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HANDLE STRUCTURE, ARTICLE CARRIER AND BLANK THEREFOR

TECHNICAL FIELD

The present invention relates to handle structures, carriers and to blanks for forming the same. More specifically,
5 but not exclusively, the invention relates to a carrier of the top gripping style and providing a carrying handle for transportation of one, two or more articles.

BACKGROUND

In the field of packaging, it is known to provide article carriers or 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
10 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 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 an object of the present invention to provide a carrier having a carrying handle to enable two or more articles
15 to be transported; in particular for large, or heavy articles.

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

SUMMARY

An aspect of the invention provides an article carrier for packaging a plurality of articles, the article carrier comprising
20 an upper panel and a lower panel in face-contacting arrangement with the upper panel, the upper panel comprising an upper article retention aperture, the lower panel comprising a lower article retention aperture, the upper article retention aperture being disposed in a concentric arrangement with the lower article retention aperture, the upper article retention apertures being defined by an upper uninterrupted perimeter of a first configuration, the lower article retention aperture being defined by a lower uninterrupted perimeter of a second configuration, wherein the first configuration is different
25 from the second configuration.

Optionally, a first one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is circular and wherein the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is out-of-round.

Optionally, the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter comprises at least one linear segment.

30 Optionally, the article carrier further comprises a handle provided by an upper handle portion of the upper panel and a lower handle portion of the lower panel, the lower handle portion underlying the upper handle portion, the at least one linear segment is disposed at a position about the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter furthestmost from the handle provided by the upper and lower handle portions.

Optionally, the at least one linear segment of the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is disposed closer to a center of the upper or lower article retention aperture than an arcuate segment of the first one of the upper and lower uninterrupted perimeters extending alongside the at least one linear segment.

5 Optionally, the at least one linear segment subtends an angle less than ninety degrees from a center of the other of the upper and lower uninterrupted perimeters.

Optionally, the at least one linear segment subtends an angle equal to or less than forty-five degrees from the center of the other of the upper and lower uninterrupted perimeters.

10 Another aspect of the invention provides a carrier blank for forming an article carrier, the blank comprising a first panel and a second panel hingedly connected to the first panel such that the first and second panels are foldable into a face-contacting flat form, the second panel forming an upper panel comprising an upper article retention aperture, the first panel forming a lower panel comprising a lower article retention aperture, the upper article retention aperture being disposed in a concentric arrangement with the lower article retention aperture when in the face-contacting flat form, the upper article retention aperture being defined by an upper uninterrupted perimeter of a first configuration, the
15 lower article retention aperture being defined by a lower uninterrupted perimeter of a second configuration, wherein the first configuration is different from the second configuration.

Optionally, a first one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is circular and a second one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is out-of-round and comprises one or more linear segments.

20 Optionally, the first panel and the second panel are hingedly connected by a fold line and wherein at least one of said one or more linear segments is disposed perpendicularly with respect to the fold line.

Optionally, the one or more linear segments comprise a pair of linear segments disposed parallel to the fold line.

25 A further aspect of the invention provides an article carrier for packaging at least one article, the article carrier comprising a main panel including an article retention aperture having an uninterrupted perimeter provided by the main panel, the uninterrupted perimeter including a load-bearing edge and a slidable edge, the load bearing edge comprising a free edge for load-bearing engagement with an article, the slidable edge comprising a free edge for sliding contact with said article, wherein at least part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, a maximum distance defined between the load-bearing edge and the slidable edge is generally equal to or less than an external lateral dimension of a portion of an article to be received in the article
30 retention aperture.

Optionally, the article carrier is engageable with an article such that the slidable edge is movable along an article surface between a first position and a second position, the slidable edge is disposed at substantially the same elevation as the load-bearing edge when in the first position, the slidable edge is located at a higher elevation than the load-bearing edge when in the second position.

Optionally, the main panel comprises a load-bearing area extending alongside the load-bearing edge, the load-bearing area being planar when the slidable edge is in the second position such that the load-bearing area is disposed substantially in a plane defined by the load-bearing edge and the slidable edge.

5 Optionally, the main panel comprises an end portion, the end portion is defined between the load-bearing edge and a free end edge of the main panel, the end portion is substantially planar in the first position and lies in a first plane, the end portion is substantially planar in the second position and lies in a second plane, the second plane is inclined to be disposed at a non-zero angle with respect to the first plane, the load-bearing edge defines a pivot about which the end portion rotates.

Optionally, the load-bearing edge comprises a linear segment.

10 Optionally, the load-bearing edge comprises a curved segment.

Optionally, the article carrier further comprises a reinforcing panel disposed in face-contacting arrangement with the main panel, the reinforcing panel comprises a second article retention aperture having a second uninterrupted perimeter provided by the reinforcing panel, the second article retention aperture is disposed concentrically with the first article retention aperture, the second uninterrupted perimeter includes a second load-bearing edge comprising a
15 free edge for load-bearing engagement with an article, the second load-bearing edge is coextensive along the first load-bearing edge.

Optionally, the first load-bearing edge comprises a linear segment and the second load-bearing edge comprises a curved segment extending alongside at least the linear segment of the first load-bearing edge.

20 Optionally, the linear segment of the first load-bearing edge is located closer to the center of the first or second article retention aperture than the curved segment of the second load-bearing edge.

Yet another aspect of the invention provides an article carrier for packaging at least one article, the article carrier comprising an upper panel and a lower panel in a face-contacting arrangement with the upper panel, the upper panel comprising an upper article retention aperture having an upper perimeter provided by the upper panel, wherein the upper perimeter includes an upper load-bearing edge which comprises an uninterrupted free edge for load-bearing
25 engagement with an article, the lower panel comprises a lower aperture having a lower perimeter provided by the lower panel, the lower perimeter includes a lower load-bearing edge which comprises an uninterrupted free edge for load-bearing engagement with an article, the lower aperture is disposed in a concentric arrangement with the upper article retention aperture such that the lower load-bearing edge lower load-bearing edge extends co-extensively with the upper load-bearing edge, a first one of the upper and lower load-bearing edges comprises a linear segment and a second
30 one of the upper and lower load-bearing edges comprises a curved segment extending alongside at least the linear segment of the first one of the upper and lower load-bearing edges.

Optionally, the linear segment of the first one of the upper and lower load-bearing edges is located closer to the center of the upper or lower aperture than the curved segment of the second one of upper and lower load-bearing edges.

Optionally, each of the upper and lower perimeters is continuous and uninterrupted.

Optionally, one of the upper and lower apertures is circular.

Yet further aspect of the invention provides an article carrier for packaging at least one article, the article carrier comprising a main panel including an article retention aperture having an uninterrupted perimeter provided by the main panel, the uninterrupted perimeter including a load-bearing edge and a slidable edge, the load bearing edge comprising a free edge for load-bearing engagement with an article, the slidable edge comprising a free edge for sliding contact with said article, wherein at least part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, wherein the load bearing edge includes a linear segment of the uninterrupted perimeter.

Optionally, the slidable edge is a non-linear segment of the uninterrupted perimeter.

Still yet another aspect of the invention provides an package comprising at least one article and an article carrier, the at least one article comprising an upper end portion of a generally cylindrical configuration, the article carrier comprising a main panel which includes an article retention aperture into which the upper end portion of the article is received, the article retention aperture having an uninterrupted perimeter provided by the main panel, the uninterrupted perimeter includes a load-bearing edge and a slidable edge, wherein the load bearing edge comprises a free edge in load-bearing engagement with an underside of the upper end portion of the article, the slidable edge comprises a free edge in sliding contact with a cylindrical surface of the upper end portion of the article, at least a part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, a maximum distance defined between the load-bearing edge and the slidable edge is generally equal to or less than the diameter of the upper end portion of the article.

Optionally, the article carrier is in engagement with the upper end portion of the article such that the slidable edge is movable along the cylindrical surface of the upper end portion between a first position and a second position, the slidable edge is disposed at substantially the same elevation as the load-bearing edge when in the first position, the slidable edge is located at a higher elevation than the load-bearing edge when in the second position.

Optionally, the main panel comprises a load-bearing area extending alongside the load-bearing edge, the load-bearing area of the main panel being planar when the slidable edge is in the second position such that the load-bearing area is disposed substantially in a plane defined by the load-bearing edge and the slidable edge.

Optionally, the main panel comprises an end portion, the end portion is defined between the load-bearing edge and a free end edge of the main panel, the end portion is substantially planar in the first position and lies in a first plane, the end portion is substantially planar in the second position and lies in a second plane, the second plane is inclined to be disposed at a non-zero angle with respect to the first plane, the load-bearing edge defines a pivot about which the end portion rotates.

Optionally, the upper end portion of the at least one article comprises a cap, the at least one article further comprises an annular gap between the cap and a lower portion of the at least one article, the load-bearing edge is disposed in

the gap such the load-bearing edge engages the underside of the cap, the slidable edge is disposed above the gap when in the second position such that the slidable edge is in sliding contact with the cylindrical surface of the cap.

Further features and advantages of the present invention will be apparent from the specific embodiments illustrated in the drawings and discussed below.

5 Within the scope of this application, it is envisaged or intended 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 considered or taken independently or in any combination thereof.

10 Features or elements described in connection with, or relation to, one embodiment are applicable to all embodiments unless there is an incompatibility of features. One or more features or elements from one embodiment may be incorporated into, or combined with, any of the other embodiments disclosed herein, said features or elements extracted from said one embodiment may be included in addition to, or in replacement of one or more features or elements of said other embodiment.

15 A feature, or combination of features, of an embodiment disclosed herein may be extracted in isolation from other features of that embodiment. Alternatively, a feature, or combination of features, of an embodiment may be omitted from that embodiment.

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 carrier according to a first embodiment;

Figure 1B is an enlarged plan view from above of a portion of the blank of Figure 1;

20 Figure 2A is a plan view from above of a carrier formed from the blank of Figure 1;

Figure 2B is a plan view from below of a carrier formed from the blank of Figure 1;

Figure 3 is a perspective view from above of a package comprising a carrier formed from the blank of Figure 1 and a pair of articles;

Figure 4 is a side view an exemplary article for use with the carrier of Figures 2A and 2B;

25 Figure 5 is a perspective view from the side of a portion of the package of Figure 3;

Figure 6 is a perspective view from the side of a portion of the package of Figure 3 showing a carrying handle in use;

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

Figure 8A is a plan view from above of a carrier formed from the blank of Figure 7;

30 Figure 8B is a plan view from below of a carrier formed from the blank of Figure 7;

Figure 9 is a perspective view from above of a portion of a package comprising a carrier formed from the blank of Figure 7 and a pair of articles;

Figure 10 is a plan view from above of a blank for forming a carrier according to a third embodiment;

Figure 11A is a plan view from above of a carrier formed from the blank of Figure 10;

Figure 11B is a plan view from below of a carrier formed from the blank of Figure 10; and

Figure 12 is a side view of an exemplary article for use with the carrier of Figures 11A and 11B.

DETAILED DESCRIPTION OF EMBODIMENTS

Detailed descriptions of specific embodiments of the handle structure, package, blanks, and carriers 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 handle structures, packages, blanks, and carriers described herein may be embodied in various and alternative forms. The Figures are not necessarily to scale and some features may be exaggerated or minimized 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 Figures 2 to 6, for carrying a group of primary products such as, but not limited to, bottles, hereinafter referred to as articles. The blank 10 forms a secondary package or handle structure for packaging at least one primary product container or package. Alternative blanks 110, 210 are shown in Figures 7 and 10 for forming alternative carriers 190; 290 (see Figures 8A, 8B, 11A, and 11B).

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; 190; 290 for engaging and carrying articles, such as primary 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. Other exemplary containers include bottles (for example metallic, glass or plastics bottles), cans (for example aluminum cans), tins, pouches, packets, and the like.

The blanks 10; 110; 210 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 recognized that one or other numbers of blanks may be employed, where suitable, for example, to provide the carrier structure described in more detail below.

The packaging structure or carton 90; 190; 290 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 are configured to form a carton or carrier 90; 190; 290 for packaging an exemplary arrangement of exemplary articles. In the illustrated embodiments, the arrangement is an $m \times n$ matrix or array, having one row ($m=1$) and two columns ($n=2$); in the illustrated embodiments one row of two articles is provided. In the embodiment of Figures 1 to 6 the articles are 1 liter bottles and may comprises a manual pump dispenser cap which forms a closure to the bottle (as shown in Figure 4), the article may be suitable for dispensing personal care products such as, but not limited to liquid soap, shampoo, hair conditioner, skin moisturizer, the bottles may be formed from a suitable material such as, but not limited to, plastic, glass, aluminum. In the embodiment of Figures 7 to 9, the articles are 1 liter bottles and may be configured to contain alcohol, peroxide, acetone, nail polish remover, bleach, ammonia or similar products and may therefore comprise a closure of the child safe type (as shown in Figure 9), to restrict access to the contents. In the embodiment of Figures 10 to 11B the articles are 16 US fl. oz. (473ml) bottles and may be configured to dispense sauces or condiments or other liquid food stuffs, the bottle may be sufficiently flexible (squeezable) to dispense product through a dispensing cap having a one-way valve, the dispensing cap may have a cover hinged thereto to protect or enclose the valve when not in use (as shown in Figure 12). Alternatively, the blanks 10; 110; 210 can be configured to form a carrier for packaging other types, number and size of articles and/or for packaging articles in a different arrangement or configuration for example, but not limited to, fully enclosed cartons or wrap-around carriers, the articles may be cups, pouches, pots or cans.

