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(54) **CARTON AND BLANK THEREFOR**

(57) A carton for packaging one or more articles having a plurality of panels defining walls of a tubular structure, the carton comprising at least one end closure panel for at least partially closing an end of the tubular structure, wherein the plurality of panels includes a first panel forming a first wall of the tubular structure and a second panel forming a second, opposing, wall of the tubular structure, wherein the first panel comprises a first polygonal shape and the second panel comprise a second, different, polygonal shape.

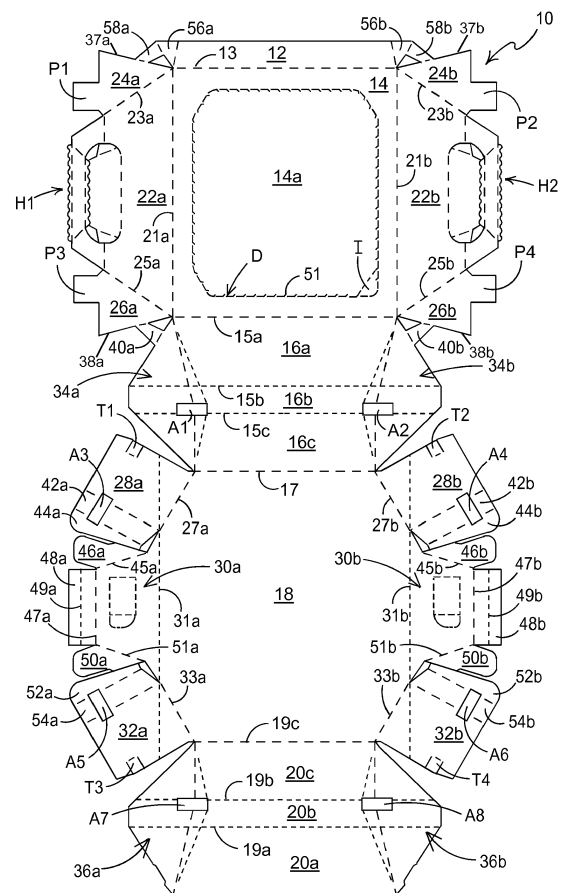


FIGURE 1

Description

TECHNICAL FIELD

[0001] The invention relates to a consumer package or carton which accommodates a group of articles such as bottles or cans. More specifically, but not exclusively, the group of articles are arranged in the rows such that a void is present at each end of the carton intermediate the outer article rows. The carton incorporates a carrying handle in the form of a 'wrap-around' band, preferably of a plastics material, which includes a portion which spans the void at each end of the carton and there provides a length of the band which is incorporated into the carton to provide a handle which may be readily grasped. The carton is configured so as to have a first polygonal shape at a first, upper, end of the carton and to have a second, different, polygonal shape at a second, lower, end of the carton.

BACKGROUND

[0002] In the field of packaging it is often required to provide consumers with a package comprising multiple primary product containers. Such multi-packs are desirable for shipping and distribution purposes and for the display of promotional information.

[0003] For cost and environmental considerations, it is preferable if such cartons are formed from as little material as possible and cause as little wastage as possible in the materials from which they are formed. Another consideration is the strength of the packaging and its suitability for holding and transporting large weights of articles.

[0004] In the packaging industry automatic, high-speed processing of the blanks that form the cartons, part-formed cartons and filled cartons is required. In designing packages, consideration needs to be given to automatic, high-speed processing and compatibility with existing automatic machinery.

[0005] It is desirable to reduce movement of the primary product container within the package. This may reduce or eliminate impact between adjacent articles. In this way, the likelihood of damage to the primary product or the primary product container is reduced.

[0006] It is also desirable to provide a carrying handle such that a user may transport the carton. Further, it is desirable to provide a dispensing feature to enable the user to easily withdraw an article from the carton.

[0007] The present invention seeks to overcome or at least mitigate the problems of the prior art by providing a carton having a brace or bumper feature for reducing movement of articles within the carton.

SUMMARY

[0008] An aspect of the invention provides a carton for packaging one or more articles having a plurality of panels defining walls of a tubular structure. The carton com-

prises at least one end closure panel for at least partially closing an end of the tubular structure. The plurality of panels includes a first panel forming a first wall of the tubular structure and a second panel forming a second, opposing, wall of the tubular structure. The first panel comprises a first polygonal shape and the second panel comprise a second, different, polygonal shape.

[0009] Optionally, the first polygonal shape is one shape selected from the group of shapes including a quadrilateral, a square and a rectangle.

[0010] Optionally, the second polygonal shape is one shape selected from the group of shapes including an octagon and a hexagon.

[0011] Optionally, the first polygonal shape comprises a first integer number of sides and the second polygonal shape comprises a second integer number of sides. The second integer number is greater than the first integer number.

[0012] Optionally, the first wall comprises at least one corner which overhangs so as to extend outwardly beyond an edge of the second wall.

[0013] Optionally, the carton comprises a plurality of end closure panels shaped and arranged to form an end wall substantially closing an open end of the tubular structure.

[0014] Optionally, the first wall is coupled to the second wall by a third wall. The third wall comprises first and second end edges, at least a portion of the first and second end edges being configured so as to be divergent with respect to each other.

[0015] Optionally, a package comprises a carton and encloses a group of uniform articles such as bottles or cans disposed in a plurality of rows. The articles are arranged or configured such that a void is formed in at least one side of said carton. The carton is encircled by a close fitting band disposed intermediate the first wall and the second wall. The band spans the void, and a portion of the carton spans the void, the portion of the carton and the portion of the band together providing a carrying handle.

[0016] A further aspect of the invention provides a blank for forming a carton. The blank comprises a plurality of panels for forming walls of a tubular structure. The blank comprises at least one end closure panel for at least partially closing an end of the tubular structure. The plurality of panels includes a first panel for forming a first wall of the tubular structure and a second panel for forming a second, opposing, wall of the tubular structure. The first panel comprises a first polygonal shape and the second panel comprise a second, different, polygonal shape.

[0017] Optionally, the plurality of panels are hinged one to the next in a linear series.

[0018] 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 con-

nection with one embodiment are applicable to all embodiments unless there is incompatibility of features.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Exemplary 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 of the invention;

Figure 2 is a plan view from above of a blank showing the position of the bases of a group of articles with respect to a base panel and the position of a top panel with respect to the base panel;

Figure 3 is a perspective view of a carton formed from the blank of Figure 1;

Figure 4 is a perspective view from above of the carton of Figure 3 showing a dispenser feature in a deployed condition;

Figure 5A is a plan view from below of a portion of the carton of Figure 3;

Figure 5B is a side view of a portion of the carton of Figure 3;

Figure 6 is a plan view from above of a blank for forming a carton according to a second embodiment of the invention;

Figure 7 is a plan view from above of a blank for forming a carton according to a third embodiment of the invention.

Figures 8 to 9B illustrate stages of construction of an end wall of a carton formed from the blank of Figure 1; and

Figure 10 is a perspective view of a carton formed from the blank of Figure 7.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0020] Detailed descriptions of specific embodiments of the packages, 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 lim-

iting, 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.

[0021] Referring to Figure 1, there is shown a plan view of a blank 10 that can be assembled into a carton 90 (see Figures 5 and 6) which is capable of accepting an input of primary products such as, but not limited to, bottles or cans, hereinafter referred to as articles A.

[0022] 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 for engaging, carrying, and/or dispensing articles, such as product containers. It is contemplated that the teachings of the invention can be applied to various product containers, which may or may not be tapered and/or cylindrical. Exemplary containers include bottles (for example metallic, glass or plastics bottles), cans (for example aluminium cans), tins, pouches, packets and the like.

[0023] The blank 10 is 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, Kraft board, corrugated board, cardboard, plastic, combinations thereof, and the like. It should be recognized that one or other numbers of blanks may be employed, where suitable, for example, to provide the carton 90 described in more detail below.

[0024] In the exemplary embodiment, the blank 10 is configured to form a carton 90 optionally of the fully enclosed type, for packaging an exemplary arrangement of exemplary articles A. In the illustrated exemplary embodiment, the carton 90 is configured to accept articles A in a chamber arrangement; and the articles are 12oz (355ml) glass bottles. The blank 10 can be alternatively configured to form a carrier for packaging other types, number and size of article and/or for packaging articles in a different arrangement or configuration.

[0025] Referring back to Figure 1, it can be seen that the blank 10 comprises a plurality of main panels, optionally arranged in a linear series, that form enclosing walls of the carton 90. Optionally, the series of main panels includes: a securing panel 12, a top panel 14, a first side panel 16, a base panel 18 and a second side wall 20. The securing panel 12, top panel 14, first side panel 16, base panel 18 and side wall 20 are hinged together in series by fold lines 13, 15a, 17 and 19c respectively.

[0026] The blank 10 may be an elongate carton blank 10 for forming a polygonal end loading type carton. The blank comprises a first side wall 16 constituted by upper 16a, intermediate 16b and lower 16c, side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 15b, 15c. The blank 10 comprises a second side wall 20 constituted by upper 20a, intermediate 20b and lower 20c side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 19b, 19a.

[0027] The base panel 18 takes the shape of a first

polygon and is optionally octagonal in shape. The top panel 14 takes the shape of a second, different, polygon and is optionally quadrilateral, square or rectangular in shape.

[0028] The base panel 18 is non-rectangular in shape and the top panel 14 is rectangular in shape.

[0029] A central bottom end closure panel 30A is hinged to a first end edge of base panel 18 by a hinged connection in the form of a transverse fold line 31A.

[0030] A pair of bottom corner end closure panels 28a and 32a is also hinged to the first end edge of base panel 18 by hinged connections taking the form of oblique corner fold lines 27a, 33a respectively, one on each side of the central bottom end closure panel 30a. The central bottom end closure panel 30A consists of an outwardly tapered center panel 60a and wing panels 46a and 50a hinged to opposed side edges of center panel 60a along convergent fold lines 45a and 51a, respectively.

[0031] Central bottom end closure panel 30a terminates in end flap 48a which is hinged to center panel 60a along fold line 47a, which lies parallel to fold line 31A. End flap 48A may comprise an optional fold line 49a which lies parallel to fold line 47A.

[0032] The bottom corner end closure panel 28a has a securing flap 44a hinged to intermediate corner panel 42a along fold line 43a. Securing flap 44a is adjacent to but detached from wing panel 46a. Intermediate corner panel 42a is hinged to bottom corner end closure panel 28a along fold line 41a which lies parallel to fold line 43a, and is formed with aperture A3 which, in use, receives a portion of an encircling band. Likewise, bottom corner end closure panel 32a has a securing flap 52a hinged to intermediate corner panel 54a along fold line 53a. Securing flap 52a is adjacent to but detached from wing panel 50a. Intermediate corner panel 54a is hinged to bottom corner end closure panel 32a along fold line 55a which lies parallel to fold line 53a, and is formed with aperture A5 which, in use, also receives a portion of the encircling band.

[0033] The bottom corner end closure panel 28a has a foldable tab T1 struck from a free side edge thereof. The tab T1 is hinged to the bottom corner end closure panel 28a by a fold line and is defined in part by a pair of cut lines; the cut lines are optionally parallel to each other.

