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(54) **Reclosable stand-up package and method of manufacturing same**

(57) A method of manufacturing is provided for a reclosable, free standing package (10) adapted to be self-supporting in an upright position when resting on a horizontal support surface. The method includes the steps of providing a bottom panel (16) in the form of a stand-up web (74) having a planar base (76) and a pair of legs (78,80) depending from opposite sides of the base; in-

serting the stand-up web between a first film panel (58) and a second film panel (60); and creating spaced apart bottom edges of the package by sealing a lower end of the first film panel to one of the legs, and a lower end of the second film panel to the other of the legs such that an entire surface of the base lies substantially parallel to a plane containing the bottom edges.

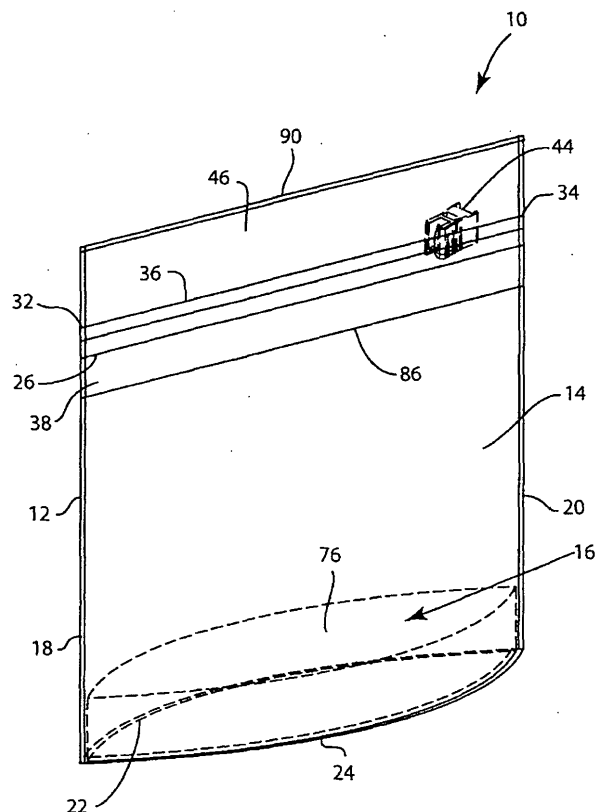


Figure 1

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Description

Field of the Invention

[0001] The present invention relates broadly to reclosable packages and methods of forming such packages, and more particularly, pertains to reclosable packages manufactured on form, fill and seal machines wherein the reclosable packages are self-supporting.

Background of the Invention

[0002] Form, fill and seal technology is known in the packaging industry as a method to package consumable goods. Consumable goods that are not used completely when the package is initially opened rely on a zipper closure to reclose the package and keep the remaining contents fresh. In some applications, a tamper-evident seal is included on the package to signify whether access has been gained to the zipper closure. Examples of consumable goods that are often packaged in packages with a zipper closure include potting soil, fertilizer, pet food, dog biscuits, and many different foods edible by humans.

[0003] For certain goods, the bottom of the reclosable package is provided with a configuration that will enable the package to stand up and be self-supporting in an upright position when resting on a horizontal supporting surface such as a shelf, cupboard, table or the like. Further developments in providing these types of stand-up packages with improved stability are desirable.

Summary of the Invention

[0004] It is one object of the present invention to provide an improved method of manufacturing a reclosable, stand-up package by inserting a stand-up web in a horizontal form, fill and seal process for making plastic bags.

[0005] It is also an object of the present invention to provide an improved reclosable, stand-up package that has a stronger, sturdier and more stable base capable of supporting the package so that it will not tip over.

[0006] The present invention is directed to a method of manufacturing a reclosable, free standing package adapted to be self-supporting in an upright position when resting on a horizontal support surface. The method includes the steps of providing a bottom panel in the form of a stand-up web having a planar base and a pair of legs depending from opposite ends of the base. The stand-up web is inserted between a first film panel and a second film panel and a lower end of the first film panel is sealed to one of the legs and a lower end of the second film panel to the other of the legs. Thus, an entire surface of the base lies substantially parallel to a plane containing the bottom edges.

[0007] The step of sealing the first and second film panels to the legs includes only horizontal sealing. The

method includes the step of creating side seams by providing seals across the first film panel and the second film panel. The method further includes the steps of providing a combined zipper closure and slider device between the first film panel and the second film panel, and sealing a first closure profile of the zipper closure to the first film panel and sealing a second closure profile of the zipper closure to the second film panel. Prior to providing a combined zipper closure and slider device between the first film panel and the second film panel, the continuous film web can be slit to create the first film panel and the second film panel. Alternatively, the web can be folded onto itself to create the first and second film panels. The step of providing a stand-up web includes unwinding and folding of a supply of film. The method further includes the step of providing a tamper-evident header over the slider device to indicate whether access has been gained to the slider device. The method also includes the step of providing a tamper-evident membrane between the first closure profile and the second closure profile. The step of slitting the film web is preceded by the step of passing the film over a V-board. The step of providing a combined zipper closure and slider device between the first film panel and the second film panel includes the step of feeding the combined zipper closure and slider device through a bottom end of the V-board. Alternatively, the step of providing a combined zipper closure and slider device between the first film panel and the second film panel includes a step of feeding the combined zipper closure and slider device in front of the V-board.

[0008] In another aspect of the invention, a reclosable, stand-up package includes first and second side panels, each having a top edge, opposed side edges and a bottom edge. The opposed side edges of the side panels are sealed together. A zipper closure is sealed to the first and second side panels along the top edges thereof. The zipper closure extends from one of the sealed side edges to the other of the sealed side edges. A slider device is operably mounted on the zipper closure for opening and closing the zipper closure. A bottom panel has a planar base and a pair of legs depending from opposite ends thereof. The pair of legs are sealed to the bottom edges of the first and second side panels such that the base is raised a constant distance above the bottom edges. The bottom panel provides a widened configuration enabling the package to be self-supporting in an upright position when the bottom edges are adapted to rest on a horizontal support surface. The legs of the bottom panel are sealed to the bottom edges of the first and second side panels along entire lengths of the bottom edges extending between the opposed sealed side edges. The zipper closure includes a removable internal tamper-evident membrane extending between the first and second side panels. The package also includes a removable tamper-evident header connected to the zipper closure and surrounding the slider device.