Turning to Figure 1, there is illustrated a blank 10 for forming a carton 90 (see Figures 2A to 6) according to a first embodiment. The blank 10 comprises a plurality of panels 12, 14 hinged one to the next by a fold line 13.

The plurality of main panels 12, 14 form a top engaging carrier or handle structure. The plurality of panels 12, 14 comprises a first panel 12 and a second panel 14. The second panel 14 is hingedly connected to the first panel 12 by a hinged connection in the form of a fold line 13.

The second panel 14 forms an upper or outer panel 14, the first panel 12 forms a lower or inner panel 16.

Each of the main panels 12, 14 may be generally bow-tie shaped, that is to say the main panels 12, 14 comprise a waisted intermediate portion 12M, 14M disposed or bridging between opposed flared, widened, or bulbous end portions 12E, 14E.

Intermediate portions 12M, 14M of each of the main panels 12, 14 provide or define a handle portion.

The intermediate portion 12M of the first panel 12 is separated from the intermediate portion 14M of the second panel 14 by an aperture A3.

The second or upper panel 14 may comprise a pair of opposed handle flaps 16, 18 hinged to opposing side edges of the intermediate portion 14M of the second or upper panel 14 by respective hinged connections; the hinged connections each take the form of a pair of fold lines 15A/15B, 17A/17B.

The pair of fold lines 15A/15B, 17A/17B may facilitate folding of the handle flaps 16, 18 about the lower panel 12 to be in face-to-face relationship with the lower panel 12.

Each of the main panels 12, 14 comprises at least one article retention structure. The main panels 12, 14 comprise a plurality of article retention structures, specifically two article retention structures arranged in 1 x 2 matrix or array. Each of the article retention structures comprises an opening or aperture A1, A2.

The first panel 12 comprises a pair of circular first apertures A1 each having a radius of curvature R1. The radius of curvature R1 is dimensioned such that the first apertures A1 have a diameter substantially equal to the width or diameter of a cap or closure C (see Figure 4), or at least a portion of the cap C, mounted to the article B.

The second panel 12 comprises a pair of off-circular second apertures A2, also referred to herein as out-of-round or squircle apertures A2, that is to say the apertures A2 comprise first portions Cr defining a notional circle NC having a second radius of curvature R2, and second portions Li which deviate from the notional circle NC. In the illustrated embodiment the second portion Li are linear portions, and aperture A2 can be considered to be a clipped or truncated circle. The illustrated embodiment can be considered to be clipped by a square centered on the center of the notional circle NC and having length and width dimensions less than the diameter of the notional circle NC.

In other embodiments, the second portions may be non-linear, and may be arcuate or circular in shape albeit with a radius of curvature larger than the second radius of curvature R2.

In the illustrated embodiment, the second portions Li define a minimum radial dimension R3 from the center of the notional circle NC. The radial dimension R3 is less than the second radius of curvature R2. The radial dimension R3 is less than the first radius of curvature R1 of the first apertures A1.

Each first aperture A1 in the first panel 12 is arranged such that its center is disposed in registry with the center of a respective one of the second apertures A2 in the second panel 14.

The second portions Li have the effect of reducing the width or radius of the second apertures A2 at discrete locations about the perimeter of the second apertures A2.

In the illustrated embodiment, the first radius of curvature R1 is substantially equal to the second radius of curvature R2. The second radius of curvature R2 may be dimensioned such that the second aperture A2 has a diameter substantially equal to the width or diameter of a cap or closure C, or at least a portion thereof.

Figures 2A and 2B show top and bottom views respectively of a carrier 90 formed from the blank 10. The carrier 90 is formed by applying glue or other adhesive treatment to glue regions G on the first panel 12 and folding the first panel 12 with respect to the second panel 14, about fold line 13, to secure the first panel 12 to the second panel 14. In other embodiments, the glue or adhesive treatment may be applied to the second panel 14.

When the carrier 90 is applied to the articles B, as shown in Figures 3, 5 and 6, the first aperture A1 and the circular portions Cr of the second apertures A2 form a close, touching contact fit with the cap C, in particular a portion of the cap C disposed adjacent or proximate to a gap or groove Gr. The groove or gap Gr is defined between a lowermost end of the cap and a neck portion N of the article B.

Regions of the second panels proximate the second portions Li of the second apertures A2 deform or displace out of the plane of the second panel 14 whilst the caps C are inserted into the carrier 90. When the second panel 14 passes beyond the lower end of the caps C said regions of the second panel 14 are released and return to a substantially coplanar relationship with the second panel 14, in doing so the regions extend into the gap or groove Gr, best shown in Figure 5.

The end portions 12E/14E of the first and second panels 12, 14 are substantially planar, and lie in a first plane PL1.

When the handle is deployed or in an operative condition, as shown in Figure 6, the intermediate portions 12M, 14M of the first and second panels 12, 14 are displaced upwardly or outwardly, and may bend or deform. Edges of the first and second panels 12, 14 defined by portions of first and second apertures A1, A2 adjacent to the intermediate portions 12M, 14M disengage from the groove or gap GR and slide upwardly about the cap C, these edges portions define a sliding edge of the first and second apertures A1, A2. Edges of the first and second panels 12, 14 defined by portions of the first and second apertures A1, A2 adjacent to the end portions 12E, 14E remain engaged with the groove or gap Gr and defines a pivot Pv, these edges portions define an engaging edge of the first and second apertures A1, A2. The end portions 12E, 14E pivot or rotate about the pivot Pv but remain substantially planar and lie in a second plane PI2. The second plane PI2 and the first plane define a non-zero angle θ therebetween.

When the carrying handle is in the deployed condition the edges of the first and second panels 12, 14 defined by the engaging edges of the first and second apertures A1, A2 are pulled or displaced inwardly further into the groove or gap Gr, the first panel 12 is received in the groove or gap Gr in addition to the second panel 14 such that the article B is suspended by both layers or plies of the carrier 90 and each of the engaging edges of the first and second apertures A1, A2 are brought into contact with the article B.

Referring now to Figures 7 to 11B, there are 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 or third embodiment, 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 6 will be described in detail.

Turning to Figure 7, there is illustrated a blank 110 for forming a carrier 190 according to a second embodiment. The blank 110 comprises a pair of main panels 112, 114 for forming a top engaging carrier or handle structure. The pair of main panels 112, 114 comprises a first panel 112 and a second panel 114. The second panel 114 is hingedly connected to the first panel 112 by a hinged connection in the form of a fold line 113. The fold line 113 is interrupted by an aperture A3 separating an intermediate portion 112M of the first panel 112 from and intermediate portion 114M of the second panel 114. Each of the main panels 112, 114 comprises at least one article retention structure. The main panels 112, 114 comprise a plurality of article retention structures, specifically two article retention structures arranged in 1 x 2 matrix or array. Each of the article retention structures comprises an opening or aperture A1, A2.

The first panel 112 comprises a pair of circular apertures A1 each having a radius of curvature R1. The radius of curvature R1 may be dimensioned such that the aperture has a diameter substantially equal to the width or diameter of a cap or closure C (see Figure 9), or at least a portion of the cap, mounted to the article B.

The second panel 114 comprises a pair of off-circular second apertures A2, that is to say the apertures A2 comprise first portions Cr defining a notional circle NC having a second radius of curvature R2, and second portions Li which deviate from the notional circle NC. In the illustrated embodiment the second portion Li are linear portions, and aperture A2 can be considered to be a clipped or truncated circle. The second apertures A2 in the embodiment illustrated in Figure 7 can be considered to be clipped by a on three sides of the notional circle NC, whereas second apertures A2 in the embodiment shown in Figure 1 are clipped on four sides of the notional circle NC. In the embodiment of Figure 1 the notional circle NC is clipped on two pairs of opposing sides, the first pair being orthogonally arranged with respect to the second pair. In the embodiment of Figure 7, an innermost edge portion of the second apertures A2 adjacent or proximate to the intermediate portion 114M of the second panel 114 is curved or arcuate, whereas in Figure 1 the innermost edge portion of the second apertures A2 is linear.

In the embodiment of Figure 7, the second apertures A2, comprise three first or curved portions Cr and three second or linear portions Li. In the embodiment of Figure 1, the second apertures A2, comprise four first or curved portions Cr and four second or linear portions Li.

In the embodiment of Figure 7, the second portions Li define a minimum radial dimension R3 from the center of the notional circle NC. The radial dimension R3 is less than the second radius of curvature R2. The radial dimension R3 is less than the first radius of curvature R1 of each of the first apertures A1.

Each first aperture A1 in the first panel 112 is arranged such that its center is disposed in registry with the center of a respective one of the second apertures A2 in the second panel 114.

The second portions Li have the effect of reducing the width or radius of the second apertures A2 at discrete locations about the perimeter of the second apertures A2.

In the embodiment of Figure 7, the second radius of curvature R2 is greater than the first radius of curvature R1, best shown in Figure 8A. This may facilitate sliding of the inner or sliding edges of the second apertures A2 about the cap C when the handle is deployed or operative, Figure 9 shows the inner or sliding edge SE of the second aperture A2 is provided with clearance to pass the inner portion of the cap C.

Turning to Figure 10, there is illustrated a blank 210 for forming a carrier 290 according to a third embodiment. The blank 210 comprises a first main panel 212 and a second main panel 214.

The second main panel 214 is hingedly connected to the first main panel 212 by a hinged connection in the form of a fold line 213.

Each of the main panels 212, 214 comprises at least one at least one article retention structure. The main panels 212, 114 comprise a plurality of article retention structures, specifically two article retention structures arranged in 1 x 2 matrix or array. Each of the article retention structures comprises an opening or aperture A1, A2.

In the embodiment of Figure 10, the second panel 214 comprises a pair of circular first apertures A1 each having a radius of curvature R1. The radius of curvature R1 may be dimensioned such that the first apertures A1 each has a diameter which may be greater than the width or diameter of a cap or closure C, or at least a portion of the cap C, mounted to the article B. In this way, in the embodiment of Figure 10 the circular apertures A1 are disposed in the uppermost layer or ply of the carrier 290, whereas in the previous embodiments the circular apertures A1 were disposed in the lowermost layer or ply of the carrier 90; 190.

The first panel 212 comprises a pair of off-circular second apertures A2, that is to say the apertures A2 comprise first portions Cr defining a notional circle NC having a second radius of curvature R2, and second portions Li which deviate from the notional circle NC. In the illustrated embodiment the second portion Li are linear portions, and aperture A2 can be considered to be a clipped or truncated circle. The second apertures A2 in the embodiment illustrated in Figure 10 can be considered to be clipped by a on four sides of the notional circle NC, on two pairs of opposing sides, the first pair being orthogonally arranged with respect to the second pair. In the embodiment of Figure 10, an innermost edge portion of the second apertures A2 adjacent or proximate to the intermediate portion 212M of the first panel 212 is linear.

In the embodiment of Figure 10, the second apertures A2 comprise four first or curved portions Cr and four second or linear portions Li.

In the embodiment of Figure 10, the second portions Li define a minimum radial dimension R3 from the center of the notional circle NC. The radial dimension R3 is less than the second radius of curvature R2. The radial dimension R3 is less than the first radius of curvature R1 of the first apertures A1.

Each second aperture A2 in the first panel 212 is arranged such that its center is disposed in registry with the center of a respective one of the first apertures A1 in the second panel 214.

The second portions Li have the effect of reducing the width or radius of the second apertures A2 at discrete locations about the perimeter of the second apertures A2.

In the embodiment of Figure 10, the first radius of curvature R1 is greater than the second radius of curvature R2, best shown in Figure 11A. This may facilitate sliding of the inner or sliding edges of the first apertures A1 about the cap C when the handle is deployed or operative.

The second radius of curvature R2 may be dimensioned such that the first or curved portions Cr portions of the second apertures A2 have a diameter which substantially equal to the width or diameter of a cap or closure C, or at least a portion thereof.

The present disclosure provides an article carrier 90 comprising at least one primary panel 12, 14; 112, 114; 212, 214 forming a handle structure. The at least one primary panel 12, 14; 112, 114; 212, 214 comprises at least one, at least two, or more article retention structures for engaging an article B so as to provide a top gripping article carrier 90; 190; 290.

The present disclosure also provides an article carrier 90; 190; 290 comprising an upper panel 14; 114; 214 and a lower panel 12; 112; 212 in face-contacting arrangement with the upper panel 14; 114; 214. The upper panel 14; 114; 214 comprises an upper article retention aperture A2; A1. The lower panel 12; 112; 212 comprises a lower article retention aperture A1; A2. The upper article retention aperture A2; A1 is disposed in a concentric arrangement with the lower article retention aperture A1; A2. The upper article retention apertures A2; A1 are defined by an upper uninterrupted perimeter P2 of a first shape or configuration, see Figure 1. The lower article retention aperture A1; A2 are defined by a lower uninterrupted perimeter P1 of a second shape or configuration. The first configuration is different from the second configuration.