[0034] The bottom corner end closure panel 32a has a foldable tab T3 struck from a free side edge thereof. The tab T3 is hinged to the bottom corner end closure panel 32a by a fold line and is defined in part by a pair of cut lines; the cut lines are optionally parallel to each other.

[0035] In alternative embodiments the tabs T1, T3 may be replaced with cutaways or recesses struck from the free side edges of bottom corner end closure panels 28a, 32a.

[0036] A second central bottom end closure panel 30b is hinged to a second end edge of base panel 18 by a hinged connection in the form of a transverse fold line

31b.

[0037] A second pair of bottom corner end closure panels 28b and 32b is also hinged to the second end edge of base panel 18 by hinged connections taking the form of oblique corner fold lines 27b, 33b respectively, one on each side of the central bottom end closure panel 30b. The central bottom end closure panel 30b consists of an outwardly tapered center panel 60b and wing panels 46b and 50b hinged to opposed side edges of center panel 60b along convergent fold lines 45b and 51b, respectively.

[0038] Second central bottom end closure panel 60b terminates in end flap 48b hinged to center panel 60b along fold line 47b which lies parallel to fold line 31b. End flap 48b may comprise an optional fold line 49b which lies parallel to fold line 47b.

[0039] The second bottom corner end closure panel 28b has a securing flap 44b hinged to intermediate corner panel 42b along fold line 43b. Securing flap 44b is adjacent to but detached from wing panel 46b. Intermediate corner panel 42b is hinged to bottom corner end closure panel 28b along fold line 41b which lies parallel to fold line 43b and is formed with aperture A4 which, in use, receives a portion of an encircling band. Likewise, bottom corner end closure panel 32b has a securing flap 52b hinged to intermediate corner panel 54b along fold line 53b, securing flap 52b being adjacent to but detached from wing panel 50b. Intermediate corner panel 54b is hinged to bottom corner end closure panel 32b along fold line 55b which lies parallel to fold line 53b, and is formed with aperture A6 which, in use, also receives a portion of the encircling band.

[0040] The bottom corner end closure panel 28b has a foldable tab T2 struck from a free side edge thereof. The tab T2 is hinged to the bottom corner end closure panel 28b by a fold line and is defined in part by a pair of cut lines; the cut lines are optionally parallel to each other.

[0041] The bottom corner end closure panel 32b has a foldable tab T4 struck from a free side edge thereof. The tab T4 is hinged to the bottom corner end closure panel 32b by a fold line and is defined in part by a pair of cut lines; the cut lines are optionally parallel to each other.

[0042] In alternative embodiments the tabs T2, T4 may be replaced with cutaways or recesses struck from the free side edges of bottom corner end closure panels 28b, 32b.

[0043] A central top end closure panel 22a is hinged to a first end edge of top panel 14 by a hinged connection taking the form of a transverse fold line 21a. The top end closure panel 22a comprises a main panel portion 64a hinged to top panel 14, and a central handle panel 66a hinged to the free end edge of main panel portion 64a along interrupted transverse fold line 63a. The main panel portion 64a is generally trapezoidal in shape. Fold line 63a is interrupted by a handle opening, which is substantially defined by handle flap 68a hinged to main panel

portion 22a along fold line 67a at one, upper, edge of the aperture. The handle flap 68a forms a cushioning flap when a user engages an upper edge of the aperture defined by the fold line 67a to employ the handle opening as a carrying handle.

[0044] The user may employ the central handle panel 66a as a carrying handle along with the encircling band B.

[0045] The handle flap 68a is flanked on each side by one of a pair of side tabs, hinged to panel 66a along crease lines, which are convergent towards the end of handle flap 68a.

[0046] A pair of top corner end closure panels 24a and 26a respectively is disposed between the end edge of top panel 14 and the central top end closure panel 22a one at each side edge of the main panel portion 64a. Top corner end closure panel 24a comprises outer panel 24a hinged to one side edge of central top end closure panel 22a along fold line 23a. Outer panel 24a is hinged to the securing panel 12 by means of a pair of gusset panels 56a, 58a. A first gusset panel 56a is hinged to securing panel 12 by a fold line; a second gusset panel 58a is hinged to the first gusset panel 56a by a fold line and to outer panel 24a by a fold line. Outer panel 24a carries at its free end edge a first projection or tab P1. Likewise, top corner end closure panel 26a comprises outer panel 26a hinged to one side edge of central top end closure panel 22a along fold line 25a. Outer panel 26a is hinged to side end closure panel 34a by means of a gusset panel 40a. Outer panel 26a carries at its free end edge a second projection or tab P3.

[0047] The central top end closure panel 22a is hingedly connected to the pair of top corner end closure panels 24a and 26a along wing flap fold lines 23a, 25a respectively. The pair of top corner end closure panels 24a and 26a form a pair of opposite wing flaps hinged to central top end closure panel 22a which is trapezoidal in shape. Each of the wing flaps 24a, 26a is secured to a respective one of the bottom corner end closure panels 32a and 28a. Each of the wing flaps has an end edge 37a, 38a which defines an acute angle with respect to the respective wing flap fold line 23a, 25a and wherein the end edge 37a, 38a of each wing flap and the respective wing flap fold line 23a, 25a are disposed such that they converge toward an adjacent end of a fold line 13, 15a between the top panel 14 and the respective one of the securing panel 12 and the first side panel 16.

[0048] The first projection P1 is shaped so as to extend between the apertures A1, A3 and the second projection P3 is shaped so as to extend between the apertures A5, A7. In this way, the degree of overlap between the outer panel 24a and the bottom corner end closure panel 32a, and between the outer panel 26a and the bottom corner end closure panel 28a is increased. The projections P1, P3 may be configured so as to extend below the encircling band B.

[0049] A second central top end closure panel 22b is hinged to a second end edge of top panel 14 by a hinged connection taking the form of a transverse fold line 21b.

The top end closure panel 22b comprises a main panel portion 64b hinged to top panel 14 and a central handle panel 66b hinged to the free end edge of main panel portion 64b along interrupted transverse fold line 63b.

5 The main panel portion 64b is generally trapezoidal in shape. Fold line 63b is interrupted by a handle opening which is substantially defined by handle flap 68b hinged to second central top end closure panel 22b along fold line 67b at one, upper, edge of the aperture. The handle flap 68b forms a cushioning flap when a user engages an upper edge of the aperture defined by the fold line 67b to employ the handle opening as a carrying handle.

10 **[0050]** The user may employ the central handle panel 66b as a carrying handle along with the encircling band B.

15 **[0051]** The handle flap 68b is flanked on each side by one of a pair of side tabs, hinged to panel 66b along crease lines, which are convergent towards the end of handle flap 68b.

[0052] A pair of top corner end closure panels 24b and 26b respectively is disposed between the end edge of top panel 14 and the central top end closure panel 22b one at each side edge of the main panel portion 64b. Top corner end closure panel 24b comprises outer panel 24b hinged to one side edge of main panel portion 64b along fold line 23b. Outer panel 24b is hinged to the securing panel 12 by means of a pair of gusset panels 56b, 58b. A first gusset panel 56b is hinged to securing panel 12 by a fold line, a second gusset panel 58b is hinged to the first gusset panel 56b by a fold line and to outer panel 24b by a fold line. Outer panel 24b carries at its free end edge a third projection or tab P2. Likewise, top corner end closure panel 26b comprises outer panel 26b hinged to one side edge of main panel portion 64b along fold line 25b. Outer panel 26b is hinged to side end closure panel 34b by means of a gusset panel 40b. Outer panel 26b carries at its free end edge a fourth projection or tab P4.

30 **[0053]** The second central top end closure panel 22b is hingedly connected to the pair of top corner end closure panels 24b and 26b along wing flap fold lines 23b, 25b respectively. The pair of top corner end closure panels 24b and 26b form a pair of opposite wing flaps hinged to second central top end closure panel 22b, which is trapezoidal in shape. Each of the wing flaps is secured to a respective one of the bottom corner end closure panels 28b and 32b. Each of the wing flaps has an end edge which defines an acute angle with respect to the respective wing flap fold line 23b, 25b and wherein the end edge of each wing flap and the respective wing flap fold line 23b, 25b are disposed such that they converge toward an adjacent end of a fold line 13, 15a between the top panel 14 and the respective one of the securing panel 12 and the first side panel 16.

45 **[0054]** The upper, intermediate and lower side wall panels 16a, 16b, 16c of the first side wall 16 carry a side end closure structure at each end thereof. A first side end closure structure is provided at a first end of the first side wall 16 and comprises side end closure panels 72a, 74a

and 76a hinged to upper, intermediate and lower side wall panels 16a, 16b, 16c respectively. Upper and intermediate side end closure panels 72a, 74a are hinged to upper and intermediate side wall panels 16a, 16b respectively by a pair of fold lines 71a, 75a. The fold line 71a is convergently arranged with the fold line 75a. The fold lines 71a, 75a converge so as to intersect each other at a first corner of the top panel 14.

[0055] Lower side end closure panel 76a is hingedly connected to the lower side wall panel 16c by a second pair of fold lines 73a, 77a. The fold line 73a is convergently arranged with the fold line 77a. The fold lines 73a, 77a converge so as to intersect each other at a first corner of the base panel 18.

[0056] An aperture A1 is struck from the intermediate side wall panel 16b and from the intermediate side end closure panel 74a. The fold lines 71a, 73a, 75a, 77a each terminate at the aperture A1. The fold line 71a and fold line 73a are arranged to converge towards the aperture A1. The fold line 75a and fold line 77a are arranged to converge towards the aperture A1.

[0057] A second side end closure structure is provided at second end of the first side wall 16 and comprises side end closure panels 72b, 74b and 76b hinged to upper, intermediate and lower side wall panels 16a, 16b, 16c respectively. Upper and intermediate side end closure panels 72b, 74b are hinged to upper and intermediate side wall panels 16a, 16b respectively by a pair of fold lines 71b, 75b. The fold line 71b is convergently arranged with the fold line 75b. The fold lines 71b, 75b converge so as to intersect each other at a second corner of the top panel 14; the second corner is adjacent the first corner of the top panel 14.

[0058] Lower side end closure panel 76b is hingedly connected to the lower side wall panel 16c by a second pair of fold lines 73b, 77b. The fold line 73b is convergently arranged with the fold line 77b. The fold lines 73b, 77b converge so as to intersect each other at a second corner of the base panel 18; the second corner is adjacent the first corner of the base panel 18.

[0059] A second aperture A2 is struck from the intermediate side wall panel 16b and from the intermediate side end closure panel 74b. The fold lines 71b, 73b, 75b, 77b each terminate at the second aperture A2. The fold line 71b and fold line 73b are arranged to converge towards the second aperture A2. The fold line 75b and fold line 77b are arranged to converge towards the second aperture A2.

[0060] The fold line 71a is divergently arranged with respect to the fold line 71b. The fold lines 71a, 71b diverge towards the top panel 14.

[0061] The fold line 75a is divergently arranged with respect to the fold line 75b. The fold lines 75a, 75b diverge towards the top panel 14.