[0009] Various other objects, features and advantages of the invention will be made apparent from the following description taken together with the drawings.

Brief Description of the Several Views of the Drawings

[0010] The drawings illustrate the best mode presently contemplated of carrying out the invention.

[0011] Figure 1 is a perspective view of a flexible, reclosable stand-up package with a tamper-evident header attached thereto;

[0012] Figure 2 is a schematic, sectional view of a folding step used in forming the flexible, reclosable stand-up package;

[0013] Figure 3 is a schematic, sectional view of a slitting step used in forming the flexible, reclosable stand-up package;

[0014] Figure 4 is a schematic, sectional view of the insertion of a combined slider device and zipper closure during the formation of the flexible, reclosable stand-up package;

[0015] Figure 5 is a schematic, sectional view of the insertion of a stand-up web used in forming the flexible, reclosable stand-up package;

[0016] Figure 6 is a schematic, sectional view of a filling operation, and the creation of a tamper-proof header used in forming the flexible, reclosable stand-up package;

[0017] Figure 7 is a schematic, sectional view of a sealing operation for the stand-up web used in forming the flexible, reclosable stand-up package;

[0018] Figure 8 is a schematic, sectional view of the locating of score lines in the tamper-proof header used in forming the flexible, reclosable stand-up package;

[0019] Figure 9 is a schematic, sectional view of the removal of the tamper-proof header from the flexible, reclosable stand-up package;

[0020] Figure 10 is a perspective view of the finished, flexible, reclosable stand-up package with the tamper-proof header removed;

[0021] Figure 11 is a schematic, perspective view of a horizontal form, fill and seal machine for manufacturing the flexible, reclosable stand-up package; and

[0022] Figure 12 is a schematic view similar to Figure 11 but showing an alternative location for feeding the combined slider device and zipper closure in the form, fill and seal machine.

Detailed Description of Preferred Embodiments

[0023] The addition of a stand-up web to a flexible package, such as a bag, is advantageous in enabling the package to be self-supporting without tipping over. The process described herein installs a stand-up web to bags manufactured using form, fill and seal machines.

[0024] A flexible, reclosable package or bag 10 having side panels 12, 14 and a raised bottom panel 16 is shown in Figure 1. Side panels 12, 14 are sealed together

at side seams 18, 20, and sealed at lower ends with a pair of bottom edges 22, 24 on bottom panel 16. A zipper closure arrangement having mating profiles to open (unseal and reseal) the bag 10 is shown at 26. The zipper closure 26 can include a variety of configurations and structures. The zipper closure 26 includes a first mating profile 28 (Figure 4) and a second mating profile 30 (Figure 4) that engage and disengage, as appropriate, to open and close the bag 10. Zipper closure 26 extends from a first edge 32 of the bag 10 to a second edge 34 across a mouth 36. First and second profiles 28, 30 have respective first and second flanges 38, 40 depending therefrom which are sealed to inner, upper surfaces of the side panels 12, 14 as seen in Figure 9. The ends of the flanges 38, 40 include an internal tamper-evident membrane 42 that lies within the interior of bag 10. In order to gain access to the interior of the bag 10, the tamper-evident membrane 42 needs to be ruptured. Membrane 42 can be integrally formed with flanges 38, 40 when zipper closure 26 is extruded or can be applied after the mating profiles have been formed.

[0025] A slider device 44 is mounted on zipper closure 26 to facilitate opening and closing zipper closure 26. Slider devices and how they function to open and close zipper closures in general are taught in U.S. Patent Nos. 5,063,644; 5,301,394 and 5,664,220, each of which is incorporated by reference herein. A notch (not shown) is disposed within zipper closure 26 adjacent to edge 34 in the bag 10. The notch is designed to provide a "park place" into which slider device 44 settles when zipper closure 26 is sealed and slider device 44 is at the first edge 32. Such notch decreases any tendency for an incomplete interlock between first mating profile 28 and second mating profile 30.

[0026] Figure 1 illustrates an external tamper-proof or tamper-evident header 46 disposed over slider device 44. By "tamper-evident", it is meant that it provides an indication to the consumer as to whether the package 10 has been previously opened. In this embodiment, the tamper-proof header 46 covers and forms a complete enclosure around the zipper closure 26 and slider device 44. Tamper-evident header 46 is formed by sealing the tops of side panels 12, 14 over slider device 44 as further depicted in Figures 6, 7 and 8. In order to access the interior of package 10 and slider device 44 for the first time, the tamper-evident header 46 needs to be removed as shown in Figure 10. Various tamper-evident structures are known throughout the art of resealable packaging and may be used in lieu of tamper-evident header 46.

[0027] The bag 10 described and shown in Figure 1 can be manufactured by a horizontal form, fill and seal machine 48 generally of the type set forth in U.S. Patent No. 6,293,896 herein incorporated by reference. The bag 10, whether with or without the tamper-evident membrane 42 and the tamper-evident header 46, is manufactured, filled and sealed by a single process that includes sequential steps. The zipper closure 26, slider

device 44 and any tamper-evident structure are applied to the bag 10 prior to the bag 10 being filled with items.

[0028] Referring now to Figure 11, the horizontal form, fill and seal machine 48 includes a process line that progresses from right to left such that, the final fill bag 10 is at the left of the Figure. The package or bag 10 is manufactured upside down so that filling takes place through the bottom of the bag 10.

