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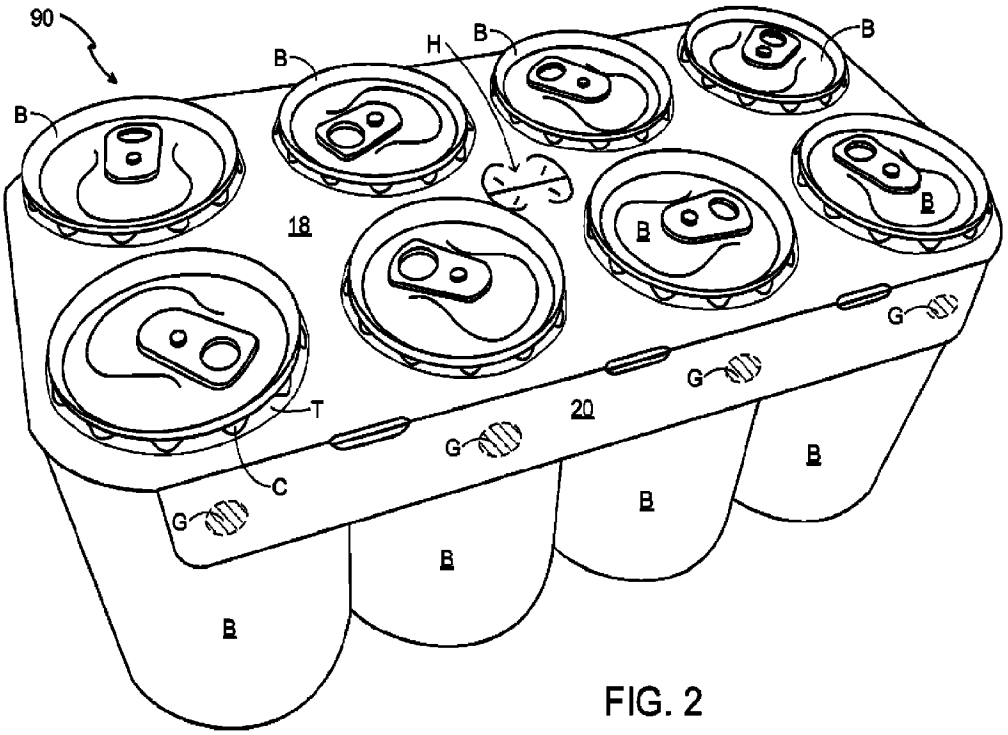

FIG. 2

(57) Abrégé/Abstract:
Aspects of the disclosure relate to a package, a carrier (90) for packaging one or more articles B and a blank (10) for forming the carrier. The package comprises an article carrier and one or more articles. The carrier comprises an engaging panel (18) having one or more top-receiving openings A2, A3. Each of the one or more articles is received in a respective one of the top-receiving openings so as to be secured to the engaging panel. The carrier further comprises at least one wing panel (20). The at least one wing panel is hinged to the engaging panel and the wing panel is adhered to at least one article.

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Abstract:

Aspects of the disclosure relate to a package, a carrier (90) for packaging one or more articles B and a blank (10) for forming the carrier. The package comprises an article carrier and one or more articles. The carrier comprises an engaging panel (18) having one or more top-receiving openings A2, A3. Each of the one or more articles is received in a respective one of the top-receiving openings so as to be secured to the engaging panel. The carrier further comprises at least one wing panel (20). The at least one wing panel is hinged to the engaging panel and the wing panel is adhered to at least one article.

ARTICLE CARRIER AND BLANK THERFOR

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of priority to U.S. Provisional Patent Application Serial No. 62/936,712 filed November 18, 2019 the disclosure of which is herein incorporated by reference in its entirety.

TECHNICAL FIELD

The present invention relates to article carriers and to blanks for forming the same. More specifically, but not exclusively, the invention relates to a carrier of the top-gripping type having one or more apertures for receiving and retaining an article therein.