[0062] The fold line 73a is divergently arranged with respect to the fold line 73b. The fold lines 73a, 73b diverge towards the base panel 18.

[0063] The fold line 77a is substantially parallel with

respect to the fold line 77b. The fold lines 77a, 77b are substantially perpendicular to the fold line 17 between the base panel 18 and the lower side wall panel 16c.

[0064] Lower end closure panel 76a is hinged to intermediate end closure panel 74a along an extension of fold line 15c which is interrupted by an aperture A1 formed partially in lower and intermediate side wall panels 76a, 74a and partially in lower and intermediate side end closure panels 16c, 16b. Upper end closure panel 72a is hinged to intermediate end closure panel 74a along an extension of fold line 15b.

[0065] Similarly, the upper, intermediate and lower side wall panels 20a, 20b, 20c of the second side wall 20 also carry a side end closure structure at each end thereof.

[0066] A first side end closure structure comprising side end closure panels 86a, 84a, 82a is hinged to upper, intermediate and lower side wall panels 20c, 20b, 20a along transverse fold lines 19b and 19a, respectively.

[0067] A first side end closure structure is provided at a first end of the second side wall 20 and comprises side end closure panels 82a, 84a and 86a hinged to upper, intermediate and lower side wall panels 20a, 20b, 20c respectively. Upper and intermediate side end closure panels 82a, 84a are hinged to upper and intermediate side wall panels 20a, 20b respectively by a pair of fold lines 87a, 83a. The fold line 87a is convergently arranged with the fold line 83a. The fold lines 87a, 83a converge so as to intersect each other proximate a third corner of the top panel 14 in an assembled carton.

[0068] Lower side end closure panel 86a is hingedly connected to the lower side wall panel 20c by a second pair of fold lines 85a, 81a. The fold line 85a is convergently arranged with the fold line 81a. The fold lines 85a, 81a converge so as to intersect each other at a third corner of the base panel 18.

[0069] A third aperture A7 is struck from the intermediate side wall panel 20b and from the intermediate side end closure panel 84a. The fold lines 81a, 83a, 85a, 87a each terminate at the third aperture A7. The fold line 81a and fold line 83a are arranged to converge towards the third aperture A7. The fold line 85a and fold line 87a are arranged to converge towards the third aperture A7.

[0070] A second side end closure structure is provided at second end of the second side wall 20 and comprises side end closure panels 82b, 84b and 86b hinged to upper, intermediate and lower side wall panels 20a, 20b, 20c respectively. Upper and intermediate side end closure panels 82b, 84b are hinged to upper and intermediate side wall panels 20a, 20b respectively by a pair of fold lines 83b, 87b. The fold line 83b is convergently arranged with the fold line 87b. The fold lines 83b, 87b converge so as to intersect each other proximate a fourth corner of the top panel 14 in a set up carton; the fourth corner is adjacent the third corner of the top panel 14.

[0071] Lower side end closure panel 86b is hingedly connected to the lower side wall panel 20c by a second pair of fold lines 81b, 85b. The fold line 81b is conver-

gently arranged with the fold line 85b. The fold lines 81b, 85b converge so as to intersect each other at a second corner of the base panel 18; the second corner is adjacent the first corner of the base panel 18.

[0072] A fourth aperture A8 is struck from the intermediate side wall panel 20b and from the intermediate side end closure panel 84b. The fold lines 81b, 83b, 85b, 87b each terminate at the fourth aperture A8. The fold line 81b and fold line 83b are arranged to converge towards the fourth aperture A8. The fold line 85b and fold line 87b are arranged to converge towards the fourth aperture A8.

[0073] The fold line 81a is divergently arranged with respect to the fold line 81b. The fold lines 81a, 81b diverge towards the base panel 18.

[0074] The fold line 83a is divergently arranged with respect to the fold line 83b. The fold lines 83a, 83b diverge towards the base panel 18.

[0075] The fold line 85A is substantially parallel with respect to the fold line 85B. The fold lines 85A, 85B are substantially perpendicular to the fold line 19c between the base panel 18 and the second lower side wall panel 20c.

[0076] Lower end closure panel 86b is hinged to intermediate end closure panel 84b along an extension of fold line 19c which is interrupted by the aperture A8 formed partially in lower and intermediate side wall panels 86b, 84b and partially in lower and intermediate side end closure panels 20c, 20b. Upper end closure panel 82b is hinged to intermediate end closure panel 84b along an extension of fold line 19b.

[0077] The blank 10 in Figure 1 is shown with an inside surface (sometimes with bleached paperboard, referred to as the "brown side") facing upwards.

[0078] The blank is pre-formed in a flat, folded condition from which it can be erected into a tubular structure, loaded with products and the ends of the tubular structure then closed as described below.

[0079] The blank 10 is folded about transverse fold line 15b so that the top panel 14 is brought into superposed relationship with base panel 18.

Glue G or other adhesive treatment is applied to the securing panel 12. In alternative embodiments glue or other adhesive treatment may be applied to a corresponding region of the second upper side wall panel 20a.

[0080] Second upper side wall panel 20A is folded about transverse fold line 19a so that it overlies the securing panel 12.

[0081] The second upper side wall panel 20a is secured to the securing panel 12.

[0082] The blank 10 thus pre-formed may then be supplied to, for example a canning or bottling plant for erecting, loading and finally closing to form the completed carton 90.

[0083] Once the carton has been erected into its tubular form it can be filled with cans or bottles in the configurations shown in Figure 2, for example, in which the bottles comprising the center rows are disposed intermediate a pair of adjacent bottles in each of the next adjacent

outer rows, thereby creating a central recess at each end of the carton. Each of the ends of the carton is then closed in the following manner.

[0084] The top corner end closure panel 24a is folded downwardly relative to top panel 14 about fold line 23a, the initial folding action of which may be instigated by the displacing inwardly of the tubular structure each of the gusset panels 56a, 58a and 40a.

[0085] This folding action is accompanied by inward folding of the side end panels 72a, 74a and 76a and also side end panels 82a, 84a and 86a across the open end of the tubular structure relative to their associated side wall panels 16, 20.

[0086] At the completion of this folding step, the outer panel 24a partially overlies the upper side end panel 82a and likewise outer panel 26a overlies upper side end panel 72a.

[0087] Glue or other adhesive treatment may be applied to the projections P1, P3 or to corresponding regions of the bottom corner end closure panels 28A, 32A.

[0088] The central handle panel 66a is then displaced upwardly into an upright position so that it stands proud of the top end closure panel 22a.

[0089] An application of glue or other adhesive treatment is then made to the lower end closure panels 76a, 86a or to corresponding regions of the bottom corner end closure panels 28a, 32a.

[0090] Both the bottom end closure panels 28a and 32a are then folded upwardly and adhered to lower side end closure panels 76a, 86a respectively. The bottom end closure panels 28a and 32a may also be adhered to outer panels 24a, 26a respectively.

[0091] Glue or other adhesive treatment is applied to the wing panels 46a, 50a.

[0092] Central bottom end closure panel 30a, including wing panels 46a, 50a, is then folded upwardly about transverse fold line 31a and the tapered center panel 60a is displaced inwardly into the central recess defined in the article group, whereby the wing panels 46a and 50a are flared outwardly of the recess and secured to panels 44a and 52a respectively.

[0093] With the end closure panels thus secured, the apertures A1, A3, A5, A7 and tabs T1, T3 are aligned, horizontally, about the end of the carton 90 and the encircling band is then applied to, and optionally heat shrunk into position around, the carton 90.

[0094] The completed carton 90 is shown in Figure 3.

[0095] Referring now to Figure 4 there is shown an upper portion of the carton 90. A dispensing feature D has been deployed to create an opening in the top panel 14 by removal of a top panel portion 14a. The top panel portion 14a is frangibly connected to the remainder top panel 14.

[0096] It can be seen by reference to Figure 2 that the top panel 14 comprises a longitudinal linear dimension, defined between fold lines 21a, 21b, and the base panel 18 comprises a longitudinal linear dimension which is defined between fold lines 31a, 31b. The longitudinal lin-

ear dimension of the top panel 14 is smaller than the longitudinal linear dimension of the base panel 18.

[0097] The top panel 14 comprises a transverse linear dimension, defined between fold lines 13, 15a, and the base panel 18 comprises a transverse linear dimension which is defined between fold lines 17, 19c. The transverse linear dimension of the top panel 14 is smaller than the transverse linear dimension of the base panel 18.

[0098] The first and second side panels 16, 20 which form first and second side walls of the carton 90 are configured and arranged such that the first and second side walls 16, 20 of the carton 90 are tapered towards each other as they approach the top panel 14 of the carton 90. In this way the carton 90 comprises a 'gable top'. The end closure panels which form end walls of the carton may be similarly arranged such that first and second end walls of the carton 90 are tapered towards each other as they approach the top panel 14.

[0099] However, due the fact that the base panel 18 comprises beveled corners, so as to be octagonal in shape, the corners of the top panel 14 overhang or project beyond the beveled corners of the base panel 18, as can be seen in Figures 5A, 5B.

[0100] The first upper side wall panel 16a comprises end edges defined by the fold lines 75a, 75b and is configured such that the longitudinal length of the first upper side panel 16a increases as it approaches the top panel 14. The second upper side panel 16A is similarly arranged.

[0101] This change in shape between the base panel 18 and the top panel 14 provides that the lower regions of the carton 90 form a close fit about the group of articles A whilst at the same time allowing the dispensing feature in the top panel 14 to be optimized to increase accessibility to the articles disposed about the periphery of the group of articles A. The location of the bases of the articles A relative to the base panel 18 and the top panel 14 is shown in Figure 2. In the illustrated embodiment the articles A each comprises tapered upper portions such that the footprint of the articles, and hence the article group, is smaller proximate the top panel 14 than the base panel 18.

[0102] Referring now to Figures 6 to 10, there is shown additional embodiments of the present disclosure. In the second and third illustrated embodiments like numerals have, where possible, been used to denote like parts, albeit with the addition of the prefix "100", "200" to indicate that these features belong to the second and third embodiments respectively. The additional embodiments share many common features with the first embodiment and therefore only the differences from the embodiment illustrated in Figures 1 to 5B will be described in detail.

[0103] Referring to Figure 6, there is shown a blank 110 according to a second embodiment comprising a plurality of main panels, optionally arranged in a linear series, that form enclosing walls of a carton. Optionally, the series of main panels includes: a securing panel 112, a top panel 114, a first side panel 116, a base panel 118

and a second side wall 120. The securing panel 112, top panel 114, first side panel 116, base panel 118 and second side panel 120 are hinged together in series by fold lines 113, 115a, 117 and 119c respectively.

[0104] The blank 110 comprises a first side wall 116 constituted by upper 116a, intermediate 116b and lower 116c, side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 115B, 115C. The blank comprises a second side wall 120 constituted in part by upper 120a, intermediate 120b and lower 120c side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 119b, 119a.