[0029] The web 50, which will provide side panels 12, 14, is supplied on a roll. In an alternative embodiment, the web 50 may comprise one or more layers of film. A series of tensioners 52 helps to control tension on the web 50 during the bag making process. From the tensioners 52, the web 50 progresses to a V-board 54 where the web 50 is folded as depicted in Figure 2. In the first embodiment of the invention, a slitter knife 56 close to the face of V-board 54 slits web 50 into two panels or halves of web 58, 60. Alternatively, as shown in Figure 12, the slitter knife can be eliminated and the web 50 simply folded to create the side panels 58, 60.

[0030] An extended length of zipper closure 26 is provided via spool 62 simultaneously with the feeding of film 50. The "home" notches discussed above are punched into zipper closure 26 at an interval defined by the bag width by an in-line punch 64 that may be a die, stamp, knife or other such process. Each notch is formed in the profile of zipper closure 26 before the zipper closure 26 is incorporated into the bag 10. Slider device 44 is provided from a rotating bowl 66 having a delivery conduit 68 which delivers a series of properly-oriented slider devices 44 to an applicator 70. The applicator 70 combines the zipper closure 26 with slider device 44 so that the slider device 44 is parked in the notch punched in the zipper disclosure 26. If misaligned on the zipper closure 26 or notch, the slider device 44 can be phased into register with the notch by sliding or moving the slider device 44 along zipper profile by guides or the like, until the slider device 44 is in register with the bag parked position or notch.

[0031] The zipper closure 26 with the slider device 44 is fed through a slot or the like at the base of the V-board 54 in between the two film halves 58, 60 of web 50 as represented in Figure 4 with profiles 28, 30 being separated. With this arrangement, the combined zipper closure 26 and slider device 44 is allowed to travel in a straight line from the point where slider device 44 is applied to zipper closure 26 to a point where the combined zipper closure 26 and slider device 44 are attached to the film halves 58, 60. Preferably, once attached to the film halves 58, 60, a straight line of travel, with no bends or turns, is maintained.

[0032] It is to be noted that because the bag 10 is manufactured upside down (i.e. the top of the bag 10 is at the bottom of the process line), the zipper closure 26 with the slider device 44 is positioned at the bottom of the film halves 58, 60 during bag formation.

[0033] After the film halves 58, 60 pass between a pair of vertical rolls 71, a film from a roll 72 is folded at 73

(Figure 11) to provide a stand-up, three sided web 74. The stand-up web 74 is positioned and held between the lower portions of the film halves 58, 60 as illustrated in Figure 5. The stand-up web 74 includes a planar base 76 and a pair of depending, diverging legs 78, 80 of equal length, and serves to define the raised bottom panel 16 of the finished bag 10. As will be appreciated hereafter, the stand-up web 74 is sized to provide a widened configuration at the bottom of finished bag 10 in order to enable the bag 10 to be self-supporting with a better stability than prior art stand-up packages.

[0034] After the introduction of the stand-web 74, heated seal bars 82 provide vertical seals on the film and zipper closure combination. These vertical seals will eventually result in side seams 18, 20 of package or bag 10 in Figure 1. Side seams 18, 20 extend along the entire height of bag 10. Typically, each seal bar 82 has a pair of bars on opposite sides of the film. Heat may be provided on one or both sides.

[0035] A top seal bar 84, positioned at the bottom of the process line, seals the zipper closure 26 to the film halves 58, 60 and can further be used to provide sealing of the tamper-evident header 46. The tamper-evident structure 46 provides an indication to the consumer whether bag 10 has been previously opened. In order to gain access to the interior of bag 10, the tamper-evident header 46 needs to be penetrated. Top seal bar 84 has first sealing surfaces positioned to provide pressure and typically heat to the area where the flanges 38, 40 of zipper closure 26 meets the film halves 58, 60 to form seals 86, 88 (Figures 6-9). The top seal bar 84 also has second surfaces positioned to provide pressure and to typically heat an area below slider device 44 in Figure 6 and form a seal between film halves 58, 60 at a top-most, horizontal seals 90.

[0036] Figure 6 represents a sectional view of the bag formation process after the seals 86, 88 and 90 have been made, and the bag being formed arrives at a filling station 92 (Figure 11) downstream of seal bar 84. At the filling station 92, items or materials 94 (e.g. cereal, snack food, fertilizer, etc.) to be contained in the resulting package are delivered by hopper 96. Hopper 96 includes valves, gates and doors, as needed, to deposit an appropriate amount of item 94 into the package from the bottom thereof while the stand-up web 74 is held away from the hopper 96 and the item or material flow.

[0037] A bottom seal bar 98 located at the top of machine 48 is used to heat seal the base 76 and provide seals 100, 102 between legs 78, 80 of the stand-up web 74 and the bottom edges of the film halves 58, 60 as depicted in Figure 7. Seals 100, 102 extend across the entire length of the bottom edges from side seam 18 to side seam 20. As a result, base 76 forms a raised bottom wall for the finished package 10. It will be understood that the size of the stand-up web 74 and, particularly its width, will dictate the degree of widened configuration at the bottom of the package which will make the bag 10 more stable and prevent tipping over as it sits on a

horizontal support surface. In figures 5-9, the height of the legs 78, 80 is shown exaggerated for clarity only and it should be appreciated that the base 76 usually sits much closer to the surface on which bag 10 is supported, as shown in Figures 1 and 10. It is to be noted that the entire base 76 will be spaced above a support surface over a constant distance defined by the equal height of the legs 78, 80. In other words, the raised bottom panel 16 lies generally parallel to a plane defined by the bottom edges 22, 24.

[0038] Bottom seal bar 98 may include an adjustable depth perforator for providing perforations 104 (Figure 8) in the film between the area of the zipper closure/film seams 86, 88 and the seam 90 at the top of the film halves 58, 60. These perforations or score lines 104 allow easy removal of the tamper-evident header 46 by the consumer. Preferably, the perforations 104 or other weakened area are positioned close to the area where the zipper flanges 38, 40 are sealed to the film halves 58, 60. This is done to minimize the amount of film remaining close to the slider device 44 after the tamper-evident header 46 is removed from bag 10 as illustrated in Figure 9.