BACKGROUND

In the field of packaging it is known to provide cartons for carrying multiple articles. Cartons are well known in the art and are useful for enabling consumers to transport, store and access a group of articles for consumption. For cost and environmental considerations, such cartons or carriers need to be formed from as little material as possible and cause as little wastage in the materials from which they are formed as possible. Further considerations are the strength 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 well known to provide top gripping article carriers in which an aperture is formed in a panel of the carrier, wherein tabs are struck from said aperture. The tabs are displaced out of the plane of said panel when an article is received in the aperture, wherein said tabs engage the article generally about a flange or lip of the article.

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

SUMMARY

A first aspect of the invention provides an article carrier for packaging at least one article, the carrier comprising a main panel having at least one top-engaging article device for receiving and securing the main panel to a respective article, the carrier further comprising at least one wing panel, the at least one wing panel being hinged to the main panel and wherein the wing panel is adhereable to the at least one article.

Optionally, at least one top-engaging article device comprises at least one top-receiving opening for receiving and securing the main panel to a respective article.

Optionally, at least one top-engaging article device comprises at least one top-receiving opening for partially receiving a respective article so as to and secure the main panel to said article.

Optionally, at least one top-engaging article device comprises a pair of top-receiving openings for partially receiving a respective article so as to and secure the main panel to said article.

Optionally, the at least one wing panel comprises a side panel hinged to the main panel and an end panel, wherein the end panel is adhereable to the at least one article.

Optionally, the end panel comprises a securing portion, the securing portion being disposed in overlapping relationship with the side panel.

Optionally, the securing portion is adhered to the at least one article.

Optionally, the securing portion is adhered to the side panel.

A second aspect of the invention provides an article carrier for packaging at least one article, the carrier comprising an engaging panel having at least one top-receiving opening for receiving and securing the engaging panel to a respective article, the carrier further comprising at least one wing panel, the at least one wing panel being hinged to the engaging panel being adhereable to the at least one article.

A third aspect of the invention provides a package comprising an article carrier and one or more articles, the carrier comprising an engaging panel having one or more top-receiving openings, each of the one or more articles being received in a respective one of the top-receiving openings so as to be secured to the engaging panel, the carrier further comprising at least one wing panel, the at least one wing panel being hinged to the engaging panel being adhered to at least one article.

Optionally, the carrier comprises at least one lap panel disposed in face to face relationship with the engaging panel.

Optionally, the at least one lap panel comprises one or more openings for receiving a portion of an article.

Optionally, at least one wing panel comprises a pair of wing panels in the form of a pair of opposing side panels hinged to opposing side edges of the engaging panel.

Optionally, the at least one lap panel is hingedly connected directly to the engaging panel by a fold or crease line.

Optionally, the at least one lap panel is hingedly connected to the main panel by at least one further panel.

Optionally, the at least one further panel comprises the wing panel.

A fourth aspect of the invention provides an article carrier for packaging at least one article, the carrier comprising a main panel having an article engaging device comprising at least one top-receiving opening, the top-receiving opening comprising a partially toothed engaging aperture having toothed perimeter section and toothless perimeter section wherein the toothless perimeter section has a radius of curvature (R_2) which is greater than the radius (R_1) of a notional circle (N_{C1}) defined by the engaging aperture.

A fifth aspect of the invention provides an article carrier for packaging at least one article, the carrier comprising a top panel and at least one wing panel hingedly connected to a side edge of the top panel by a corner fold line, wherein the carrier comprises a handle structure including a pair of handle openings disposed on the opposite sides of the corner fold line between a top panel and the wing panel.

Optionally, the at least one wing panel comprises a pair of wing panels in the form of opposing side panels, and the carrier comprises a handle opening in each of the pair of wing panels.

Optionally, the carrier comprises a further handle opening in the top panel.

Optionally, the further handle opening in the top panel comprises a pair of foldable tabs forming cushioning flaps hinged to the top panel, the foldable tabs being hinged in opposition to each other and each being foldable towards one of the handle openings in one of the pair of wing panels.

