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(54) Packaging bag with expansion force release, end opening.

(57) A bag (20) for containing and dispensing a compressed, stacked array (90) of articles (96) has a hexahedral shape with one of the end walls (110,112) having a frangible line (42) therein. When the frangible line (42) is broken, an opening (111) is formed in the end wall (110) that permits dispensing of the articles (96) one at a time while preventing the articles from being forcefully ejected out the opening (111).

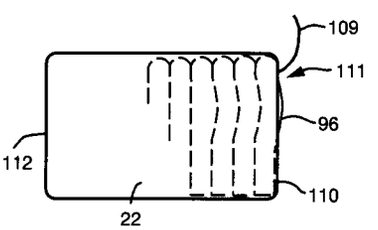

FIG. 13A

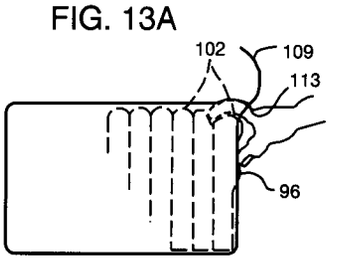

FIG. 13B

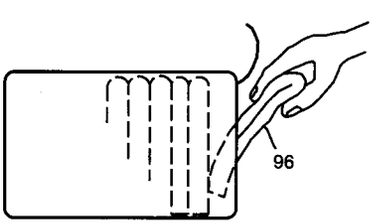

FIG. 13C

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The present invention relates to packaging bags for receiving, containing, and dispensing packaged articles. More particularly, the present invention relates to a packaging bag which is preferably flexible and has an expansion force release, end opening that assists in the removal of compressed articles one at a time.

Packaging bags composed of flexible polymer materials have been used for packaging various types of products, such as infant diapers, training pants, feminine care products and adult incontinence garments. The bags allow packaging of the articles to create a carton-like look and configuration which facilitates transportation and display on retail shelves. The bags typically include handles to facilitate the carrying of individual packages from the retail shelves, and can include mechanisms for providing an access opening in the package.

These conventional plastic bags generally have not provided a desired combination of convenient portability and a substantially interference-free access to the packaged articles through the opening of the bag, and particularly have not provided easy-to-withdraw access of the articles when they are packed in a compressed, tight-fitting state in the bag. For example, relatively large openings in the bag can too easily allow articles to fall out of the bag, and this problem is magnified when the articles are compression packed because the resulting expansion force can forcibly eject multiple articles at one time from the bag. Conversely, if the opening is too small, the first few of the compressed, tight-fitting articles are extremely difficult to separate and withdraw one at a time, particularly for a weak or elderly caretaker.

The present invention therefore provides a packaging bag having a partial expansion force release, end opening according to any one of independent claims 1, 2, 5 and 8. Further advantageous features, aspects and details of the invention are evident from the dependent claims, the description and the drawings. The claims are intended to be understood as a first non-limiting approach of defining the invention in general terms.

According to one aspect of the invention, there is provided a packaging bag having a partial expansion force release, end opening for individually dispensing a compressed, stacked array of articles contained therein. The packaging bag comprises a pair of side walls, a pair of end walls, and a top wall and a bottom wall, and a compressed stack of articles exerts an expansion force against the end walls. A frangible line is formed in one of the end walls and, upon being broken, provides an opening in the end wall in which the opening is completely positioned within the end wall periphery. The opening partially releases the expansion force against the end walls so that the end walls still contain the articles in the bag, while the opening permits access to and removal of the articles one at a time.

According to another aspect of the invention, there is provided a packaging bag having a partial expansion force release, end opening for individually dispensing a compressed, stacked array of articles contained therein. The packaging bag comprises a pair of side walls, a pair of end walls, and a top wall and a bottom wall, and a compressed stack of articles exerts an expansion force against the end walls. A frangible line is formed in one of the end walls and, when broken, provides an opening in that end wall. The opening has a maximum height dimension and a maximum width dimension, and one of these dimensions is less than a respective height or width dimension of the end wall, so that the end walls still contain the articles in the bag when the frangible line is broken to form the opening.

According to yet another aspect of the invention, there is provided a packaging bag having a partial expansion force release, end opening for individually dispensing a compressed, stacked array of articles contained therein. The packaging bag comprises a pair of side walls, a pair of end walls, and a top wall and a bottom wall, and the compressed stacked array of articles exerts an expansion force against the end walls. Each one of the articles has a height dimension, a width dimension, a top edge, a bottom edge, and a side edge. A frangible line is formed entirely within one of the end walls and, when broken, provides an opening in that end wall. The frangible line comprises an upper limit of frangibility, a lower limit of frangibility, and a lateral limit of frangibility, in which the upper limit of frangibility is spaced from the article top edge a distance between about 0 percent to about 50 percent of the article height dimension.

According to a still further aspect of the invention, there is provided a packaging bag having a partial expansion force release, end opening for individually dispensing a compressed, stacked array of articles contained therein. The packaging bag comprises a pair of side walls, a pair of end walls, a top wall, and a bottom wall, and in which each end wall has a height dimension, a width dimension, a top edge, a bottom edge, and a side edge. A compressed, stacked array of articles is contained in the bag and exerts an expansion force against the end walls. A frangible line is formed entirely within one of the end walls and, when broken, provides an opening in that end wall. The frangible line comprises an upper limit of frangibility, a lower limit of frangibility, and a lateral limit of frangibility, in which the upper limit of frangibility is spaced from the end wall top edge a distance between about 0 percent to about 50

percent of the end wall height dimension.

The above-mentioned and other features of this invention, and the manner of attaining them, will become more apparent and the invention itself will be better understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

Fig. 1 representatively shows an unfilled bag side view of a preferred embodiment of the present invention;

Fig. 2 representatively shows a cross-sectional, end view of the bag taken along line 2-2 of Fig. 1;

Fig. 3 representatively shows a cross-sectional, end view of another bag having a separate, false gusset;

Fig. 4 representatively shows a side view of the bag in Fig. 1 after the bag has been compression packed with articles;

Fig. 5 representatively shows an end view of the filled bag of Fig. 4;

Fig. 6 representatively shows a top view of the filled bag of Fig. 4;

Fig. 7 is an end view of the filled bag with a line of frangibility;

Fig. 8 representatively shows an end view of a filled bag having another line of frangibility;

Fig. 9 representatively shows an end view of a bag having yet another line of frangibility;

Fig. 10 shows a representative stack array of articles;

Fig. 11 representatively shows a perspective view of the filled bag in which the handle web traverses across the bag top wall along the width dimension of the bag;

Fig. 12 representatively shows a perspective view of another filled bag in which the handle web traverses across the package top wall along the length dimension of the bag, and further shows still another line of frangibility;

Fig. 13A representatively shows a side view of a handleless filled bag in which the expansion force release, end opening feature has been activated;

Fig. 13B representatively shows a user's hand with a finger inserted through the opening and on an article in preparation of removal of a single article; and

Fig. 13C representatively shows the article having been drawn partially through the opening for subsequent complete withdrawal of the article.