[0039] A vertically oriented blade or cutter bar 106 cuts the edges at the side seams 18, 20 to provide individual, filled, free standing packages 108.

[0040] Figure 12 depicts an alternative form, fill and seal machine 48 identical to that disclosed above except that zipper closure spool 62, in-line punch 64, slider bowl 66, delivery conduit 68 and zipper closure and slider device applicator 70 are located above the process line rather than beneath it. In this design, the combined zipper closure and slider device is fed in front of the V-board 54 for insertion between film halves 58, 60. As shown in Figure 12, the V-board 54 does not include a slit such that the web 50 maintains its integrity and is folded to create the side panels 58, 60.

[0041] It should now be appreciated that either process machine 48 provides a flexible, reclosable stand-up bag 10 with a removable tamper-evident header 46 as shown in Figure 1, as well as an internal tamper-proof membrane 42 as seen in Figure 9. The insertion of stand-up web 74 enables the bag 10 to have a widened lower configuration with a raised bottom panel 16 so that the bag is self-supporting with enhanced stability. The stand-up web 74 can be made from a stiffer material than film panels 58, 60 and could be made from a transparent material that would allow the consumer to view the contents of the bag 10. In addition, the stand-up web 74 may include a material that has a high amount of metalizing which would give the package even greater stability.

[0042] Having described the presently preferred embodiments, it is to be understood that the invention may be otherwise embodied within the scope of the appended claims.

The features disclosed in the foregoing description, in the claims and/or in the accompanying drawings may,

both separately and in any combination thereof, be material for realising the invention in diverse forms thereof .

5 Claims

1. A method of manufacturing a reclosable, free standing package adapted to be self-supporting in an upright position when resting on a horizontal support surface, the method comprising the steps of:

- a) providing a bottom panel in the form of a stand-up web having a planar base and a pair of legs depending from opposite ends of the base;
- b) inserting the stand-up web between a first film panel and a second film panel; and
- c) creating spaced apart bottom edges of the package by sealing a lower end of the first film panel to one of the legs, and a lower end of the second film panel to the other of the legs such that an entire surface of the base lies substantially parallel to a plane containing the bottom edges.

2. The method of claim 1, wherein the step of sealing the first and second film panels to the legs includes only horizontal sealing.

3. The method of claim 1, including the step of creating side seams by providing seals across the first film panel and the second film panel.

4. The method of claim 1, including the steps of

- a) providing a combined zipper closure and slider device between the first film panel and the second film panel; and
- b) sealing a first closure profile of the zipper closure to the first film panel and sealing a second closure profile of the zipper closure to the second film panel.

5. The method of claim 4, wherein prior to the step of providing a combined zipper closure and slider device between the first film panel and the second film panel, the method comprises the step of:

- a) slitting a film web to provide the first film panel and the second film panel.

6. The method of claim 1, wherein the step of providing a stand-up web includes unwinding and folding a film.

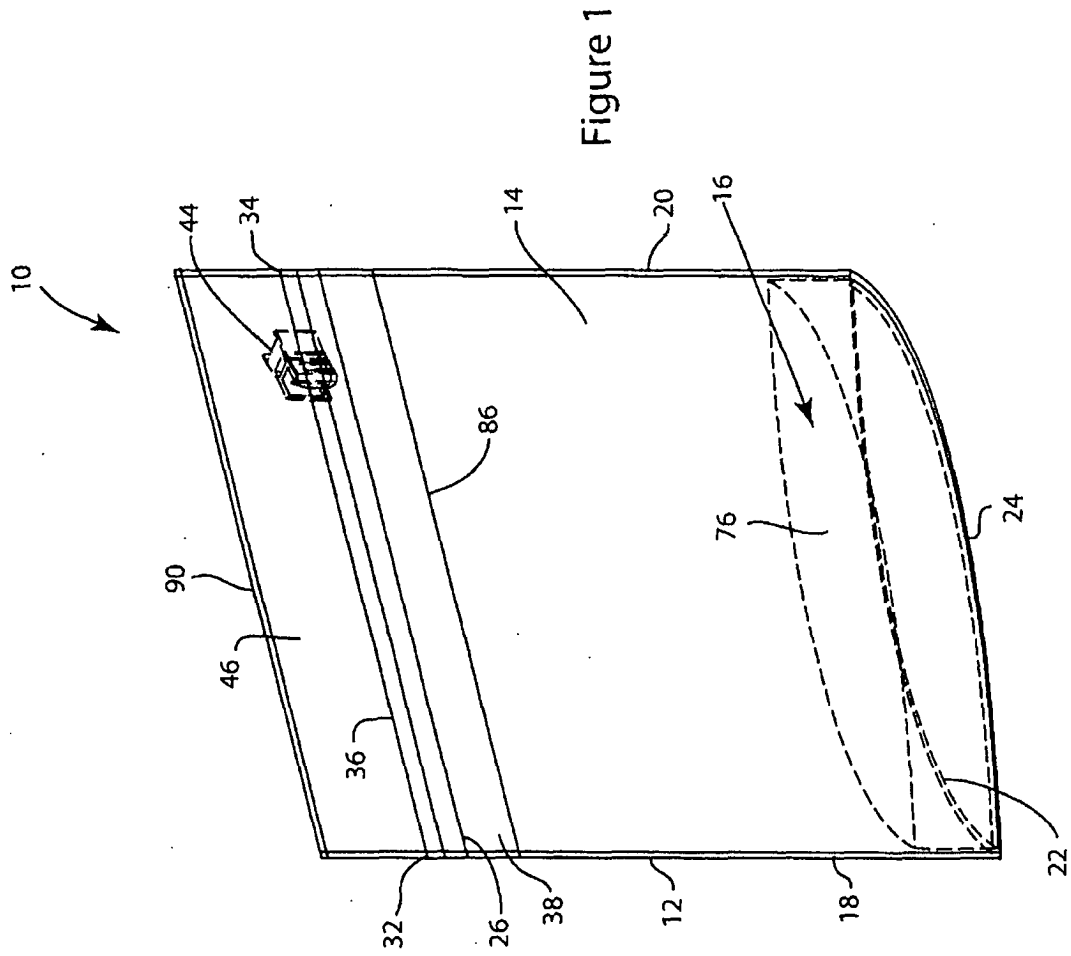
7. The method of claim 4, including the step of providing a tamper-evident header over the slider device to indicate whether access has been gained to the

slider device.

