

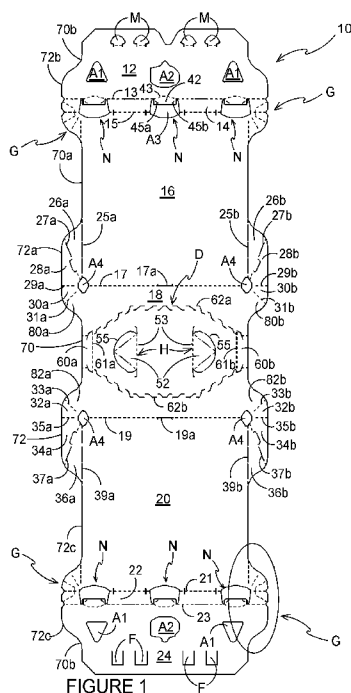
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(54) Title: CARTON AND BLANK THEREFOR



(57) Abstract: Aspects of the disclosure relate to a carton (90) for packaging a plurality of flanged articles, a blank for forming the carrier and to a nested arrangement of blanks. The carton comprises plurality of walls including; a top wall (18), a first side wall (16), a second side wall (20), a first base wall (12) hingedly connected to the first side wall by a first fold line. The carton comprises a lower tab comprising a first portion extending from the first side wall and a second portion extending from the base wall. The first portion is hingedly connected to the second portion by a second fold line. The second fold line is collinearly arranged with the first fold line. The lower tab extends from a free end of the first side wall and base wall. The carton comprises a heel opening for receiving a heel portion of an endmost article.

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CARTON AND BLANK THEREFOR

TECHNICAL FIELD

5 The present invention relates to cartons and to blanks for forming the same. More specifically, but not exclusively, the invention relates to a wraparound carrier having a foldable corner structure.

BACKGROUND

10 In the field of packaging it is known to provide cartons for carrying multiple articles. Cartons are well known in the art and are useful for enabling consumers to transport, store and access a group of articles for consumption. For cost and environmental considerations, such cartons or carriers need to be formed from as little material as possible and cause as little wastage in the materials from which they are formed as possible. Further considerations are the strength
15 of the carton and its suitability for holding and transporting large weights of articles. It is desirable that the contents of the carton are secure within the carton.

It is desirable to produce cartons from blanks which are nestable, this provides environmental and economic benefit, and it may be beneficial in increasing or maximising the number of
20 carton blanks which can be taken from paperboard or other sheet material having a standard or fixed width.

It is also desirable to be able to transport the carton in a bag or sack without tearing or otherwise compromising the integrity of the bag or damaging other items in the bag.

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The present invention seeks to provide an improvement in the field of cartons, typically formed from paperboard or the like.

SUMMARY

30 A first aspect of the invention provides a carton for packaging one or more articles. The carton comprises plurality of walls including; a top wall, a first side wall, a second side wall, a first base wall hingedly connected to the first side wall by a first fold line. The carton comprises a lower tab comprising a first portion extending from the first side wall and a second portion extending from the base wall. The first portion is hingedly connected to the second portion by
35 a second fold line. The second fold line is collinearly arranged with the first fold line. The lower tab extends from a free end of the first side wall and base wall. The carton comprises a heel opening for receiving a heel portion of an endmost article. The heel opening is disposed

adjacent to the lower tab and struck at least from the first side wall. The first side wall comprises a third fold line extending longitudinally across the first side wall from an inner edge of the heel opening so as to define a bevel panel. The carton comprises a deformable structure defined in the lower tab between the heel opening and a free end edge of the carton. The first
5 portion of the lower tab comprises a relief tab defined in part by a pair of divergently arranged fold lines and in part by a cut line extending between the proximal ends of the divergent fold lines.

10 Optionally, the lower tab comprises a fourth fold line extending between the cut line and the free end edge.

Optionally, the fourth fold line is collinear with the third fold line.

15 Optionally, the lower tab comprises a first recess struck from the free end edge and wherein the fourth fold line extends from the cut line towards the recess.

Optionally, the first recess is substantially V-shaped and has a vertex at its bottom, and wherein the fourth fold line extends towards the vertex of the first recess.

20 Optionally, the first recess defines a first arcuate free edge portion of the lower tab and wherein the fourth fold line extends radially from the first recess.

Optionally, the first recess extends between the fourth fold line and the first fold line so as to inset a free end edge portion of the lower tab defined therebetween.

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Optionally, the lower tab comprises a second recess struck from the free end edge and wherein the first fold line extends from the heel opening towards the second recess.

30 Optionally, the second recess is substantially V-shaped and has a vertex at its bottom, and wherein the first fold line extends towards the vertex of the second recess.

Optionally, the second recess defines a first arcuate free edge portion of the lower tab and wherein the first fold line extends radially from the second recess.

35 Optionally, the lower tab comprises a recess struck from the free end edge thereof.

Optionally, the lower tab comprises a web structure coupling the relief tab to the first side wall.

Optionally, the web structure comprises a first flap hingedly connected to the first side wall by a fifth fold line and a second flap hingedly connected to the first flap by a sixth fold line, the second flap being hingedly connected to the relief tab by one of the divergent fold lines.

5

Optionally, the heel opening is struck at least in part from the lower tab.

A second aspect of the invention provides a blank for forming a carton. The blank comprises plurality of panels including; a top panel, a first side panel, a second side panel, a first base panel hingedly connected to the first side panel by a first fold line. The blank comprises a tab comprising a first portion extending from the first side panel and a second portion extending from the first base panel. The first portion is hingedly connected to the second portion by a second fold line. The second fold line is collinearly arranged with the first fold line. The tab extends from a free end of the first side panel and base pane. The blank comprises a heel opening for receiving a heel portion of an endmost article. The heel opening is disposed adjacent to the tab and struck at least from the first side panel. The first side panel comprises a third fold line extending longitudinally across the first side panel from an inner edge of the heel opening so as to define a bevel panel. The blank comprises a deformable structure defined in the tab between the heel opening and a free end edge of the blank. The first portion of the tab comprises a relief tab defined in part by a pair of divergently arranged fold lines and in part by a cut line extending between the proximal ends of the divergent fold lines.

Within the scope of this application it is envisaged that the various aspects, embodiments, examples, features and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings may be taken independently or in any combination thereof. For example, features described in connection with one embodiment are applicable to all embodiments unless there is incompatibility of features.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a plan view from above of a blank for forming a carton according to a first embodiment;

Figure 2 is a perspective view from above of the carton formed from the blank of Figure 1;

Figure 3 is a perspective view of a portion of the carton of Figure 2 showing a deformable corner region in an unfolded condition;

Figures 4 and 5 are perspective views of a portion of the carton of Figure 2 showing the deformable corner region in a folded condition;

Figure 6 is an end view of a first end of the carton of Figure 2 showing a first deformable corner region in an unfolded condition and a second deformable corner region in a folded condition;

Figure 7 is a plan view from above of a blank for forming a carton according to a second embodiment;

Figure 7A is an enlarged view of a deformable corner region of the blank of Figure 7;

Figure 8 is a plan view from above of a blank for forming a carton according to a third embodiment;

Figure 8A is an enlarged view of a deformable corner region of the blank of Figure 8;

Figure 9 is a plan view from above of a blank for forming a carton according to a fourth embodiment; and

Figure 9A is an enlarged view of a deformable corner region of the blank of Figure 9.

DETAILED DESCRIPTION OF EMBODIMENTS

Detailed descriptions of specific embodiments of the package, blanks and cartons are disclosed herein. It will be understood that the disclosed embodiments are merely examples of the way in which certain aspects of the invention can be implemented and do not represent an exhaustive list of all of the ways the invention may be embodied. As used herein, the word “exemplary” is used expansively to refer to embodiments that serve as illustrations, specimens, models, or patterns. Indeed, it will be understood that the packages, blanks and cartons described herein may be embodied in various and alternative forms. The Figures are not necessarily to scale and some features may be exaggerated or minimised to show details of particular components. Well-known components, materials or methods are not necessarily described in great detail in order to avoid obscuring the present disclosure. Any specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the invention.

Referring to Figure 1, there is shown a plan view of a blank 10 capable of forming a carton or carrier 90, as shown in Figure 2, for containing and carrying a group of primary products such as, but not limited to, beverage cans, hereinafter referred to as articles B, as shown in Figure 2. The blank 10 forms a secondary package for packaging at least one primary product container or package.

Figures 7, 8 and 9 each show a plan view of a blank 110; 210; 310 capable of forming a carton or carrier (not shown) for containing and carrying a group of primary products such as, but not limited to, beverage cans, hereinafter referred to as articles B. The blanks 110; 210; 310 form a secondary packages for packaging at least one primary product container or package.

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In the embodiments detailed herein, the terms “carton” and “carrier” refer, for the non-limiting purpose of illustrating the various features of the invention, to a container 90 for engaging and carrying articles B, such as primary product containers B. It is contemplated that the teachings of the invention can be applied to various product containers B, which may or may not be tapered and/or cylindrical. Other exemplary containers include bottles (for example metallic, glass or plastics bottles), cans (for example aluminium cans), tins, cups, pots, pouches, packets and the like.

The blanks 10; 110; 210; 310 are formed from a sheet of suitable substrate. It is to be understood that, as used herein, the term “suitable substrate” includes all manner of foldable sheet material such as paperboard, corrugated board, cardboard, plastic, combinations thereof, and the like. It should be recognised that one or other numbers of blanks may be employed, where suitable, for example, to provide the carrier structure described in more detail below.

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The packaging structure or carton 90 described herein may be formed from a sheet material such as paperboard, which may be made of or coated with materials to increase its strength. An example of such a sheet material is tear-resistant NATRALOCK® paperboard made by WestRock Company. It should be noted that the tear resistant materials may be provided by more than one layer, to help improve the tear-resistance of the package. Typically, one surface of the sheet material may have different characteristics to the other surface. For example, the surface of the sheet material that faces outwardly from a finished package may be particularly smooth and may have a coating such as a clay coating or other surface treatment to provide good printability. The surface of the sheet material that faces inwardly may, on the other hand, be provided with a coating, a layer, a treatment or be otherwise prepared to provide properties such as one or more of tear-resistance, good glue-ability, heat sealability, or other desired functional properties.