With reference to Figs. 1 and 2, bag 20 includes a front panel 22, which has two opposed side edge regions 24 and 26, a top edge region 28 and a bottom edge region 30. A back panel 32 has two opposed side edge regions 34 and 36, a top edge region 38 and a bottom edge region 40. The back panel 32 is connected in a generally adjacent, facing relation to front panel 22 along the corresponding adjacent side edge regions thereof. As a result, the two sets of connected side edges (24, 34 and 26, 36) form a pair of connected end regions or end walls 110, 112 (Figs. 11, 13A-C). In addition, the front 22 and back 32 panels have an appointed lengthwise stack direction 100. A top gusset 52 is connected to the top edge regions 28 and 38 of front panel 22 and back panel 32. At least one of the end walls 110, 112 has an appointed line 42 (Fig. 7) of frangibility extending therein. The width dimension 92 (Fig. 10) of a stacked array 90 of articles 96 substantially corresponds to the width dimension of top gusset 52 when the top gusset is spread out in its unfolded, extended-flat condition.

Bag 20 may additionally include a handle web 44 which connects to the top edge regions 28 and 38 of the front and back panels 22 and 32 (e.g. Fig. 11). Handle web 44 has a mounting portion 46 (Fig. 1) for connecting to the front 22 and back 32 panels, and a strap portion 48 for providing a carrying loop 50. The carrying loop 50 is constructed to bridge transversely over top gusset 52 and to extend between front panel 22 and back panel 32. The carrying loop 50 can be constructed and arranged to provide for arm suspension of bag 20.

In another aspect of the invention, a handle web 45 (Fig. 12) may be constructed to bridge longitudinally over top gusset 52 and arranged to extend generally along stack direction 100. A mounting portion 47 of handle web 45 connects to longitudinally spaced apart, top edge regions 28 and 38 of the front and back panels 22 and 32, and a strap portion 49 of handle web 45 provides a suitable carrying loop 51. The carrying loop 51 is constructed to bridge longitudinally over top gusset 52 and to extend between the opposed end walls 110, 112 of a filled package.

Carrying loop 50 may further provide two generally opposed loop faces 54 and 56 (Fig. 2). Each loop face 54,56 can have at least one hand-grip opening 58 formed therein with the hand-grip openings configured to provide for a hand-suspension of bag 20. Carrying loop 50 may optionally include an appointed separation section, such as frangible section 60 (Fig. 6), located at a selected, intermediate position between hand-grip openings 58. Frangible section 60 is constructed and arranged to provide for a reconfiguration of the carrying loop 50 into separate, independently movable strap portions. In the illustrated embodiment, frangible section 60 of carrying loop 50 extends generally aligned with top edge region 28 of front panel 22, and is constructed with sufficient tensile load capacity to permit the arm-suspension of bag 20

while the bag is substantially filled with the selected articles.

If desired, handle webs 44 and 45 may be absent from bag 20 as illustrated in Fig. 13A-C. Compression packing of articles of the size of diapers, training pants, feminine care products, and the like, result in bag 20 being of small enough size that it can easily be carried without need of a handle.

The term "compressed articles" or similar terminology will mean that a stack of articles, such as articles 96 in Fig. 10, are compressed inwardly by a compression force at face surfaces 106 of articles 96 in a direction parallel to stack direction 100 so as to decrease the length dimension 91 of the originally, uncompressed articles. The term "compression packed" or similar terminology describes the state or condition of articles 96 after they have been compressed and inserted into bag 20. The term "expansion force" or similar terminology refers to that generally equal force exerted by the compressed articles 96 in a direction generally opposite and parallel to the compression force and against primarily end walls 110, 112. Naturally, all of the walls of bag 20 experience some degree of tension as a result of articles 96 exerting an expansion force primarily against end walls 110, 112.

Front panel 22 and back panel 32 may be composed of different materials, or may be composed of substantially the same type of material. Typically, the material is a polymer film which is sufficiently flexible to assume a desired, generally hexahedral shape when the bag is substantially filled with articles. In addition, the material should have sufficient strength to hold and contain the articles without breaking and without excessive bulging or stretching of the film material. For example, the film material may be composed of a polyethylene film or film laminate having a thickness of about 0.0635 millimeters (about 2.5 mils). For example, the film material may comprise a LDPE (low density polyethylene) film, a LDPE/LLDPE (linear low density polyethylene) film laminate, a LDPE/MDPE (medium density polyethylene) film laminate, a LDPE/HDPE (high density polyethylene) film laminate or the like.

With reference again to Figs. 1 and 2, front panel 22 includes two opposed, generally parallel side edge regions 24 and 26. The front panel 22 further includes a top edge region 28 which generally interconnects and runs substantially perpendicular to the side edge regions. The front panel has a length dimension 70 and a height dimension 72. It is readily apparent that the panel length and height dimensions will vary depending upon the size and the desired configuration of the packaged articles.

Back panel 32 includes two opposed, generally parallel side edge regions 34 and 36. The back panel further includes a top edge region 38 which extends substantially perpendicular to side edge regions 34 and 36, and generally interconnects the side edge regions. Back panel 32 is generally coextensive with front panel 22 and is positioned in an adjacent, facing relation with the front panel. Thus, a major face surface of the back panel is located generally parallel to a major face surface of the front panel. The two side edge regions 34 and 36 of back panel 32 are suitably interconnected with the correspondingly adjacent side edge regions 24 and 26 of front panel 22. The interconnecting assembly of the front and back panels may be accomplished by various techniques well known in the art, such as adhesive bonding, thermal bonding, ultrasonic bonding, welding, and the like. Alternatively, the interconnection may be accomplished with inter-engaging mechanical fastening systems, such as sewing, stapling, riveting, and the like. Similarly, the other component parts of bag 20 described in the present specification can be attached or otherwise connected together employing the above-described assembly techniques.

Top gusset member 52 is operably connected to the top edge regions 28 and 38 of front panel 22 and back panel 32. Top gusset 52 may be integrally formed with either of front panel 22 or back panel 32, or may be integrally formed with both the front and back panels. Alternatively, top gusset 52 may be a separate web of material which is assembled to top edge 28 of front panel 22 and top edge 38 of back panel 32. The top gusset is typically composed of a flexible polymer film material, such as the material employed to construct front panel 22 or back panel 32. For example, top gusset 52 can be composed of a LDPE film laminate having a thickness of about 0.0635 millimeters (about 2.5 mils).

With reference to Fig. 2, top gusset 52 is integrally formed with both front panel 22 and back panel 32. Accordingly, a unitary web of material is selectively folded to form top gusset 52 and front 22 and back 32 panels. The top gusset extends from fold line 64 to fold line 66 and includes a medial fold line 68. Fold line 64 provides a line of demarcation between front panel 22 and top gusset 52. Similarly, fold line 66 provides a line of demarcation between back panel 32 and the top gusset. Fold line 68 extends substantially down the center of top gusset 52, and generally bisects the top gusset to define gusset panel sections 74 and 76, which are substantially equal in size. The top gusset has a gusset length dimension 70, and has an unfolded, extended width which substantially corresponds to the desired package width 122 (Fig. 11).

Top gusset member 52 in its folded condition, operatively delimits two panel sections 74 and 76 (Fig. 2), with each panel section including its respective portions of gusset end regions 78 and 80 (Fig. 1). Top gusset 52 is positioned in its folded condition, and the gusset end portions of gusset panel section 74 are suitably attached by bonding lines 82 or otherwise connected to the correspondingly adjacent gusset end portions of gusset panel section 76. Additionally, the gusset end portions of gusset panel 74 are suitably connected to side edge regions 24 and 26 of front panel 22, and the gusset end portions of gusset panel section 76 are suitably connected to side edge regions 34 and 36 of back panel 32.