[0105] The upper, intermediate and lower side wall panels 116a, 116b, 116c of the first side wall 116 carry a side end closure structure at each end thereof. A first side end closure structure is provided at first end of the first side wall 116 and comprises side end closure panels 172A, 174A and 176A hinged to upper, intermediate and lower side wall panels 116a, 116b, 116c respectively. Upper and intermediate side end closure panels 172A, 174A are hinged to upper and intermediate side wall panels 116a, 116b respectively by a fold line 175a. The fold line 71A of the embodiment of Figure 1 has been omitted.

[0106] Lower side end closure panel 176A is hingedly connected to the lower side wall panel 116c by a second fold line 177a. The fold line 73a of the embodiment of Figure 1 has been omitted.

[0107] A second side end closure structure is provided at a second end of the first side wall 116 and comprises side end closure panels 172b, 174b and 176b hinged to upper, intermediate and lower side wall panels 116a, 116b, 116c respectively. Upper and intermediate side end closure panels 172b, 174b are hinged to upper and intermediate side wall panels 116a, 116b respectively by a fold line 175b. The fold line 71b of the embodiment of the embodiment of Figure 1 has been omitted.

Lower side end closure panel 176B is hingedly connected to the lower side wall panel 116c by a second fold line 177b. The fold line 73b of the embodiment of Figure 1 has been omitted.

[0108] The fold line 175a is divergently arranged with respect to the fold line 175b. The fold lines 175a, 175b diverge towards the top panel 114.

[0109] The fold line 177a is substantially parallel with respect to the fold line 177b. The fold lines 177a, 177b are substantially perpendicular to the fold line 117 between the base panel 118 and the lower side wall panel 116c.

[0110] The blank 110 comprises a cutaway C1; cutaway C1 is struck in part from a free end edge of each of the lower and intermediate side end closure panels 174a, 176a. The blank 110 comprises a second cutaway C2; second cutaway C2 is struck in part from a free end edge of each of the lower and intermediate side end closure panels 174b, 176b at the second end of the first side wall 116.

[0111] Similarly, the upper, intermediate and lower

side wall panels 120a, 120b, 120c of the second side wall 120 also carry a side end closure structure at each end thereof.

[0112] In the blank 110 of Figure 6 the outer panels 24a, 26a of the top corner end closure panels 24a and 26a have been omitted. The main panel portion 122a of the central top end closure panel 122A is hingedly connected to the securing panel 112 by means of a series of four of gusset panels 156a, 158a, 192a, 194a. A first gusset panel 156a is hinged to securing panel 112 by a fold line, a second gusset panel 158a is hinged to the first gusset panel 156a by a fold line, a third gusset panel 192a is hinged to the second gusset panel 158a by a fold line and a fourth gusset panel 194a is hinged to the third gusset panel 192a by a fold line; the fourth gusset panel 194a is hinged to the main panel portion 122a by a further fold line.

[0113] The main panel portion 164a of the central top end closure panel 122a is hingedly connected to the upper side end closure panel 172a by means of a series of three gusset panels 195a, 196a, 197a. A first gusset panel 195a is hinged to main panel portion 164a by a fold line, a second gusset panel 196a is hinged to the first gusset panel 195a by a fold line and a third gusset panel 197a is hinged to the second gusset panel 196a by a fold line; the third gusset panel 197a is hinged to the upper side end closure panel 172a by a further fold line.

[0114] The blank 110 comprises first and second central bottom end closure panel 130a, 130b each of which terminates in an end flap 148a, 148b hinged to the respective center panel by respective ones of fold line 147a, 147b. Fold lines 49a, 49b present in the embodiment of Figure 1 have been omitted.

[0115] Referring to Figure 7, there is shown a blank 210 according to a third embodiment comprising a plurality of main panels, optionally arranged in a linear series, that form enclosing walls of a carton. Optionally, the series of main panels includes: a securing panel 212, a top panel 214, a first side panel 216, a base panel 218 and a second side panel 220. The securing panel 212, top panel 214, first side panel 216, base panel 218 and second side panel 220 are hinged together in series by fold lines 213, 215a, 217 and 219c respectively.

[0116] The blank 210 comprises a first side wall 216 constituted by upper 216a, intermediate 216b and lower 216c, side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 215b, 215c. The blank 210 comprises a second side wall 220 constituted in part by upper 220a, intermediate 220b and lower 220c side wall panels hinged one to the next by hinged connections taking the form of longitudinal fold lines 219b, 219a.

[0117] In the blank 210 of Figure 7 the gusset panels 56a, 58a, 56b, 58b of the embodiment of Figure 1 have been omitted. The securing panel 212 is free of connection to the outer panels 224a, 224b. The gusset panels 40a, 40b of the embodiment of Figure 1 have also been omitted; outer panels 226a, 226b are free of connection

to the respective ones of the side end closure panels 234a, 234b.

[0118] In this embodiment the open end of the tubular structure may be closed by a folding method as shown in Figures 8 to 10.

[0119] The blank, when in a pre-formed, flat folded condition, is erected into a tubular structure, loaded with products and the ends of the tubular structure then closed as described below.

[0120] The side end closure panels 234a, 234a, incorporating the side end panels 272a, 274a, 276a and also side end panels 282a, 284a, 286a respectively, are folded across the open end of the tubular structure relative to their associated side wall panels, as indicated by direction arrows D1, D2 in Figure 8.

[0121] The top end closure panel 222a is folded downwardly relative to top panel 214 about fold line 221a, as indicated by direction arrow D5 in Figure 9A.

[0122] During this folding action, the outer panels 224a, 226a are folded downwardly. At the completion of this folding step, the outer panels 224a, 226a partially overlie a respective one of the upper side end closure panels 272a, 282a.

[0123] The central handle panel 266a is folded upwardly with respect to main panel portion 264a along interrupted transverse fold line 263a as indicated by direction arrow D6 in Figure 9B.

[0124] Glue or other adhesive treatment is applied to the bottom corner end closure panels 228a and 232a or to corresponding regions of the lower side end panels 276a, 286a and the projections P1, P3.

[0125] The bottom corner end closure panels 228a and 232a are folded upwardly relative to the base panel 218, as shown in Figure 9B. The bottom corner end closure panels 228a and 232a are secured to the respective ones of the lower side end panels 276a, 286a and to the projections P1, P3.

[0126] Glue or other adhesive treatment is applied to the wing panels 246a, 250a or to corresponding regions of the securing flaps 252a, 252b as shown in Figure 9B.

[0127] The central bottom end closure panel 230a is folded upwardly with respect to base panel 218 along fold line 231a.

[0128] The tapered center panel 260a is displaced inwardly into a central recess defined by the endmost articles A, whereby the wing panels 246a, 250a are flared outwardly of the recess and secured to securing flaps 252a and 252b respectively.

[0129] The central handle panel 266a is folded downwardly with respect to main panel portion 264a along interrupted transverse fold line 263a.

[0130] With the end closure panels thus secured, an encircling band is then applied to, and optionally heat shrunk into position around, the carton 290, as shown in Figure 10.

[0131] Of course, the opposite end of the carton is closed in a like manner. The apertured portions of the end closure panels provide locations for receiving por-

tions of a tight-fitting encircling band B applied subsequently to the carton about its midriff.

[0132] In some embodiments the handle panels 266a, 266b may be folded downwardly, after application of the encircling band B, so that they extend across the associated end void and the band. The handle panels 266a, 266b may be secured to the band B so that together they provide a handle to facilitate transport of the package. The recessed end construction allows the handle portion of the strap to be grasped more readily than otherwise would be the case in the absence of the void.

[0133] The present disclosure provides a carton for packaging one or more articles having a plurality of panels defining the walls of a chamber for receiving at least one article. The plurality of panels may be arranged as a linear series hingedly connected one to the next. The carton comprises a plurality of end flaps for closing the carton. The carton comprises a first or top panel having a first polygonal shape and a second or base panel having second, different polygonal shape. The second or base panel opposes the first or top panel. The first shape may be a quadrilateral, square or rectangle. The second shape may be octagonal, hexagonal or other shape. The second shape may comprise more sides than the first shape.

[0134] The first or top panel may comprise corner portions which overhang or extend outward over or beyond the second or base panel.

[0135] Embodiments of the present disclosure provide a carton having a plurality of panels defining walls of a tubular structure. The tubular structure comprises a first wall and a second opposing wall. Optionally, the first wall is substantially rectangular in shape and the second wall is non-rectangular, optionally octagonal in shape. The carton comprises an end wall which at least partially closes an open end of the tubular structure. Optionally, both open end is closed at least in part by an end wall. The end wall is formed from a first set of closure flaps connected to the first wall and from a second set of closure flaps connected to the second wall respectively. The first set of closure flaps includes a generally trapezoidal end flap hingedly connected to the first wall and a pair of opposite wing flaps hingedly connected to the trapezoidal flap along wing flap fold lines respectively. Each of the wing flaps is secured to at least one of the second set of end closure flaps. Each of the wing flaps has an end edge which defines an acute angle with respect to the respective wing flap fold line. The end edge of each wing flap and the respective wing flap fold line are arranged such that they converge toward an adjacent end of a fold line between the first wall and a side wall which extends between the first wall and the second wall. The first set of closure flaps includes each of the pair of top corner end closure panels 24a, 26a; 124a, 126a, 224a, 226a and the central top end closure panel 22a; 122a; 222a. The second set of closure flaps includes each of the pair of bottom corner end closure panels 28a, 32a; 128a, 132a; 228a, 232a; and the central bottom end closure panel

30a; 130a; 230a.

[0136] 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.

[0137] It will be recognized 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.

[0138] 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.

[0139] As used herein, the terms "severance line", "weakened line", and "frangible line" refer to all manner of lines that facilitate separating portions of the substrate from one another or that indicate optimal separation locations. Severance lines may be frangible or otherwise weakened lines, tear lines, cut lines, or slits.

[0140] 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 cut line, a line of aligned slits, a line of scores and any combination of the aforesaid options.

[0141] 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 cut line, an interrupted cut line, 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.

[0142] 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 second aperture.