In the illustrated embodiment, the blanks 10; 110; 210; 310 are configured to form a carton or carrier 90 for packaging an exemplary arrangement of exemplary articles B. In the illustrated embodiments the arrangement is an m x n matrix or array, having two rows (m=2) and three columns (n=3); in the illustrated embodiments two rows of three articles B are provided, and

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the articles B are 500ml beverage cans. Alternatively, the blanks 10; 110; 210; 310 can be configured to form a carrier for packaging other types, number and size of articles B and/or for packaging articles B in a different arrangement or configuration for example, but not limited to, fully enclosed cartons or basket carriers, the articles B may be bottles or cans.

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Turning to Figure 1, there is illustrated a blank 10 for forming a carton 90 (see Figure 2) according to a first embodiment. The blank 10 comprises a plurality of main panels 12, 14, 16, 18, 20, 22, 24 for forming a tubular structure. The plurality of main panels 12, 14, 16, 18, 20, 22, 24 comprises: a first base panel 12, a first corner panel 14, a first side panel 16, a top panel 18, a second side panel 20, a second corner panel 22 and a second base panel 24. The plurality of panels 12, 14, 16, 18, 20, 22, 24 may be arranged in a linear series hinged one to the next by corresponding fold lines 13, 15, 17, 19, 21, 23.

In alternative embodiments, the first and second corner panels 14, 22 may be omitted, the fold lines 15, 21 may be omitted.

The first and second corner panels 14, 22 may be considered to form lower portions of the respective one of the first or second side panels 16, 20, or alternatively of the first or second base panels 12, 24, to which they are hingedly connected.

20

The blank 10 is foldable to form a package 90 as illustrated in Figure 2. The first and second base panels 12, 24 are engageable with one another in an overlapping relationship to form a composite base wall 12/24 of the carton 90. The blank 10 may comprise a complementary locking mechanism for securing the second base panel 24 to the first base panel 12. The second base panel 24 may comprise at least one first part F of the complementary locking mechanism. The first base panel 12 may comprise at least one second part M of the complementary locking mechanism. In the illustrated embodiment, the second base panel 24 comprises a plurality of female tabs F defining openings in the second base panel 24. The first base panel 12 comprises a plurality of male tabs M, the openings in the second base panel 24 being configured to receive a respective one of the male tabs M. The female tabs F are arranged to be displaced out of the second base panel 24 to form the opening and to bear against the male tabs M when received therein. In some embodiments the complementary locking mechanism M/F may be omitted, the first and second base panels 12, 24 may be secured to each other by other means such as but not limited to adhesive or staples.

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Optionally, the first and second base panels 12, 24 may comprise at least one first aperture A1. In the illustrated embodiment, each of the first and second base panels 12, 24 comprises

two first apertures A1. Optionally, the first and second base panels 12, 24 may comprise at least one second aperture A2. In the illustrated embodiment, each of the first and second base panels 12, 24 comprises one second apertures A2. The first and second apertures A1, A2 may be employed to facilitate construction of the carton 90. A packaging machine component
5 may engage with the first and second apertures A1, A2 to enable the plurality of panels 12, 14, 16, 18, 20, 22, 24 to be tightened about a group of articles B. The first and second apertures A1, A2 may also be employed to facilitate alignment of the first and second base panels 12, 24 with respect to each other or to align the first part of the complementary locking mechanism with the second part of the complementary locking mechanism. The
10 complementary locking mechanism illustrated and described is entirely optional.

The blank 10 may comprise at least one heel engagement structure N for engaging with a heel or lower portion of an article B. The blank 10 illustrated in Figure 1 comprises six heel engagement structures N each is provided for engaging a respective article B. Each of the
15 heel engagement structures N is substantially similar in construction and will be described by reference to a heel engagement structure N provided in the first side panel 16.

The heel engagement structure N may comprise an opening. The opening is defined in part by a heel aperture A3 and in part by a heel tab 42. The heel tab 42 is hingedly connected to
20 the first base panel by fold line 43. The heel tab 42 is struck from the first corner panel 14.

The fold line 43 interrupts the fold line 13 hingedly connecting the first base panel 12 to the first corner panel 14. The fold line 43 may be non-linear, in the illustrated embodiment the fold line 43 is curved or arcuate in shape, in other embodiments it may be formed from at least two
25 linear fold lines divergently arranged with respect to each other and contiguous with each other.

The heel tab 42 may comprise a pair of divergently arranged fold lines 45a, 45b which may define foldable corner portions of the heel tab 42.

The top panel 18 may comprise an optional handle structure H. The handles structure H comprises a pair of foldable finger tabs 52. The finger tabs 52 are spaced apart from each other. The finger tabs 52 are hingedly connected to the top panel 18 by fold lines 53 and are defined in part by a cut line or severance line 55. A first one of the finger tabs 52 is hingedly
35 connected to the top panel 18 in opposition to a second one of the finger tabs 52.

The top panel 18 may comprise a detachable portion D in the form of a tear strip. The detachable portion D is defined by a first tear or severance line 62a and by a second tear or severance line 62b. The first and second severance lines 62a, 62b extend generally longitudinally across the top panel 18. The second severance line 62b is laterally spaced apart from the first severance line 62a. A tear initiation device in the form of a pull tab 60a, 60b may be provided at each end of the tear strip. The pull tabs 60a, 60b are hingedly connected to the tear strip by respective fold lines 61a, 61b, and may be defined in part by weakened lines which are more readily torn than the first and second severance lines 62a, 62b, that is to say the weakened lines offer less tear resistance than the first and second severance lines 62a, 62b.

The detachable portion D may facilitate access to the contents, articles B, of the carton 90 upon removal thereof.

Each of the panels 12, 16, 18, 20, 24 is formed with a pair of cutouts or recesses. The cutouts are defined in opposed end edges of the blank 10. The cutouts comprise full, major cutouts 70, 70a, 70c and partial or minor cutouts 70b.

A first cutout 70 is defined in the top panel 18 around midway along each of its opposed end edges. A second cutout 70a is defined in each end edge of the first side panel 16. A third cutout 70c is defined in each end edge of the second side panel 20.

A partial or minor cutout 70b is defined in each of the opposed end edges of each of the first and second base panels 12, 24.

As a result, the blank 10 is provided along either longitudinal edge thereof with four tabs 72, 72a, 72b, 72c each interposed between adjacent ones of the cutouts 70, 70a, 70b, 70c.

As illustrated in Figure 1, a first upper tab 72 is sandwiched and defined by the adjacently disposed first and third cutouts 70, 70c. A second upper tab 72a is sandwiched and defined by the first and second cutouts 70, 70a. A first lower tab 72b is sandwiched and defined by the second cutout 70a and by a first one of the partial cutouts 70b, defined in the first base panel 12. A second lower tab 72c is sandwiched and defined by the third cutout 70c and by a second one of the partial cutouts 70b, defined in the second base panel 24.

The first upper tab 72 is positioned astride the adjacent fold line 19. The second upper tab 72a is positioned astride the adjacent fold line 17.

The first lower tab 72b is positioned astride the adjacent fold lines 13, 15. The second lower tab 72c is positioned astride the adjacent fold lines 21, 23.

- 5 The full or major cutouts 70, 70a, 70c are capable of accommodating an appropriately sized one of the tabs 72, 72a, 72c of a like or similar adjacently disposed blank.

Each of the partial or minor cutouts 70b cooperates with a partial or minor cutouts 70b of a subsequent or preceding second blank (not shown), disposed end to end with the blank 10
10 illustrated in Figure 1, so as to provide a void or cutout capable of accommodating an appropriately sized tab 72, 72a, 72b, 72c of an adjacent third blank (not shown) which third blank is disposed side by side (optionally, at least a portion of a longitudinal edge of the blank 10 may be shared, or in common, with at least a portion of a longitudinal edge of the third blank) with the blank 10 of Figure 1. A first partial cutout 70b from a first blank 10 and a second
15 partial cutout 70b from a second blank are required to accommodate a single tab 72, 72a, 72b, 72c of a third blank. In this way two partial cutouts 70b may be considered to form a full cutout.

Each of the first and second upper tabs 72 and 72a forms, or assists in forming of, an end
20 retention structure for preventing the contents of the carton 90 from dislodging from the carton 90 when said blank 10 is erected into the carton 90. Each of the first and second upper tabs 72 and 72a is provided with cut and fold lines to form a top-engaging structure when it is folded along the fold lines.

25 More specifically, each upper tab 72, 72a comprises an anchoring portion 26a, 26b, 36a, 36b hingedly connected to the adjacent side panel 16, 20 along a fold line 25a, 35b, 39a, 39b. Each upper tab 72, 72a comprises a gusset portion 28a, 28b, 34a, 34b hingedly connected to the anchoring portion 26a, 26b, 36a, 36b along a fold line 27a, 27b, 37a, 37b.

30 Each upper tab 72, 72a comprises a web portion 30a, 30b, 32a, 32b hingedly connected to the gusset portion 28a, 28b, 34a, 34b along an extension 29a, 29b, 35a, 35b of respective one of the fold lines 17, 19. Each upper tab 72, 72a comprises a covering portion 80a, 80b, 82a, 82b that is integrally formed with the top panel 18. Each web portion 30a, 30b, 32a, 32b is hingedly connected to the respective covering portion 80a, 80b, 82a, 82b by a fold line 31a,
35 31b, 33a, 33b.

An optional aperture A4 may be struck in part from the top panel 18, in part from the first or second side panel 16, 20 and in part from the upper tab 72, 72a. The aperture A4 defines a terminus of each of the fold lines 17, 19; 29a, 29b, 35a, 35b; 31a, 31b, 33a, 33b; 27a, 27b, 37a, 37b; 25a, 35b, 39a, 39b and is disposed at a notional converging point of the aforesaid fold lines.

Folding of each upper tab 72, 72a is achieved during the erection of the carton. To form a top engaging structure out of each upper tab 72, 72a, the anchoring portion 26a, 26b, 36a, 36b is folded about 180 degrees to bring it into a face-contacting relationship with the inside surface of the adjacent side panel 16, 20. The anchoring portion 26a, 26b, 36a, 36b is held in the folded position by being pressed by one of the packaged articles B against the adjacent side panel 16, 20. The folding of the anchoring portion 26a, 26b, 36a, 36b causes the gusset portion 28a, 28b, 34a, 34b to be folded outwardly about the fold line 27a, 27b, 37a, 37b so that the gusset portion 28a, 28b, 34a, 34b extends outwardly from the fold line 27a, 27b, 37a, 37b along the side wall of the one packaged article B. At the same time, the web portion 30a, 30b, 32a, 32b is caused to fold downwardly along the fold line 31a, 31b, 33a, 33b and is thereby brought to a folded position where it extends between the fold line 31a, 31b, 33a, 33b and the outer edge of the gusset portion 28a, 28b, 34a, 34b. The top-engaging structure thus completed is illustrated in Figure 2 wherein the structure is shown as tightly engaging the top of the one article B.