In an alternative embodiment of the invention where top gusset 52 is a separate member assembled to front panel 22 and back panel 32, the top gusset member may be composed of a material which is different than the material comprising the front and back panels. Upon assembly, the longitudinal, lengthwise edge regions of the top gusset member will be connected by suitable fastening mechanisms to the front and back panels along the regions thereof which generally correspond to fold lines 64 and 66.

The panel sections 74, 76 of top gusset 52 may be joined to front panel 22 and back panel 32 with selected groups of diagonally extending lines of attachment. With reference to Fig. 1 , gusset panel section 74 can be attached to front panel 22 with diagonally extending lines of attachment, such as gusset thermal bonds 84 and 85. Similarly, gusset panel section 76 can be attached to back panel 32 with diagonal thermal bonds 88 and 89. The angle and placement of the diagonal bonds are selected and arranged such that the filled package assumes and reliably maintains the desired carton-like appearance. For example, the diagonal bonds can have a width of about 0.32 cm (about 0.125 inch), and a length which is generally aligned at an angle of about 45 degrees downwardly from bond line 62. In the illustrated embodiment, the downward end of the diagonal bond intersects its respective side panel bond 37 at a point located approximately 1.905 cm (0.75 inch) above gusset fold line 68. The side panel bond has a width of about 0.952 cm (about 0.375 inch).

To facilitate access to the bag contents, at least one of the end walls 110, 112 has a line 42 (Fig. 7) of frangibility therein. With reference to Fig. 11, bag 20 has a package length 120, package width 122, and package height 124. Referring now to Fig. 7, frangible line 42 defines a partially, closed-loop design similar to an inverted, truncated triangle. This loop design can be curvilinear or non-curvilinear. Line 42 has an upper limit 43 of frangibility that is spaced below top wall 108, a lower limit 41 of frangibility spaced above the bottom wall 114 of bag 20, and lateral limits 39 of frangibility spaced inwardly from respective side walls 116, 118. Periphery 53 of line 42 thus lies fully within the periphery of end wall 110 and is spaced-apart from walls 108, 114, 116, 118. Another way of describing these limits of frangible line 42 is with respect to an individual article 96. For example, upper limit 43 of frangibility, with respect to Fig. 7, is spaced below top edge 102 of an article 96, lower limit 41 of frangibility is spaced above bottom edge 104 of an article 96, and lateral limits 39 of frangibility are spaced inwardly of respective side edges 98. Thus, the periphery 53 of frangible line 42 lies fully within the periphery of face surface 106 of the article 96 immediately adjacent end wall 110. Generally, upper limit 43 of frangibility is spaced from top edge 102 and/or top wall 108 (i.e., the end wall top edge) a distance from about 0 percent to about 50 percent of the height 93 (Fig. 10) of an article 96; lower limit 39 of frangibility is spaced from bottom edge 104 and/or bottom wall 114 (i.e., the end wall bottom edge) a distance from about 0 percent to about 90 percent of the height 93 of an article 96; and lateral limit 39 is spaced inwardly from a respective side edge 98 and/or side wall 116, 118 (i.e., the end wall side edges) a distance from about 0 percent to about 40 percent of the width 92 of an article 96.

As illustrated in Fig. 7, frangible line 42 is not a complete closed-loop line. There is a hinge portion 113 that serves as a hinge-like connection between the flap 109 of material located within the bounds of frangible line 42 and the other portion of the bag material outside the limits of frangible line 42. Thus, when frangible line 42 is broken, preferably at or near lower limitation 41, and then pulled upwardly to break line 42 towards upper limit 43, hinge portion 113 serves to hingedly maintain connection between flap 109 of broken material and the remaining portion of end wall 110.

The present invention contemplates that frangible line 42 may assume other geometric or non-geometric designs. For example, Fig. 8 illustrates frangible line 42 in the shape of an oval with its longitudinal axis generally parallel to top and bottom walls 108, 114. Also, line 42 with its oval shape can have its longitudinal axis generally perpendicular to walls 108, 114. Line 42 can be formed in other shapes, such as a circular, racetrack, and the like.

Fig. 9 illustrates another frangible line 42 in which the lateral limits 39 of frangibility are essentially coincident with side walls 116, 118 or the vertical edges of end wall 110, with the upper limit 43 of frangibility being spaced downwardly from top wall 108 and the lower limit 41 of frangibility spaced upwardly from bottom wall 114. In Fig. 9,

frangible line 42 defines a rectangular-like shape.

With reference to Fig. 12, frangible line 42 again defines a rectangular-like shape. However, in this particular instance, the upper limit 43 of frangibility is essentially coincident with top wall 108 and the lower limit 41 of frangibility is essentially coincident with bottom wall 114.

The lateral limits 39 of frangibility are spaced inwardly from side walls 116, 118 or the vertical edges of end wall 110.

The present invention also contemplates line 42 being a complete closed-loop so that flap 109 can be entirely removed from end wall 110.

The frangibility of line 42 may, for example, be provided by partially cutting or otherwise thinning through the thickness of the bag material in a predetermined pattern, providing a selected pattern of perforations along the appointed sections of the bag, providing a desired pattern of stress-fatigue weakening along the appointed sections of the bag, or the like. In the illustrated embodiment, frangible line 42 is provided by a line of perforations in which there can be approximately 2-10 perforations per 2.54 cm (per lineal inch) of frangible line 42. For example, in Fig. 7, frangible line 42 is composed of alternating slits and lands. The slits are approximately 0.3175 cm (1/8 inch) long and substantially aligned along the intended direction of frangibility. The lands also have a length dimension of 0.3175 cm (1/8 inch), as measured along the intended direction of frangibility.

Handle web 44 (or handle web 45) is suitably connected to front panel 22 and back panel 32 to provide a bag carrying system. The handle web is composed of a flexible web material, such as a polymer material composed of a MDPE/LDPE film laminate or a HDPE film, which has sufficient tensile strength and sufficient load capacity to support the weight of a filled bag while the bag is suspended by the handle web. In the illustrated embodiment, for example, handle web 44 is composed of a MDPE/LDPE film material having a web thickness of about 0.10 mm (about 4 mils).

Handle web 44 (Fig. 1) has a mounting portion 46 for connecting the handle web to the front and back panels.

Mounting portion 46 of handle web 44 is constructed to extend substantially along the entire length of the top edge regions 28 and 38 of front panel 22 and back panel 32, respectively. As a result, mounting portion 46 can be attached, for example, with bonds 62, along substantially the entire top edge periphery of the filled package. Such a configuration can more widely spread and distribute the carrying stresses induced by using the handle web to transport a filled bag. Optionally, mounting portion 46 of handle web 44 may be bonded along an extent which is less than the entire length of the top edge regions of the front and back panels. Preferably, however, mounting portion 46 extends the entire length of the top edge regions of the front and back panels.

Handle web 44 can further include a strap portion 48 for providing a carrying loop 50. The carrying loop is constructed to continuously bridge over top gusset 52 and to extend between front panel 22 and back panel 32 in a generally arched configuration. As a result, carrying loop 50 can be arranged to provide for an arm suspension of bag 20 through the operation of loop 50.

