12, 14 meet at bottom edge 17, side edges 16, 18 and top edge 19. Any or all of edges 16, 17, 18, 19 may be seals or may be folds. In the embodiment illustrated in FIGS. 1, 1A and 1B, bottom edge 17 is a seal between side panel 12 and side panel 14 and top edge 19 is a seal between side panel 12 and side panel 14 within header 70. In alternate embodiments, for example, bottom edge 17 could be a fold. Side edges 16, 18 could be either seals or folds. For example, one piece of material could be folded to form panels 12, 14, thus forming one folded side edge (e.g., side edge 16) and one sealed side edge (e.g., side edge 18). In an alternate configuration, a tube of material can be used, thus forming two folded side edges (side edges 16, 18). Still further, package 10 could have each of edges 16, 17, 18, 19 being sealed. These various edge configurations are known in the art and any of these are suitable for package 10.

[0046] FIG. 17 illustrates package 10" with each of edges 16, 17, 18 having a fairly wide (e.g., at least 1 mm wide, e.g., at least 2 mm wide) seals 85, 105, 95, respectively. Such wide seals 85, 105, 95 generally increase the strength of edges 16, 17, 18 and further inhibit leakage or seepage. Seals 85, 105, 95 can be made by the application of heat and pressure.

[0047] As provided above, zipper closure 20 has first zipper profile 22 and second zipper profile 24, which engage and disengage from each other to provide access to storage interior 15 of package 10. Profiles 22, 24 are constructed to be repeatedly sealed (e.g., closed, engaged, mated, etc.) and unsealed (e.g., opened, disengaged, unmated, etc.), for example, by pressure exerted by the user's fingers. In some embodiments, zipper profiles 22, 24 are configured to provide an indication, for example by color change, when they are sealed. FIGS. 10, 11 and 16 show an embodiment of zipper profile 22' having an area of adhesive 30 present between its profile members. Adhesive 30 may increase the

sealing strength between profiles 22, 24 and inhibit air leakage through zipper closure 20.

[0048] In package 10, and in packages 10' and 10", zipper closure 20 is configured to be opened and closed by slider device 25, whereas in package 10", zipper closure 20 is opened and closed without the aid of a slider device. Optional areas 26, 28 are present at edges 16, 18, for example, to strengthen the ends of zipper closure 20 and/or to inhibit slider device 25 from traveling too far along zipper closure 20.

[0049] As provided above, seal 40 is present on the interior of at least one of panels 12, 14. Seal 40 allows panels 12, 14 to be sealed together, preferably with a fluid-impermeable or hermetic seal. Seal 40 preferably extends from side edge 16 to side edge 18, and may be any suitable width (taken in the direction from bottom edge 17 to zipper closure 20). Seal 40 can be a material, e.g., adhesive, applied to a surface of panel(s) 12, 14 or seal 40 may be integral with or formed by panel(s) 12, 14.

[0050] Seal 40 may be a repeatably reclosable seal or a one-time seal, such as an adhesive seal or a mechanical seal that is not reclosable. For example, seal 40 may be an adhesive peel seal, which can be sealed, readily opened, and resealed. Examples of peel seals include those described in U.S. Pat. Nos. 6,290,393; 6,210,038, and 6,131,248, each of which is incorporated herein by reference. Seal 40 may alternately be a non-resealable adhesive peel, that is, a seal that, once broken, cannot be resealed. Still further, seal 40 may be a mechanical connection between panels 12, 14 formed, for example, by a melting and joining of their materials, due to the application of heat and pressure in the area. Seal 40 could alternately be a physical or mechanical interaction, such as a seal formed by material that separates or delaminates between layers, and that cannot be resealed. FIG. 16 illustrates an embodiment having seal 40 as a reclosable peel seal 43, which has multiple layers of adhesive film, which when the package is opened and seal 40 is broken, one adhesive strip stays with one side of the package, and when closed again, a fresh adhesive strip adheres to the opposite side. Examples of non-resealable seals include those described in U.S. Pat. No. 6,004,032, which is incorporated herein by reference. Various configurations of seals 40 are further described below.