Each lower tab 72b, 72c serves to provide sufficient material in which the adjacent endmost heel aperture A3 is defined. More particularly, the heel aperture A3 adjacent to each lower tab 72b, 72c is positioned such that sufficient material surrounds the heel aperture A3 even when the heel aperture A3 extends into that lower tab 72b, 72c. During the erection and packaging of articles B, the blank 10 is manipulated so that each heel aperture A3 receives the bottom of a respective article B to retain said article B within the carton 90. The heel tabs 42 are also folded to assist in retaining the articles B.

Each lower tab 72b, 72c comprises a deformable structure G forming a foldable corner region of a carton 90. The deformable structure G takes the form of an arrangement of fold lines and is suitable for removing a sharp corner or edge of the carton 90. This may be advantageous when the carton 90 is transported or carried in a carrier bag, particularly, but not exclusively, those formed from plastic, paper or similar sheet material. The deformable structure G prevents or reduces the likelihood of the carton 90 perforating, tearing or otherwise piercing the material from which the carrier bag is formed. It will be appreciated that any puncture in the carrier bag will compromise the load bearing capacity of the carrier bag, and once

compromised a tear is likely to propagate which may lead to egress of the carton 90 or other items disposed in the carrier bag and the consequent possibility of damage thereto.

Each deformable structure G is substantially similar in construction and will be described by reference to a deformable structure G provided in one of the second lower tabs 72c shown in Figure 1A. The second lower tab 72c is formed in part from the second side panel 20, in part from the optional second corner panel 22 and in part from the second base panel 24.

The deformable structure G comprises a relief tab 88 formed in part from the second side panel 20 and in part from the second corner panel 22. In embodiments in which the first or second corner panels 14, 22 are omitted, the relief tab 88 may be formed in part from the second side panel 20 and in part from the second base panel 24.

The relief tab 88 is defined in part by a first fold line 87 provided in the second side panel 20 and in part by a second fold line 91 provided in the second corner panel 22.

The first fold line 87 is divergently arranged with respect to the second fold line 91. The first and second fold lines 87, 91 diverge towards the longitudinal or free side edge of the blank 10. The first and second fold lines 87, 91 comprises first ends disposed proximal to each other and second ends disposed distal from each other.

The relief tab 88 is defined in part by a cutline or severable line 93. The cutline 93 may extend from the first end of first fold line 87 towards the first end of the second fold line 91. The cutline 93 may substantially extend between the first, proximal, end of first fold line 87 and the first, proximal, end of the second fold line 91. The cutline 93 may connect the first end of first fold line 87 with the first end of the second fold line 91 so as to be contiguous therewith. The cutline 93 may be arranged to be substantially parallel to an adjacent portion of the longitudinal or free side edge of the second lower tab 72c. The relief tab 88 may be substantially trapezoidal in shape.

An extension or portion of fold line 21 defines a third fold line 89 that substantially bisects the relief tab 88. In other embodiments, the third fold line 89 may be off centered such that the relief tab 88 is asymmetrical with respect to the third fold line 89.

The relief tab 88 may comprise a first cutaway or recess R1 struck from the longitudinal or free side edge thereof. In the embodiment of Figure 1 the recess R1 is substantially V-shaped or triangular so as to define a vertex at its bottom. The recess R1 interrupts the third fold line

89 coupling one of the bisected portions of the relief tab 88 to the other bisected portion. The third fold line 89 terminates at the vertex of the recess R1. The recess R1 removes material astride the third fold line 89 so as to reduce the prominence of the third fold line 89 proximate the free edge of the second lower tab 72c. The recess R1 provides a clipped edge of the third fold line 89.

The relief tab 88 is disposed between the longitudinal or free side edge of the second lower tab 72c and the adjacent endmost heel aperture A3.

The deformable structure G may comprise a web structure comprising a pair of flaps 84, 86. A first flap 84 is hinged to the second side panel 20 by a fourth fold line 83. The fourth fold line 83 may be collinear with a longitudinal free edge of the third major cutout 70c. A second flap 86 is hingedly connected to the first flap 84 by a fifth fold line 85. The fifth fold line 83 is divergently arranged with respect to the fourth fold line 83. The first flap 84 is substantially triangular in shape. The second flap 86 is hingedly connected to the relief tab 88 by the first fold line 87. The fifth fold line 83 is divergently arranged with respect to the first fold line 87. The second flap 86 is substantially triangular in shape.

The first and second flaps 84, 86 interconnect the relief tab 88 to the second side panel 20.

The deformable structure G enables the portion of the second lower tab 72c provided by the second side panel 20 (and by the optional second corner panel 22 when provided) to be folded or deformed about the end of an endmost adjacent article B so as to bring the free edge of said portion of the second lower tab 72c into closer proximity with said endmost article B. It reduces the rigidity of the outer region of said portion of the second lower tab 72c such that it is readily deformed. In this way the likelihood of the second lower tab 72c puncturing the wall of a carrier bag when disposed inside, either during loading or carrying of the carrier bag, is reduced. This may reduce the practice of "double bagging" placing a first carrier bag inside a second carrier bag to create two ply wall.

The deformable structure G may comprise a second cutaway or recess R2 struck from the longitudinal or free side edge thereof. In the embodiment of Figure 1, the second recess R2 is substantially V-shaped so as to define a vertex at its bottom. The second recess R2 interrupts the fold line 23 coupling the second base panel 24 to the second corner panel 22. The fold line 23 terminates at the vertex of the second recess R2. The second recess R2 removes material astride the fold line 23 so as to reduce the prominence of the fold line 23 proximate

the free edge of the second lower tab 72c. The second recess R2 provides a clipped edge of the fold line 23.

Turning to the construction of the carton 90 as illustrated in Figure 2, the carton 90 can be formed by a series of sequential folding operations in a straight line machine so that the carton 90 is not required to be rotated or inverted to complete its construction. The folding process is not limited to that described below and may be altered according to particular manufacturing requirements.

A group of articles B is assembled; in the embodiment illustrated in Figure 2 six articles B are arranged in a 2 x 3 array. The top panel 18 of the blank 10 is disposed above the group of articles B to provide a top wall 18 of the carton 90.

The first and second side panels 16, 20 are folded, with respect to the top panel 18 about fold lines 17, 19 respectively, about opposing sides of the group of articles B so as to be disposed about the opposing sides of the group of articles B to form first and second side walls 16, 20. Of the carton 90.

The anchor portions 26a, 26b, 36a, 36 may be folded into face contacting relationship with the respective one of the first and second side panels 16, 20 substantially simultaneously with folding the first and second side panels 16, 20 with respect to the top panel 18, to form the top engaging structures described above.

Alternatively, the top engaging structures may be formed subsequent to erection of the carton 90 into a tubular form. The anchor portions 26a, 26b, 36a, 36 may be tucked between the respective one of the first and second side panels 16, 20 to which they are hingedly connected and an adjacently disposed article B.

The first and second corner panels 14, 22 are folded, with respect to the respective one of the first and second side panels 16, 20 about fold lines 15, 21 respectively, about the heels or lower portions of adjacently disposed articles B.

The heel tabs 42 may folded out of the plane of the first and second corner panels 14, 22, about fold lines 43, prior to folding the first and second corner panels 14, 22 the respective one of the first and second side panels 16, 20.

The first base panel 12 is folded about the fold line 13 so as to be disposed adjacent to the base of the group of articles B, the second base panel 24 is then folded about the fold line 23 so as to be in at least partial overlapping relationship with the first base panel 12; in doing so each of the heel tabs 42 may be brought into engagement with a base of a respective article B.

The first and second base panels 12, 24 are secured together. Each of the male tabs M is displaced inwardly out of the plane of the second base panel 24. In so doing, each of the female tabs F is displaced inwardly creating a corresponding opening in the first base panel 12. The male tabs M are received in respective ones of the openings so as to lock the first and second base panels 12, 24 together. In this way a tubular structure is formed about the group of articles B.

The assembled carton 90 is shown in Figure 2. Figures 3, 4 and 5 show a close up of one of the deformable structures G in the set-up carton 90.

Figure 3 illustrates the deformable structure G in an initial or starting position in which the deformable structure G is in an unfolded or undeformed condition.

The relief tab 88 comprises a first, upper, portion which is substantially coplanar with the second side panel 20 and a second, lower, portion which is substantially coplanar with the second corner panel 22. The fold line 89 is substantially collinear with the fold line 23 hingedly connecting the second corner panel 22 to the second side panel 20.

Figures 4 and 5 illustrate the deformable structure G in a second, deployed, position in which deformable structure G is in a folded or deformed condition. The deformable structure G may be folded or deformed by an external body or influence, for example the deformable structure G may be brought into contact with a wall of a carrier bag. The wall acts upon the carton 90 exerting forces upon the deformable structure G. The relief tab 88 is displaced inwardly by a force applied in a suitable direction.

The relief tab 88 is folded about the endmost article B so as to be brought into closer proximity thereto. In this way the lower corners of the carton 90, provided by the first and second lower tabs 72b, 72c, are rounded, tapered or chamfered. This may be beneficial in reducing the likelihood of the carton 90 puncturing the carrier bag. It may allow the wall of carrier bag to contact a larger area or region of the carton 90 whereby reducing the pressure exerted on the bag by spreading the load forces over a greater area. As a consequence of deformation of the

first and second lower tabs 72b, 72c the wall of the carrier bag may contact the endmost articles in the carton 90.

Figure 6 shows an end view of a carton 90 in which one of the lower corners of the carton 90 has been folded or deformed and the other visible lower corner of the carton 90 is unfolded.

Referring now to Figures 7, 7A, 8, 8A, 9 and 9A, there are shown alternative embodiments of the present disclosure. In the alternative illustrated embodiments, like numerals have, where possible, been used to denote like parts, albeit with the addition of the prefix "100", "200", "300" to indicate that these features belong to the second, third and fourth embodiments respectively. The alternative embodiments share many common features with the embodiment of Figures 1 to 6 and therefore only the differences from the embodiment illustrated in Figures 1 to 6 will be described in any greater detail.