As representatively shown in Fig. 6, carrying loop 50 may include an appointed separation region, such as frangible section 60, which is located and arranged at an intermediate position between the hand-grip openings. The loop frangible section is constructed to provide for a separation and reconfiguration of the carrying loop into generally independently movable strap portions. The resultant strap portions are then capable of being individually repositioned to completely disconnect the original bridging between the front and back panels produced by carrying loop 50. Preferably, the carrying loop is substantially devoid of any seams or bonding lines which might excessively interfere with the desired separation of the appointed separation region. Loop frangible section 60 defines a direction of separability (e.g., frangibility) which extends generally parallel with top edge region 28 of front panel 22. The separability of section 60 may be provided by any suitable treatment which reduces the strength of section 60 relative to the remainder of carrying loop 50. For example, the frangibility of section 60 may be provided by selectively reducing the web thickness along section 60, by providing a line of perforations along the frangible section, by inducing a pattern of stress-fatigue weakness along the frangible section, or by a like construction. While loop frangible section 60 may be relatively weaker than the remainder of carrying loop 50, the frangible section is constructed with sufficient tensile load capacity to permit the arm-suspension of bag 20 while the bag is substantially filled with contained articles. Strap portion 48 has a strap length and a strap width, and the loop frangible section 60 extends generally along the strap width. The strap length is selected to provide a loop size which is convenient for carrying while the bag is suspended from a user's arm through use of carrying loop 50. It will be readily apparent that the specific strap length will depend upon the final width dimension of a filled bag.

Bag 20 is typically filled through its bottom, and the bottom edge regions of the front and rear panels are folded and suitably bonded to close the bottom of the bag against the bottom portions of

the articles in a conventional manner well known to the packaging art. When substantially filled with the articles, the resulting bag has a generally hexahedral shape, as representatively shown in Fig. 11.

Individual articles 96 generally define opposing side edges 98, a top edge 102, a bottom edge 104, and opposing face surfaces 106. The individual articles are stacked upon their respective face surfaces 106, and when the stacks are compression packed, surfaces 106 face along stack direction 100 of bag 20. Accordingly, the top edges 102 of the articles contact the top wall 108 of the package, the bottom edges 104 of the articles contact the bottom wall 114 of the package, the side edges 98 of the articles contact the package panels 22, 32, and the outermost face surface 106 of the end articles 96 contact end walls 110, 112.

Although the shown embodiment of stack array 90 is composed of a single stack of articles, it is readily apparent that the stack array may comprise a plurality of individual stacks. The individual stacks may be arranged side by side, top to bottom, or combinations thereof as desired.

Stack array 90 is compressed along stack direction 100 to reduce the length dimension 91 of array 90 so as to fit within the length dimension 120 (Fig. 11) of the bag 20. Since articles 96 are resilient, the stack array 90 exerts an expansion force along stack direction 100 after the compressed stack of articles has been inserted into bag 20. This expansion force is restrained by the package walls, particularly end walls 110 and 112. As a result, the expansion force exerted by the compressed articles applies a tensile stress to the walls, and the applied stress generates a certain amount of resilient elastic strain or stretch against the walls. Accordingly, the bag material is suitably selected and sized to withstand and accommodate the stresses and strains produced by the forces generated by the compressed stack array 90 contained within the filled package. Preferably, the bag material is selected and sized such that it does not undergo excessive amounts of permanent, plastic deformation when stressed by the stacked array. As is clear from the above description, the major force of expansion of the packed articles acts in a direction generally parallel to stack direction 110 and thus against end walls 110, 112.

With reference to Fig. 11, bag 20 in its filled package form has a package length 120, a package width 122, and a package height 124. Medial portions of front panel 22 and back panel 32 form package side walls 116 and 118, respectively. Longitudinal end regions of front panel 22 and back panel 32 form package end walls 110 and 112 with the bonding line of attachment 37 running along the end walls along the height dimension of the filled package. Top gusset 52 becomes extended with the medial portion of the top gusset forming package top wall 108. As bag 20 is filled with articles, longitudinal end regions of top gusset 52 become folded and tucked into the interior of the package to form generally triangular-shaped tucks 126. Where diagonal bonds 84, 85, 88 and 89 (also Fig. 1) are employed to secure selected portions of top gusset 52 to front panel 22 and back panel 32, tucks 126 are securely held against package end walls 110 and 112. As a result, the contained articles are substantially prevented from migrating into the space between tuck 126 and package end walls 110 and 112. Such migration could undesirably distort the package shape, inhibit efficient stacking of the filled packages, inhibit easy removal of articles, and degrade the aesthetic appearance of the packages when displayed on retail shelves.

With reference to Figs. 7, 13A-C, bag 20 is opened by breaking frangible line 42 to gain access via opening 111 to articles 96. Typically, the separation of frangible line 42 is initiated by breaking lower limit 41 and then propagating the break or tear along frangible line 42 through lateral limits 39 and upper limit 43 and terminating at hinge portion 113, thus forming flap 109 (Fig. 13A). As a result of this separating or breaking of frangible line 42, the expansion force against end walls 110, 112 is only partially released because the remaining portion of end wall 110 continues to hold the stacked array of articles within the confines of bag 20 so that the articles 96 are not forcefully ejected through opening 111. With reference to Fig. 13B, the user can insert a finger or thumb through opening 111 near hinge portion 113 and then on or over the top edge 102 of the first article 96. Thereafter, the user can use the finger or thumb to pivot or lever the top portion of article 96 through opening 111, as illustrated in Fig. 13C. The user then can grasp the top of article 96 and pull it out of bag 20 while the remaining articles 96 are maintained within the confines of bag 20 by end wall 110.

As described, it can be appreciated that the bag of the present invention provides the desired containment and individual dispensing of articles compression packed therein one at a time without having multiple articles forcefully ejected through the opening.

With reference to Fig. 8 and the oval-shaped frangible line 42, removal of an article 96 is similar to that explained with reference to Figs. 7, 13A-C.

With reference to Fig. 9, removal of article 96 is similar to that explained with reference to Figs. 7, 13A-C.

With reference to Fig. 12, the user can simply insert a finger or thumb inside the opening created by the breaking of frangible line 42 and grasping the article side edge 98 in order to pivot or lever

the side edge portion of an article 96 through the opening formed by breaking frangible line 42.

The present invention contemplates other types of shapes or designs for frangible line 42 that only partially release the expansion force so that multiple articles 96 are not forcefully ejected through opening 111. At the same time, opening 111 permits access to the articles and their easy individual removal, which is assisted by the action of the expansion force against the face 106 of the article to be removed.

Claims

1. A packaging bag (20) having a partial expansion force release, end opening (111) for individually dispensing a compressed, stacked array (90) of articles (96) contained therein, comprising:
a pair of side walls (116,118), a pair of end walls (110,112), and a top wall (108) and a bottom wall (114),
a compressed stack (90) of articles (96) being contained in said bag (20) and exerting an expansion force against said end walls (110,112), and
a frangible line (42) being formed in one (110) of said end walls and, upon being broken, providing an opening (111) in said one end wall (110), said opening (111) being completely positioned within a periphery of said one end wall (110) to only partially release the expansion force against said end walls (110,112) so that said end walls still contain said articles (96) in said bag (20) while said opening (111) allows access to and removal of said articles one at a time from said bag (20).