Optionally, the handle opening in each of the pair of wing panels is defined, at least in part, by a foldable tab hinged to the respective wing panel.

Optionally, the handle opening in each of the pair of wing panels is defined, at least in part, by a foldable tab hinged to the top panel.

Optionally, the wing panel is a two ply structure comprising an inner wing panel and an outer wing panel disposed in face to face relationship with each other.

Optionally, the inner wing panel comprising a handle opening disposed in registry or alignment with a handle opening in the outer wing panel.

Optionally, the inner wing panel is hingedly connected to the outer wing panel.

Optionally, the handle opening in the inner wing panel is provided by an extension of the outer wing panel which is struck from the inner wing panel, the extension creating an opening inner wing panel when the outer wing panel is folded with respect to the inner wing panel.

A sixth aspect of the invention provides a blank for forming an article carrier, the blank comprising an engaging panel having at least one top-receiving opening for receiving and securing the engaging panel to a respective article, the blank further comprising at least one wing panel, the at least one wing panel being hinged to the engaging panel and wherein a setup carton the wing panel is adhereable to the at least one article.

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.

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.

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.

In accordance with an aspect of an embodiment, there is provided an article carrier for packaging at least one article, the carrier comprising a main panel having at least one top-engaging article device for receiving a respective article to secure the main panel to the respective article, the at least one top-engaging article device comprising at least one engaging feature comprising at least one of: a plurality of teeth, a slit, and an opening, wherein the at least one engaging feature provides an engaging edge configured to at least partially engage with an upper portion of the respective article; the carrier further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the main panel.

In accordance with another aspect of an embodiment, there is provided a package comprising: a package comprising an article carrier and at least one article, the carrier comprising an engaging panel having at least one top-receiving opening, each of the at least one article being received in each of the at least one top-receiving openings, respectively, so as to be secured to the engaging panel, wherein the at least one top-receiving opening provides an engaging edge configured to at least partially engage with an upper portion of the respective article; the carrier further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the engaging panel.

In accordance with another aspect of an embodiment, there is provided a blank for forming an article carrier configured to hold a plurality of generally cylindrical cans, the blank comprising an engaging panel having at least one top-receiving opening for receiving a respective article to secure the engaging panel to the respective article, the at least one top-receiving opening comprising at least one engaging feature comprising at least one of: a plurality of teeth, a slit, and an opening, wherein the at least one engaging feature provides an engaging edge configured to at least partially engage with an upper portion of the respective article; the blank further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the engaging panel.

BRIEF DESCRIPTION OF THE DRAWINGS

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 carrier according to a first embodiment;

Figure 1B is an enlarged plan view of a portion of the blank of Figure 1 showing an article retention structure;

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

Figure 2B is enlarged plan view of a portion of the carrier of Figure 2;

Figure 3 is a plan view from above of a blank for forming a carrier according to a second embodiment;

Figure 4 is a perspective view from above of a carrier formed from the blank of Figure 3;

Figure 5 is an end view the carrier of Figure 4;

Figure 6 is a plan view from above of a blank for forming a carrier according to a third embodiment;

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

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

Figure 9 is a plan view from above of a blank for forming a carrier according to a sixth embodiment;

Figure 10 is an enlarged plan view of a portion of the blank of Figure 3 showing an article retention structure;

Figure 11A is a cross sectional view of a first article;

Figure 11B is a side view of a second article showing a sectional view of the first article of Figure 11B superimposed thereon;

Figure 12 is a plan view from above of a blank for forming a carrier according to a seventh embodiment;

Figure 13 is a plan view from above of a blank for forming a carrier according to an eighth embodiment; and

Figure 14 is a perspective view from above of an article carrier formed from the blank of Figure 13.

DETAILED DESCRIPTION OF EMBODIMENTS

Detailed descriptions of specific embodiments of the 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 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 minimised to show details of particular components. Well-known components, materials or methods are not necessarily described in great detail in order to avoid obscuring the present disclosure. Any specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the invention.