8. The method of claim 4, including the step of providing a tamper-evident membrane between the first closure profile and the second closure profile. 5
9. A reclosable free standing package made by the method according to claim 1.
10. The method of claim 5, wherein the step of slitting the film web is preceded by the step of passing the film web over a V-board. 10
11. The method of claim 10, wherein the step of providing a combined zipper closure and slider device between the first film panel and the second film panel includes the step of feeding the combined zipper closure and slider device through a bottom end of the V-board. 15
20
12. The method of claim 10, wherein the step of providing a combined zipper closure and slider device between the first film panel and the second film panel includes a step of feeding the combined zipper closure and slider device in front of the V-board. 25
13. A reclosable, stand-up package comprising:
 - first and second side panels, each having a top edge, opposed side edges and a bottom edge, the opposed side edges of the side panels being sealed together; 30
 - a zipper closure sealed to the first and second side panels along the top edges thereof, the zipper closure extending from one of the sealed side edges to the other of the sealed side edges; 35
 - a slider device operably mounted on the zipper closure for opening and closing the zipper closure; and 40
 - a bottom panel having a generally planar base and a pair of legs depending from opposite ends thereof, the legs being sealed to the bottom edges of the first and second side panels such that the entire surface of the base is raised a constant distance above the bottom edges, the bottom panel providing a widened configuration enabling the package to be self-supporting in an upright position when the bottom edges are adapted to rest on a horizontal support surface. 45
50
14. The reclosable, stand-up package of claim 13, wherein the legs of the bottom panel are sealed to the bottom edges of the first and second side panels along entire lengths of the bottom edges extending between the opposed sealed side edges. 55

15. The reclosable, stand-up package of claim 13, wherein the zipper closure includes a removable internal tamper-evident membrane extending between the first and second side panels.

16. The reclosable, stand-up package of claim 13, including a removable tamper-evident header connected to the zipper closure and surrounding the slider device.



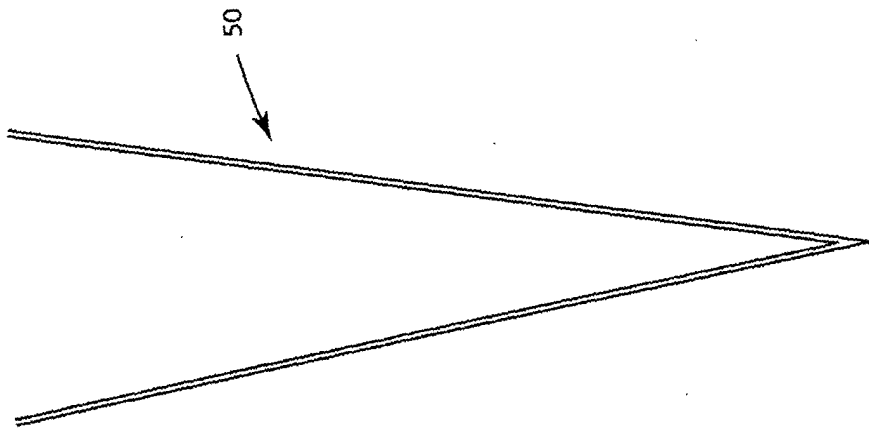


Figure 2

Figure 3

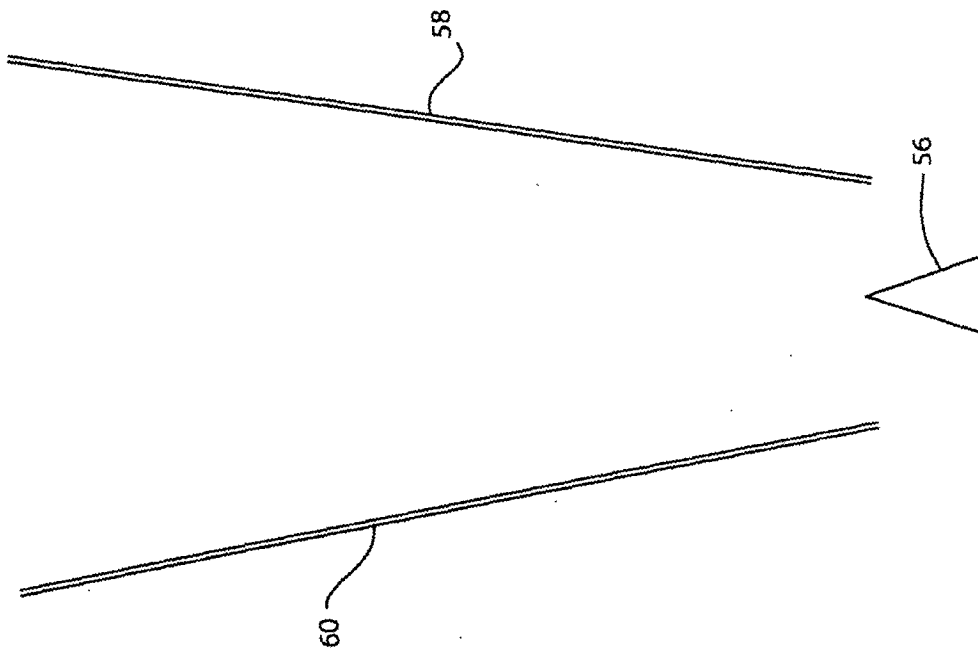
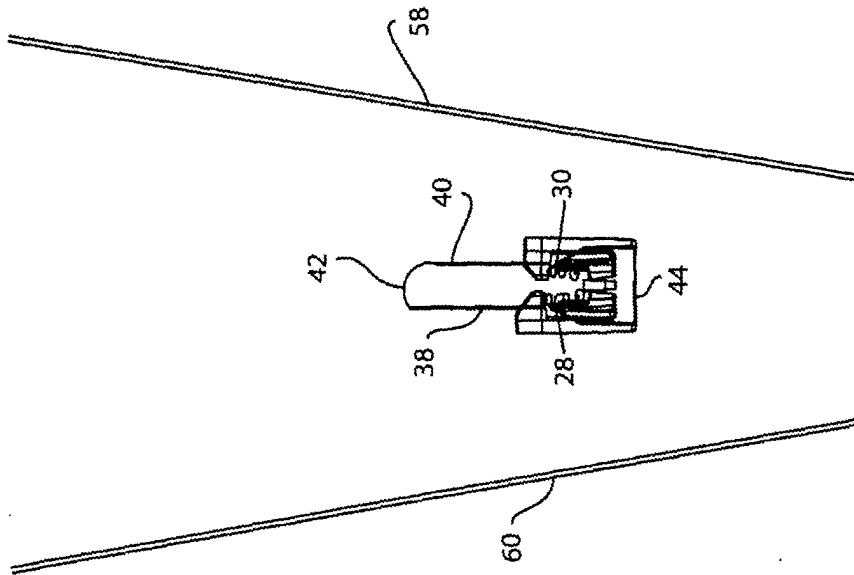