2. A packaging bag (20) having a partial expansion force release, end opening (111) for individually dispensing a compressed, stacked array (90) of articles (96) contained therein, comprising:
a pair of side walls (116,118), a pair of end walls (110,112), and a top wall (108) and a bottom wall (114),
a compressed stack (90) of articles (96) being contained in said bag (20) and exerting an expansion force against said end walls (110,112), and
a frangible line (42) being formed in one (110) of said end walls (110,112) and, when broken, providing an opening (111) in said one end wall (110),
said opening (111) having a maximum height dimension (H) and a maximum width dimension (W), one of said maximum height dimension and said maximum width dimension of said opening (111) being less than a respective height (124) and a respective width (122) of said end wall (110), so that said end walls (110) still contain said articles (96) in said bag (20) while said opening (111) allows access to and removal of said articles (96) one at a time from said bag (20).

3. The bag of claim 2 wherein the other of said maximum height dimension (H) and said maximum width dimension (W) of said opening (111) is substantially equal to the other of said respective said height (124) and said respective width (122) of said one end wall (110).

4. The bag of claim 3 wherein said frangible line (42) is generally rectangular in shape.

5. A packaging bag (20) having a partial expansion force release, end opening (111) for individually dispensing a compressed, stacked array (90) of articles (96) contained therein, comprising:
a pair of side walls (116,118), a pair of end walls (110,112), a top wall (108) and a bottom wall (114),
a compressed stack (90) of articles (96) being contained in said bag (20) and exerting an expansion force against said end walls (110,112), individual ones of said articles (96) having a height dimension (93), a width dimension (92), a top edge (102), a bottom edge (104), and a side edge (98), and
a frangible line (42) being formed entirely within at least one of said end walls (110, 112) and, when broken, providing an opening (111) in said end wall (110),
said frangible line (42) comprising an upper limit (43) of frangibility, a lower limit (41) of frangibility, and a lateral limit (39) of frangibility,
said upper limit (43) of frangibility being spaced from said article top edge (102) a distance between about 0 percent to about 50 percent of said article height dimension (93).

6. The bag of claim 5 wherein said lower limit (41) of frangibility is spaced from said article bottom edge (104) a distance between 0 percent to 90 percent of said article height dimension (93).

7. The bag of claim 5 or 6 wherein said lateral limit (39) of frangibility is spaced from said article side edge (98) a distance between 0 percent to 40 percent of said article width dimension (92).

8. A packaging bag (20) having a partial expansion force release, end opening (111) for individually dispensing a compressed, stacked array (90) of articles (96) contained therein, comprising:
a pair of side walls (116,118), a pair of end walls (110,112), a top wall (108) and a bottom wall (114), each said end wall (110,112) having a height dimension (124), a width dimension (122), a top edge, a bottom edge, and a side edge,
a compressed stack (90) of articles (96) being contained in said bag (20) and exerting an expansion force against said end walls (110,112),
a frangible line (42) being formed entirely within one of said end walls (110, 112) and, when broken, providing an opening in said end wall (110),
said frangible line (42) comprising an upper limit (43) of frangibility, a lower limit (41) of frangibility, and a lateral limit (39) of frangibility,
said upper limit (43) of frangibility being spaced from said end wall top edge a distance between about 0 percent to about 50 percent of said end wall height dimension (124).

9. The bag of claim 8 wherein said lower limit (41) of frangibility is spaced from said end wall bottom edge a distance between about 0 percent to about 90 percent of said end wall height dimension (124).

10. The bag of claim 8 or 9 wherein said lateral limit (39) of frangibility is spaced from said end wall side edge a distance between about 0 percent to about 40 percent of said article width dimension (122).

11. The bag of any one of the preceding claims wherein said frangible line (42) is a partial closed-loop.

12. The bag of any one of claims 1 to 10 wherein said frangible line (42) is a closed-loop.

13. The bag of any one of the preceding claims wherein said frangible line (42) is curvilinear.

14. The bag of any one of claims 1 to 12 wherein said frangible line (42) is non-curvilinear.

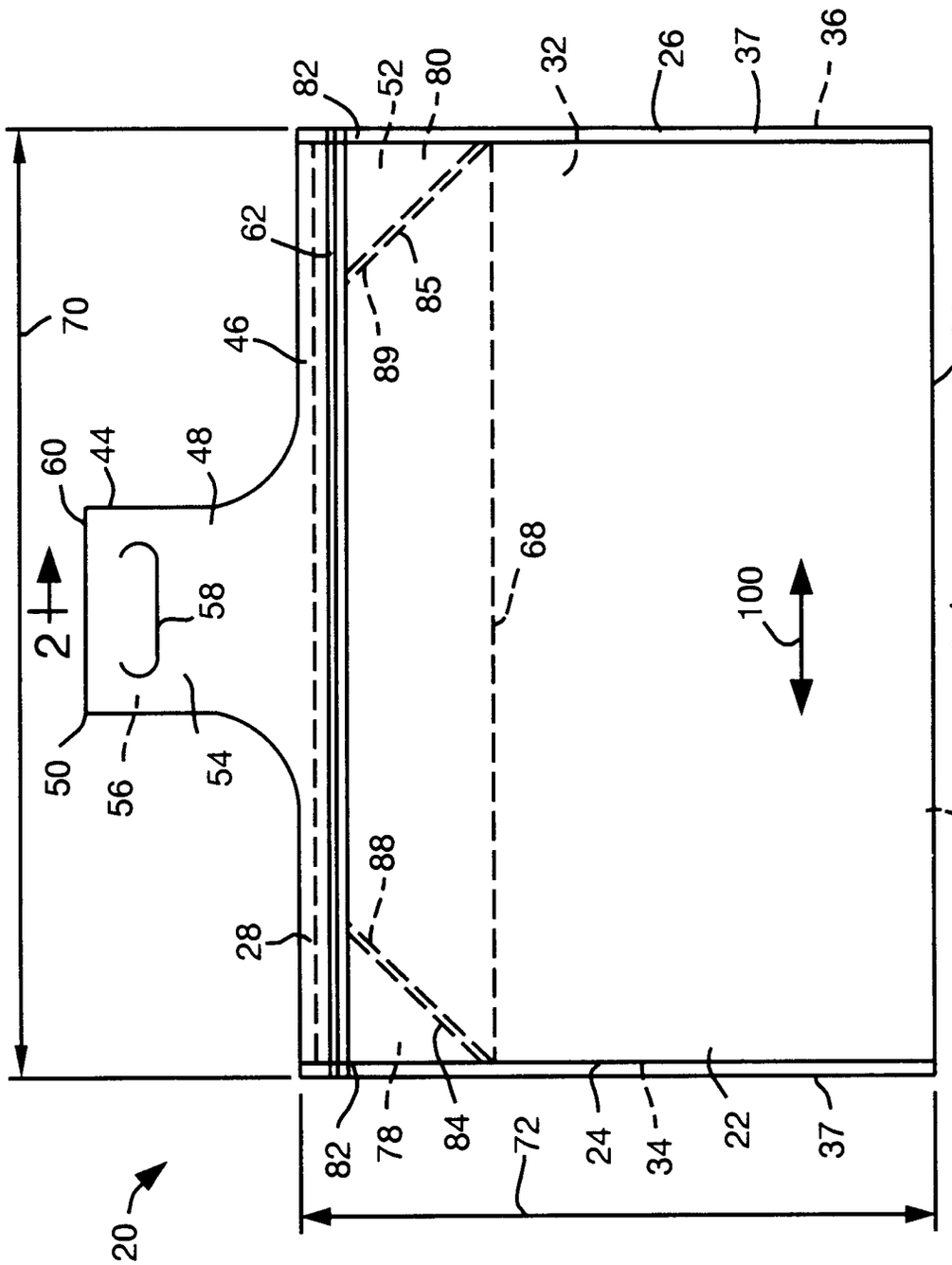
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FIG. 1