Referring to Figure 1, there is shown a plan view of a blank 10 which is capable of forming a carton or carrier 90, as shown in Figure 2, for containing and carrying a group of primary products such as, but not limited to, bottles or cans, hereinafter referred to as articles B, as shown in Figure 2. The blank 10 forms a secondary package for packaging at least one primary product container or package. Alternative blanks 110; 210; 310; 410; 510; 610; 710 are shown in Figures 3, 6, 7, 8, 9, 12 and 13.

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 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. Exemplary containers include bottles (for example metallic, glass or plastics bottles), cans (for example aluminium cans), tins, pouches, packets and the like.

The blanks 10; 110; 210; 310; 410; 510; 610; 710 are formed from a sheet of suitable substrate. It is to be understood that, as used herein, the term "suitable substrate" includes all manner of foldable sheet material such as paperboard, corrugated board, cardboard, plastic, combinations thereof, and the like. It should be recognised that one or other numbers of blanks may be employed, where suitable, for example, to provide the carrier structure described in more detail below.

The packaging structures or cartons 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 embodiments, the blanks 10; 110; 210; 310; 410; 510; 610; 710 are configured to form a carton or carrier 90; 190; 790 for packaging an exemplary arrangement of exemplary articles B. In the embodiments illustrated in Figures 1 to 8 and 12 to 14, the arrangement is a 2 x 4 matrix or array; in the illustrated embodiments two rows of four articles B are provided, and the articles B are beverage cans. In the embodiment illustrated in Figure 9, the arrangement is a 1 x 4 matrix or array; in the illustrated embodiment one row of four articles B are provided, and the articles B are beverage cans. Alternatively, the blanks 10, 110, 210, 310, 410, 510; 610; 710 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.

In the embodiments of Figures 3, 4, 5, 6 and 9, the beverage cans may be 12oz (355ml) cans of the sleek or slim design; that is to say the articles B are substantially of the same diameter over their entire height. An exemplary article B_S is illustrated in Figure 11B, the article B_S has a maximum diameter or lateral dimension D_{BS} (the diameter D_{BS} may be about 2.25inches or about 58mm). The article B_S comprises an upper portion or top closure T which has a diameter or lateral dimension D_N (the diameter D_N may be about 2.125inches or 54.8mm).

The neck N_S may provide an outwardly projecting flange, that is to say it may comprise an undercut for engaging with the carrier. A top closure T may be attached to the side wall of the article B_S to form a seam or "chime" C which provides the flange F. In some embodiments the variation in diameter between the top closure and the main body M_S of the article B is less than 7mm, may be less than 5mm and optionally is less than 4mm.

As used herein the terms "sleek" or "slim" refer to articles B_S which have little or no variation in their lateral dimension between the top closure T which engages with the carrier 90 and the main body M_S of the article B_S. The articles B_S are substantially parallel sided or of substantially uniform diameter.

In the embodiments of Figures 1, 2, 7, 8, 12 and 13, the beverage cans may be 12oz (355ml) cans. An exemplary article B is illustrated in Figure 11A, the article B has a maximum diameter or lateral dimension D_B (the diameter D_B may be about 2.6inches or about 66mm). The article B comprises an upper portion or top closure which has a diameter or lateral dimension D_{N1} (the diameter D_{N1} may be about 2.125inches or 54.8mm). In some embodiments the variation in diameter between the top closure and the main body M of the article B is greater than 7mm, may be 10mm or more and optionally may be at least 12mm.

Referring to Figure 1 there is shown a blank 10 comprising a plurality of panels 12, 14, 16, 18, 20, 22, 24, including a main panel 18 for forming an upper ply of a top wall or an engaging panel of a carrier 90 (see Figure 2). The plurality of panels 12, 14, 16, 18, 20, 22, 24 may be arranged in a linear series hinged one to the next by corresponding fold lines 13, 15, 17, 19, 21, 23.