Figure 7 and 7A illustrate a blank 110 according to a second embodiment. The blank 110 comprises a plurality of main panels 112, 114, 116, 118, 120, 122, 124 for forming a tubular structure. The plurality of main panels 112, 114, 116, 118, 120, 122, 124 comprises: a first base panel 112, a first corner panel 114, a first side panel 116, a top panel 118, a second side panel 120, a second corner panel 122 and a second base panel 124. The plurality of panels 112, 114, 116, 118, 120, 122, 124 may be arranged in a linear series hinged one to the next by corresponding fold lines 113, 115, 117, 119, 121, 123.

Figure 7A is an enlarged view of one of the deformable structures G (the deformable structures G are substantially similar in construction and will be described by reference to the deformable structure G of Figure 7A. The deformable structures G is defined in a second lower tab formed in part from the second side panel 120, in part from the optional second corner panel 122 and in part from the second base panel 124.

The deformable structure G comprises a relief tab 188 formed in part from the second side panel 120 and in part from the second corner panel 122. In embodiments in which the first or second corner panels 114, 122 are omitted, the relief tab 188 may be formed in part from the second side panel 120 and in part from the second base panel 124.

The relief tab 188 is defined in part by a first fold line 187 provided in the second side panel 120 and in part by a second fold line 191 provided in the second corner panel 122.

The first fold line 187 is divergently arranged with respect to the second fold line 191. The first and second fold lines 187, 191 diverge towards the longitudinal or free side edge of the blank 110.

- 5 The relief tab 188 is defined in part by a cutline or severable line 193. The cutline 193 may extend from a first end of first fold line 187 towards a first end of the second fold line 191. The cutline 193 may substantially extend between the first end of first fold line 187 and the first end of the second fold line 191. The cutline 193 may connect the first end of first fold line 187 with the first end of the second fold line 191 so as to be contiguous therewith. The cutline 193
10 may be arranged to be substantially parallel to an adjacent portion of the longitudinal or free side edge of the second lower tab. The relief tab 188 may be substantially trapezoidal in shape.

- An extension or portion of fold line 121 defines a third fold line 189 that substantially bisects the relief tab 188. In other embodiments the third fold line 189 may be off centre such that the
15 relief tab 188 is asymmetrical with respect to the third fold line 189.

- The relief tab 188 may comprise a first cutaway or recess R1 struck from the longitudinal or free side edge thereof. In the embodiment of Figures 7 and 7A, the recess R1 is substantially U-shaped so as to define a convexly rounded bottom . The recess R1 interrupts the third fold
20 line 189 coupling the bisected portions of the relief tab 188. The third fold line 189 terminates at the rounded bottom of the first recess R1. The recess R1 removes material astride the third fold line 189 so as to reduce the prominence of the third fold line 189 proximate the free edge of the second lower tab. The recess R1 provides a clipped edge of the third fold line 89.

- 25 The relief tab 188 is disposed between the longitudinal or free side edge of the second lower tab and the adjacent endmost heel aperture A3.

- The deformable structure G may comprise a web structure comprising a pair of flaps 184, 186. A first flap 184 is hinged to the second side panel 120 by a fourth fold line 183. The fourth fold
30 line 183 may be collinear with a longitudinal free edge of the third major cutout. A second flap 186 is hingedly connected to the first flap 184 by a fifth fold line 185. The fifth fold line 183 is divergently arranged with respect to the fourth fold line 183. The first flap 184 is substantially triangular in shape. The second flap 186 is hingedly connected to the relief tab 188 by the first fold line 187. The fifth fold line 183 is divergently arranged with respect to the first fold line
35 187. The second flap 186 is substantially triangular in shape.

The first and second flaps 184, 186 interconnect the relief tab 188 to the second side panel 120.

5 The deformable structure G enables the portion of the second lower tab provided by the second side panel 120 (and by the optional second corner panel 122 when provided) to be folded or deformed about the end of an endmost adjacent article B so as to bring the free edge of said portion of the second lower tab into closer proximity with said endmost article B. It reduces the rigidity of the outer region of said portion of the second lower tab such that it is readily deformed. In this way the likelihood of the second lower tab puncturing the wall of a
10 carrier bag when disposed inside, either during loading or carrying of the carrier bag, is reduced. This may reduce the practice of "double bagging" placing a first carrier bag inside a second carrier bag to create two ply wall.

15 The deformable structure G may comprise a second cutaway or recess R2 struck from the longitudinal or free side edge thereof. In the embodiment of Figures 7 and 7A, the second recess R2 is substantially U-shaped so as to define a convexly rounded bottom. The second recess R2 interrupts the fold line 123 coupling the second base panel 124 to the second corner panel 122. The fold line 123 terminates at the rounded bottom of the second recess R2. The second recess R2 removes material astride the fold line 213 so as to reduce the prominence
20 of the fold line 123 proximate the free edge of the second lower tab. The second recess R2 provides a clipped edge of the fold line 123.

Figure 8 and 8A illustrate a blank 210 according to a third embodiment. The blank 210 comprises a plurality of main panels 212, 214, 216, 218, 220, 222, 224 for forming a tubular
25 structure. The plurality of main panels 212, 214, 216, 218, 220, 222, 224 comprises a first base panel 212, a first corner panel 214, a first side panel 216, a top panel 218, a second side panel 220, a second corner panel 222 and a second base panel 224. The plurality of panels 212, 214, 216, 218, 220, 222, 224 may be arranged in a linear series hinged one to the next by corresponding fold lines 213, 215, 217, 219, 221, 223.

30 Figure 8A is an enlarged view of one of the deformable structures G (the deformable structures G are substantially similar in construction and will be described by reference to the deformable structure G of Figure 8A). The deformable structures G is defined in a second lower tab formed in part from the second side panel 220, in part from the optional second corner panel 222 and
35 in part from the second base panel 224.

The deformable structure G comprises a relief tab 288 formed in part from the second side panel 220 and in part from the second corner panel 222. In embodiments in which the first or second corner panels 214, 222 are omitted, the relief tab 288 may be formed in part from the second side panel 220 and in part from the second base panel 224.

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The relief tab 288 is defined in part by a first fold line 287 provided in the second side panel 220 and in part by a second fold line 291 provided in the second corner panel 222.

The relief tab 288 is defined in part by a cutline or severable line 293.

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An extension or portion of fold line 221 defines a third fold line 289 which substantially bisect the relief tab 288. In other embodiments the third fold line 289 may be off centre such that the relief tab 288 is asymmetrical with respect to the third fold line 289.

15 The deformable structure G comprises a single cutaway or recess R struck from the longitudinal or free side edge of the second lower tab. The recess R is elongate and extends longitudinally of the blank 210. The recess R interrupts the third fold line 289 the second fold line 291 and the fold line 223 hingedly connecting the second corner panel 222 to the second base panel 224. The recess R1 removes material astride the fold lines 289, 291, 223 so as to
20 reduce the prominence of the fold line 289, 291, 223 proximate the free edge of the second lower tab. The recess R provides a clipped edge of the fold lines 289, 291, 223. The recess R has the effect of inseting the free end edge of the bevel panel 222 (i.e., a free edge portion of the lower tab) with respect to the remainder of the second lower tab.

25 Figures 9 and 9A illustrate blank 310 according to a third embodiment. The blank 310 comprises a plurality of main panels 312, 314, 316, 318, 320, 322, 324 for forming a tubular structure. The plurality of main panels 312, 314, 316, 318, 320, 322, 324 comprises a first base panel 312, a first corner panel 314, a first side panel 316, a top panel 318, a second side panel 320, a second corner panel 322 and a second base panel 324. The plurality of panels
30 312, 314, 316, 318, 320, 322, 324 may be arranged in a linear series hinged one to the next by corresponding fold lines 313, 315, 317, 319, 321, 323.

Figure 9A is an enlarged view of one of the deformable structures G (the deformable structures G are substantially similar in construction and will be described by reference to the deformable structure G of Figure 9A). The deformable structures G is defined in a second lower tab formed in part from the second side panel 320, in part from the optional second corner panel 322 and in part from the second base panel 324.

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The deformable structure G comprises a relief tab 388 formed in part from the second side panel 320 and in part from the second corner panel 322. In embodiments in which the first or second corner panels 314, 322 are omitted, the relief tab 388 may be formed in part from the second side panel 320 and in part from the second base panel 324.

The relief tab 388 is defined in part by a first fold line 387 provided in the second side panel 320 and in part by a second fold line 391 provided in the second corner panel 322.

The relief tab 388 is defined in part by a cutline or severable line 393.

An extension or portion of fold line 321 defines a third fold line 389 which substantially bisect the relief tab 388. In other embodiments the third fold line 389 may be off centre such that the relief tab 388 is asymmetrical with respect to the third fold line 389.

The deformable structure G comprises a recess R or recesses R1, R1 shown in the previous embodiments have been omitted in the present embodiment shown in Figures 9 and 9A.

The present disclosure provides a carton 90 for packaging articles B. The carton 90 is formed from a blank 10; 110; 210; 310 which can be nested with like blanks each forming a carton 90.

The blank 10; 110; 210; 310 comprises longitudinal edges having a plurality of recesses defining tabs therebetween. The recesses may be arranged to allow the blank 10; 110; 210; 310 to be nested with similar blanks 10; 110; 210; 310. The tabs provide upper and lower corner portions of the carton 90. The lower corner portions may comprise a deformable, folding, structure G which enables the lower corner portions to be deformed or folded for reducing the sharpness of the lower corner portions of the carton 90. The deformable, folding, structure G enable the lower corner portions to be readily folded to become rounded in nature when load forces are applied thereto.

It can be appreciated that various changes may be made within the scope of the present invention. For example, the size and shape of the panels and apertures may be adjusted to accommodate articles of differing size or shape.

It will be recognised that as used herein, directional references such as "top", "bottom", "base", "front", "back", "end", "side", "inner", "outer", "upper" and "lower" do not necessarily limit the

respective panels to such orientation, but may merely serve to distinguish these panels from one another.