A first one of the upper uninterrupted perimeter P2 and the lower uninterrupted perimeter P1 is circular and wherein the other one of the upper uninterrupted perimeter P2 and the lower uninterrupted perimeter P1 is out-of-round.

The other one of the upper uninterrupted perimeter P2 and the lower uninterrupted perimeter P1 comprises at least one linear segment Li.

The article carrier 90; 190; 290 may further comprise a handle provided by an upper handle portion 14M; 114M; 214M of the upper panel 14; 114; 214 and a lower handle portion 12M; 112M; 212M of the lower panel 12; 112; 212 underlying the upper handle portion 14M; 114M; 214M. The at least one linear segment Li is disposed at a position about the other one of the upper uninterrupted perimeter P1 and the lower uninterrupted perimeter P2 furthestmost from the handle provided by the upper and lower handle portions 14M, 12M; 114M, 112M; 214M, 212M.

The at least one linear segment Li of the other one of the upper uninterrupted perimeter P1 and the lower uninterrupted perimeter P2 is disposed closer to a center of the upper or lower article retention aperture A2, A1 than an arcuate segment Cr2 of the first one of the upper and lower uninterrupted perimeters P1, P2 extending alongside the at least one linear segment Li.

The at least one linear segment Li subtends an angle α (see Figure 1) which is greater than zero and less than ninety degrees from a center of the other of the upper and lower uninterrupted perimeters P1, P2.

Optionally, the at least one linear segment Li subtends an angle α which is greater than zero and equal to or less than forty-five degrees from the center of the other of the upper and lower uninterrupted perimeters P1, P2.

Optionally, the at least one linear segment Li subtends an angle α which is greater than zero and equal to or less than thirty degrees from the center of the other of the upper and lower uninterrupted perimeters P1, P2.

The angular value of the angle α depends on the size of the other of the upper and lower uninterrupted perimeters P1, P2. For example, the greater the size (e.g., the maximum lateral size or the diameter) of the other uninterrupted perimeter is, the less the value of the angle α is.

The present disclosure provides a carrier blank 10; 110; 210 for forming an article carrier 90; 190; 290. The blank 10; 110; 210 comprises a first panel 12; 112; 212 and a second panel 14; 114; 214 hingedly connected to the first panel 12; 112; 212 such that the first and second panels 12, 14; 112, 114; 212, 214 are foldable into a face-contacting flat form. The second panel 14; 114; 214 forms an upper panel 14; 114; 214 comprising an upper article retention

aperture A2; A1, the first panel 12; 112; 212 forms a lower panel 12; 112; 212 comprising a lower article retention aperture A1; A2. The upper article retention aperture A2; A1 is disposed in a concentric arrangement with the lower article retention aperture A1; A2 when in the face-contacting flat form. The upper article retention apertures A2; A1 are defined by an upper uninterrupted perimeter P2 of a first configuration, the lower article retention apertures A1; A2 are defined by a lower uninterrupted perimeter P1 of a second configuration. The first configuration is different from the second configuration.

A first one of the upper uninterrupted perimeter P2 and the lower uninterrupted perimeter P1 is circular and a second one of the upper uninterrupted perimeter P2 and the lower uninterrupted perimeter P1 is out-of-round or off-circular and comprises one or more linear segments Li, e.g., one to four linear segments. Multiple linear segments Li may be arranged at the same angular pitch along the respective perimeter, or they may be arranged at different angular pitches. A linear segment Li may be located at a position along the respective perimeter furthestmost from the handle. Optionally, a pair of linear segments Li may be located with an arcuate segment (or an angular space) therebetween such that the arcuate segment is located at a position along the respective perimeter furthestmost from the handle.

The first panel 12; 112; 212 and the second panel 14; 114; 214 are hingedly connected by a fold line 13; 113; 213 and wherein at least one of said one or more linear segments Li is disposed perpendicularly with respect to the fold line 13; 113; 213. The one or more linear segments Li may comprise a pair of linear segments Li disposed parallel to the fold line 13; 113; 213.

The present disclosure also provides an article carrier 90; 190; 290 for packaging at least one article, the article carrier 90; 190; 290 comprising a main panel 12, 14; 112, 114; 212, 214 comprising an article retention aperture A1, A2 having an uninterrupted perimeter P1, P2 provided by the main panel 12, 14; 112, 114; 212, 214. The uninterrupted perimeter P1, P2 includes a load-bearing edge LE1, LE2 and a slidable edge SE1, SE2, see Figure 1B. The load bearing edge LE1, LE2 comprises a free edge for load-bearing engagement with an article B. The slidable edge SE1, SE2 comprises a free edge for sliding contact with an article B. The slidable edge SE1, SE2 at least in part is disposed at a location about the article retention aperture A1, A2 so as to oppose the load-bearing edge LE1, LE2. The maximum distance D1, D2 between the load-bearing edge LE1, LE2 and the slidable edge SE1, SE2 is generally equal to or less than an external lateral size of an article B or portion of an article B to be received in the article retention aperture A1, A2.

The article carrier 90; 190; 290 is engageable with an article B such that the slidable edge SE1, SE2 is movable along an article surface between a first position and a second position. The slidable edge SE1, SE2 is disposed in substantially the same elevation as the load-bearing edge LE1, LE2 when in the first position. The slidable edge SE1, SE2 is located at a higher elevation than the load-bearing edge LE1, LE2 when in the second position.

The main panel 12, 14; 112, 114; 212, 214 comprises a load-bearing area LB1, LB2 extending alongside the load-bearing edge LE1, LE2. The load-bearing area LB1, LB2 being flat or planar when the slidable edge SE1, SE2 is in the

second position such that the load-bearing area LB1, LB2 is disposed substantially in a plane PI2 defined by the load-bearing edge LE1, LE2 and the slidable edge SE1, SE2.

The main panel 12, 14; 112, 114; 212, 214 comprises an end portion 12E, 14E; 112E, 114E; 212E, 214E, the end portion 12E, 14E; 112E, 114E; 212E, 214E is defined between the load-bearing edge LE1, LE2 and a free end edge of the main panel 12, 14; 112, 114; 212, 214. The end portion 12E, 14E; 112E, 114E; 212E, 214E is substantially planar in the first position and lies in a first plane PI1. The end portion 12E, 14E; 112E, 114E; 212E, 214E is substantially planar in the second position and lies in a second plane PI2. The second plane PI2 is inclined or disposed at a non-zero angle θ with respect to the first plane PI1. The load-bearing edge LE1, LE2 defines a pivot Pv about which the end portion 12E, 14E; 112E, 114E; 212E, 214E pivots or rotates.

The load-bearing edge LE1, LE2 may comprise a linear segment Li. The load-bearing edge LE1, LE2 may comprise a curved segment Cr2.

The article carrier may further comprise a reinforcing panel 14, 12; 114, 112; 214, 212 disposed in face-contacting arrangement with the main panel 12, 14; 112, 114; 212, 214. The reinforcing panel comprises a second article retention aperture A2, A1 having a second uninterrupted perimeter P2, P1 provided by the reinforcing panel 14, 12; 114, 112; 214, 212. The second article retention aperture A2, A1 is disposed concentrically with the first article retention aperture A1, A2. The second uninterrupted perimeter P2, P1 includes a second load-bearing edge LE2, LE1 comprising a free edge for load-bearing engagement with an article B. The second load-bearing edge LE2, LE1 is coextensive along the first load-bearing edge LE1, LE2.

The first load-bearing edge LE1, LE2 comprises a linear segment Li and the second load-bearing edge LE2, LE1 comprises a curved segment Cr2 extending alongside at least the linear segment Li of the first load-bearing edge LE1, LE2. The linear segment Li of the first load-bearing edge LE1, LE2 is located closer to the center of the first or second article retention aperture A1, A2 than the curved segment Cr2 of the second load-bearing edge LE2, LE1.

The present disclosure provides an article carrier 90; 190; 290 for packaging at least one article B. The article carrier 90; 190; 290 comprises an upper panel 14; 114; 214 and a lower panel 12; 112; 212 in a face-contacting arrangement with the upper panel 14; 114; 214. The upper panel 14; 114; 214 comprises an upper article retention aperture A2, A1 having an upper perimeter P2 provided by the upper panel 14; 114; 214. The upper perimeter P2 includes an upper load-bearing edge LE2 which comprises an uninterrupted free edge for load-bearing engagement with an article B. The lower panel 12; 112; 212 comprises a lower aperture A1; A2 having a lower perimeter P1 provided by the lower panel 12; 112; 212. The lower perimeter P1 includes a lower load-bearing edge LE1 which comprises an uninterrupted free edge for load-bearing engagement with an article B. The lower aperture A1; A2 is disposed in a concentric arrangement with the upper article retention aperture A2, A1 such that the lower load-bearing edge lower load-bearing edge LE1 extends co-extensively with the upper load-bearing edge LE2. A first one of the upper and lower load-bearing edges LE2, LE1 comprises a linear segment Li and a second one of the upper and lower load-bearing

edges LE2, LE1 comprises a curved segment Cr2 extending alongside at least the linear segment Li of the first one of the upper and lower load-bearing edges LE2, LE1.

The linear segment Li of the first one of the upper and lower load-bearing edges LE2, LE1 is located closer to the center of the upper or lower aperture A2, A1 than the curved segment Cr2 of the second one of upper and lower load-bearing edges LE2, LE1.

Each of the upper and lower perimeters P2, P1 is continuous and uninterrupted.

One of the upper and lower apertures A2, A1 is circular.

The present disclosure provides a package comprising at least one article B and an article carrier 90; 190; 290. The at least one article B comprising an upper end portion C of a generally cylindrical configuration. The article carrier 90; 190; 290 comprises a main panel 12, 14; 112, 114; 212, 214 which comprises an article retention aperture A1, A2 in which the upper end portion C of the article B is received. The article retention aperture A1, A2 has an uninterrupted perimeter P1, P2 provided by the main panel 12, 14; 112, 114; 212, 214. The uninterrupted perimeter P1, P2 includes a load-bearing edge LE1, LE2 and a slidable edge SE1, SE2. The load bearing edge LE1, LE2 comprises a free edge in load-bearing engagement with an underside of the upper end portion C of the article B. The slidable edge SE1, SE2 comprises a free edge in sliding contact with a cylindrical surface of the upper end portion C of the article B. At least a part of the slidable edge SE1, SE2 is disposed at a location about the article retention aperture A1, A2 opposing the load-bearing edge LE1, LE2. The maximum distance D1, D2 between the load-bearing edge LE1, LE2 and the slidable edge SE1, SE2 is generally equal to or less than the diameter D_B (see Figure 4) of the upper end portion C of the article B.

The article carrier 90; 190; 290 is in engagement with the upper end portion C of the article B such that the slidable edge SE1, SE2 is movable along the cylindrical surface of the upper end portion C between a first position and a second position. The slidable edge SE1, SE2 is disposed in substantially the same elevation as the load-bearing edge LE1, LE2 when in the first position. The slidable edge SE1, SE2 is located at a higher elevation than the load-bearing edge LE1, LE2 when in the second position.

The main panel 12, 14; 112, 114; 212, 214 comprises a load-bearing area LB1, LB2 extending alongside the load-bearing edge LE1, LE2. The load-bearing area LB1, LB2 of the main panel 12, 14; 112, 114; 212, 214 being flat or planar when the slidable edge SE1, SE2 is in the second position such that the load-bearing area LB1, LB2 is disposed substantially in a plane PI2 defined by the load-bearing edge LE1, LE2 and the slidable edge SE1, SE2.

The main panel 12, 14; 112, 114; 212, 214 comprises an end portion 12E, 14E; 112E, 114E; 212E, 214E, the end portion 12E, 14E; 112E, 114E; 212E, 214E is defined between the load-bearing edge LE1, LE2 and a free end edge of the main panel 12, 14; 112, 114; 212, 214. The end portion 12E, 14E; 112E, 114E; 212E, 214E is substantially planar in the first position and lies in a first plane PI1. The end portion 12E, 14E; 112E, 114E; 212E, 214E is substantially planar in the second position and lies in a second plane PI2. The second plane PI2 is inclined or disposed at a non-

zero angle θ with respect to the first plane PI1. The load-bearing edge LE1, LE2 defines a pivot Pv about which the end portion 12E, 14E; 112E, 114E; 212E, 214E pivots or rotates.

The upper end portion C of the at least one article B comprises a cap C. The at least one article B further comprises an annular gap Gr between the cap C and a lower portion B of the at least one article B, the load-bearing edge LE1, LE2 is disposed in the gap Gr such the load-bearing edge LE1, LE2 engages the underside of the cap C. The slidable edge SE1, SE2 is disposed above the gap Gr when in the second position such that the slidable edge SE1, SE2 is in sliding contact with the cylindrical surface of the cap C.