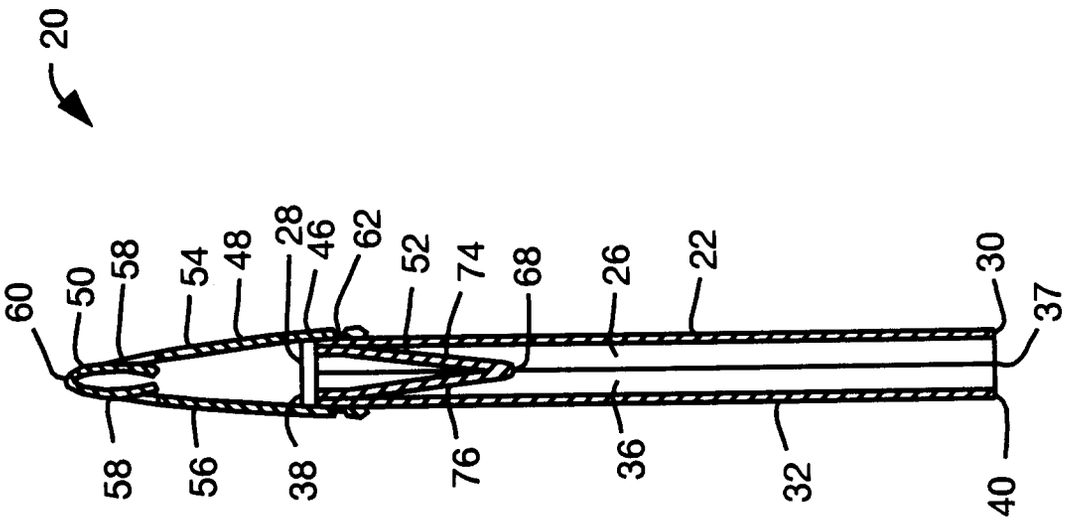
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FIG. 3

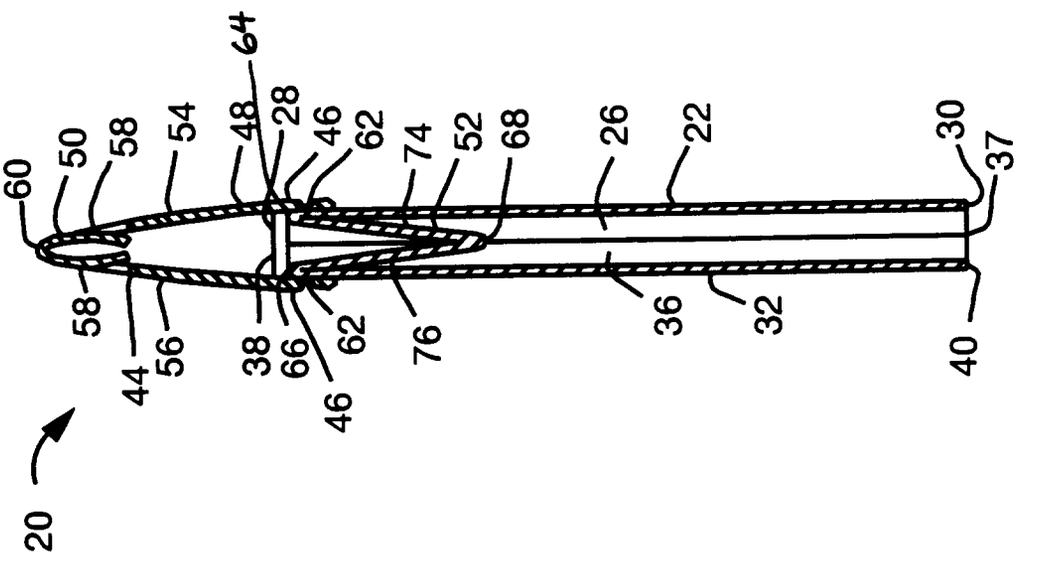
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FIG. 2