As used herein, the terms “hinged connection” and “fold line” refer to all manner of lines that define hinge features of the blank, facilitate folding portions of the blank with respect to one another, or otherwise indicate optimal panel folding locations for the blank. Any reference to “hinged connection” should not be construed as necessarily referring to a single fold line only; indeed a hinged connection can be formed from two or more fold lines wherein each of the two or more fold lines may be either straight/linear or curved/curvilinear in shape. When linear fold lines form a hinged connection, they may be disposed parallel with each other or be slightly angled with respect to each other. When curvilinear fold lines form a hinged connection, they may intersect each other to define a shaped panel within the area surrounded by the curvilinear fold lines. A typical example of such a hinged connection may comprise a pair of arched or arcuate fold lines intersecting at two points such that they define an elliptical panel therebetween. A hinged connection may be formed from one or more linear fold lines and one or more curvilinear fold lines. A typical example of such a hinged connection may comprise a combination of a linear fold line and an arched or arcuate fold line which intersect at two points such that they define a half moon-shaped panel therebetween.

As used herein, the term “fold line” may refer to one of the following: a scored line, an embossed line, a debossed line, a line of perforations, a line of short slits, a line of half-cuts, a single half-cut, an interrupted cutline, a line of aligned slits, a line of scores and any combination of the aforesaid options.

It should be understood that hinged connections and fold lines can each include elements that are formed in the substrate of the blank including perforations, a line of perforations, a line of short slits, a line of half-cuts, a single half-cut, a cutline, an interrupted cutline, slits, scores, any combination thereof, and the like. The elements can be dimensioned and arranged to provide the desired functionality. For example, a line of perforations can be dimensioned or designed with degrees of weakness to define a fold line and/or a severance line. The line of perforations can be designed to facilitate folding and resist breaking, to facilitate folding and facilitate breaking with more effort, or to facilitate breaking with little effort.

The phrase “in registry with” as used herein refers to the alignment of two or more elements in an erected carton, such as an aperture formed in a first of two overlapping panels and a second aperture formed in a second of two overlapping panels. Those elements in registry with each other may be aligned with each other in the direction of the thickness of the

overlapping panels. For example, when an aperture in a first panel is “in registry with” a second aperture in a second panel that is placed in an overlapping arrangement with the first panel, an edge of the aperture may extend along at least a portion of an edge of the second aperture and may be aligned, in the direction of the thickness of the first and second panels, with the

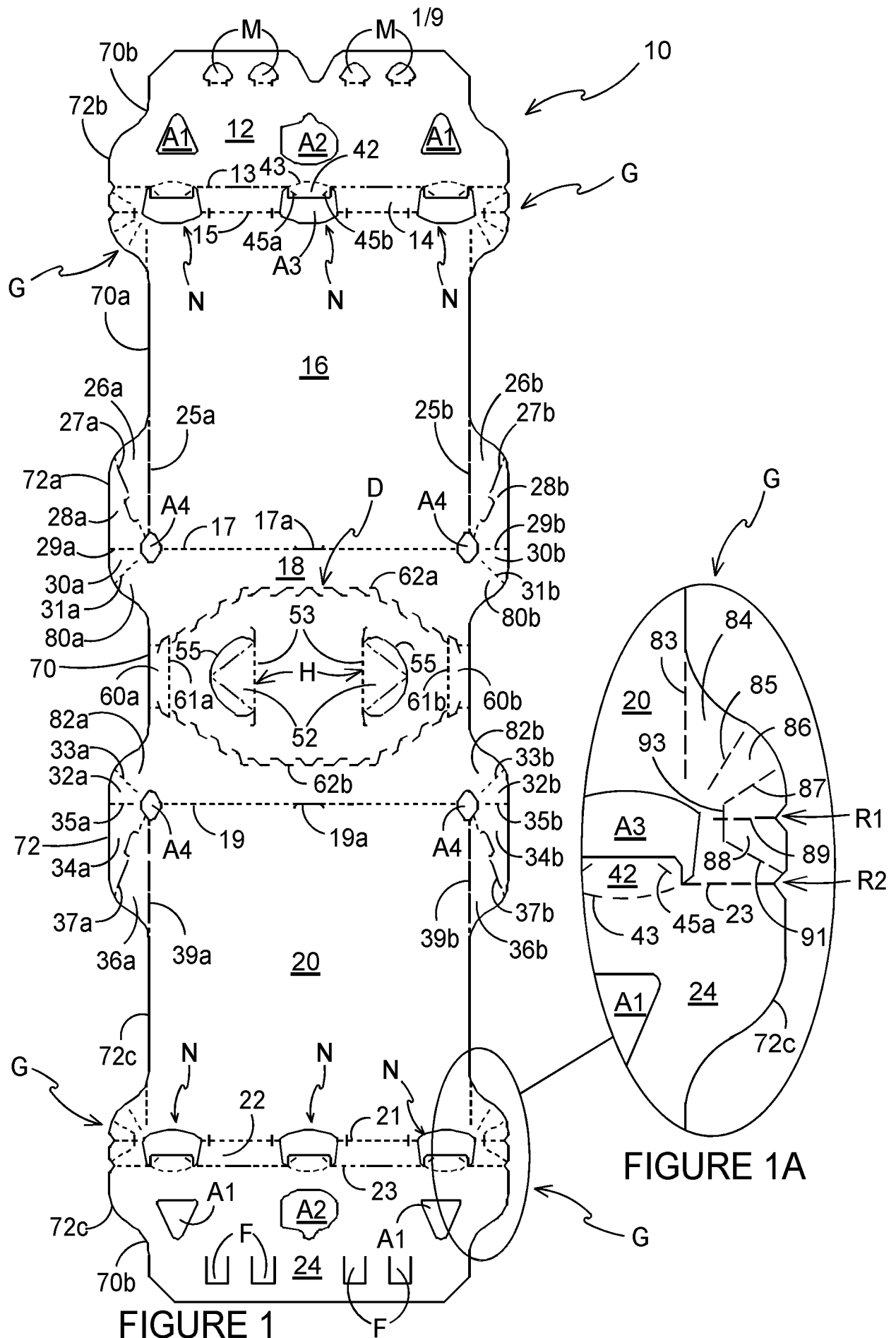
5 second aperture.

CLAIMS

1. A carton for packaging one or more articles, the carton comprising plurality of walls including; a top wall, a first side wall, a second side wall, a first base wall hingedly connected to the first side wall by a first fold line, wherein the carton comprises a lower tab comprising a first portion extending from the first side wall and a second portion extending from the base wall, the first portion being hingedly connected to the second portion by a second fold line, the second fold line being collinearly arranged with the first fold line, the lower tab extending from a free end of the first side wall and base wall, the carton comprising a heel opening for receiving a heel portion of an endmost article, the heel opening being disposed adjacent to the lower tab and struck at least from the first side wall, the first side wall comprising a third fold line extending longitudinally across the first side wall from an inner edge of the heel opening so as to define a bevel panel, wherein the carton comprises a deformable structure defined in the lower tab between the heel opening and a free end edge of the carton, the first portion of the lower tab comprising a relief tab defined in part by a pair of divergently arranged fold lines and in part by a cut line extending between the proximal ends of the divergent fold lines.
2. A carton according to claim 1 wherein the lower tab comprises a fourth fold line extending between the cut line and the free end edge.
3. A carton according to claim 2 wherein the fourth fold line is collinear with the third fold line.
4. A carton according to claim 3 wherein the lower tab comprises a first recess struck from the free end edge and wherein the fourth fold line extends from the cut line towards the recess.
5. A carton according to claim 4 wherein the first recess is substantially V-shaped and has a vertex at a bottom thereof, and wherein the fourth fold line extends towards the vertex of the first recess.
6. A carton according to claim 4 wherein the first recess defines a first arcuate free edge portion of the lower tab and wherein the fourth fold line extends radially from the first recess.

7. A carton according to claim 4 wherein the first recess extends between the fourth fold line and the first fold line so as to inset a free end edge portion of the lower tab defined therebetween.
8. A carton according to claim 1 wherein the lower tab comprises a second recess struck from the free end edge and wherein the first fold line extends from the heel opening towards the second recess.
9. A carton according to claim 7 wherein the second recess is substantially V-shaped and has a vertex at a bottom thereof, and wherein the first fold line extends towards the vertex of the second recess.
10. A carton according to claim 7 wherein the second recess defines a first arcuate free edge portion of the lower tab and wherein the first fold line extends radially from the second recess.
11. A carton according to claim 1 wherein the lower tab comprises a recess struck from the free end edge thereof.
12. A carton according to claim 1 wherein the lower tab comprises a web structure coupling the relief tab to the first side wall.
13. A carton according to claim 12 wherein the web structure comprises a first flap hingedly connected to the first side wall by a fifth fold line and a second flap hingedly connected to the first flap by a sixth fold line, the second flap being hingedly connected to the relief tab by one of the divergent fold lines.
14. A carton according to claim 1 wherein the heel opening is struck at least in part from the lower tab.
15. A blank for forming a carton, the blank comprising plurality of panels including; a top panel, a first side panel, a second side panel, a first base panel hingedly connected to the first side panel by a first fold line, wherein the blank comprises a tab comprising a first portion extending from the first side panel and a second portion extending from the first base panel, the first portion being hingedly connected to the second portion by a second fold line, the second fold line being collinearly arranged with the first fold line, the tab extending from a free end of the first side panel and base panel, the blank comprising a heel opening

for receiving a heel portion of an endmost article, the heel opening being disposed adjacent to the tab and struck at least from the first side panel, the first side panel comprising a third fold line extending longitudinally across the first side panel from an inner edge of the heel opening so as to define a bevel panel, wherein the blank comprises a deformable structure defined in the tab between the heel opening and a free end edge of the blank, the first portion of the tab comprising a relief tab defined in part by a pair of divergently arranged fold lines and in part by a cut line extending between the proximal ends of the divergent fold lines.