The main panel 18 includes at least one article retention structure RT. In the embodiment of Figures 1 and 2 the main panel 18 comprises a plurality of article retention structures RT, specifically eight article retention structures RT arranged in 2 x 4 matrix or array. Each of the article retention structures RT comprise an aperture A2, A3. A first row article of retention structures RT each comprise a first aperture A2, a second row of article retention structures RT each comprise a second aperture A3.

Each article retention structure RT comprises an article receiving opening defined in part by a respective one of the first and second apertures A2, A3.

Each of the article retention structures RT is substantially similar in construction and will therefore be described in detail with reference to the article retention structure RT shown in Figure 1B.

The aperture A3 comprises a perimeter which may approximate, or define, a notional circle N_{CE}. The notional circle N_{CE} comprises a radius R_{CE}.

Each article retention structure comprises a plurality of teeth T disposed about the circumference or perimeter of their respective article receiving opening.

The teeth T are formed in the main panel 18 about the aperture A3.

Each tooth T comprises an engaging or tooth edge E1, as shown in Figure 1B. Each tooth edge E1 may be arcuate. The tooth edges E1 may be defined by an arc or portion of a circle N_{CT}. In one example the circle N_{CT} may have a radius of 50mm (63/32"). The radius of the circle N_{CT} may be in the range 30mm (1.181") to 75mm (189/64").

In the illustrated embodiment the tooth edges E1 are defined by a portion of the circle N_{CT}, the circle N_{CT} comprises a radius R_{CT} which is greater than the radius R_{CE} of the notional circle N_{CE} of the aperture A3.

The main panel 18 comprises cutaways C in the form of recesses or notches. The cutaways C are substantially "U" shaped, the cutaways C each define a portion of a notional circle N_{CR} see Figure 1B. The notional circle N_{CR} comprises a radius R_{CR}.

The cutaways C extend radially outward from the notional circle N_{CE} defined by the teeth T.

The teeth T are each defined, at least in part, by a pair of cutaways C. The cutaways C form relief elements extending radially away from the centre of the notional circle N_{CE}.

In one embodiment the cutaways C are defined by a portion of a circle having a radius of about 2.38mm (3/32"), the radius may be in the range 1.59mm (1/16") to 4.76mm (3/16").

It will be appreciated that the radius of curvature R_{CT} of the engaging edges of the teeth T is substantially greater than the radius of curvature of the cutaways C. The ratio of the radius of curvature of the cutaways C to the radius of curvature R_{CT} of the engaging edges of the teeth T, may be in the range 0.02 to 0.16.

The outermost portions of the cutaways C define a notional circle N_{CR}, the notional circle N_{CR} is concentric with notional circle N_{CE} defined by the apertures A2, A3. The notional circle N_{CR} is comprises a radius R_{CR} which is greater than the radius R_{CE} of the notional circle N_{CE} defined by the apertures A2, A3. A gap, space or distance F1 is defined radially therebetween, and may be considered to be the depth or radial dimension of the cutaways C.

Optionally, the notional circle N_{CR} defined by the cutaways C is arranged to be substantially equal to, or slightly greater than a circle defined by a rim, chime or uppermost end of the article B to be received therein. That is to say the diameter D_N of the rim, chime or uppermost end of the article B is substantially equal to, or slightly less than the twice the radius R_{CR}, $(D_n \leq 2R_{CR})$.

The blank 10 comprises a first outer side panel 16 hingedly connected to a first side edge of the main panel 18 by a hinged connection in the form of a fold line 17. A first inner side panel 14 is hingedly connected to the first outer side panel 16 by a hinged connection in the form of a fold line 15.

The blank 10 comprises a second outer side panel 20 hingedly connected to a second side edge of the main panel 18 by a hinged connection in the form of a fold line 19. The second side edge of the main panel 18 opposes the first side edge of the main panel 18. A second inner side panel 22 is hingedly connected to the second outer side panel 20 by a hinged connection in the form of a fold line 21.