Figure 4



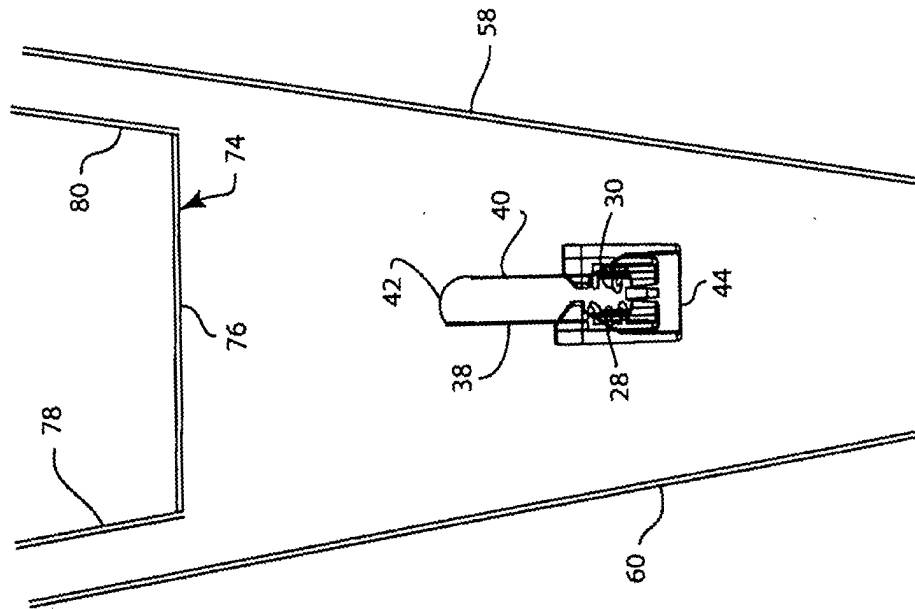
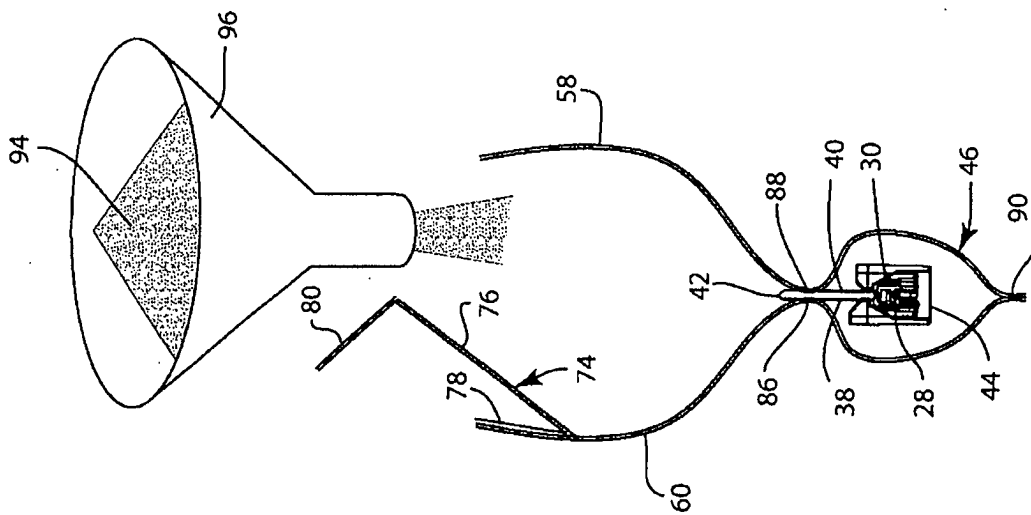