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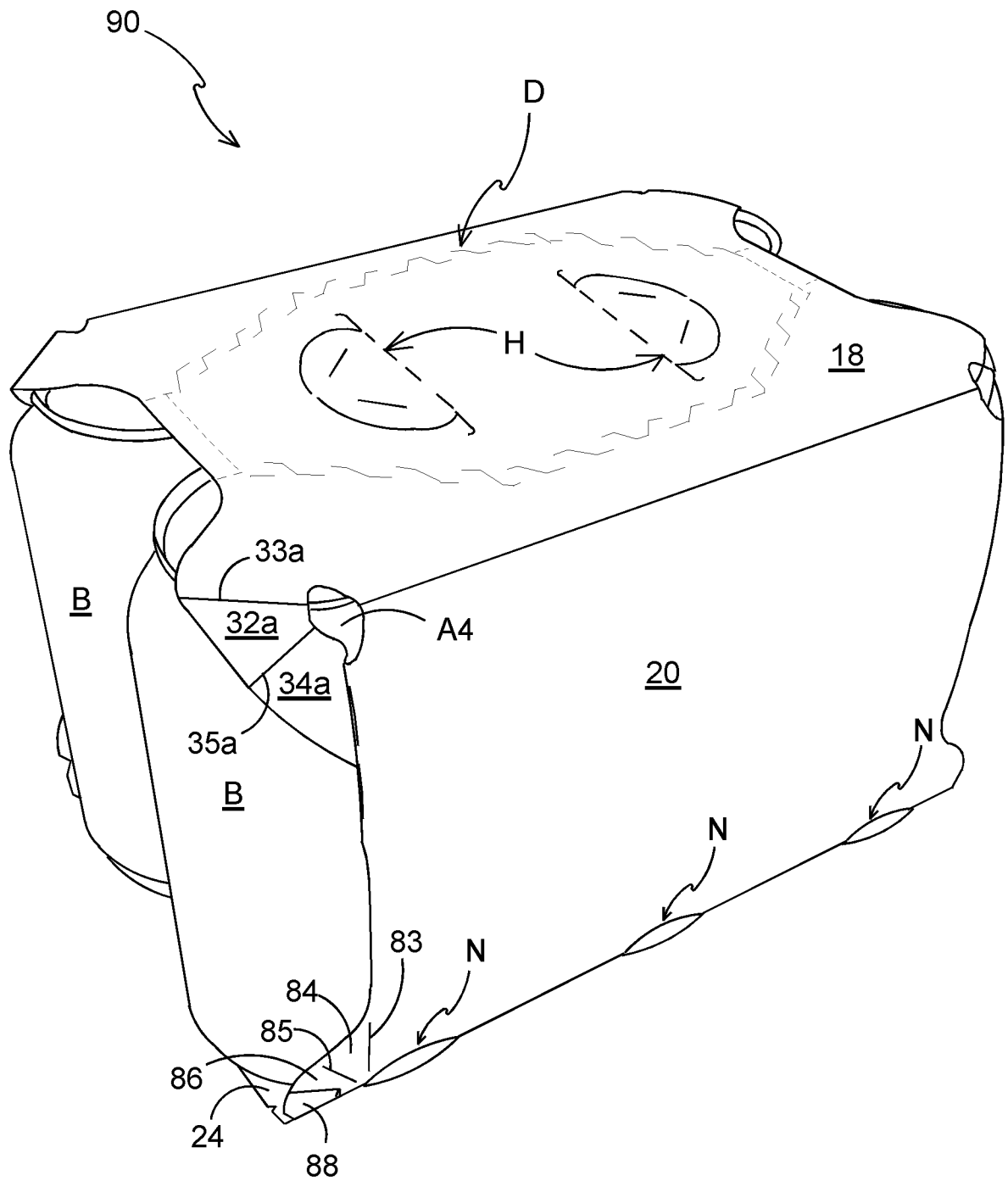