Claims

1. A carton for packaging one or more articles having a plurality of panels defining walls of a tubular structure, the carton comprising at least one end closure panel for at least partially closing an end of the tubular structure, wherein the plurality of panels includes a first panel forming a first wall of the tubular structure and a second panel forming a second, opposing, wall of the tubular structure, wherein the first panel comprises a first polygonal shape and the second panel comprise a second, different, polygonal shape.
2. A carton according to claim 1 wherein the first polygonal shape is one shape selected from the group of shapes including; a quadrilateral, a square and a rectangle.
3. A carton according to claim 1 wherein the second polygonal shape is one shape selected from the group of shapes including; an octagon and a hexagon.
4. A carton according to claim 1 wherein the first polygonal shape comprises a first integer number of sides and the second polygonal shape comprises a second integer number of sides and wherein the second integer number is greater than the first integer number.
5. A carton according to claim 1 wherein the first wall comprises at least one corner which overhangs so as to extend outwardly beyond an edge of the second wall.
6. A carton according to claim 1 wherein the carton comprises a plurality of end closure panels shaped and arranged to form an end wall substantially closing an open end of the tubular structure.
7. A carton according to claim 1 wherein the first wall is coupled to the second wall by a third wall and wherein the third wall comprises first and second end edges, at least a portion of the first and second end edges being configured so as to be divergent with respect to each other.
8. A package comprising a carton according to claim 1 and enclosing a group of uniform articles such as bottles or cans disposed in a plurality of rows and arranged or configured such that a void is formed in at least one side of said carton wherein the carton is encircled by a close fitting band disposed intermediate the first wall and the second wall and wherein the band spans the void, and a portion of the carton spans the void, the portion of the carton and the portion of the band together providing a carrying handle.
9. A blank for forming a carton, the blank comprising a plurality of panels for forming walls of a tubular structure; the blank comprising at least one end closure panel for at least partially closing an end of the tubular structure, wherein the plurality of panels includes a first panel for forming a first wall of the tubular structure and a second panel for forming a second, opposing, wall of the tubular structure, wherein the first panel comprises a first polygonal shape and the second panel comprise a second, different, polygonal shape.
10. A blank according to claim 9 wherein the plurality of panels are hinged one to the next in a linear series.
11. A carton for packaging one or more articles having a plurality of panels defining walls of a tubular structure having a rectangular wall and an opposing non-rectangular wall, the carton comprising an end closure wall for closing at least one of the opposed ends of the tubular structure at least in part, wherein the end closure wall comprises first and second sets of closure flaps connected to the rectangular and non-rectangular walls respectively, the first set including a generally trapezoidal end flap hingedly connected to the rectangular wall and a pair of opposite wing flaps hingedly connected to the trapezoidal flap along wing flap fold lines respectively, wherein each of the wing flaps is secured to at least one of the second set of end closure flaps, wherein each of the wing flaps has an end edge which defines an acute angle with respect to the respective wing flap fold line and wherein the end edge of each wing flap and the respective wing flap fold line are disposed such that they converge toward an adjacent end of a fold line between the rectangular wall and a side wall

which extends between the rectangular wall and the non-rectangular wall.

12. A blank for forming a carton, the blank comprising a plurality of panels for forming walls of a tubular structure having a rectangular wall and an opposing non-rectangular wall, the carton comprising an end closure wall for closing at least one of the opposed ends of the tubular structure at least in part, wherein the end closure wall comprises first and second sets of closure flaps connected to the rectangular and non-rectangular walls respectively, the first set including a generally trapezoidal end flap hingedly connected to the rectangular wall and a pair of opposite wing flaps hingedly connected to the trapezoidal flap along wing flap fold lines respectively, wherein each of the wing flaps is securable in a setup condition to at least one of the second set of end closure flaps, wherein each of the wing flaps has an end edge which defines an acute angle with respect to the respective wing flap fold line and wherein the end edge of each wing flap and the respective wing flap fold line are disposed such that they converge toward an adjacent end of a fold line between the rectangular wall and a side wall which extends between the rectangular wall and the non-rectangular wall.

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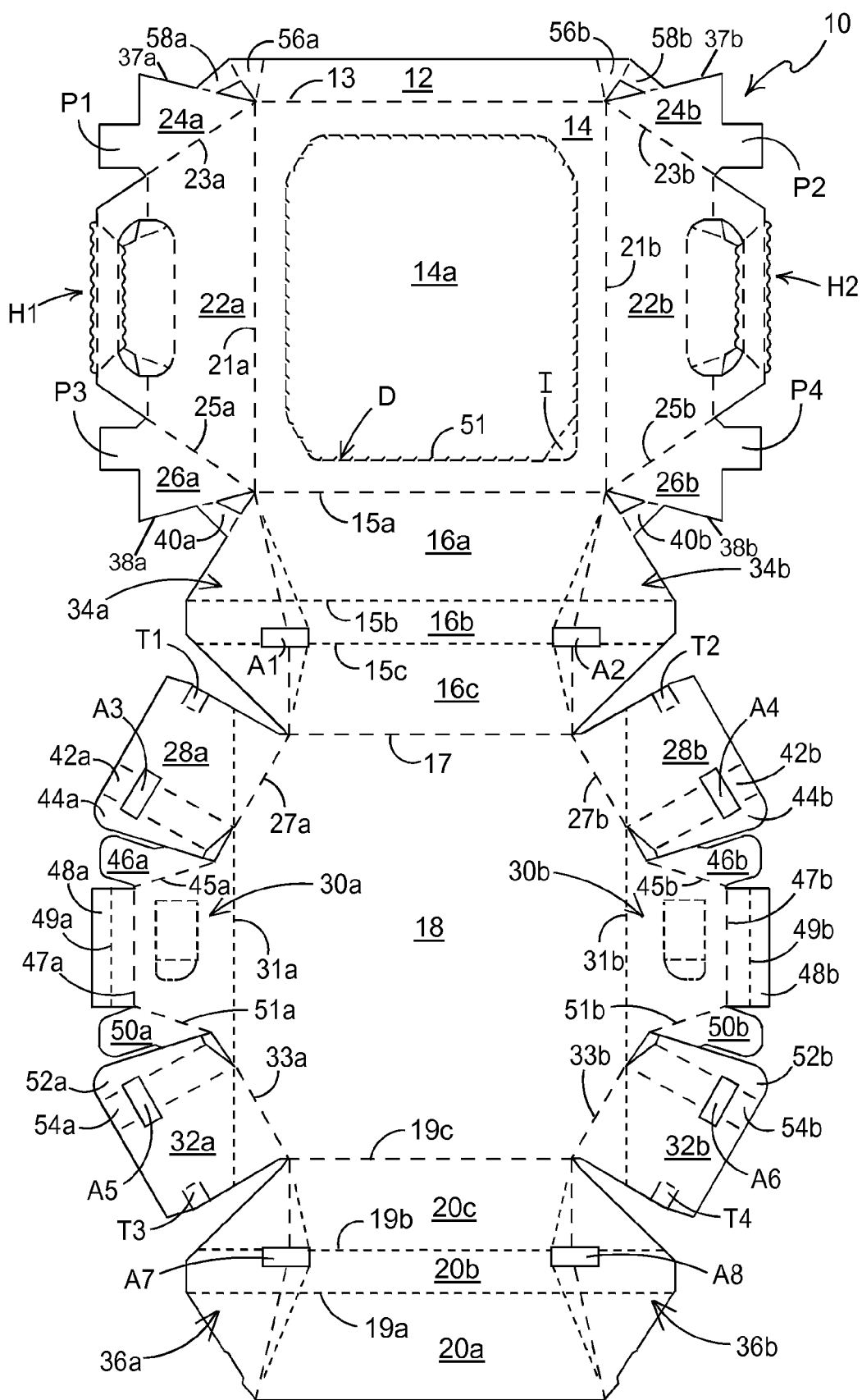