[0051] Valve 60 is preferably a one-way evacuation valve, allowing fluid flow therethrough in only one direction; preferably, that direction is from storage interior 15 of package 10 to the exterior of package 10. Valve 60 can be any suitable valve, including those known as "Goglio" type or "Raackmann" type. Goglio-type valves are available, for example, from Bosch, Wipf and Wico; Raackmann-type valves are available, for example, from Amcor. Other examples of suitable valves 40 include those described in U.S. Pat. Nos. 6,913,803; 6,733,803; 6,607,764, and 6,539,691, each of which is incorporated herein by reference.

[0052] Various parts of a specific type of valve 60 are illustrated in FIG. 6. Valve 60 includes a valve body 62, a valve membrane 63, and a valve containment cap 64. Membrane 63 preferably inhibits the passage of particulate (e.g., solid) items through valve 60. In some embodiments, membrane 63 may be configured to allow air and other gases therethrough but not allow liquids therethrough; PTFE (polytetrafluoroethylene) is an example of such a material.

[0053] An alternate embodiment of a suitable valve is illustrated in FIG. 7; this valve uses two components, body 170 having apertures therethrough and adhesive-backed component 172. This valve would be installed on one of side panel 12, 14 via adhesive-backed component 172. Valve 60, which includes the valve construction of FIG. 7, may be a manually activated valve or may be configured for use with an external device, such as a vacuum pump, as will be described below.

[0054] Package 10 preferably includes textured standoff material 50 in locations where it is desired to maintain a slight distance, gap or spacing, between side panels 12, 14 and, for example, an item within interior 15 of package 10. Textured standoff material 50 may additionally or alternatively be positioned to inhibit, for example, side panel 14, from interfering with the functioning of valve 60. Material 50 interfaces with evacuation valve 60 to inhibit the possibility of the vacuum process being hindered or closed off, which could occur with a with flat or smooth film for panel 14.

[0055] Textured standoff material 50 is a textured material having, for example, protrusions, dots, bumps, detents, grooves, etc., or other structures that provide a surface that is not smooth. Generally, the textured features of standoff material 50 are at least 0.01 mm high, often at least 0.05 mm high, for example, about 0.1 mm high, or more, such as about 0.5 mm high or even 1 mm high. Such a textured standoff material 50 is desirable in package constructions to maintain a slight air gap or spacing between side panels 12, 14 and any item present within interior 15.

[0056] Standoff material 50 can be present on or occupy generally any portion of one or both of side panels 12, 14. Textured standoff material 50 may extend the width of package 10 from side edges 16, 18, as illustrated in FIG. 1, or may stop short of edges 16, 18. In the other direction, standoff material 50 may extend, from bottom edge 17 and extend close to seal 40, as illustrated in FIG. 1. In FIG. 1, package 10 has standoff material 50 present in the general area where valve 60 is present. Other configurations for standoff material 50 are suitable. For example, FIG. 9 illustrates package 10' with standoff material 50 extending from a region short of bottom edge 17 to close to valve 60, but not in the area where valve 60 is present. Yet another example is in FIG. 13, where package 10'' has standoff material 50 extending from bottom edge 17 to a region short of seal 40; material 50 is not in the area where seal 40 or valve 60 is present.