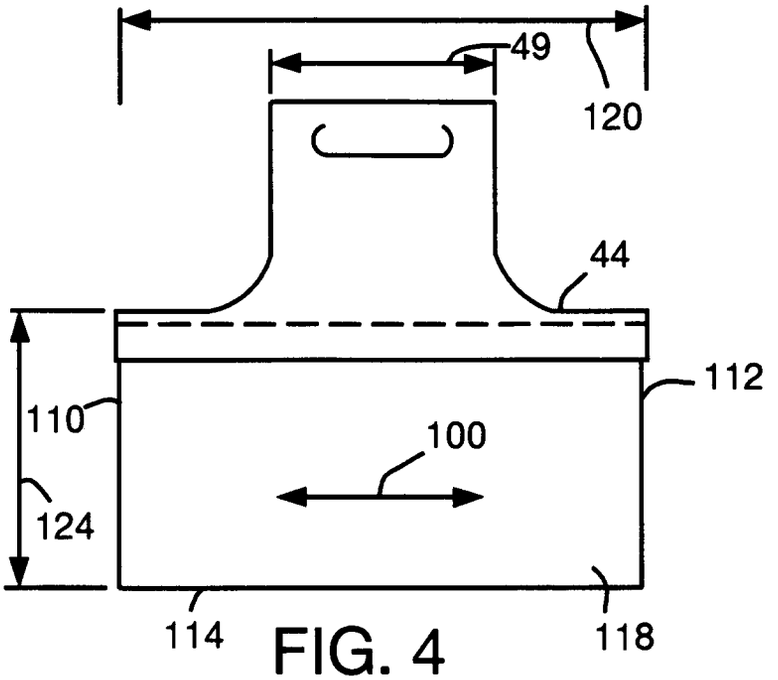

FIG. 4

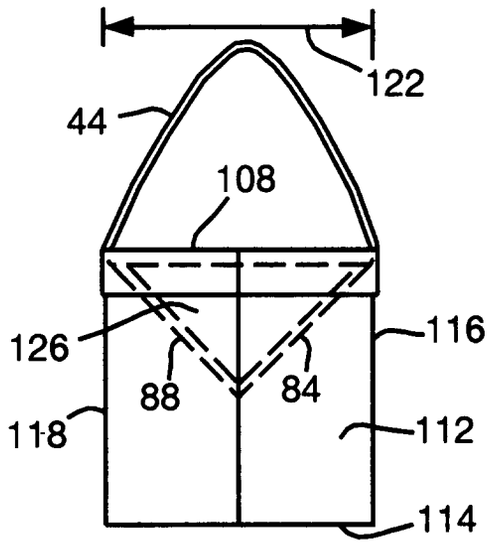

FIG. 5

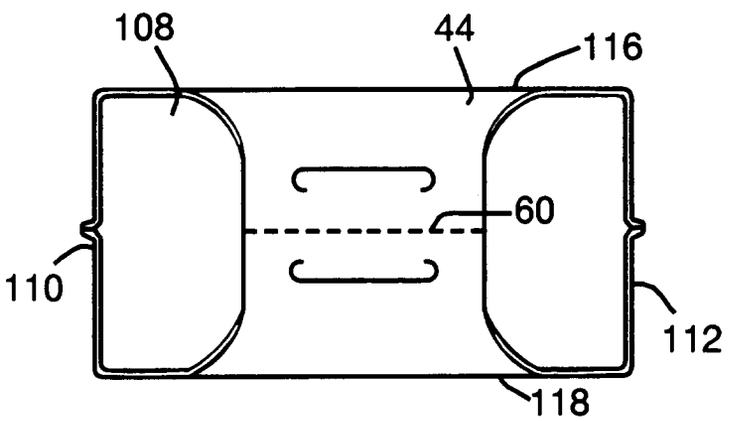

FIG. 6

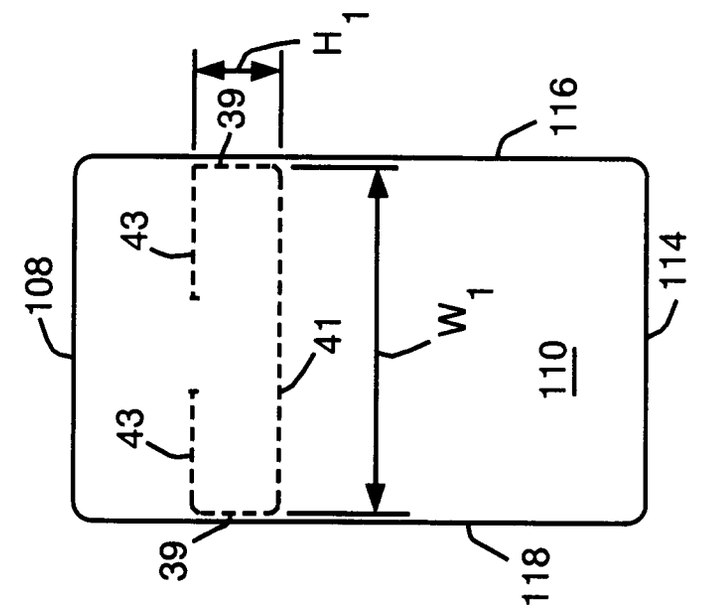

FIG. 9

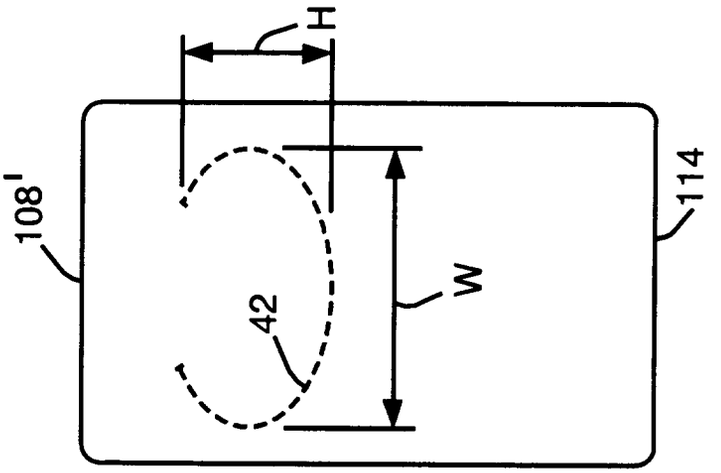

FIG. 8

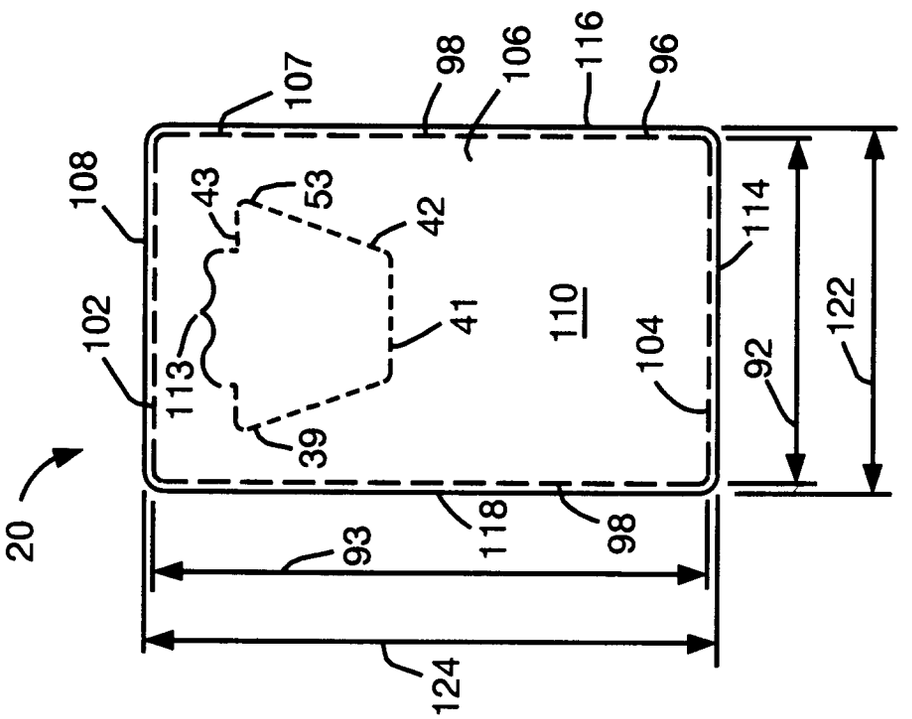

FIG. 7

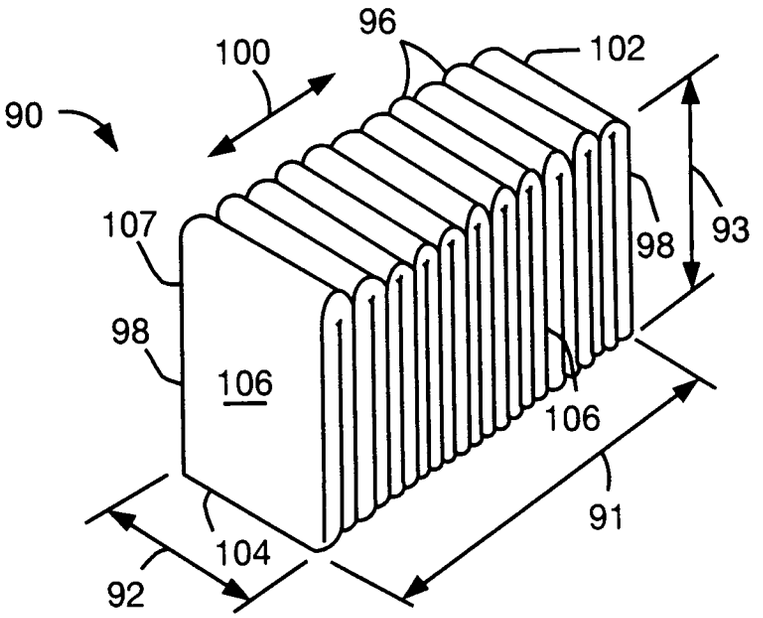

FIG. 10

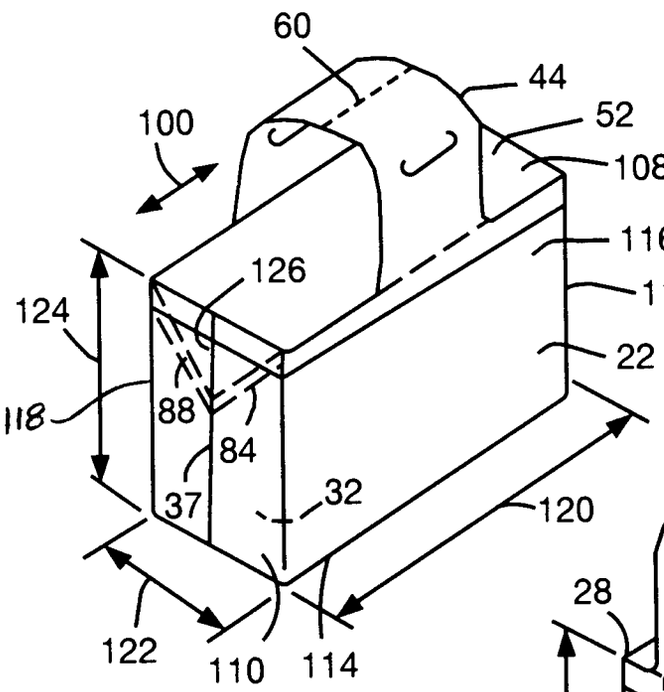

FIG. 11

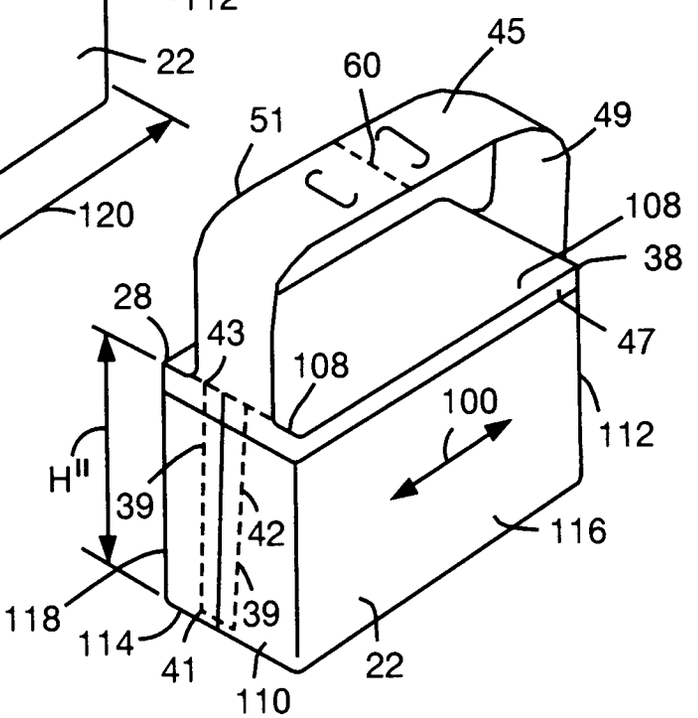

FIG. 12

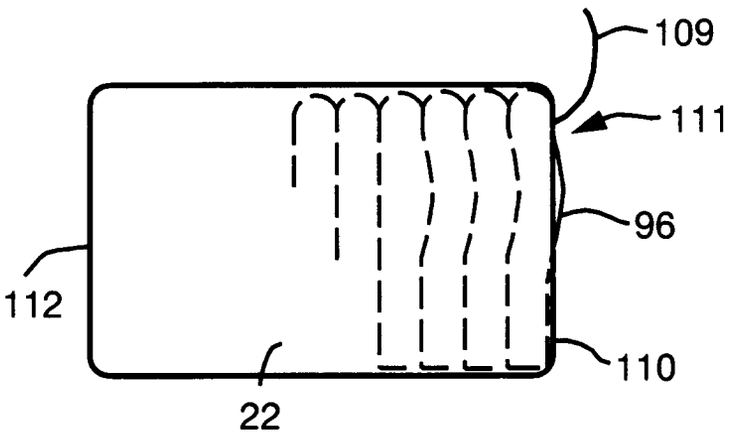

FIG. 13A

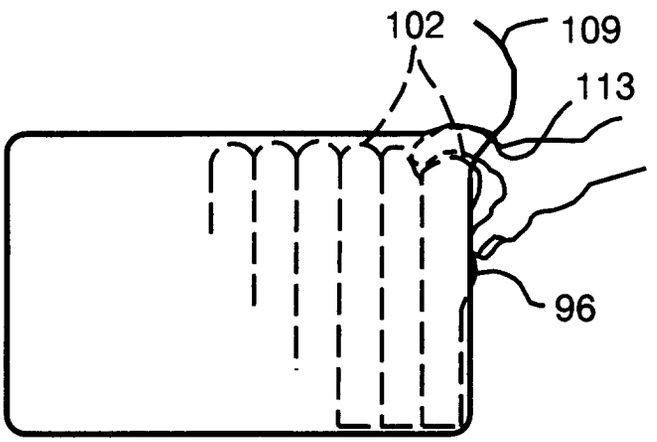

FIG. 13B

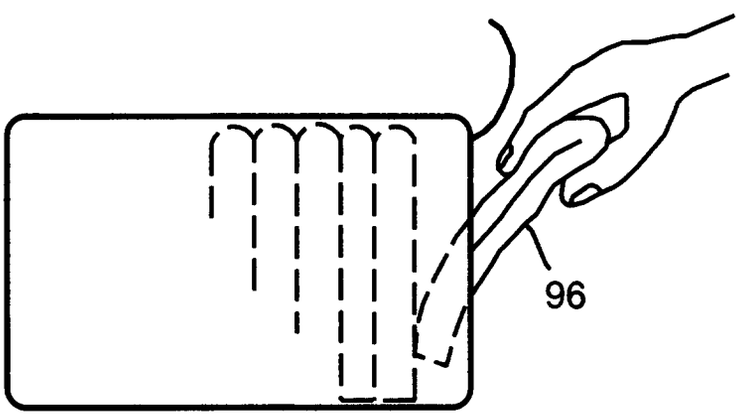

FIG. 13C

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 11 2662

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-U-9 103 473 (CITO-KUNSTSTOFFE UND VERPACKUNGSFOLIEN GMBH) * page 2, line 1 - page 4, line 10; claims 1-7; figures 1-4 *	1,5-10, 12-14	B65D75/58
Y		2-4	
X	FR-A-2 421 817 (A.J. BINGLEY LTD) * page 1, line 16 - page 2, line 17 * * page 3, line 26 - line 39 *	1,2,5-14	
Y	US-A-5 050 742 (D.R. MUCKENFUHS) *abstract* * column 4, line 63 - column 5, line 8; figure 5A *	2-4	
A	DE-A-4 102 547 (KOCHSIEK MASCHINENBAU SOLTAU GMBH) * column 2, line 29 - line 40; figure 1 *	1	
A	EP-A-0 473 089 (KIMBERLY-CLARK CORPORATION) * column 12, line 11 - line 24; figures 1,13,14B *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 OCTOBER 1993	LILIMPAKIS E.

CATEGORY OF CITED DOCUMENTS

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P : intermediate document

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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