The blank 10 comprises a first lap panel 12 hingedly connected to the first inner side panel 14 by a hinged connection in the form of a fold line 13.

The blank 10 comprises a second lap panel 24 hingedly connected to the second inner side panel 22 by a hinged connection in the form of a fold line 23.

The first lap panel 12 comprises a plurality of third apertures A1, the embodiment of Figure 1 comprises four third apertures A1 arranged in 1 x 4 matrix or array. Each of the third apertures A1 is arranged to be disposed in registry with a respective one of the apertures A2 of the first row article retention structures. The radius of the third apertures A1 may be substantially equal to, or greater than, the radius of the notional circle N_{CR}. The diameter of the third apertures A1 may be substantially equal to, or greater than, the diameter D_{N1} of the top closure of the articles B.

The second lap panel 24 comprises a plurality of fourth apertures A4, the embodiment of Figure 1 comprises four fourth apertures A4 arranged in 1 x 4 matrix or array. Each of the fourth apertures A4 is arranged to be disposed in registry with a respective one of the apertures A3 of the second row article retention structures. The radius of the fourth apertures A4 may be substantially equal to, or greater than, the radius of the notional circle N_{CR}. The diameter of the fourth apertures A4 may be substantially equal to, or greater than, the diameter D_{N1} of the top closure of the articles B.

The first lap panel 12 and the second lap panel 24 are configured to be disposed in face to face relationship with the main panel 18. The first lap panel 12 is disposed in overlapping relationship with the main panel 18. The second lap panel 24 is disposed in overlapping relationship with the main panel 18.

The first lap panel 12 may comprise an undulating or curvilinear free edge defining a plurality of tabs or projections T1, T2, T3. The second lap panel 24 may comprise an undulating or curvilinear free edge defining a plurality of recesses R1, R2, R3. The free edge of the first lap panel 12 is arranged to mate or tessellate with the free edge of the second lap panel 24. The free edge of the second lap panel 24 is complementary to the free edge of the first lap panel 12.

The fold line 17 may comprise or be interrupted by one or more cutaways 17A, 17B, 17C, in the form of apertures, which reduce the folding resistance.

The fold line 13 may comprise or be interrupted by one or more cutaways 13A, 13B, 13C, in the form of cut lines, which reduce the folding resistance. The cut lines may be non-linear, optionally U-shaped. Each of the cut lines may be arranged to be disposed in registry with a respective one of the apertures or cutaways interrupting the fold line 17.

The fold line 19 may comprise one or more cutaways 19A, 19B, 19C, in the form of apertures, which reduce the folding resistance.

The fold line 23 may comprise or be interrupted by one or more cutaways 23A, 23B, 23C, in the form of cut lines, which reduce the folding resistance. The cut lines may be non-linear, optionally U-shaped. Each of the cut lines may be arranged to be disposed in registry with a respective one of the apertures or cutaways interrupting the fold line 19.

The main panel 18 may optionally comprise a first handle structure H2. The first handle structure H2 may comprise a first handle opening. The first handle opening may be defined by a pair of tabs 50A, 50B struck from the main panel 18 each hingedly connected thereto by a fold line 51A, 51B. The pair of tabs 50A, 50B are located in a region disposed centrally between a first pair of article retention structures RT and a second pair of article retention structures RT.

The first lap panel 12 may optionally comprise a second handle structure H1. The second handle structure H1 may comprise a second handle opening. The second handle opening is struck from the first lap panel 12. The second handle opening may be defined by a pair of tabs 40A, 40B struck from the first lap panel 12 each hingedly connected thereto by a fold line 41A, 41B

Turning to the construction of the carrier 90 from the blank 10, the blank 10 may be applied to a group of articles B.

The blank 10 is folded about fold line 15 to bring the first outer side panel 14 into face to face relationship with the first inner side panel 16 and the first lap panel 12 into face to face relationship with a portion of the main panel 18.