[0057] Package 10 preferably also includes tamper evident header 70, which encases or envelopes zipper closure 20. To gain access to zipper closure 20, header 70 is at least partially detached from package 10 via weakness or weaknesses 75. Header 70 provides a quick indication whether or not access has been gained to zipper closure 20. FIGS. 1A and 1B illustrate header 70 formed from a material (e.g., a polymeric web) covering zipper closure 20 and slider device 25 and attached to side panels 12, 14; in this embodiment, zipper profiles 22, 24 are integral with side panels 12, 14 and header 70 is a separate piece. FIG. 1C illustrates alternate header 70' formed from a material (e.g., a polymeric web) covering zipper closure 20 and slider device 25 and integral with side panels 12, 14; in this embodiment, header 70' is integral with side panels 12, 14 and zipper profiles 22, 24 are

separate. These and other tamper evident headers are well known; see for example, U.S. Pat. Nos. 6,524,002; 5,492,411, and 5,893,645, each of which is incorporated herein by reference.

[0058] An example of another tamper evident feature is illustrated in FIG. 4, which shows elements of a package unassembled. FIG. 4 shows side panels 12, 14 with zipper profiles 22, 24, respectively, with slider device 25, seal 40, valve 60, and header 70. Also shown is a second tamper evident feature, web 27, which extends from side panel 12 to side panel 14 below zipper closure 20. Web 27 provides a barrier between zipper closure 20 and the interior of the package. To gain access to the interior of the package and items retained therein, after opening zipper closure 20, web 27 is breached. Similar to header 70, web 27 can include a weakness to breach web 27.

[0059] For ease of description, package 10 illustrated in FIGS. 1, 1A and 1B is a sealed, unopened package. No item is shown within interior 15, although in most configurations, package 10, when in the configuration illustrated in these figures, will have an item therein.

[0060] Referring to FIG. 2, package 10 is illustrated being filled through its bottom end 17 via hopper 120. Prior to and during the filling, side panels 12, 14 are not sealed to each other at edge 17, but rather, define an opening 110 therebetween to allow access to interior 15. Item(s) to be sealed within interior 15 pass from hopper 120 through opening 110 between side panels 12, 14 and into the interior of package 10. Side panels 12, 14 are then sealed together to form a seal at bottom end 17. Typically during the filling process, zipper closure 20 is closed and seal 40 is sealed.

[0061] Package 10, in many embodiments, is produced by processes often referred to as "form fill and seal" processes. In these processes, the package, particularly storage interior 15, is manufactured (i.e., formed), the item is placed within storage interior 15 (i.e., filled), and then any last seals, such as at bottom edge 17, are made (i.e., sealed). "Form fill and seal" will be referred to as "FFS" hereinafter. Package 10 may be made by a horizontal FFS process (e.g., where the film forming side panels 12, 14 and zipper closure 20, and slider device 25 if present, move in a generally horizontal direction) or a vertical FFS process (e.g., where the film forming side panels 12, 14 and zipper closure 20, and slider device 25 if present, move in a generally vertical direction). It is understood that hybrid processes may include movement of these parts in various orientations. Typically, with horizontal FFS processes, the unfilled package 10 progresses through the process up-side-down, as illustrated in FIG. 2. That is, bottom edge 17 is positioned above top edge 19. With vertical FFS process, the unfilled package progresses either up-side-down or sideways. Additional details regarding methods of making package 10, and packages 10', 10'', are described below.

[0062] FIG. 3 illustrates items 130 within package 10. Items 130 can be a collection of small food items, such as shredded cheese, meats, fruits, or vegetables. FIG. 15 illustrates item 130', a chicken leg, within package 10. It is understood that other items, food or not, may be sealed within package 10 or the other packages of this disclosure. To gain access to items 130, header 70 is removed at weakness 75, thus providing access to slider device 25 and zipper closure 20. FIG. 3 illustrates header 70 being removed by a user.

[0063] After header 70 has been removed, the user can move slider device 25 from side edge 16 toward side edge 18 and thus open zipper closure 20. If sealed, seal 40 is opened, unsealed, or broken. Access is thus provided to interior 15 and to item 130. After removing a desired amount of item 130, package 10 is resealed, typically by first resealing seal 40 (if seal 40 is configured for resealing) and then closing zipper closure 20 by moving slider device 25 toward side edge 16. It is understood that zipper closure 20 could be closed prior to seal 40 being resealed.