FIGURE 2

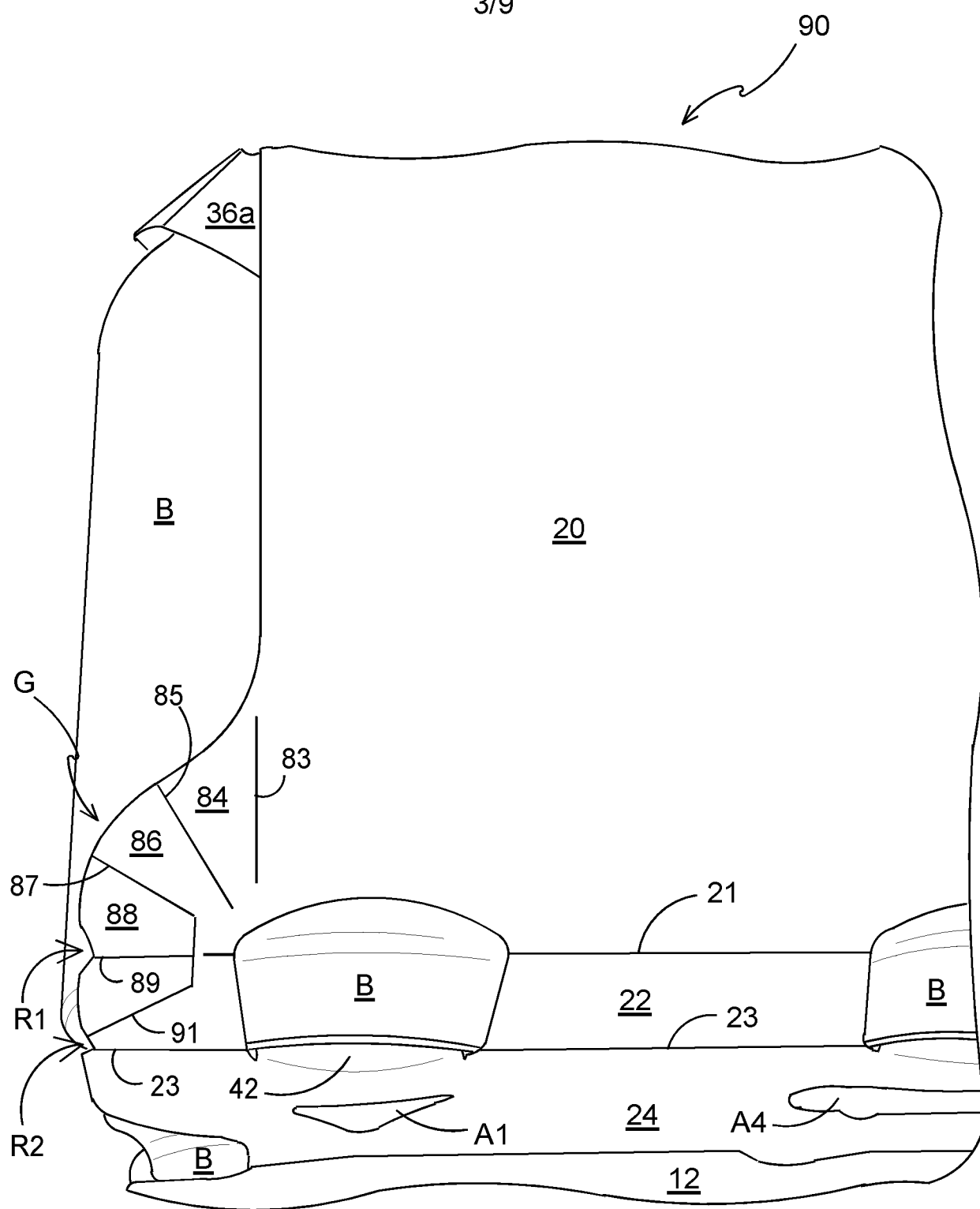


FIGURE 3

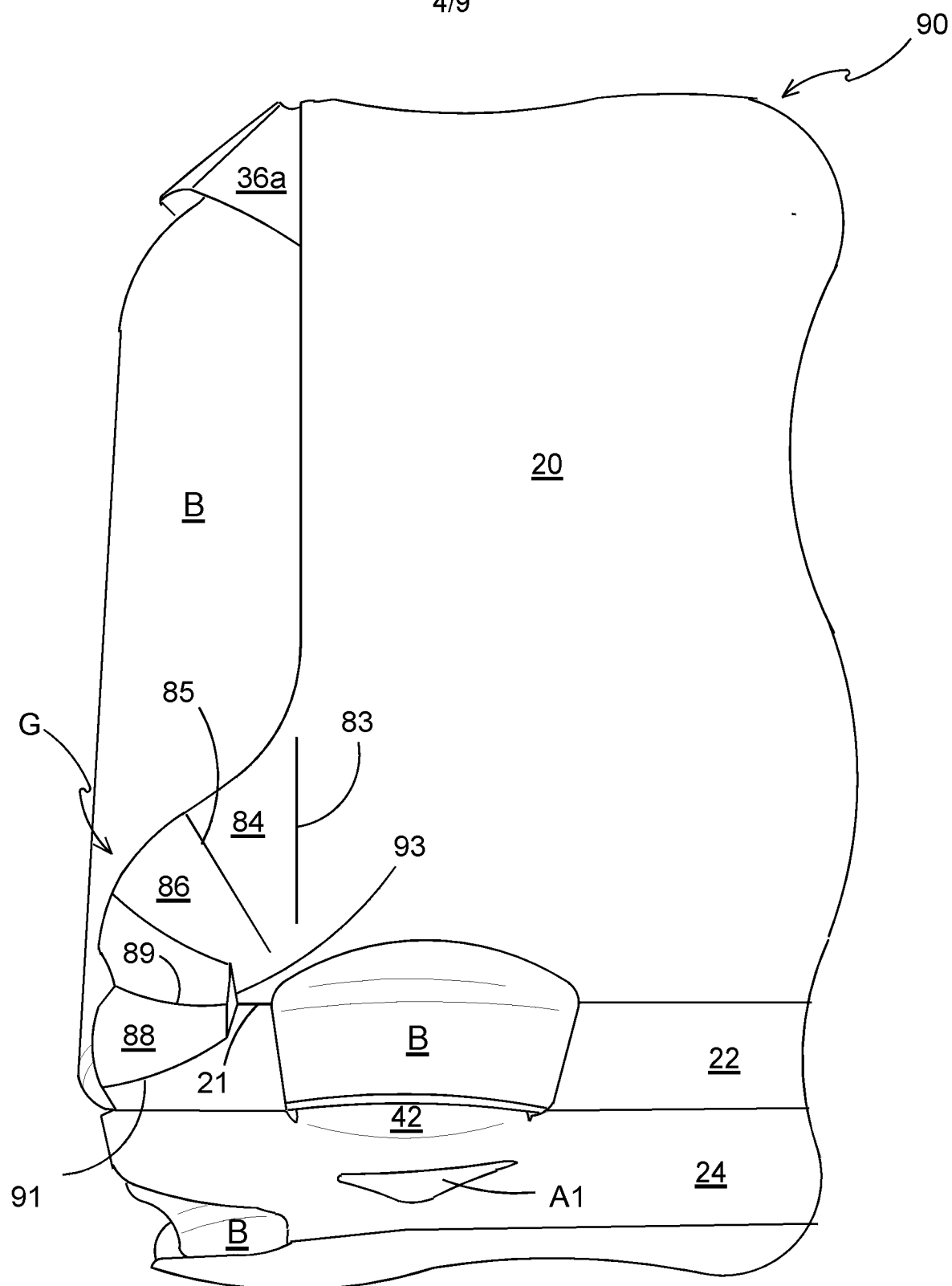


FIGURE 4

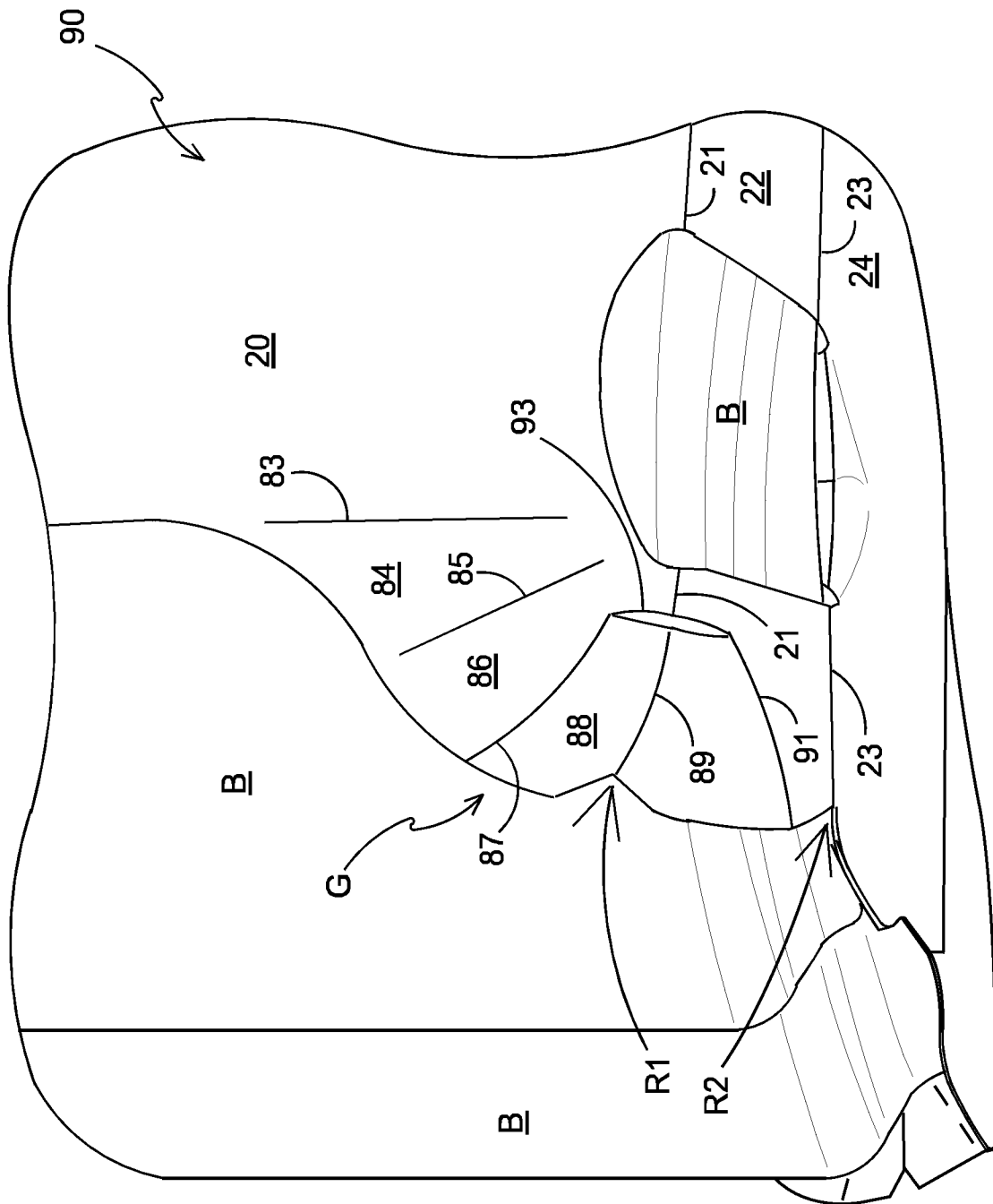


FIGURE 5

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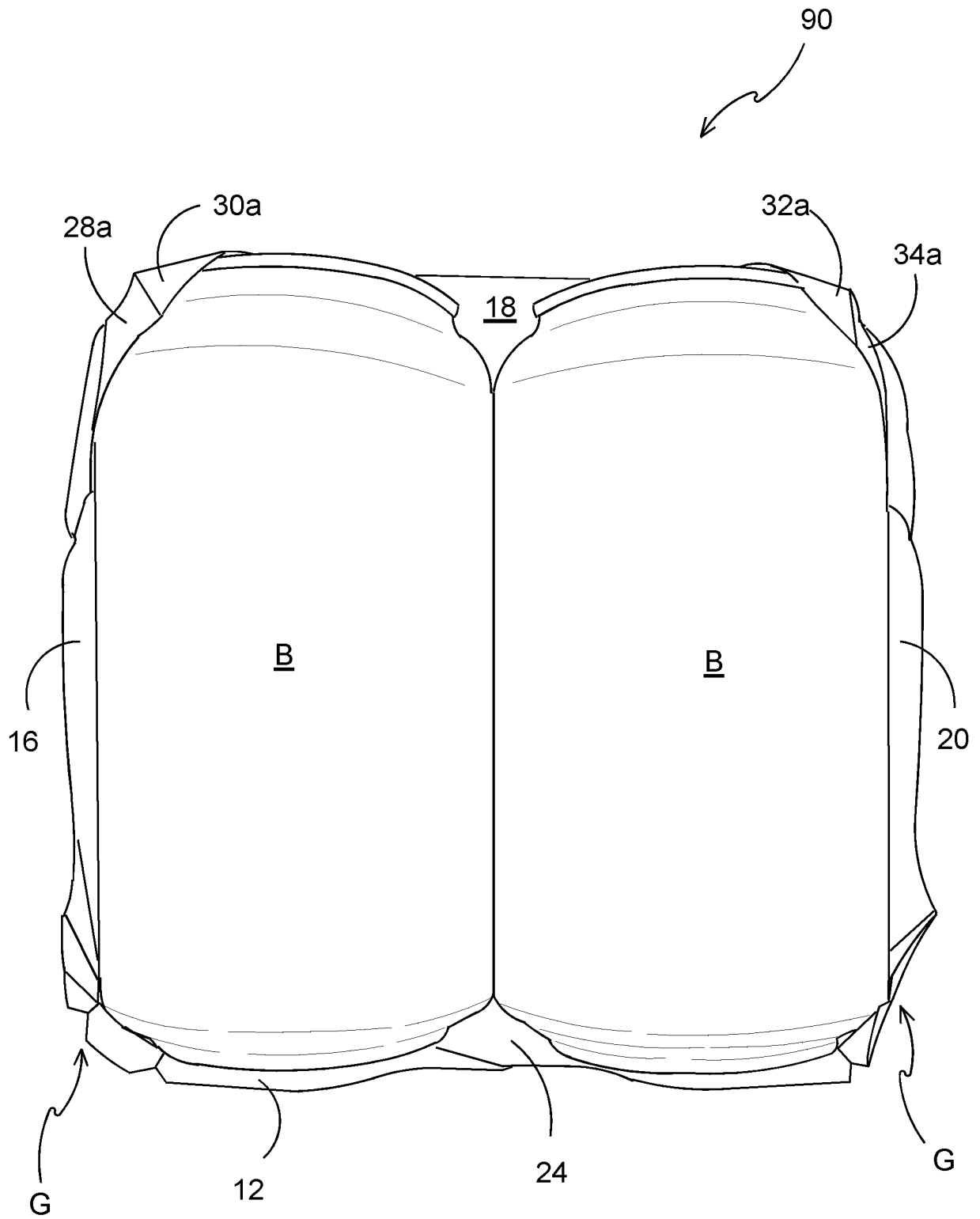