Figure 5

Figure 6



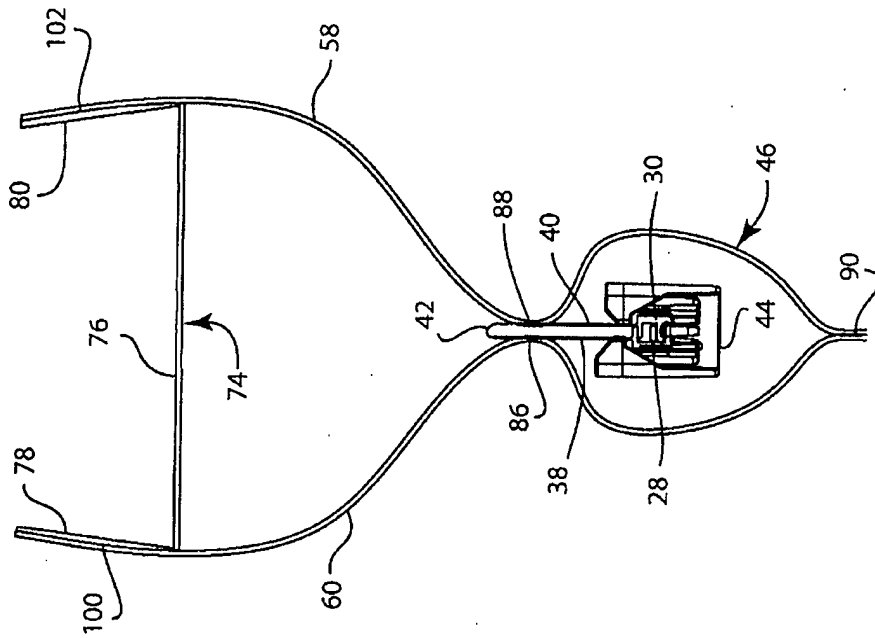


Figure 7

Figure 8

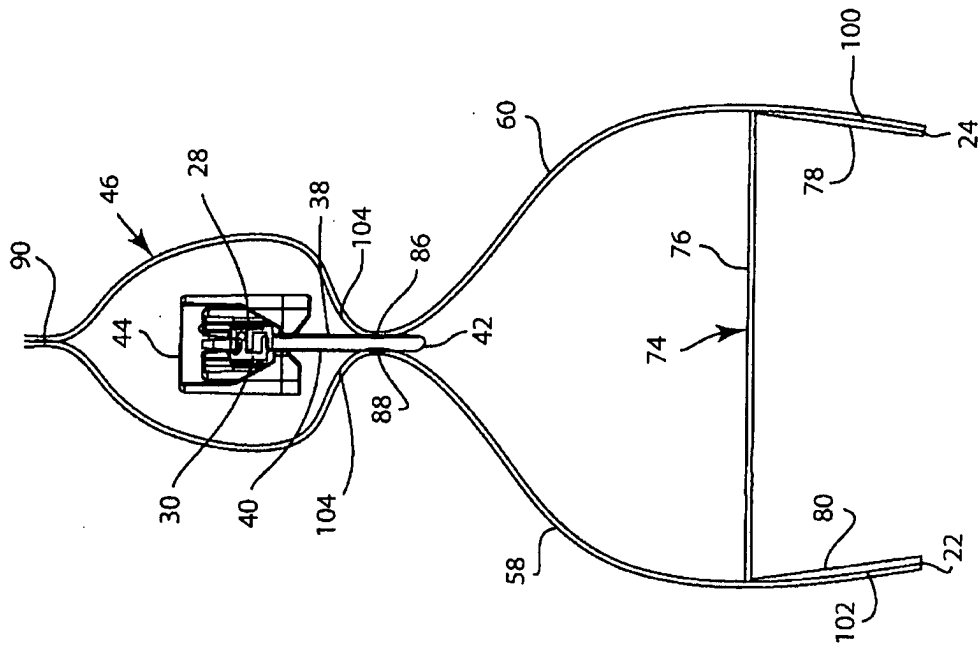


Figure 9

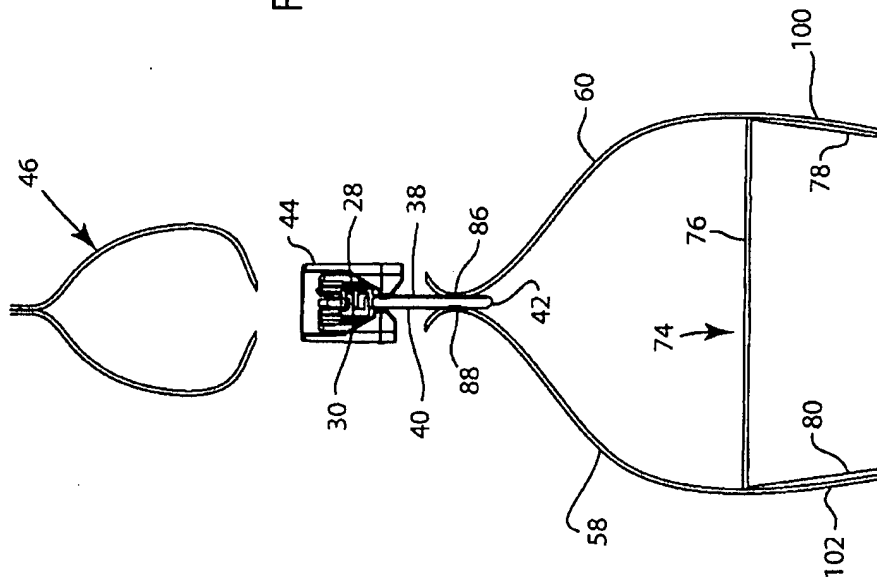
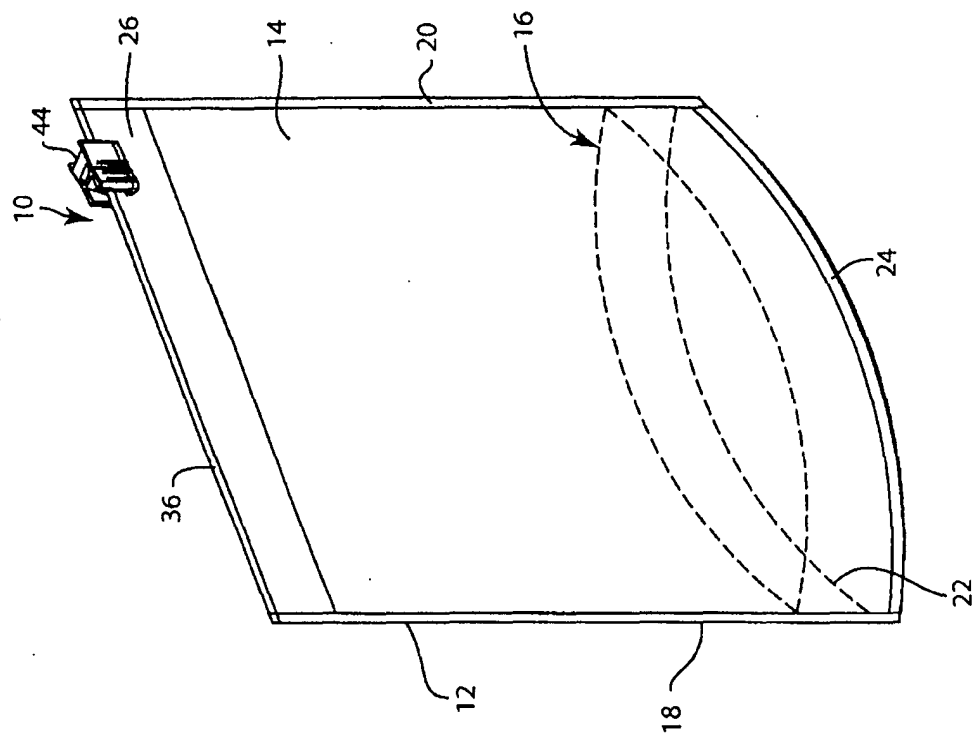