In the embodiment of Figure 1, the out-of-round (or squircle) aperture A2 in the upper panel 14 may be slightly smaller in radius about its perimeter than the circular aperture A1 in the lower panel 12. The maximum difference in radius may, optionally, be up to or about 1.00mm. The minimum difference in radius may, optionally, be down to or about 0.10mm.

In the embodiment of Figure 7, the out-of-round aperture A2 in the upper panel 114 may be slightly smaller in radial dimension along the three linear segments Li than the circular aperture A1 in the lower panel 112; the maximum difference in radius may, optionally, be up to or about 1.00mm. The out-of-round aperture A2 in the upper panel 114 may be slightly greater in radius along the three curved segments Cr than the circular aperture A1 in the lower panel 112; the maximum difference in radius may, optionally, be up to or about 0.50mm.

In the embodiment of Figure 10, the out-of-round (or squircle) aperture A2 in the lower panel 212 may be slightly smaller in radius about its perimeter than the circular aperture A1 in the upper panel 214; the maximum difference in radius may, optionally, be up to or about 1.00mm, the minimum difference in radius may, optionally, be down to or about 0.10mm).

Referring to Figure 1 and Figure 7, an optional range of the maximum distance between a linear segment Li and the adjacent arcuate segment Cr2 extending alongside the linear segment Li may, optionally, be no less than 0.5mm and no greater than 1.00mm when the second radius of curvature R2 is in the range of 5.00mm and 10.00mm.

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 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.

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
5 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.

10 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 or a severance line or both. The line of perforations can be
15 designed to facilitate folding and resist breaking, to facilitate folding and facilitate breaking with more effort, or to facilitate breaking with little effort.

The phrases "in registry with" and "in vertical 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
20 other in the direction of the thickness of the overlapping panels. For example, when an aperture in a first panel is "in registry with" or "in vertical 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. An article carrier for packaging a plurality of articles, the article carrier comprising an upper panel and a lower panel in face-contacting arrangement with the upper panel, the upper panel comprising an upper article retention aperture, the lower panel comprising a lower article retention aperture, the upper article retention aperture being disposed in a concentric arrangement with the lower article retention aperture, the upper article retention apertures being defined by an upper uninterrupted perimeter of a first configuration, the lower article retention aperture being defined by a lower uninterrupted perimeter of a second configuration, wherein the first configuration is different from the second configuration.
2. An article carrier according to claim 1, wherein a first one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is circular and wherein the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is out-of-round.
3. An article carrier according to claim 2, wherein the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter comprises at least one linear segment.
4. An article carrier according to claim 3, wherein the article carrier further comprises a handle provided by an upper handle portion of the upper panel and a lower handle portion of the lower panel, the lower handle portion underlying the upper handle portion, the at least one linear segment is disposed at a position along the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter furthestmost from the handle.
5. An article carrier according to claim 3, wherein the at least one linear segment of the other one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is disposed closer to a center of the upper or lower article retention aperture than an arcuate segment of the first one of the upper and lower uninterrupted perimeters extending alongside the at least one linear segment.
6. An article carrier according to claim 3, wherein the at least one linear segment subtends an angle less than ninety degrees from a center of the other of the upper and lower uninterrupted perimeters.
7. An article carrier according to claim 3, wherein the at least one linear segment subtends an angle equal to or less than forty-five degrees from the center of the other of the upper and lower uninterrupted perimeters.
8. A carrier blank for forming an article carrier, the blank comprising a first panel and a second panel hingedly connected to the first panel such that the first and second panels are foldable into a face-contacting flat form, the second panel forming an upper panel comprising an upper article retention aperture, the first panel forming a lower panel comprising a lower article retention aperture, the upper article retention aperture being disposed in a concentric arrangement with the lower article retention aperture when in the face-contacting flat form, the upper article retention aperture being defined by an upper uninterrupted perimeter of a first configuration, the lower article retention aperture being defined by a lower uninterrupted perimeter of a second configuration, wherein the first configuration is different from the second configuration.

9. A carrier blank according to claim 8, wherein a first one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is circular and a second one of the upper uninterrupted perimeter and the lower uninterrupted perimeter is out-of-round and comprises one or more linear segments.
10. A carrier blank according to claim 9, wherein the first panel and the second panel are hingedly connected by a fold line and wherein at least one of said one or more linear segments is disposed perpendicularly with respect to the fold line.
11. A carrier blank according to claim 10, wherein the one or more linear segments comprise a pair of linear segments disposed parallel to the fold line.
12. An article carrier for packaging at least one article, the article carrier comprising a main panel including an article retention aperture having an uninterrupted perimeter provided by the main panel, the uninterrupted perimeter including a load-bearing edge and a slidable edge, the load bearing edge comprising a free edge for load-bearing engagement with an article, the slidable edge comprising a free edge for sliding contact with said article, wherein at least part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, a maximum distance defined between the load-bearing edge and the slidable edge is generally equal to or less than an external lateral dimension of a portion of an article to be received in the article retention aperture.
13. An article carrier according to claim 12, wherein the article carrier is engageable with an article such that the slidable edge is movable along an article surface between a first position and a second position, the slidable edge is disposed at substantially the same elevation as the load-bearing edge when in the first position, the slidable edge is located at a higher elevation than the load-bearing edge when in the second position.
14. An article carrier according to claim 13, wherein the main panel comprises a load-bearing area extending alongside the load-bearing edge, the load-bearing area being planar when the slidable edge is in the second position such that the load-bearing area is disposed substantially in a plane defined by the load-bearing edge and the slidable edge.
15. An article carrier according to claim 13, wherein the main panel comprises an end portion, the end portion is defined between the load-bearing edge and a free end edge of the main panel, the end portion is substantially planar when the slidable edge is in the first position and lies in a first plane, the end portion is substantially planar when the slidable edge is in the second position and lies in a second plane, the second plane is inclined to be disposed at a non-zero angle with respect to the first plane, the load-bearing edge defines a pivot about which the end portion rotates.
16. An article carrier according to claim 12, wherein the load-bearing edge comprises a linear segment.
17. An article carrier according to claim 12, wherein the load-bearing edge comprises a curved segment.
18. An article carrier according to claim 12, wherein the article carrier further comprises a reinforcing panel disposed in face-contacting arrangement with the main panel, the reinforcing panel comprises a second article retention aperture having a second uninterrupted perimeter provided by the reinforcing panel, the second article retention aperture is disposed concentrically with the first article retention aperture, the second uninterrupted perimeter includes a second

load-bearing edge comprising a free edge for load-bearing engagement with an article, the second load-bearing edge is coextensive along the first load-bearing edge.

19. An article carrier according to claim 18, wherein the first load-bearing edge comprises a linear segment and the second load-bearing edge comprises a curved segment extending alongside at least the linear segment of the first load-bearing edge.
20. An article carrier according to claim 19, wherein the linear segment of the first load-bearing edge is located closer to the center of the first or second article retention aperture than the curved segment of the second load-bearing edge.
21. An article carrier for packaging at least one article, the article carrier comprising an upper panel and a lower panel in a face-contacting arrangement with the upper panel, the upper panel comprising an upper article retention aperture having an upper perimeter provided by the upper panel, wherein the upper perimeter includes an upper load-bearing edge which comprises an uninterrupted free edge for load-bearing engagement with an article, the lower panel comprises a lower aperture having a lower perimeter provided by the lower panel, the lower perimeter includes a lower load-bearing edge which comprises an uninterrupted free edge for load-bearing engagement with an article, the lower aperture is disposed in a concentric arrangement with the upper article retention aperture such that the lower load-bearing edge extends co-extensively with the upper load-bearing edge, a first one of the upper and lower load-bearing edges comprises a linear segment and a second one of the upper and lower load-bearing edges comprises a curved segment extending alongside at least the linear segment of the first one of the upper and lower load-bearing edges.
22. An article carrier according to claim 21, wherein the linear segment of the first one of the upper and lower load-bearing edges is located closer to the center of the upper or lower aperture than the curved segment of the second one of upper and lower load-bearing edges.
23. An article carrier according to claim 21, wherein each of the upper and lower perimeters is continuous and uninterrupted.
24. An article carrier according to claim 21, wherein one of the upper and lower apertures is circular.
25. A package comprising at least one article and an article carrier, the at least one article comprising an upper end portion of a generally cylindrical configuration, the article carrier comprising a main panel which includes an article retention aperture into which the upper end portion of the article is received, the article retention aperture having an uninterrupted perimeter provided by the main panel, the uninterrupted perimeter includes a load-bearing edge and a slidable edge, wherein the load bearing edge comprises a free edge in load-bearing engagement with an underside of the upper end portion of the article, the slidable edge comprises a free edge in sliding contact with a cylindrical surface of the upper end portion of the article, at least a part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, a maximum distance defined between the load-bearing edge and the slidable edge is generally equal to or less than the diameter of the upper end portion of the article.

26. A package according to claim 25, wherein the article carrier is in engagement with the upper end portion of the article such that the slidable edge is movable along the cylindrical surface of the upper end portion between a first position and a second position, the slidable edge is disposed at substantially the same elevation as the load-bearing edge when in the first position, the slidable edge is located at a higher elevation than the load-bearing edge when in the second position.
27. A package according to claim 26, wherein the main panel comprises a load-bearing area extending alongside the load-bearing edge, the load-bearing area of the main panel being planar when the slidable edge is in the second position such that the load-bearing area is disposed substantially in a plane defined by the load-bearing edge and the slidable edge.
28. A package according to claim 26, wherein the main panel comprises an end portion, the end portion is defined between the load-bearing edge and a free end edge of the main panel, the end portion is substantially planar when the slidable edge is in the first position and lies in a first plane, the end portion is substantially planar when the slidable edge is in the second position and lies in a second plane, the second plane is inclined to be disposed at a non-zero angle with respect to the first plane, the load-bearing edge defines a pivot about which the end portion rotates.
29. A package according to claim 25, wherein the upper end portion of the at least one article comprises a cap, the at least one article further comprises an annular gap between the cap and a lower portion of the at least one article, the load-bearing edge is disposed in the gap such that the load-bearing edge engages the underside of the cap, the slidable edge is disposed above the gap when in the second position such that the slidable edge is in sliding contact with the cylindrical surface of the cap.
30. An article carrier for packaging at least one article, the article carrier comprising a main panel including an article retention aperture having an uninterrupted perimeter provided by the main panel the uninterrupted perimeter including a load-bearing edge and a slidable edge, the load bearing edge comprising a free edge for load-bearing engagement with an article, the slidable edge comprising a free edge for sliding contact with an article, wherein at least part of the slidable edge is disposed at a location about the article retention aperture opposing the load-bearing edge, wherein the load-bearing edge includes a linear segment of the uninterrupted perimeter.
31. An article carrier according to claim 30, wherein the slidable edge is a non-linear segment of the uninterrupted perimeter.