[0064] To extend the freshness of item 130 remaining in package 10, air present within interior 15 can be removed through valve 60. FIG. 5 illustrates a hand held vacuum pump 150 poised for attachment to valve 60, to remove air from inside package 10; FIG. 15 illustrates vacuum pump 150 poised for attachment to valve 60 to remove air from package 10 having item 130', a chicken leg, therein. Vacuum pump 150 is illustrated in more detail in FIG. 8. FIG. 12 illustrates a user's hand pushing on package 10' to urge air from package 10' through valve 60.

[0065] FIG. 13 illustrates package 10", which does not have a slider device. To gain access to items within package 10", header 70 is removed at weakness 75, thus providing access to zipper closure 20. Header 70 would be removed in the same manner as illustrated in FIG. 3.

[0066] After header 70 has been removed, the user can open zipper closure 20 by unmating closure profiles 22, 24. If sealed, seal 40 is opened, unsealed, or broken. Access is thus provided to interior 15 and to the item therein. Package 10" is resealed, typically by first resealing seal 40 (if seal 40 is configured for resealing) and then closing zipper closure 20 or by closing zipper closure 20 and then resealing seal 40, if so configured. To extend the freshness of items remaining in package 10", air can be removed through valve 60, for example by vacuum pump 150 or by a user's hand.

[0067] As mentioned above, package 10, 10', 10", 10''' is produced by "form fill and seal" processes, either horizontal FFS or vertical FFS. Package 10, 10', 10", 10''' may be made by a horizontal FFS process (e.g., where the film forming side panels 12, 14 and zipper closure 20 and slider device 25, if present, move in a generally horizontal direction) or a vertical FFS process (e.g., where the film forming side panels 12, 14 and zipper closure 20 and slider device 25, if present, move in a generally vertical direction).

[0068] In one general embodiment of a horizontal FFS process, two extended lengths of the film, each forming a side panel 12, 14, move in a generally horizontal direction. An extended length of zipper closure 20 may be attached to side panels 12, 14 or may already be integral with the panel film. Slider device 25, if present, could be located on zipper closure 20 prior to being attached to side panels 12, 14. Standoff material 50 can be attached to side panel(s) 12, 14 or may be side panels(s) 12, 14. Valve 60 is typically installed into one of the extended lengths of film at predetermined intervals, to correspond to one valve 60 per package 10, 10', 10", 10'''. Seal 40 can be formed between side panels 12, 14 before, after, or concurrently with zipper closure 20 being attached. Material for header 70 may be attached to side panels 12, 14 at any step during the process.

[0069] After the various elements have been joined to form an extended length, seals, which will result in side

edges 16, 18, are made. Areas 26, 28 are usually made (e.g., crushed) simultaneously with the side edge seals, but could be made in a separate step. After storage interior 15 has been formed (i.e., between side panels 12,14 having side edges 16, 18), item 130, 130' is placed, e.g., dropped, into storage interior 15, and then bottom edge 17, which is positioned above the rest of package 10, 10', 10", 10''', is sealed.

[0070] In an alternate embodiment of a horizontal FFS process, one extended length of film moves in a generally horizontal direction. This film is folded to form both panels 12, 14 with header 70 and folded edge 19 therebetween. Any order of applying zipper closure 20 and optional slider device 25, standoff material 50, valve 60, seal 40 and weakness 75 can be used. Similar to the first embodiment, after the various elements have been joined to form an extended length, side edges 16, 18 and areas 26, 28 may be made. Item 130, 130' is placed into storage interior 15, and then bottom edge 17 is sealed.