FIGURE 6

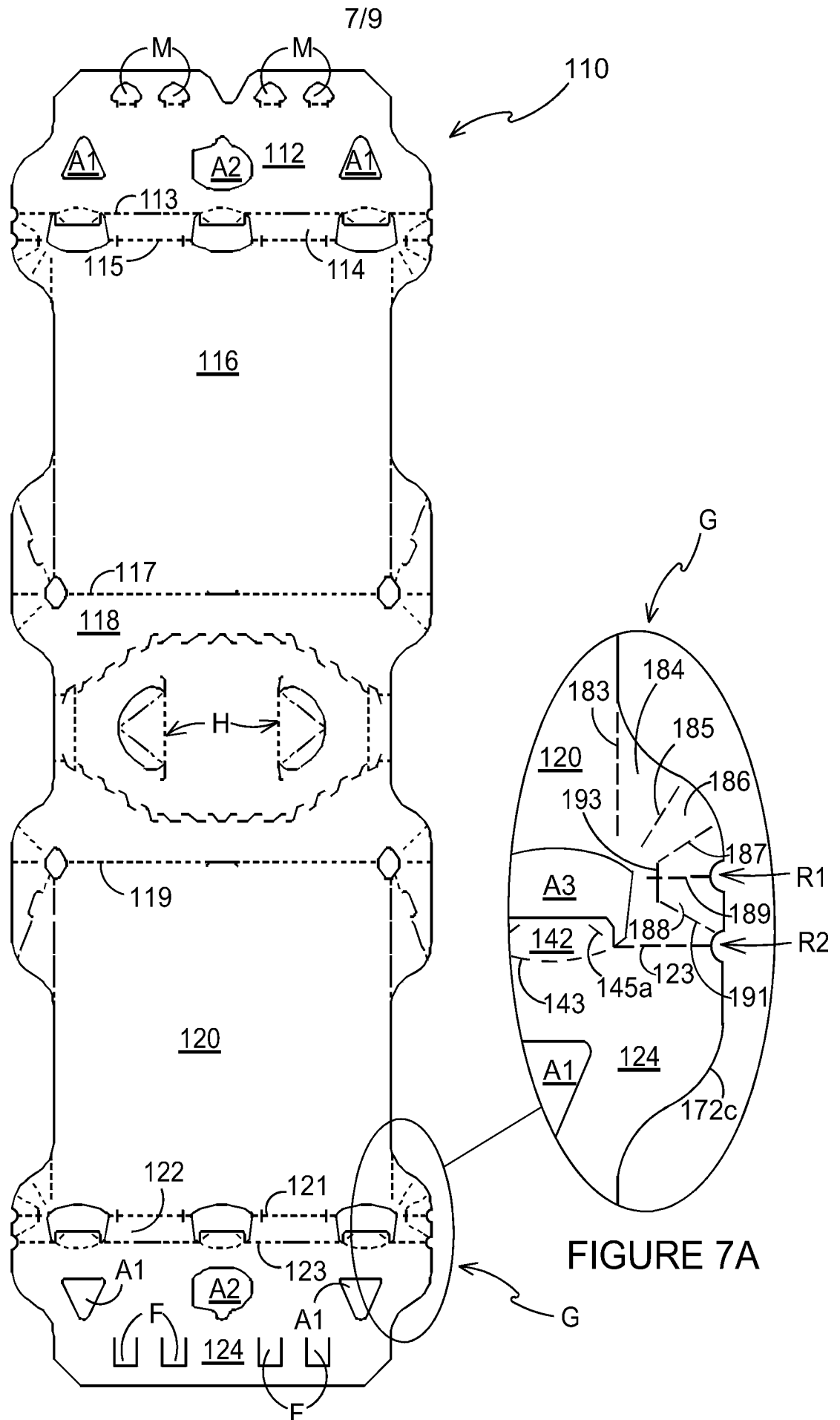


FIGURE 7

FIGURE 7A

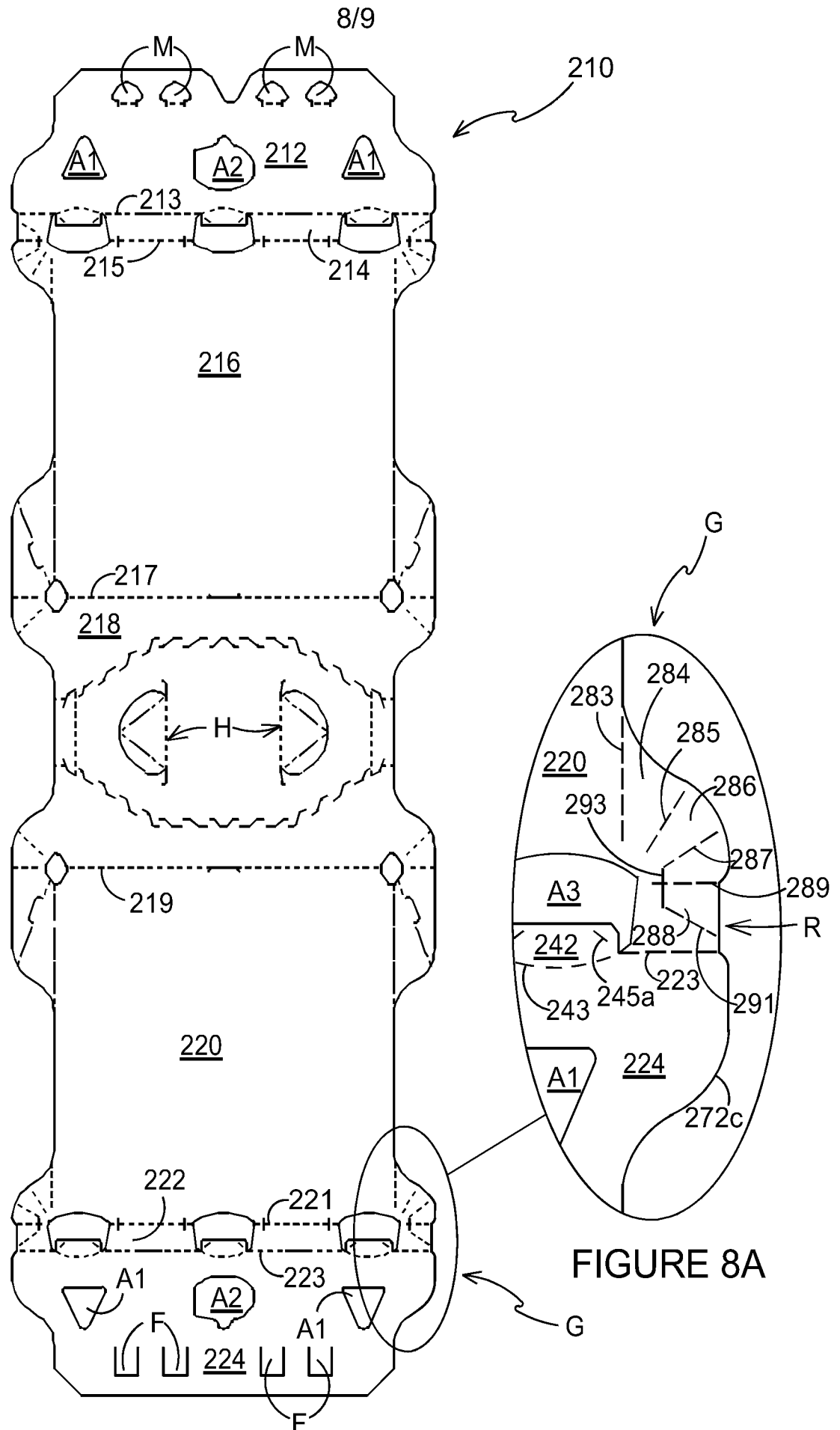


FIGURE 8

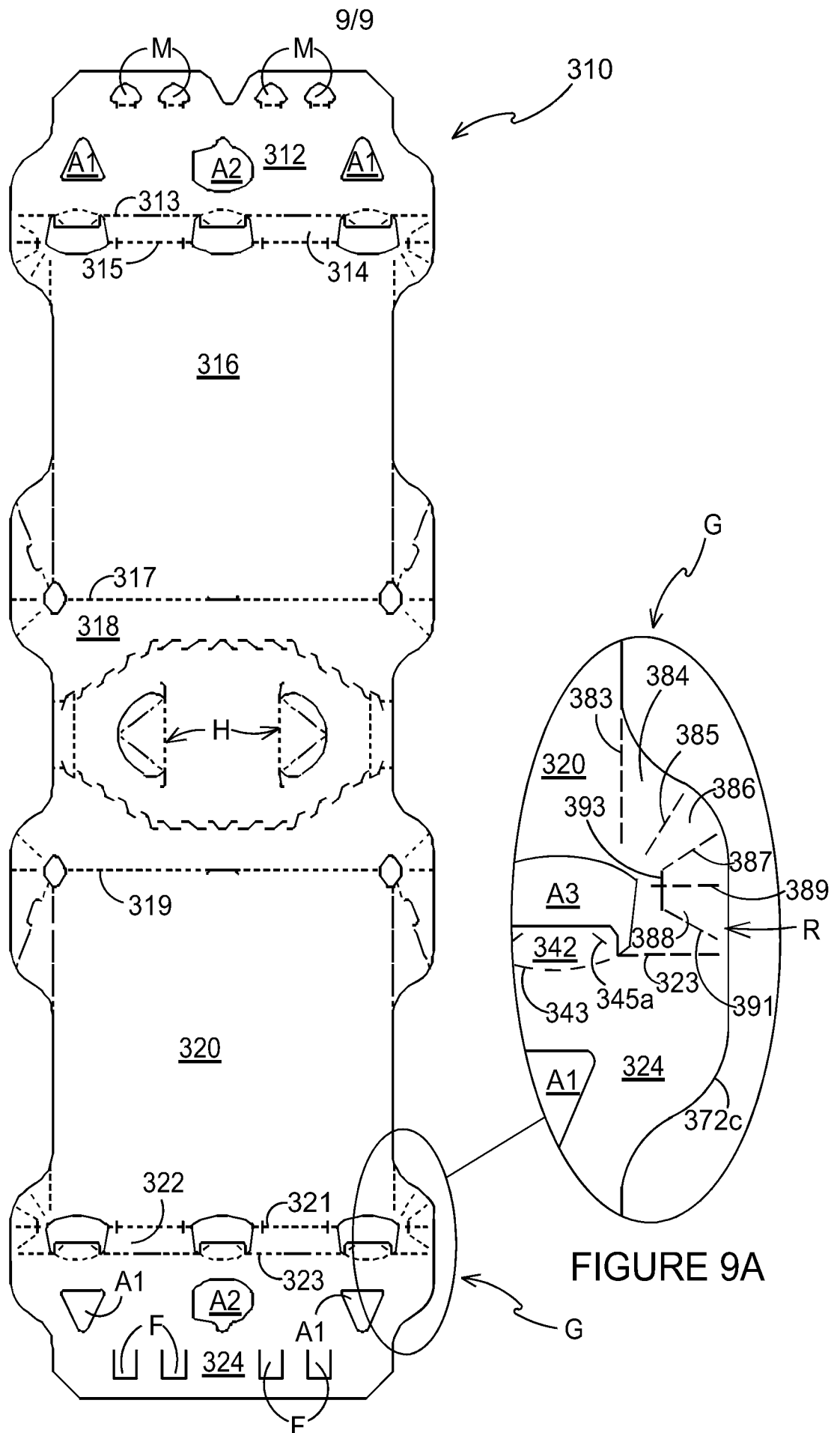


FIGURE 9

FIGURE 9A

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2018/059353

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D71/16
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 26 39 906 A1 (MEAD CORP) 16 March 1978 (1978-03-16) Figures 1, 3, 4 and related text in description. -----	1-3,14, 15
Y	US 5 597 071 A (SUTHERLAND ROBERT L [US]) 28 January 1997 (1997-01-28) the whole document -----	1-3,14, 15
A	US 2016/101917 A1 (SPIVEY SR RAYMOND R [US] ET AL) 14 April 2016 (2016-04-14) the whole document -----	1-15
A	US 5 558 213 A (SUTHERLAND ROBERT L [US]) 24 September 1996 (1996-09-24) the whole document ----- -/-	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

8 March 2019

Date of mailing of the international search report

19/03/2019

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Authorized officer

Pernice, Ciro

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/059353

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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