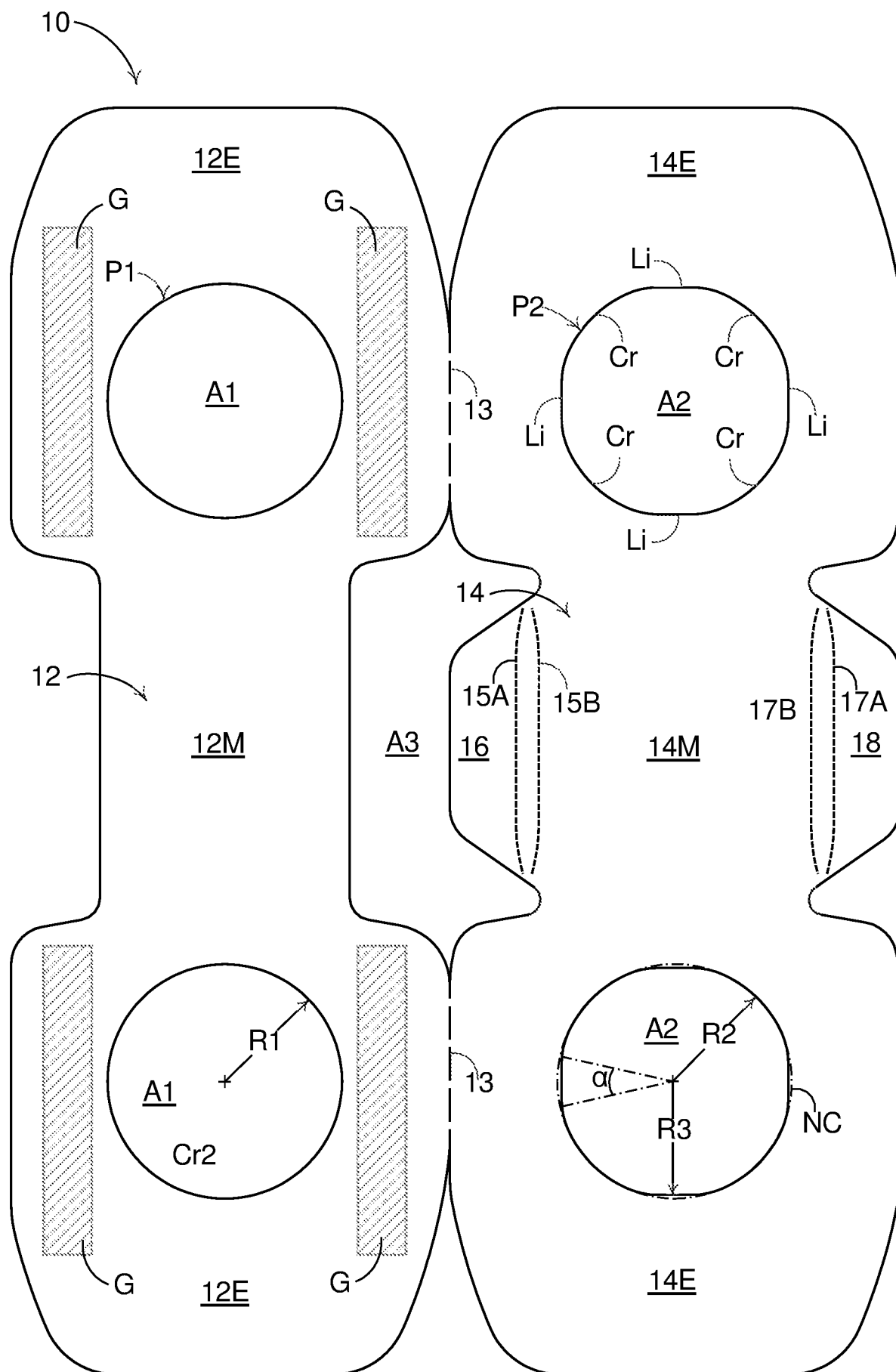


FIG. 1

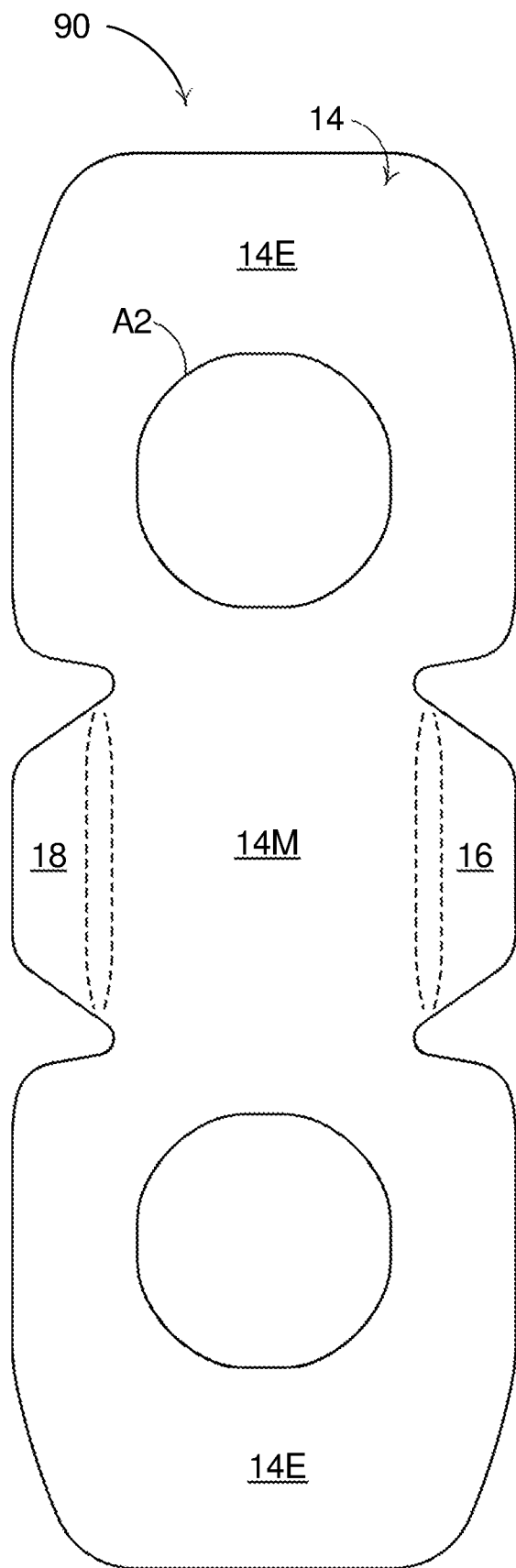


FIG. 2A

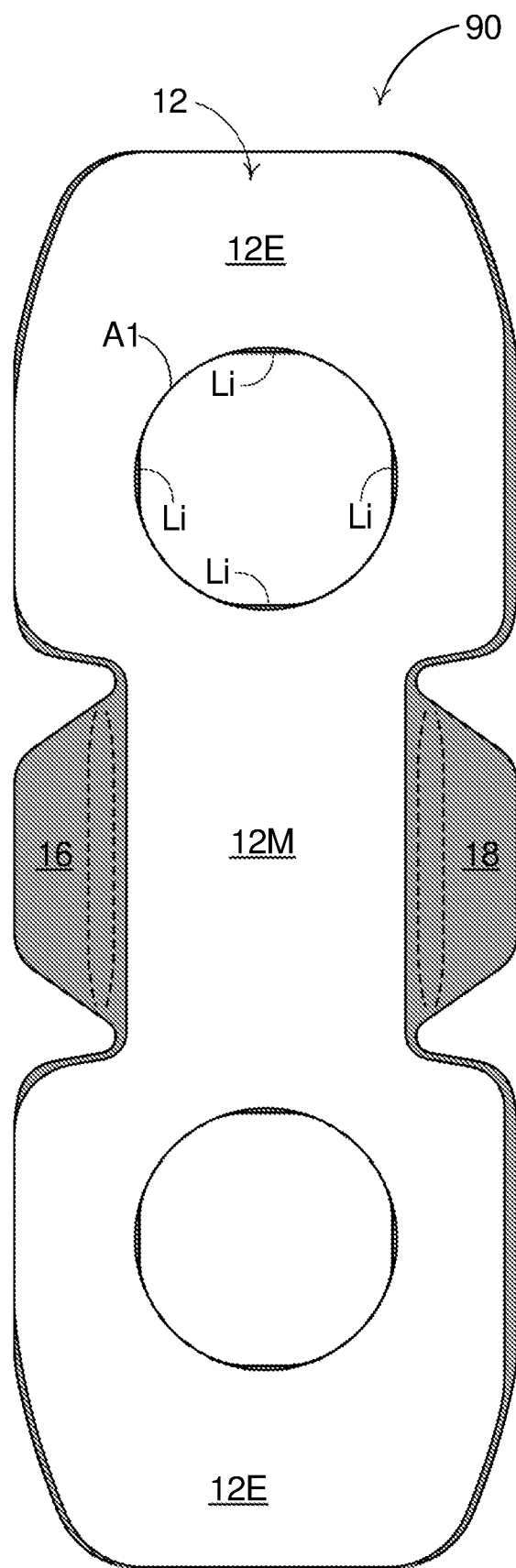


FIG. 2B

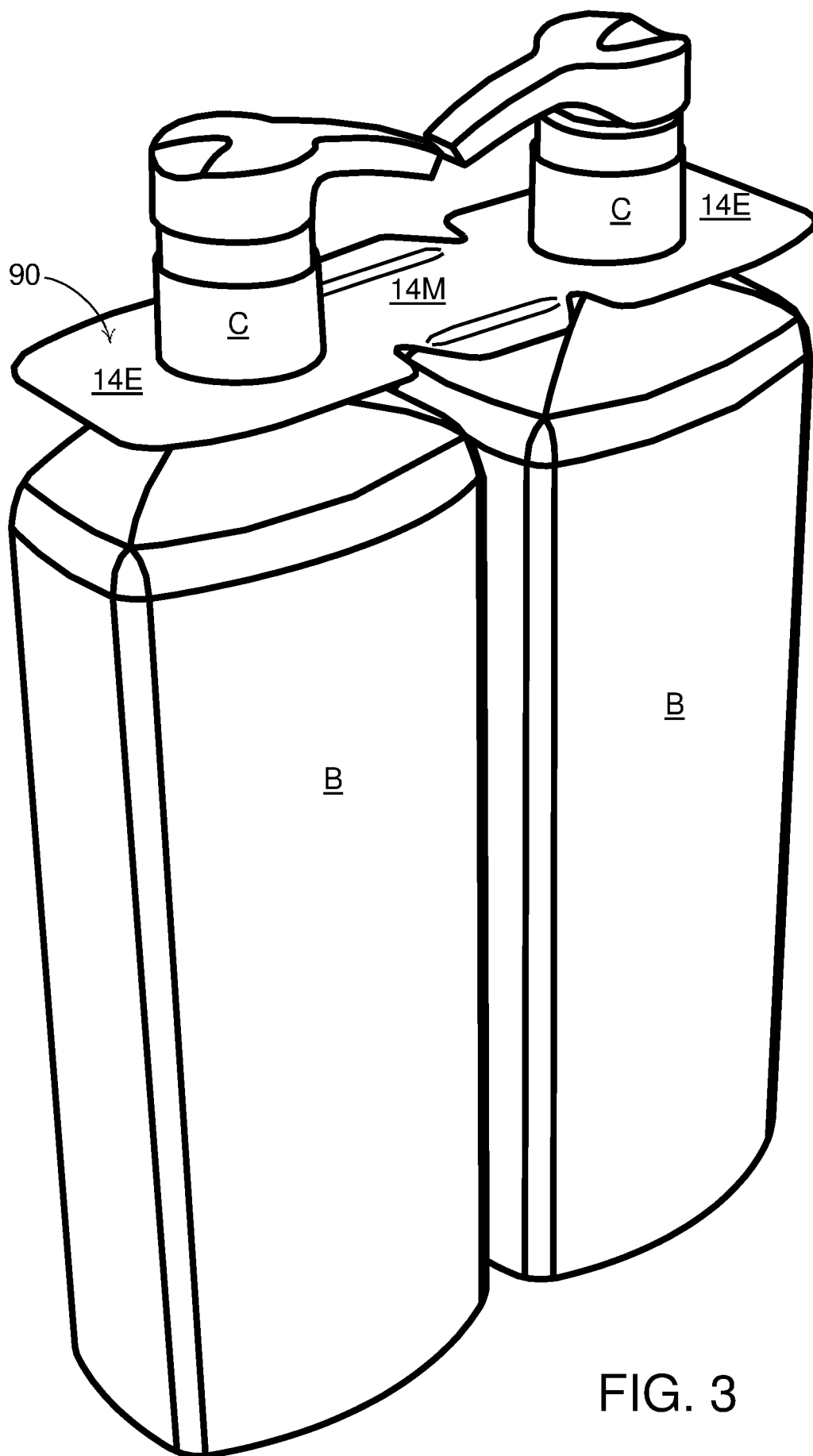


FIG. 3

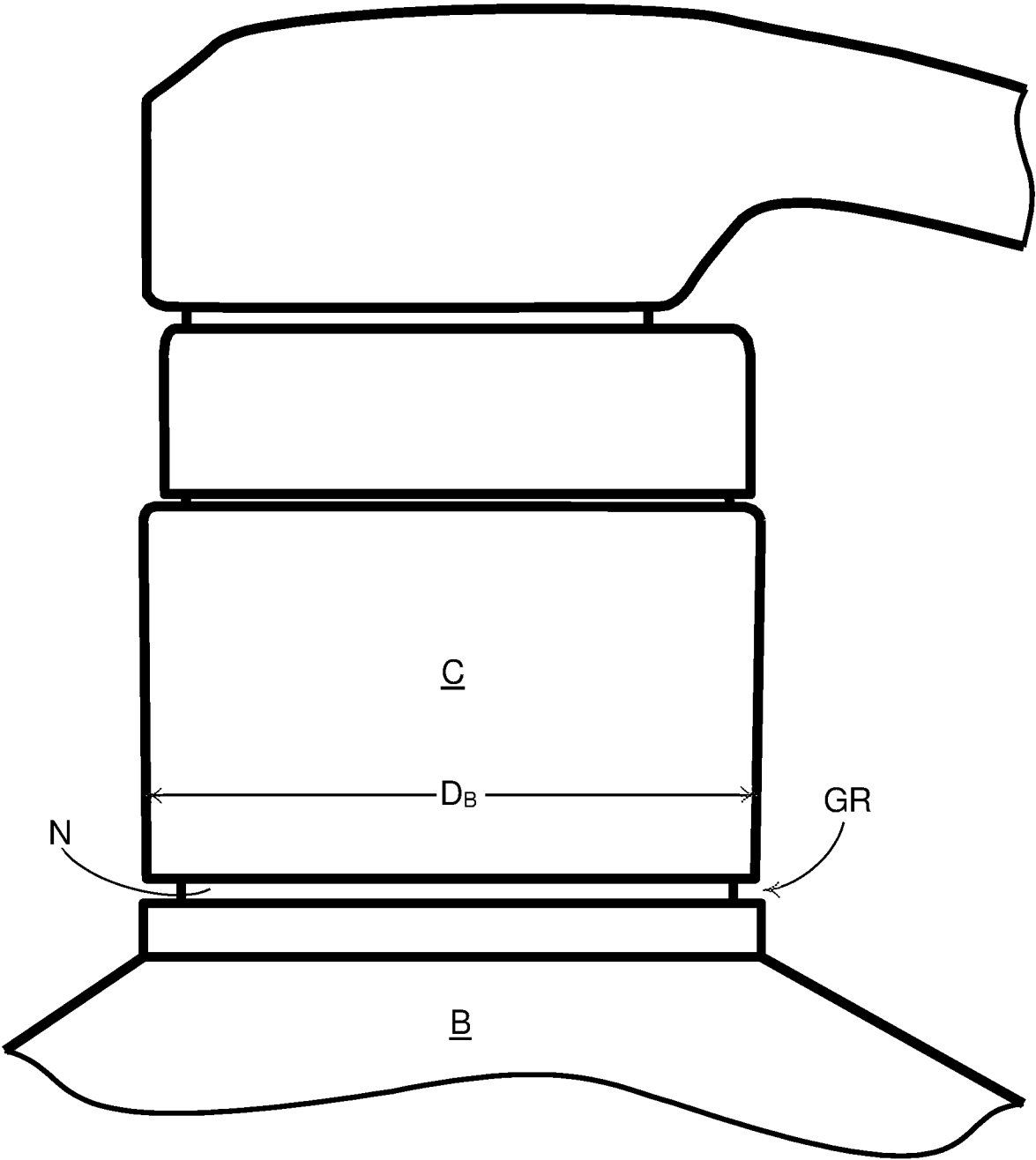


FIG. 4

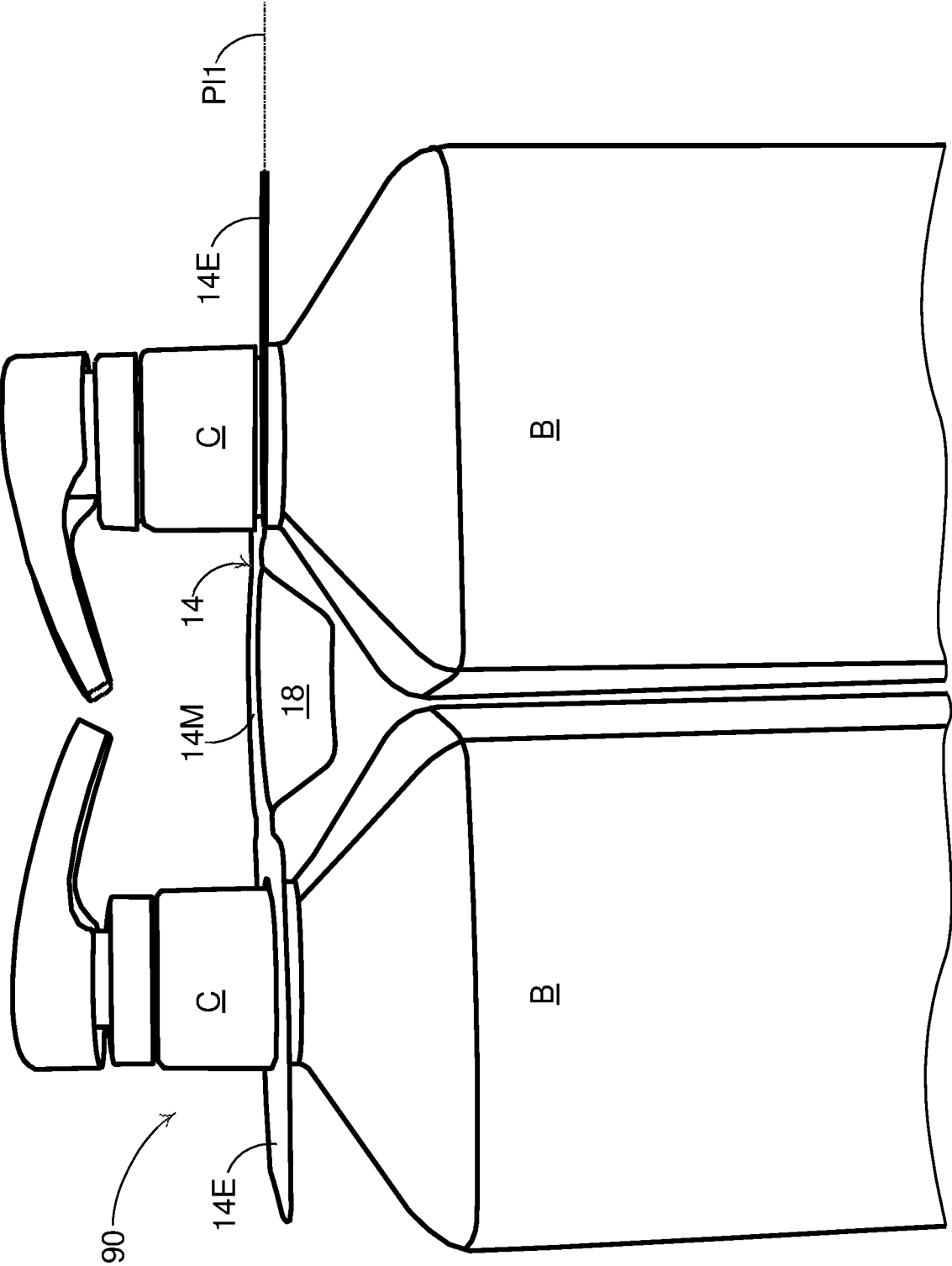


FIG. 5

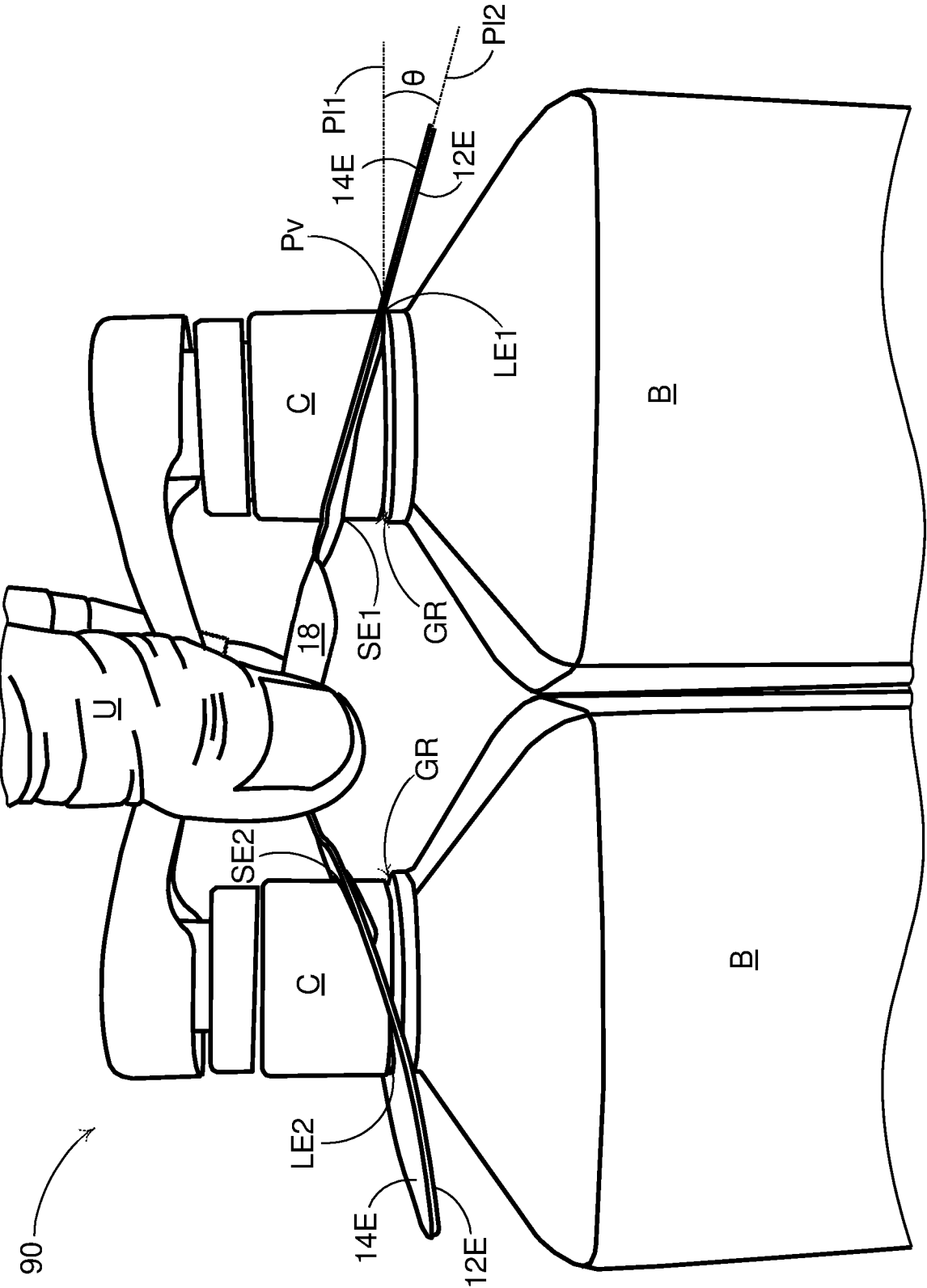


FIG. 6

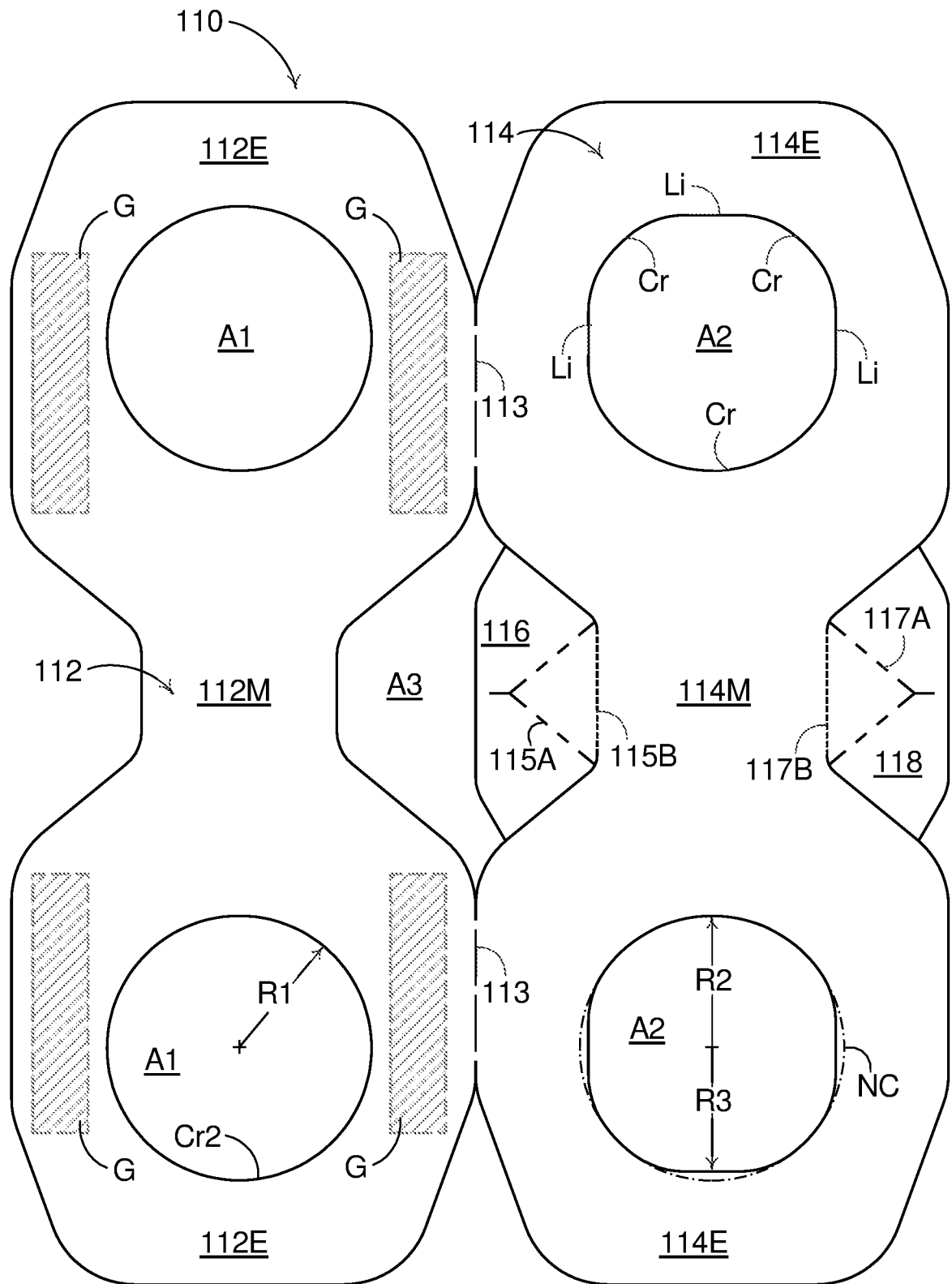


FIG. 7

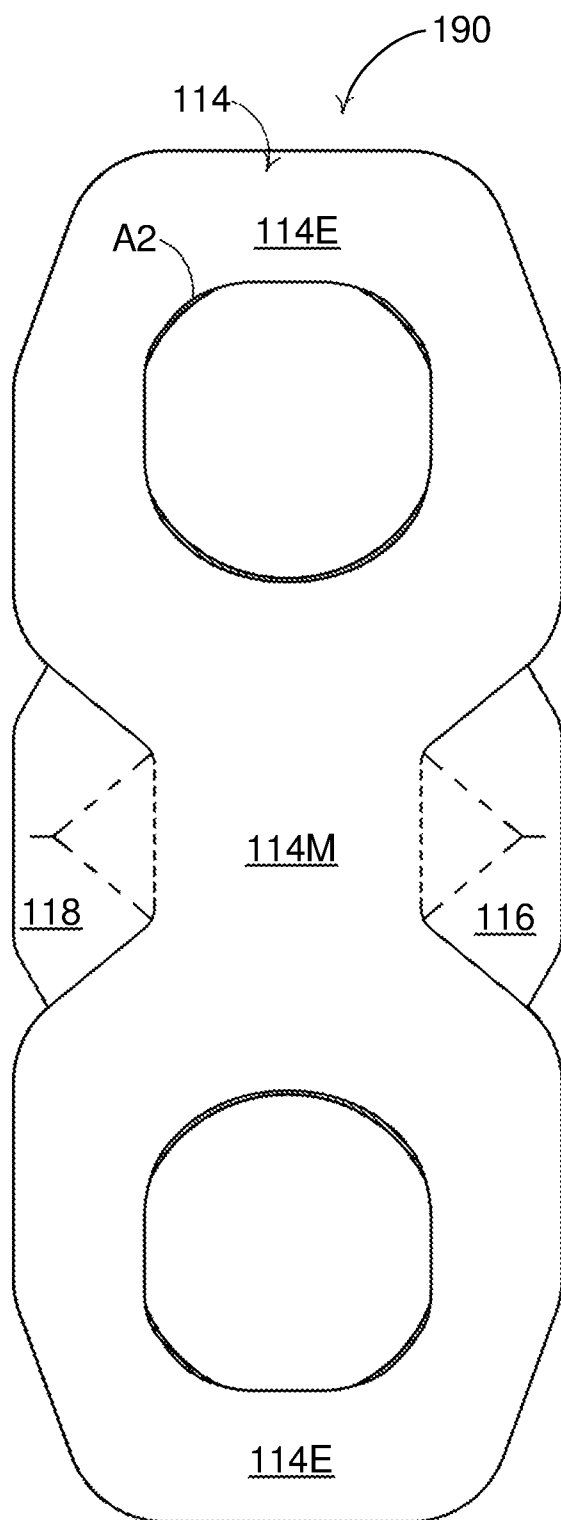


FIG. 8A

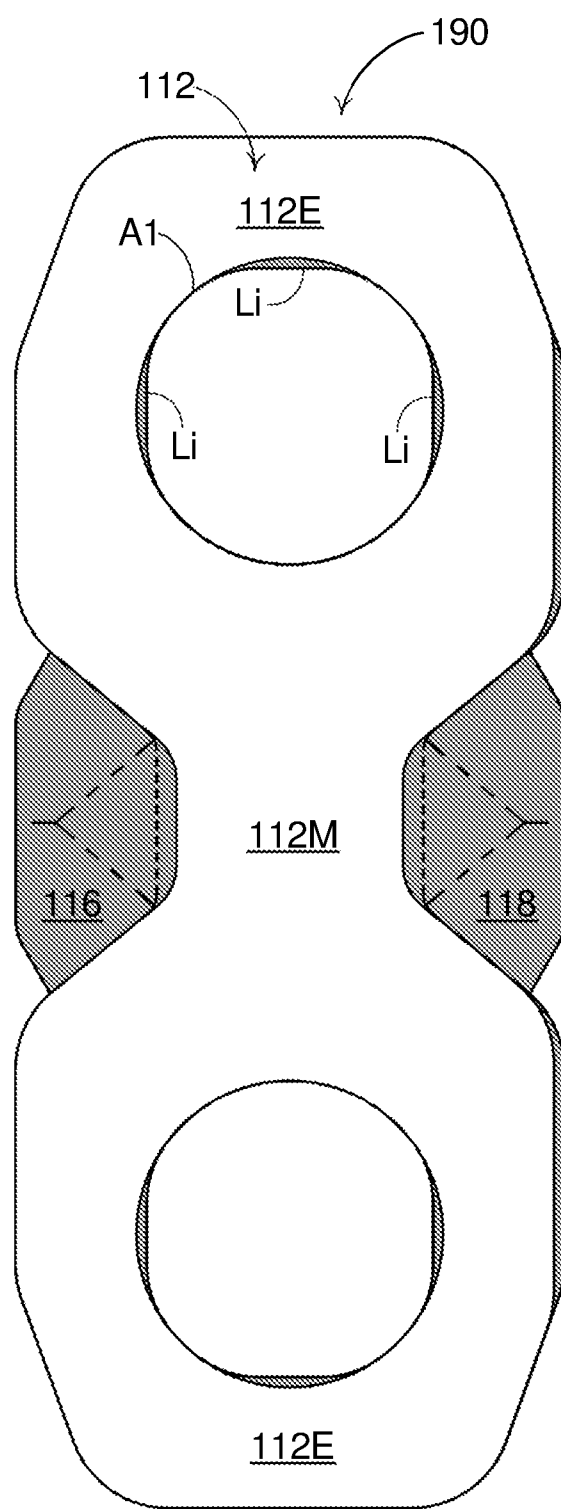