[0071] FIG. 18 illustrates a configuration for a form fill seal machine in horizontal configuration that uses a single web of film to form package 10; this configuration could also be suitable in vertical form. The process of FIG. 18 has an extended length of film 400 with a textured surface (suitable for textured standoff material 50), a punching mechanism 420, valve applicator 430, film scoring mechanism 440, extended length of reclosable zipper 520, ultrasonic crushing unit 540, notch punch 500, dancer take up rolls 490, slider applicator system 460, reclosable zipper closure applicator 550, package side seal bars 530, product loading system 420, package bottom sealing system 310, and package cut off system 300.

[0072] FIG. 19 illustrates a process similar to that of FIG. 18, except that an extended length of textured material is provided as material 53, which is attached to web 400. The resulting package 10' has standoff material 50 present in only a portion of side panel(s) 12, 14.

[0073] In one embodiment of a vertical FFS process, two extended lengths of film, each forming a side panel 12, 14, move in a generally vertically downward direction. Similar to above, an extended length of zipper closure 20 may be attached to side panels 12, 14, before, after, or concurrently with the film being sealed together to form top edge 19. Standoff material 50 can be side panels 12, 14 (as in the process of FIG. 18) or can be attached to side panels 12, 14 (as in the process of FIG. 19). Valve 60 is typically installed into one of the extended lengths of film at predetermined intervals, to correspond to one valve 60 per package 10. Seal 40 can be formed between side panels 12, 14 before, after, or concurrently with edge 19 being formed or with zipper closure 20 being attached. Weakness 75 may be formed at any stage. Bottom seal 17 can also be formed at any stage in this process.

[0074] After the various elements have been joined to form an extended length, a seal, which results in, for example, side edge 18 and area 28, is made. After this step, storage interior 15 has been made between side panels 12, 14, edge 17, seal 40 and side edge 18. Item 130, 130' is placed, e.g., dropped, into storage interior 15, and then side edge 16, which is positioned above the rest of package 10, is sealed. Such a FFS process moves in a generally downward vertical direction.

[0075] In an alternate embodiment of a vertical FFS process, one extended length of film moves in a generally

horizontal direction. This film is folded to form both panels **12, 14** with folded edge **19** or edge **17** therebetween. Any order of applying zipper closure **20**, standoff material **50**, valve **60**, seal **40** and weakness **75** can be used. Similar to the first embodiment, after the various elements have been joined to form an extended length, side edge **18** and area **28** are made. Item **130, 130'** is placed into storage interior **15**, and then side edge **16** is sealed.

[0076] The above specification and examples are believed to provide a complete description of the manufacture and use of particular embodiments of the invention. It is understood by those skilled in the art of packaging that package **10** and any other embodiments may be made by generally any suitable process, not just those described herein. As mentioned above, any or all of edges **16, 17, 18, 19** may be folds or seals between side panels **12, 14**. A slider device **25** (if present), may be applied to zipper profiles **22, 24** before or after incorporation with side panels **12, 14**. Package **10** may include side gussets or gussets in panels **12, 14** to provide increased volume for interior **15**. Various other configurations and methods of making package **10, 10', 10'', 10'''** are suitable.

[0077] Because many embodiments of the invention can be made without departing from the spirit and scope of the invention, the true scope and spirit of the invention reside in the broad meaning of the claims hereinafter appended.

What is claimed is:

1. A polymeric resealable bag comprising:
 - (a) a surrounding wall defining an interior volume, the surrounding wall having a first side edge and a second side edge;
 - (b) a zipper closure secured to the surrounding wall, comprising a first mating closure profile and a second mating closure profile;
 - (c) a first tamper-evident structure casing at least a portion of the zipper closure, the first tamper-evident structure having a weakness extending between the first and second side edges constructed and arranged to permit removal of the first tamper-evident structure along the weakness from a remaining portion of the bag; and
 - (d) a one-way evacuation valve oriented in the surrounding wall between the zipper closure and the interior volume.
2. The resealable bag of claim 1 wherein the surrounding wall comprises a first panel section and a second opposed panel section.
3. The resealable bag of claim 2 wherein:
 - (a) the first mating profile is attached to the first panel section and extends from the first side edge to the second side edge; and
 - (b) the second mating profile is attached to the second panel section and extends from the first side edge to the second side edge.
4. The resealable bag of claim 2 further comprising a seal present on at least one of the first and second panel sections, between the zipper closure and the interior volume, and extends between the first and second side edges.
5. The resealable bag of claim 2 further comprising a slider device operably mounted on the zipper closure and

being moveable between a first position adjacent to the first side edge and a second position adjacent to the second side edge;