Figure 10



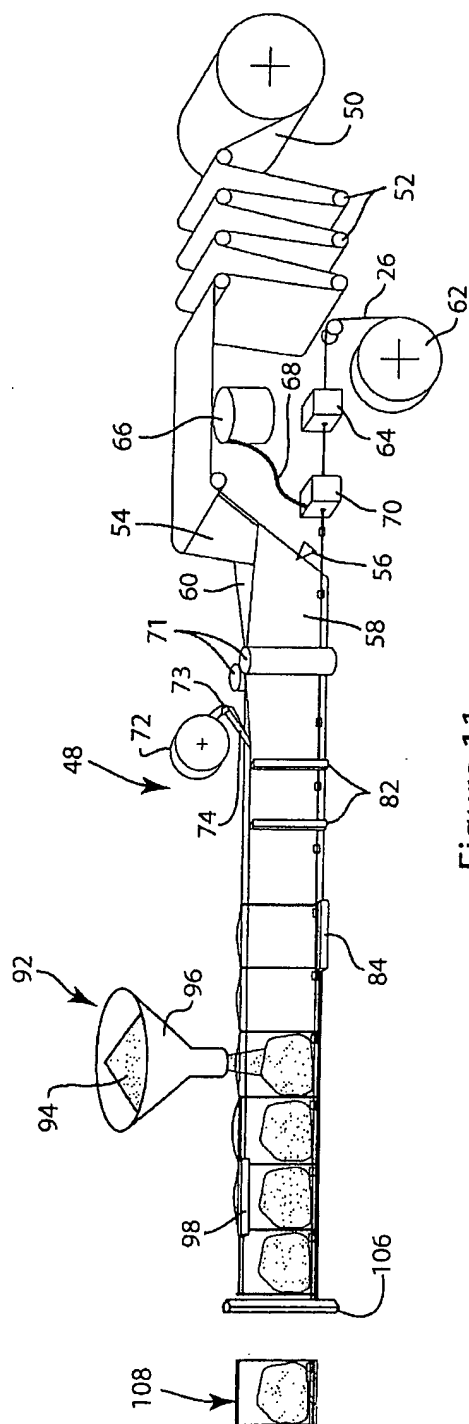


Figure 11

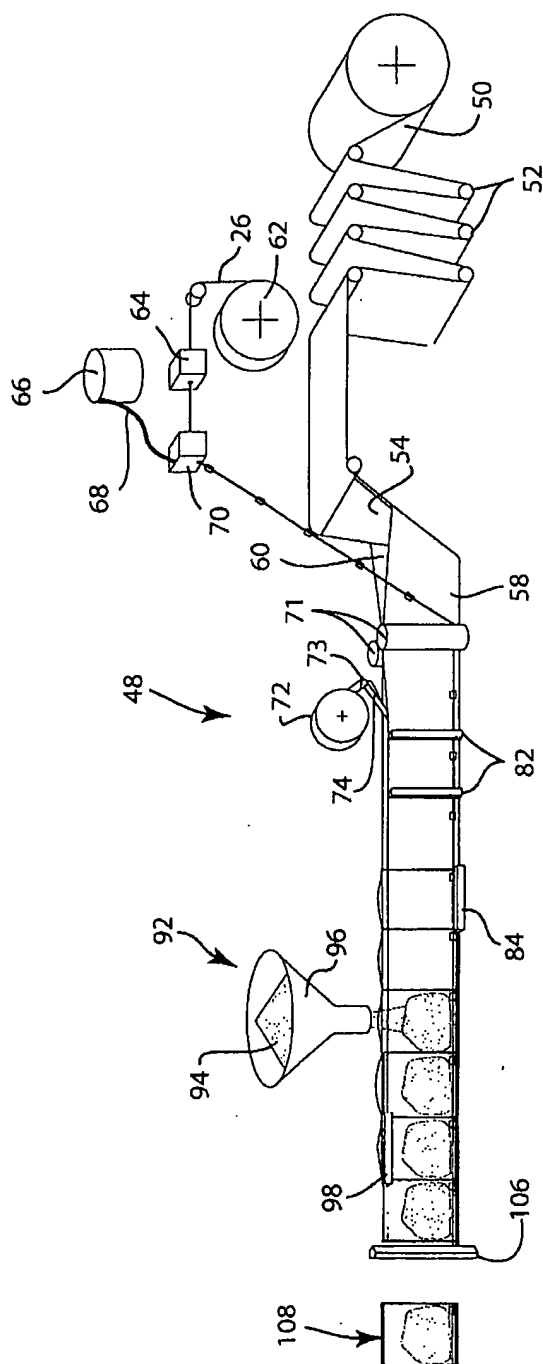


Figure 12