FIGURE 1

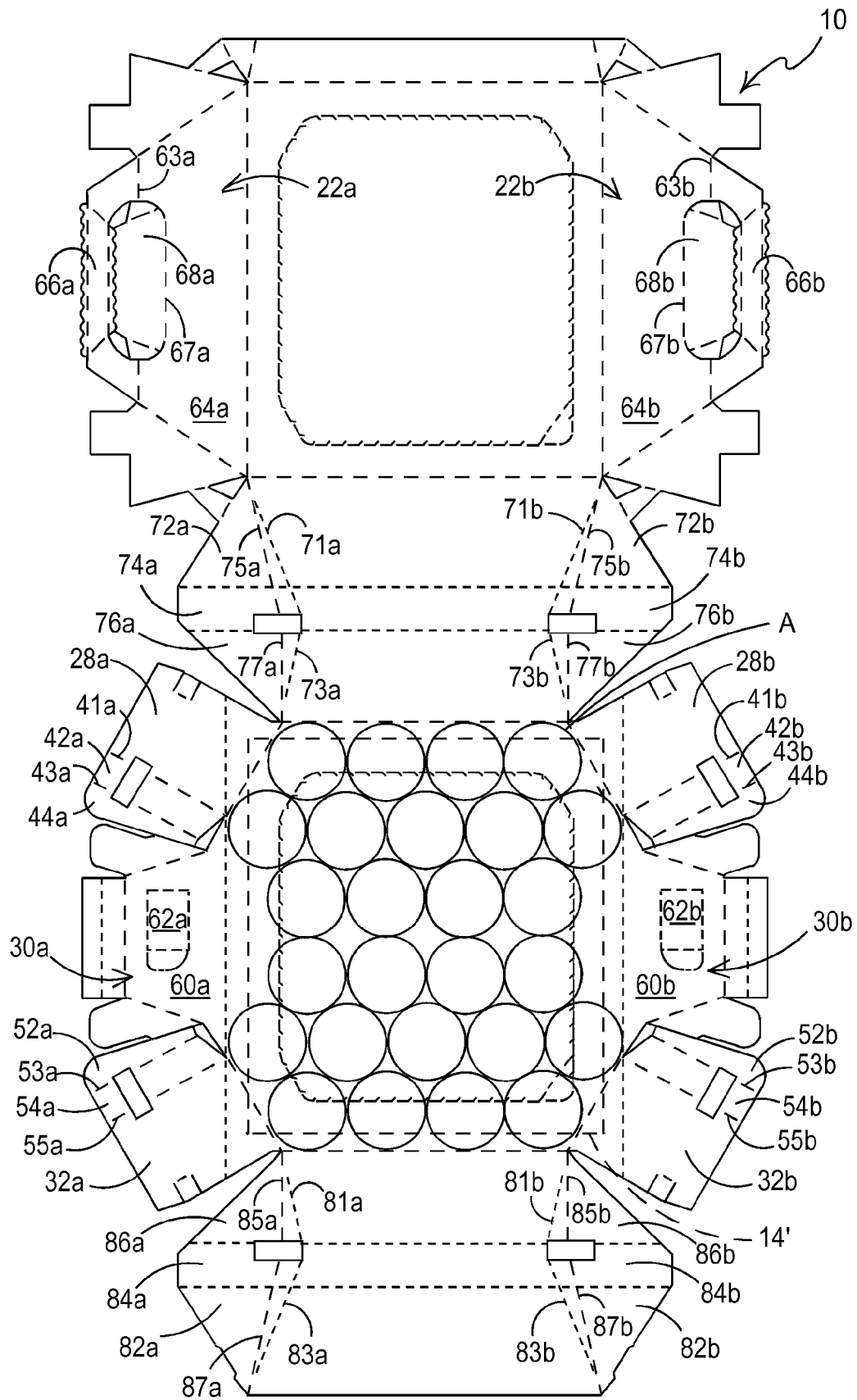


FIGURE 2

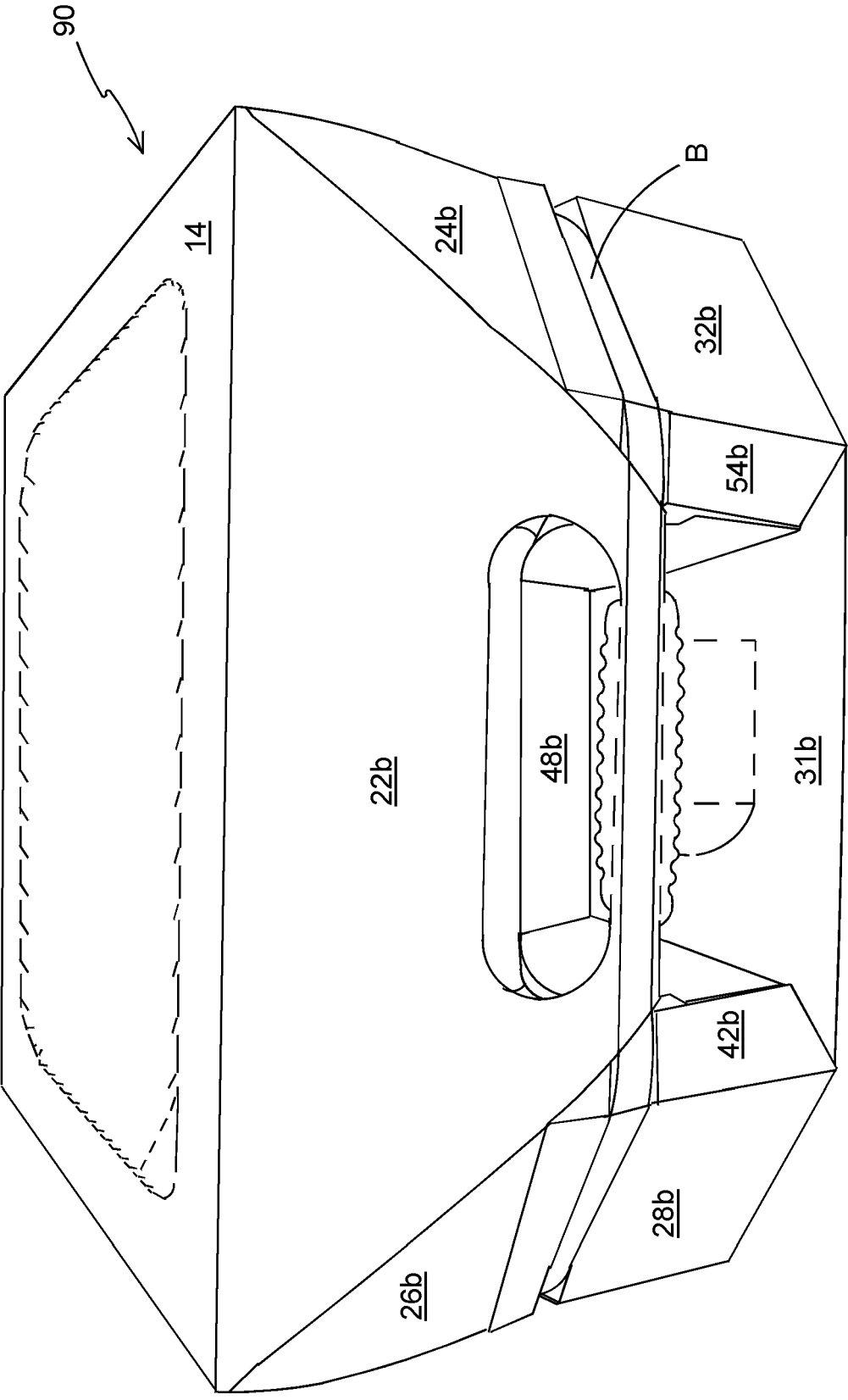


FIGURE 3

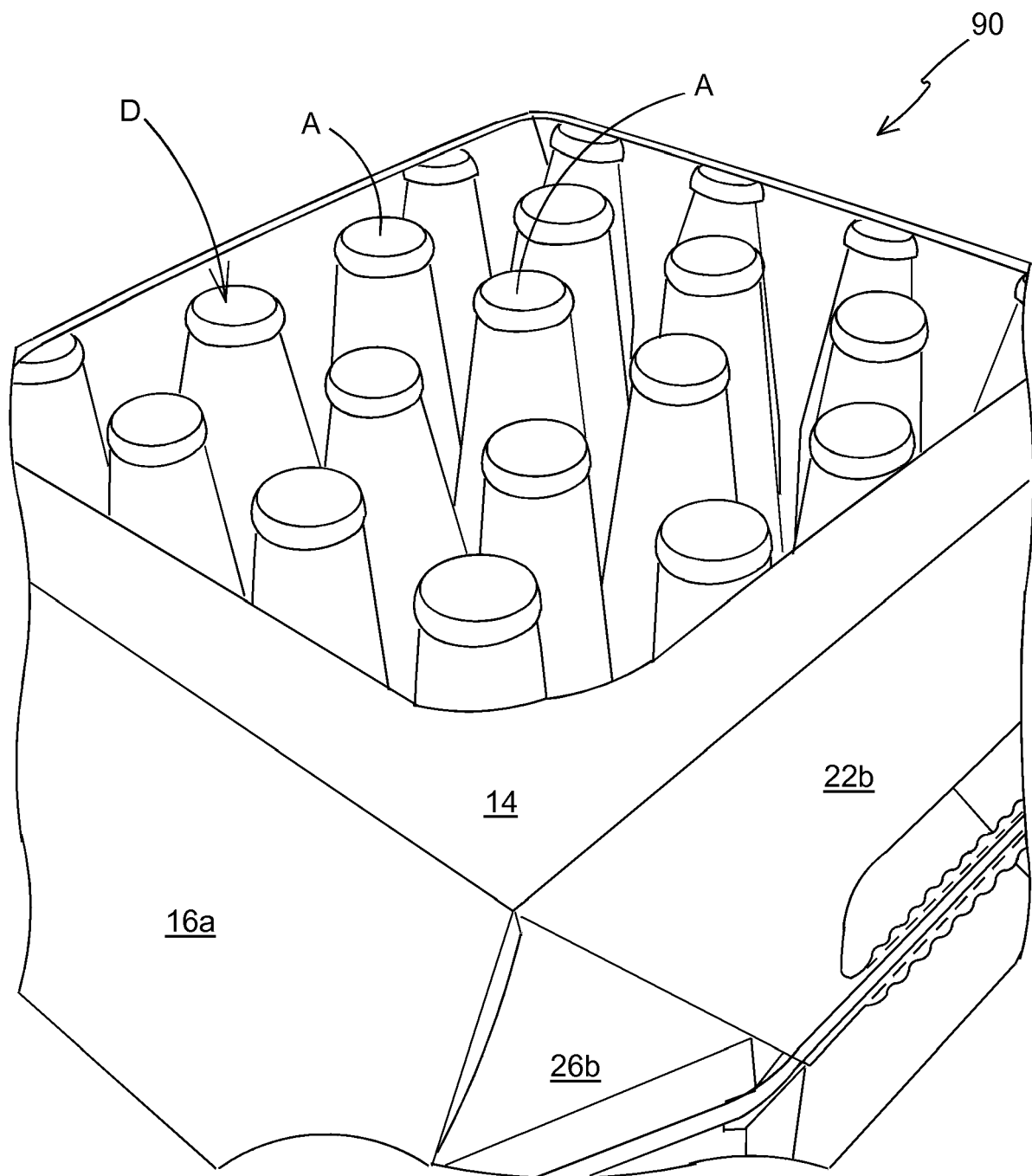


FIGURE 4

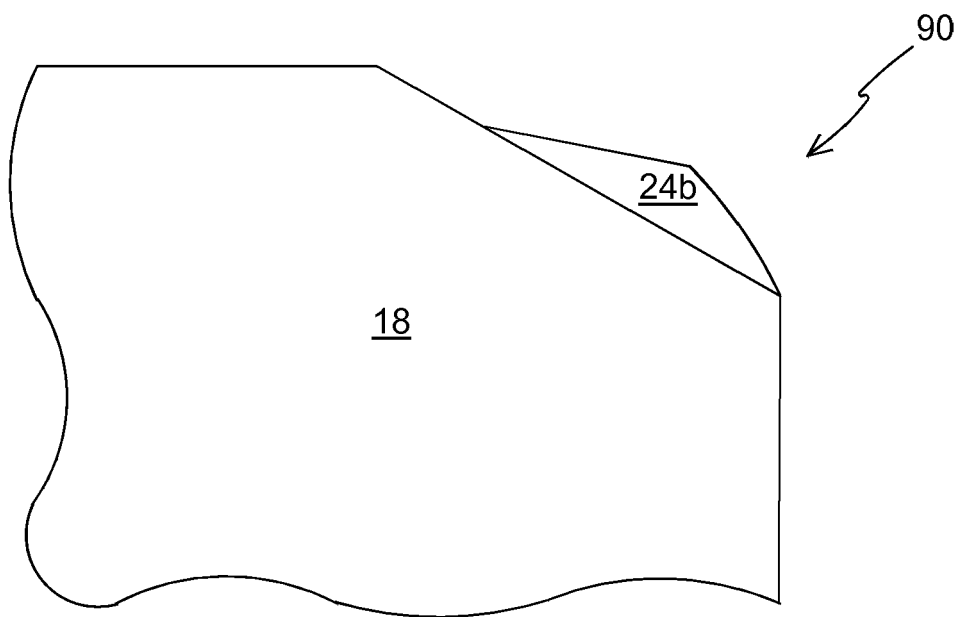


FIGURE 5A

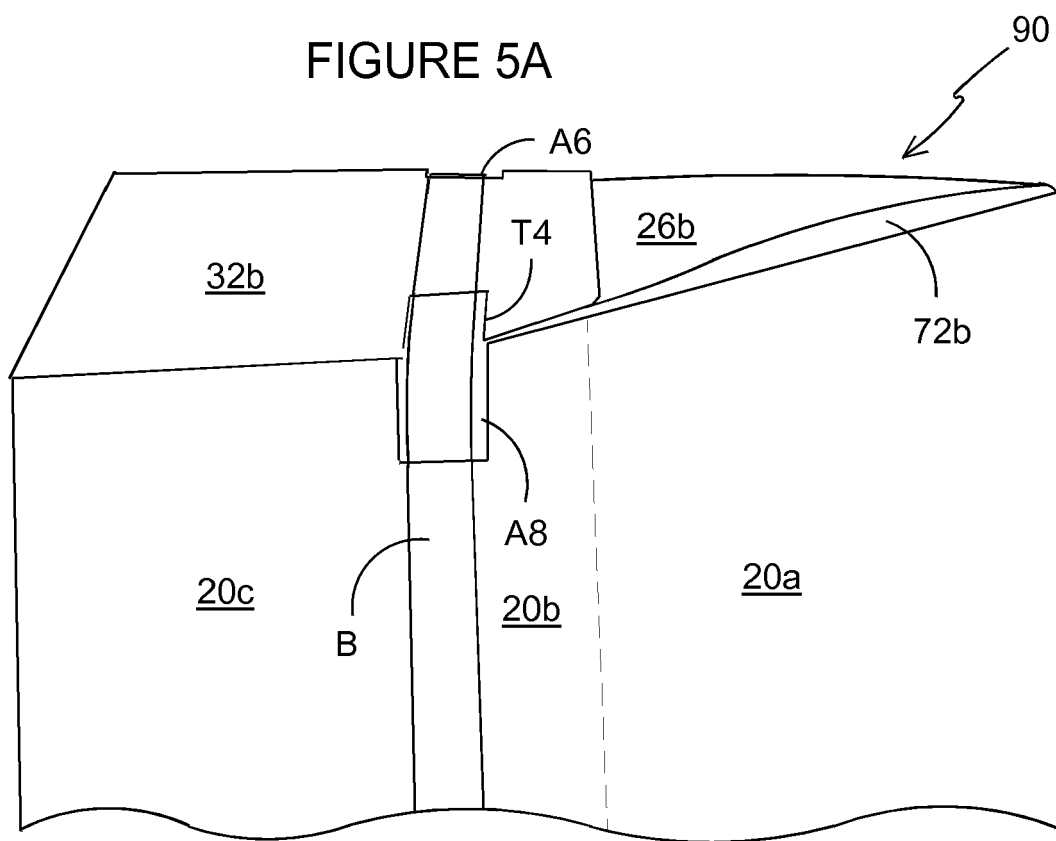


FIGURE 5B

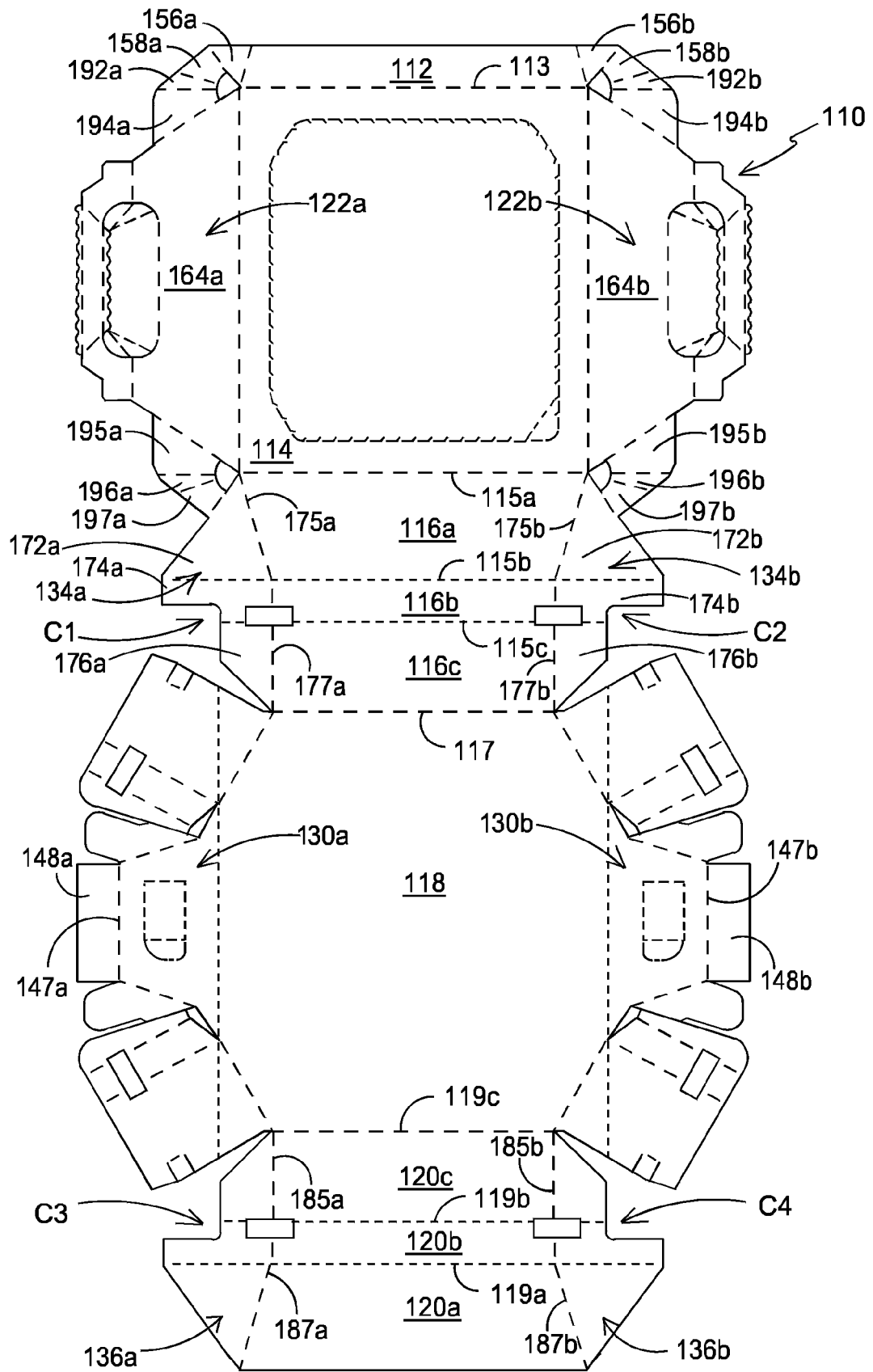


FIGURE 6

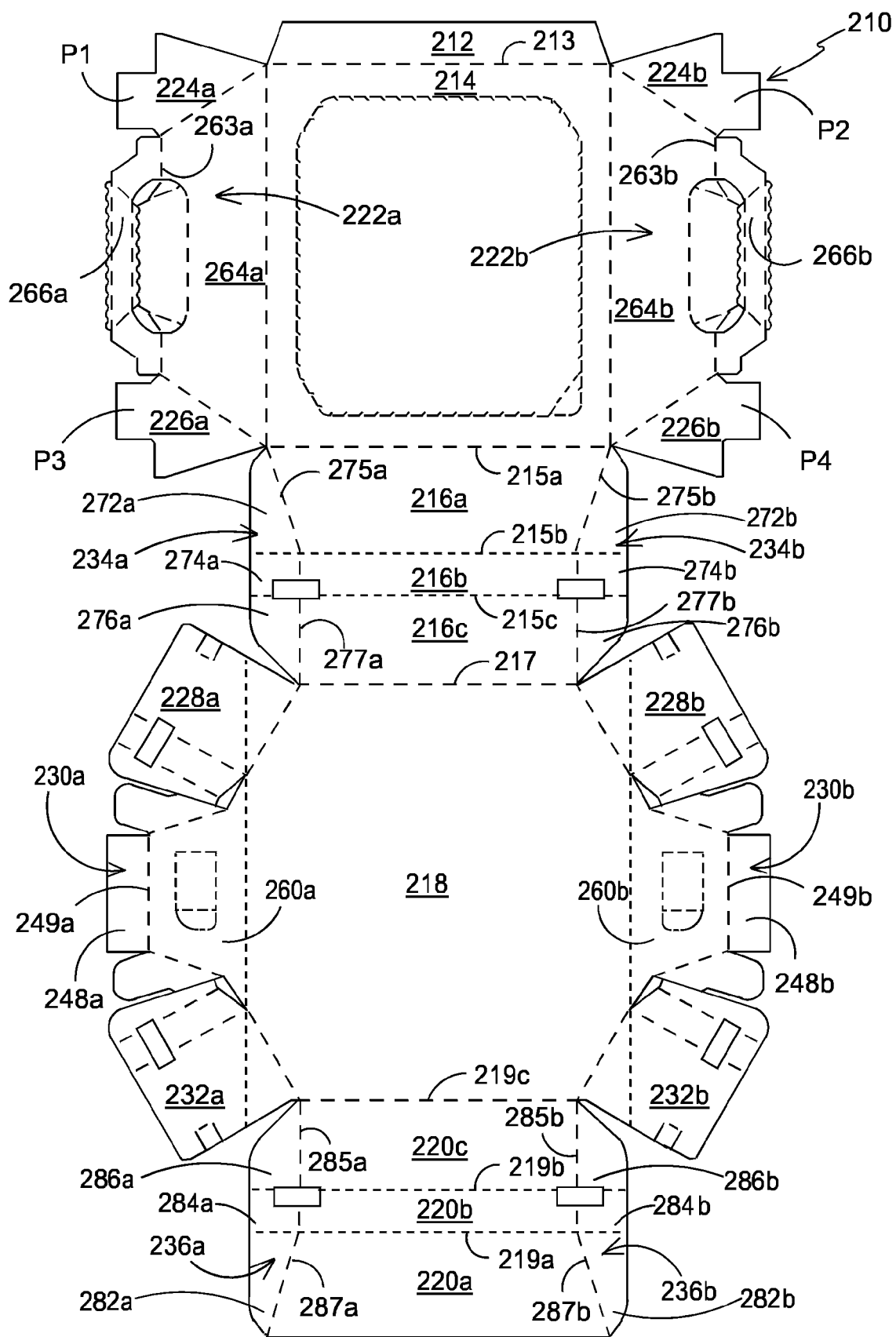