- (a) the slider device being constructed and arranged to interlock the first mating profile with the second mating profile when the slider device is moved in a direction from the second position to the first position; and
 - (b) the slider device being constructed and arranged to disengage the first mating profile from the second mating profile when the slider device is moved in a direction from the first position to the second position.
6. The resealable bag of claim 2 further comprising a second tamper evident-structure positioned between the zipper closure and interior volume.
 7. The resealable bag of claim 6 wherein the second tamper evident-structure comprises a web extending between the first panel section and the second panel section from the first side edge to the second side edge.
 8. The resealable bag of claim 1 wherein the surrounding wall comprises textured film material.
 9. The resealable bag of claim 8, wherein the surrounding wall comprises a first panel section and a second opposed panel section.
 10. The resealable bag of claim 9, wherein the textured film material is attached to at least one of the first and second panel sections.
 11. The resealable bag of claim 9, wherein the textured film material is integral with at least one of the first and second panel sections.
 12. The resealable bag of claim 4, wherein the seal is a resealable seal.
 13. The resealable bag of claim 2 wherein:
 - (a) the zipper closure includes:
 - (i) a first zipper profile defining a first profile member secured to the first panel section; and
 - (ii) a second zipper profile defining a second profile member secured to the second panel section;
 - (A) the first profile member and second profile member being constructed and arranged to selectively interlock and separate.
 14. The resealable bag of claim 4 wherein the seal is positioned between the zipper closure and the valve.
 15. The resealable bag of claim 4 wherein the valve is positioned between the zipper closure and the seal.
 16. The resealable bag of claim 3 further comprising:
 - (a) a food item in the interior volume.
 17. A method of storing a food item in a polymeric bag; the method comprising:
 - (a) providing a bag having: a surrounding wall defining an interior volume, the surrounding wall having a first side edge and a second side edge; a zipper closure secured to the surrounding wall, comprising a first mating closure profile and a second mating closure profile; a first tamper-evident structure casing at least a portion of the zipper closure, the first tamper-evident structure having a weakness extending between the first and second side edges constructed and arranged to permit

removal of the first tamper-evident structure along the weakness from a remaining portion of the bag; and a one-way evacuation valve oriented in the surrounding wall between the zipper closure and the interior volume.; and

(b) providing a food item in the interior volume.

18. A method according to claim 17 wherein:

(a) the step of providing a food item includes orienting cheese in the interior volume.

19. A method according to claim 17, wherein:

(a) the step of providing a bag includes providing a bag having a resealable peel seal between the first and second panel sections.

20. A method of using a polymeric bag; the method comprising:

(a) breaching a tamper evident header to obtain access to a zipper closure;

(b) pulling the zipper closure apart to separate the closure to provide access to a seal sealing together opposing panel sections of a bag;

(b) pulling the opposing panel sections of the bag apart in a vicinity of the seal to release the seal and provide access to a storage area of the bag;

(c) accessing a food item in the storage area of the bag;

(d) after accessing the food item, interlocking the zipper closure to close the bag; and

(e) squeezing the bag to force at least some gas in the bag through a one-way valve located in the first panel section.

21. A method according to claim 20 wherein:

(a) the step of pulling the zipper closure apart to separate the closure comprises moving a slider device from a first position adjacent to the first side edge to a second position adjacent to the second side edge to separate the closure; and

(b) the step of interlocking the zipper closure to close the bag comprises moving the slider device from the second position to the first position.

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