FIG. 8B

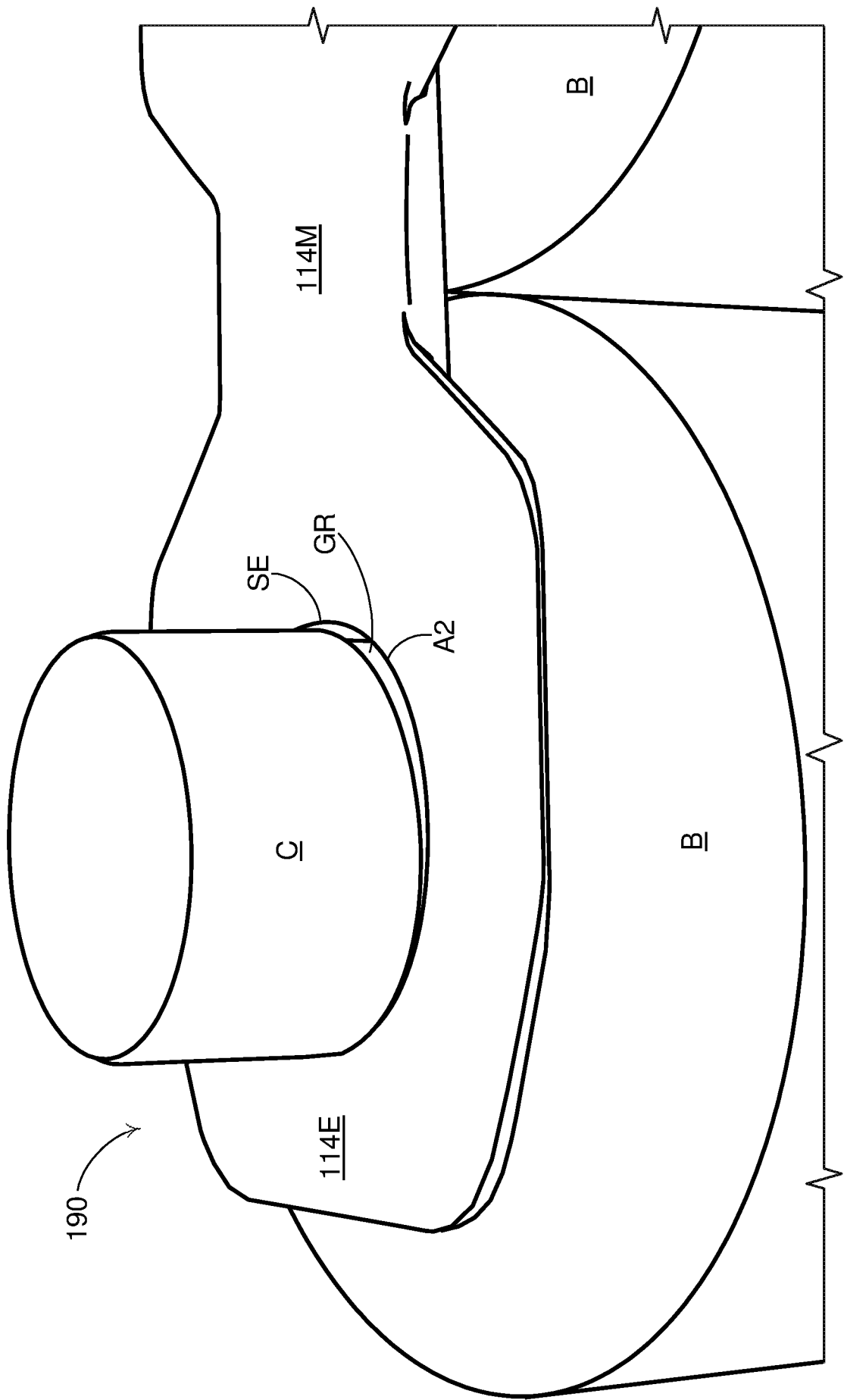


FIG. 9

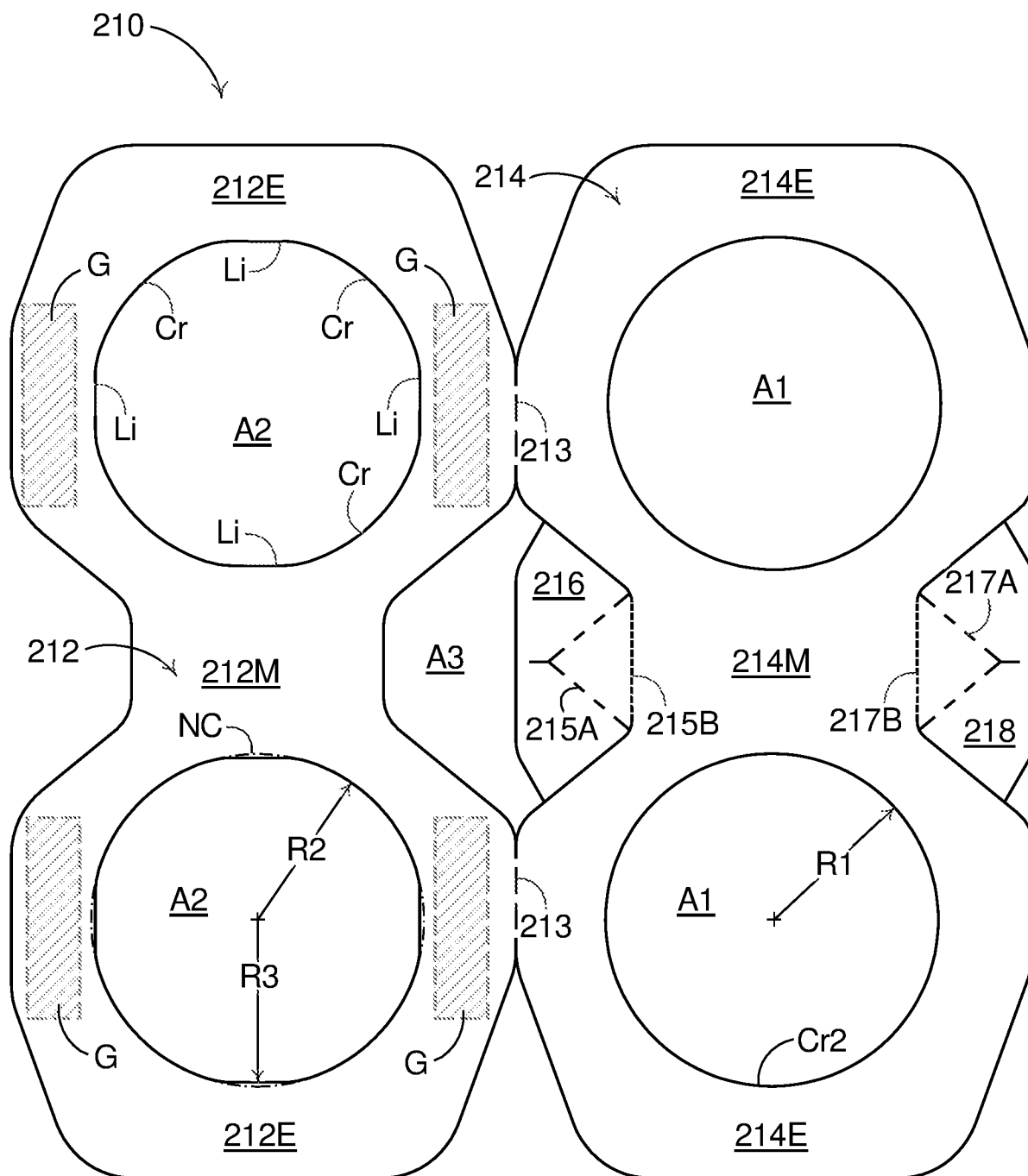


FIG. 10

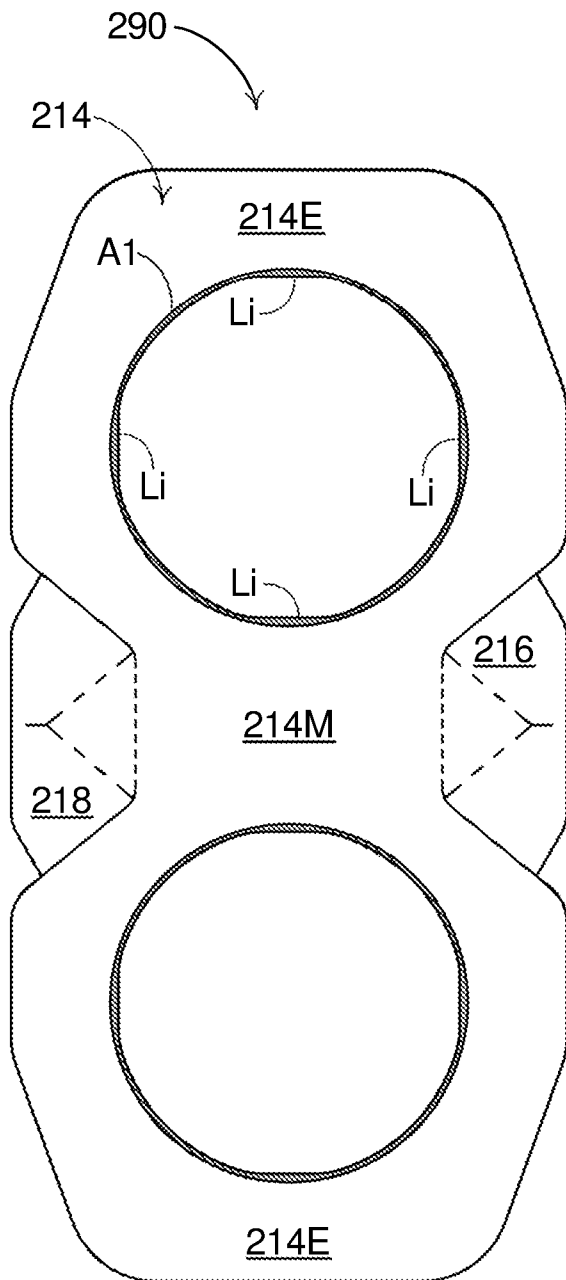


FIG. 11A

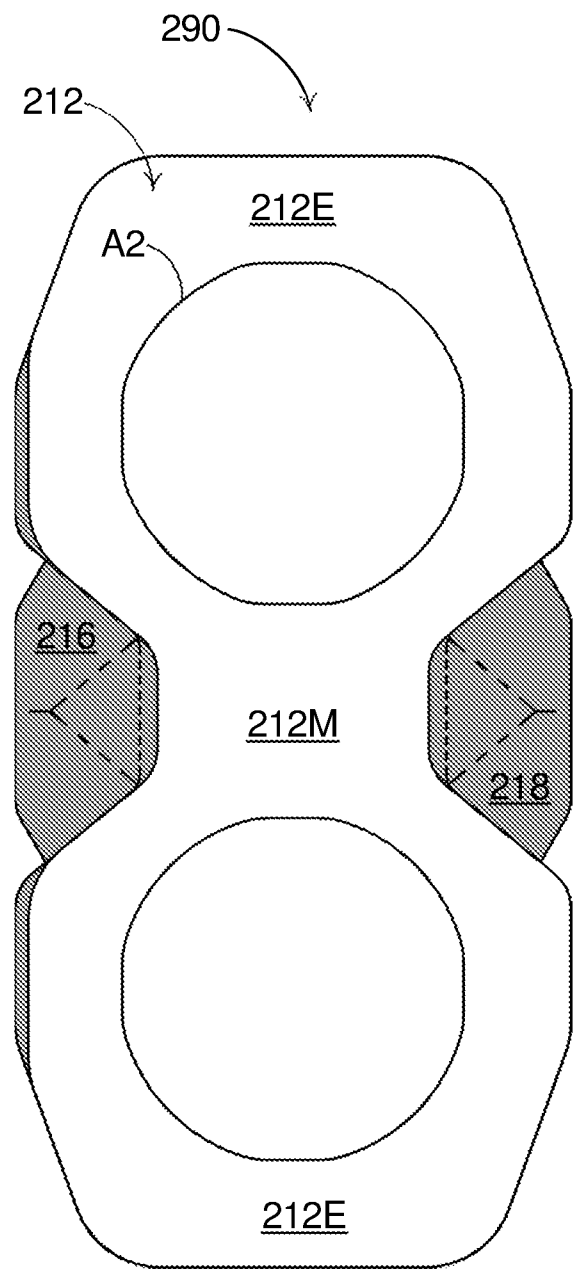


FIG. 11B

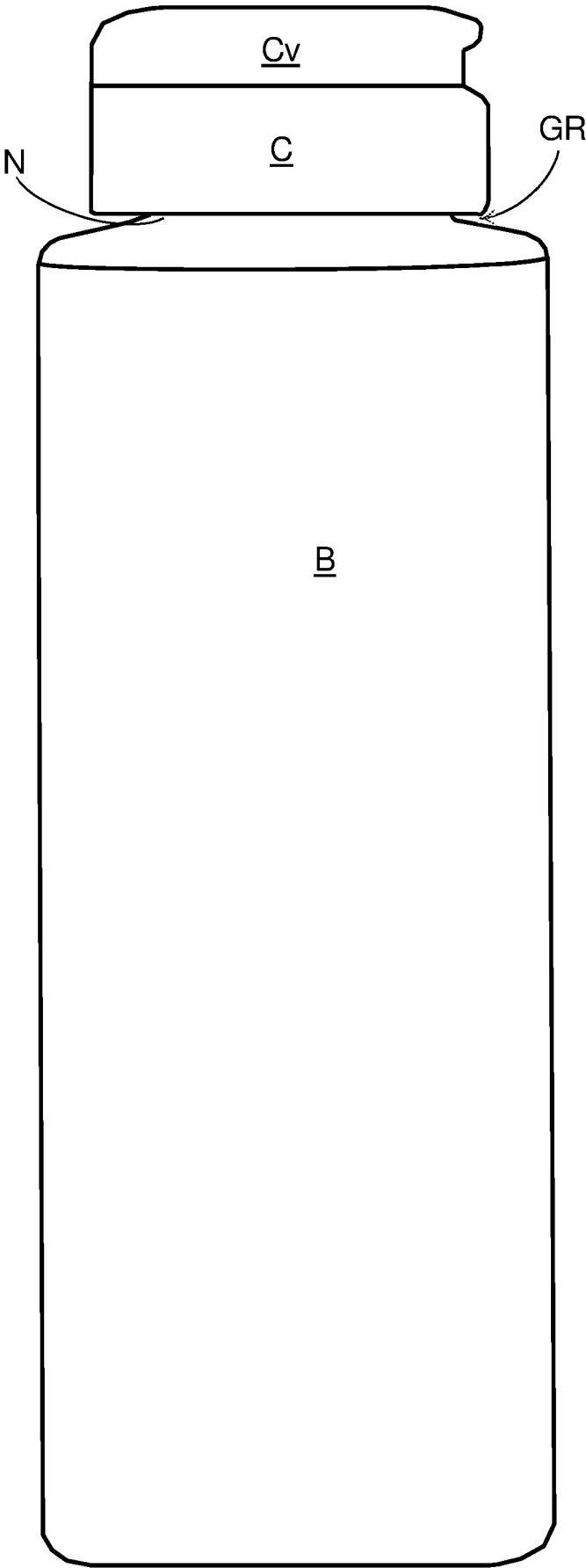


FIG. 12

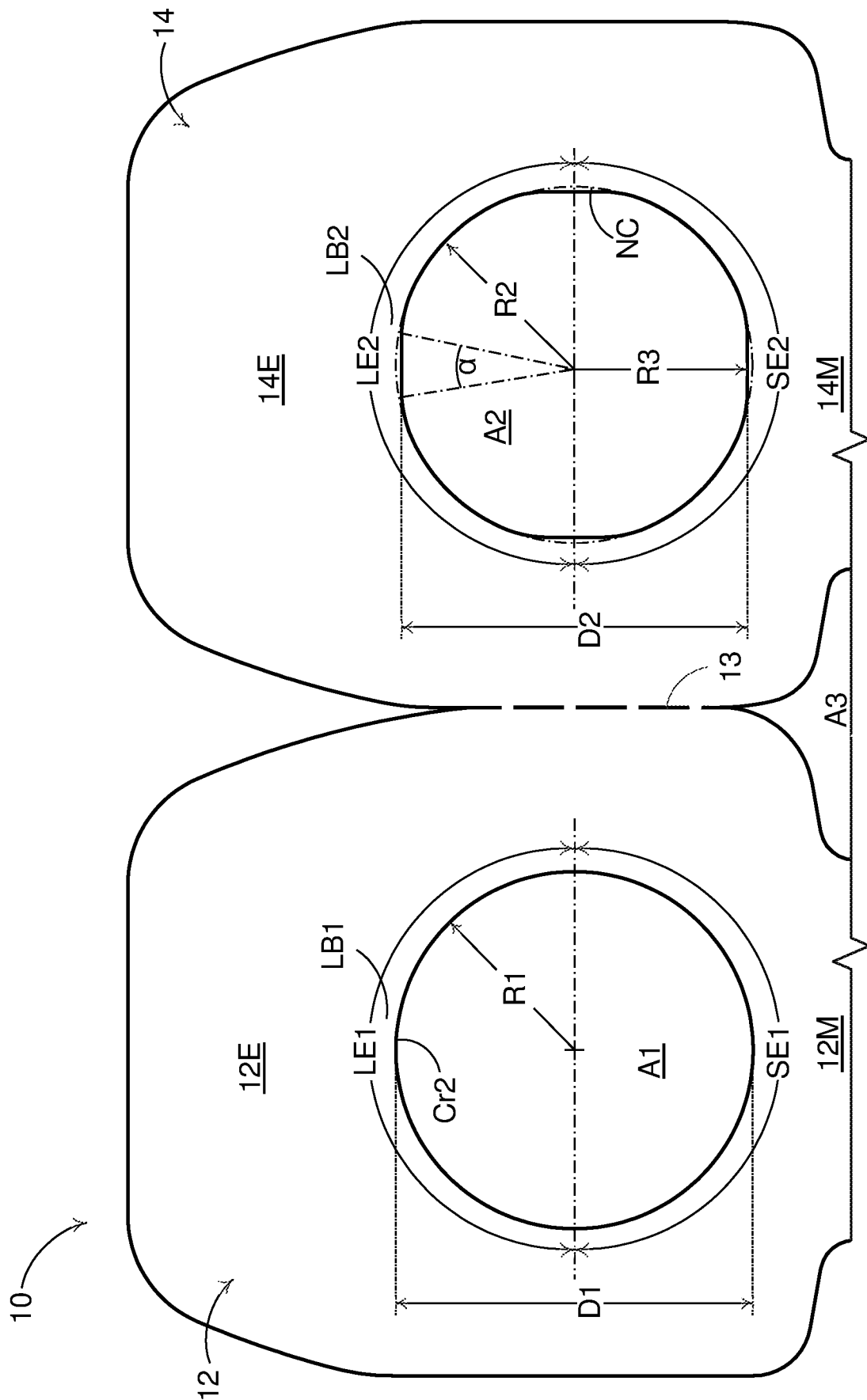


FIG. 1B

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2024/054727

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D71/42

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.
A	WO 2023/114338 A1 (WESTROCK PACKAGING SYSTEMS LLC [US]) 22 June 2023 (2023-06-22) page 5, lines 28-34; figures 2-5, 10 -----	1 - 31
A	US 5 682 982 A (STONEHOUSE DONALD BRUCE [US]) 4 November 1997 (1997-11-04) column 5, lines 53-56; figures 1-3, 14-16 -----	1 - 31
A	US 2023/150742 A1 (ZACHERLE MATTHEW E [US]) 18 May 2023 (2023-05-18) paragraphs [0069] - [0071]; figures 1-6 -----	1 - 31
A	FI 20 195 166 A1 (SIHVO LAURI [FI]) 7 September 2020 (2020-09-07) figures 1, 1a, 8 -----	1 - 31

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Further documents are listed in the continuation of Box C.

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See patent family annex.

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"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 February 2025

Date of mailing of the international search report

12/03/2025

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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