FIGURE 7

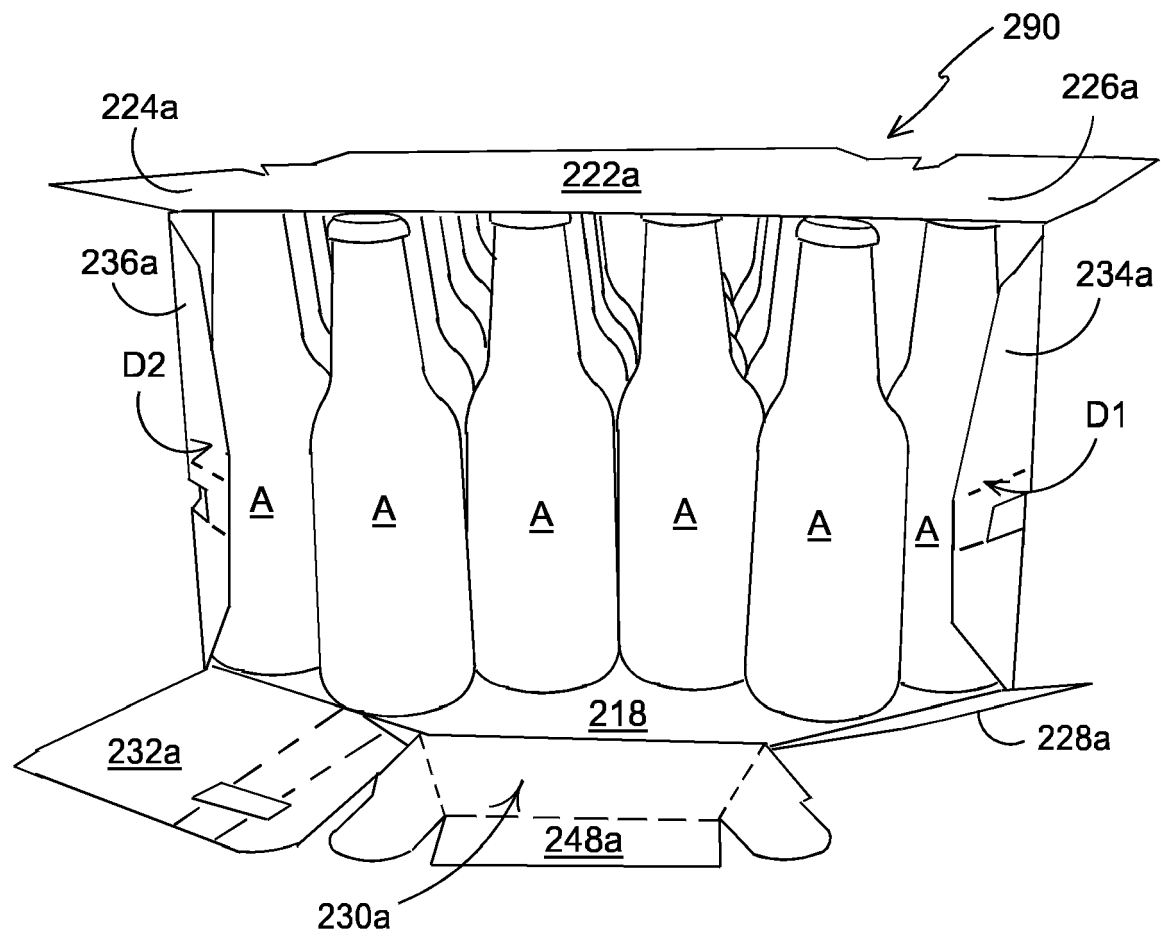


FIGURE 8

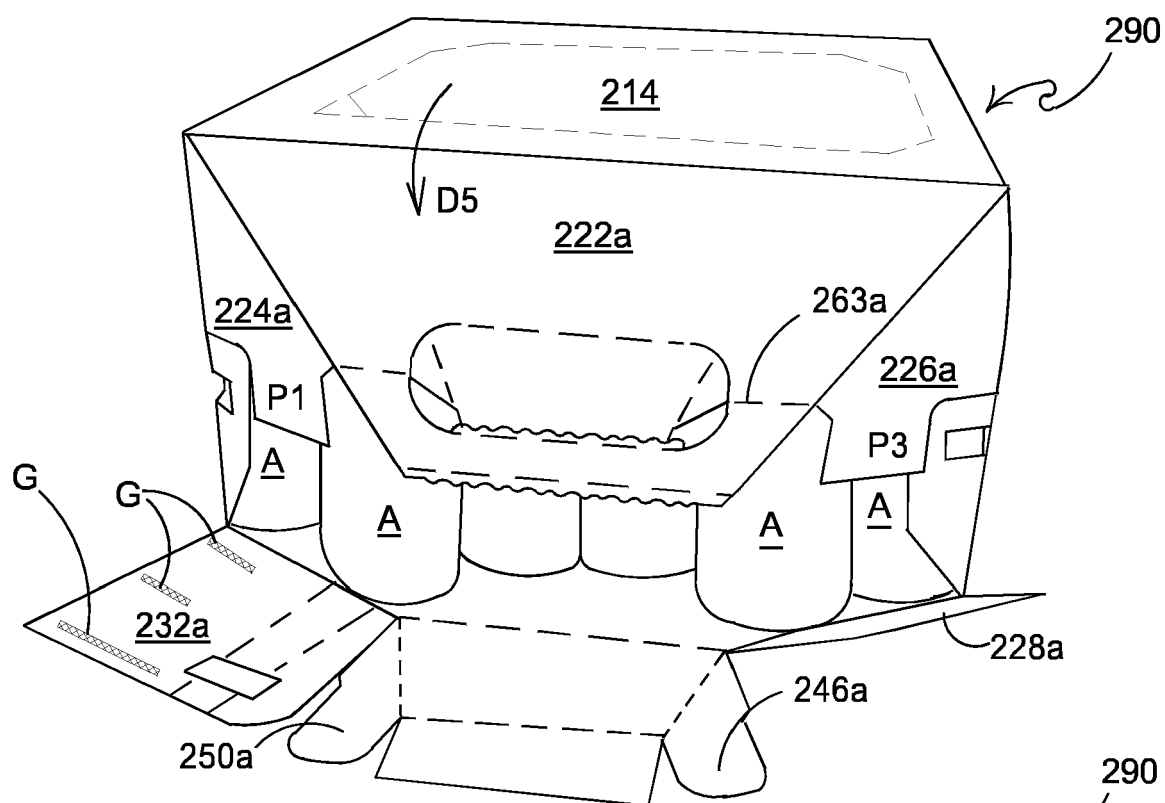


FIGURE 9A

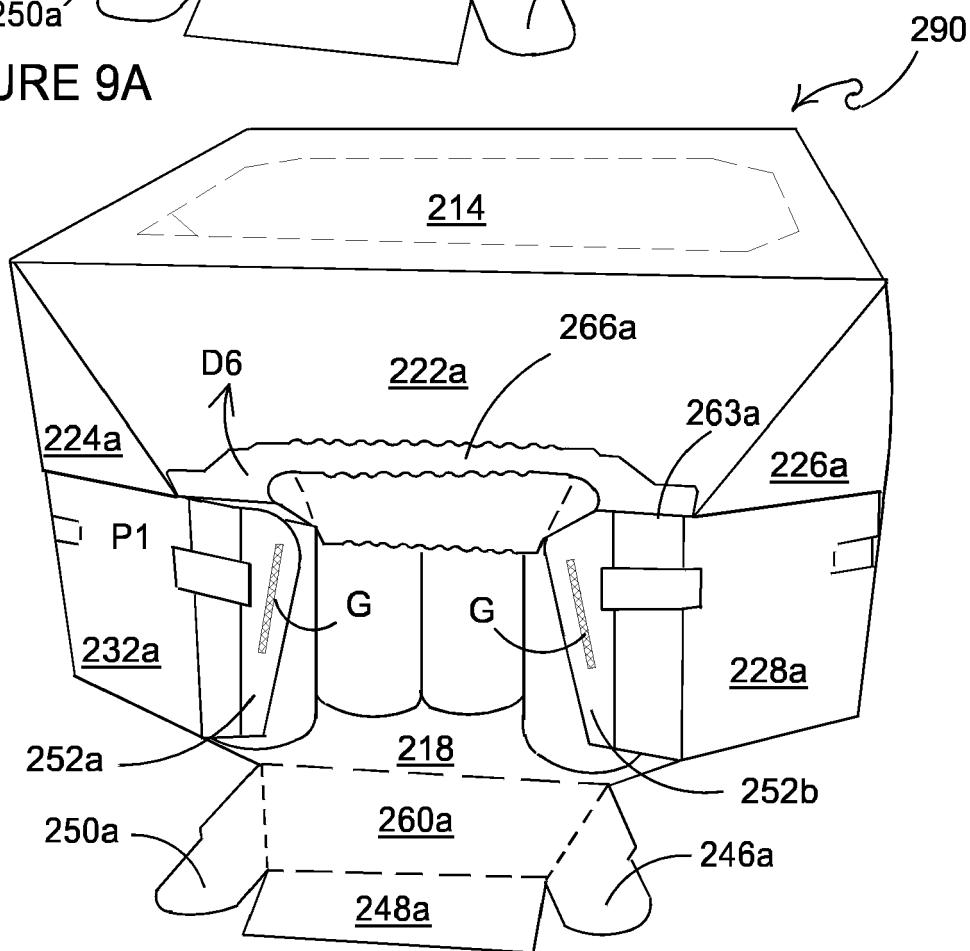
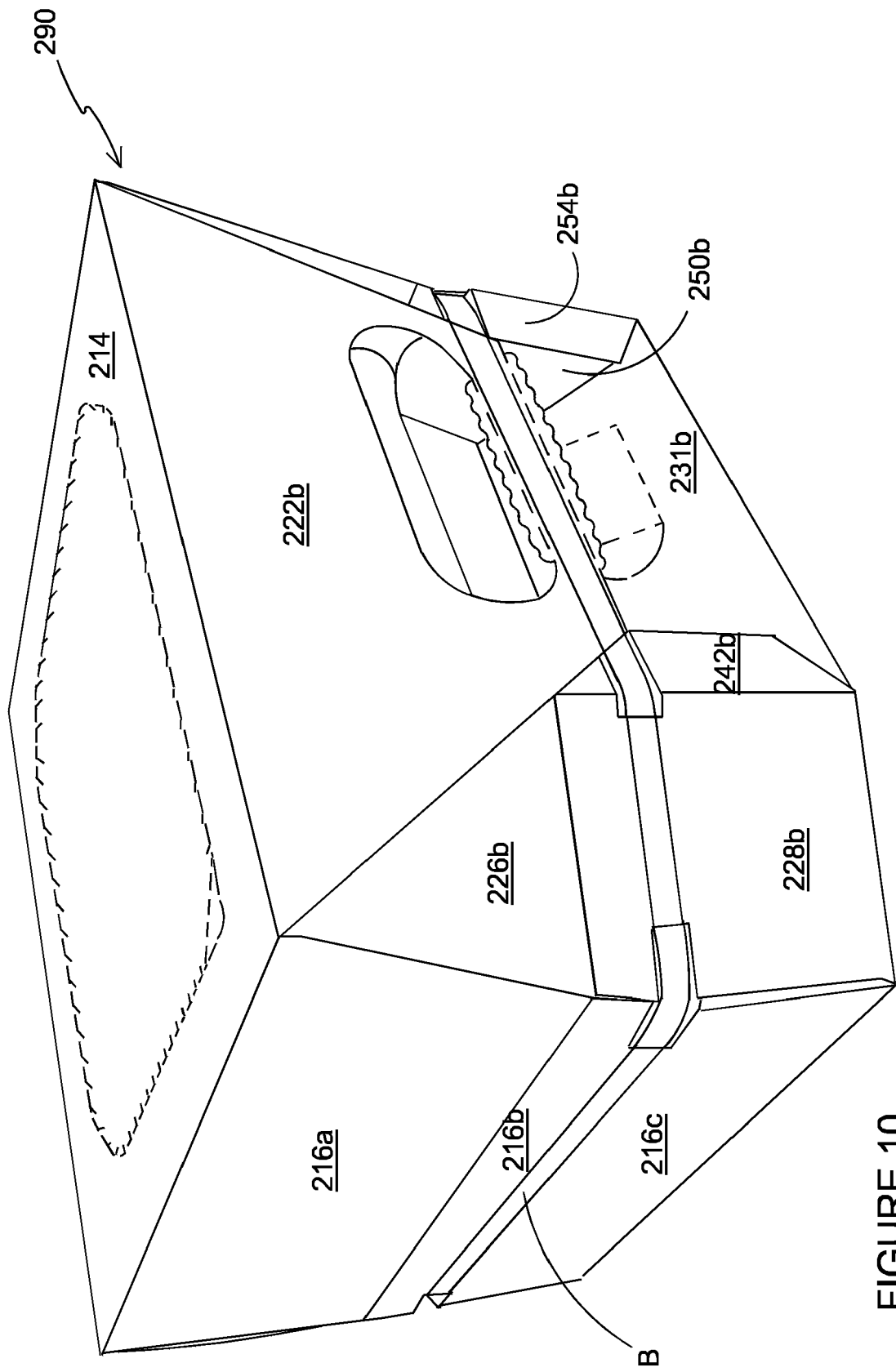


FIGURE 9B





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			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		18 April 2018	Pernice, Ciro
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention 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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ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 3636

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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