The blank 10 is folded about fold line 21 to bring the second outer side panel 22 into face to face relationship with the second inner side panel 20 and the second lap panel 24 into face to face relationship with a second portion of the main panel 18.

The second handle structure H1 is brought into vertical alignment with the first handle structure H2.

Glue or other adhesive treatment G is applied to the first inner side panel 16 and to the second inner side panel 20 (see Figure 2).

The blank 10 is lowered with respect to a group of articles B. Each of the article retention structures RT of the blank 10 are aligned with a respective article B in the group. Portions of the articles B pass through the main panel 18 and through a respective one of the first and second lap panels 12, 24. The toothed regions of the main panel 18 about each of the article retention structures RT may be folded out of the plane of the main panel 18.

Each toothed region of the main panel 18 may be folded about one of the articles B received in the respective one of the article retention structures RT, the blank 10 may deform about the article B for example but not limited to a shoulder portion of the article B, where the article B is a can the shoulder portion may be provide by the neck-in as shown in Figure 2B.

The engaging edges E1 of the teeth T engage beneath a projection. The projection may be located about the neck or chime of the article B (which may provide a flange F) of an article B. When the article B is can the projection may be provided by a canner's end seam. In other

embodiments it may be provided by a ridge or undercut shaping of the article B or by an end closure of the article B for example but not limited to a crown cork or closure. In this way, the engaging edges E1 grip or hold the article B and prevent or inhibit the article B from unintentionally separating from the main panel 18. The assembled carrier 90 is shown in Figure 2.

The blank 10 includes at least a paperboard substrate. The material of the paperboard substrate may be selected from any conventional paperboard, for example, ranging in weight upwardly from about 10pt., preferably from about 16pt. to about 28pt. (0.028"/~0.7mm). An example of such a substrate is a 27 point (pt.) SBS board (solid bleached sulfate paperboard coated on one side, trade name PrintKote®) or CNK® board (Coated Natural Kraft® -an unbleached kraft paperboard having a clay coating on one side, trade name CarrierKoteTM) manufactured by WestRock® Company. The paperboard substrate may be a bleached or unbleached board. The board may be coated on at least one side, optionally the side opposite the lamination, with a conventional coating selected for compatibility with the printing method and board composition.

The blank 10 may include a tear resistant layer laminated to the paperboard layer. It optionally includes an adhesive layer between the paperboard substrate and the tear resistant layer. The tear resistant layer may be disposed over the uncoated side of the paperboard substrate and may be formed of polymeric material and secured to the substrate. The tear resistant layer imparts toughness to the laminate structure. Suitable tear resistant materials may include, but not be limited to, tear resistant laminated sheet material, e.g., NATRALOCK®, which may include a layer of an n-axially oriented film, e.g. MYLAR®, which is a bi-axially oriented polyester, oriented nylon, cross-laminated polyolefin or high density polyolefin. The orientation and cross-laminated structure of these materials contribute to the tear resistant characteristic. Also, tear resistance may be attributed to the chemical nature of the tear resistant material such as extruded metallocene-catalyzed polyethylene (mPE).

Alternatively, the tear resistant layer may be a layer of linear low-density polyethylene (LLDPE). In embodiments where linear low-density polyethylene (LLDPE) or mPE is used, it is not necessary to incorporate an adhesive layer. Other suitable materials having a high level of tear resistance may also be used.

The adhesive layer may be formed of polyolefin material such as a low-density polyethylene (LDPE). The adhesive layer may be placed between the substrate and the tear resistant layer to secure the tear resistant layer to the substrate.

Referring now to Figures 3 to 12, there are shown additional embodiments of the present disclosure. In the second, third, fourth, fifth and sixth illustrated embodiments like numerals have, where possible, been used to denote like parts, albeit with the addition of the prefix "100", "200", "300", "400", "500" to indicate that these features belong to the second, third, fourth, fifth and sixth 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 2B will be described in detail.

Figure 3 illustrates a second embodiment and shows a blank 110 comprising a plurality of panels 112, 114, 116, 118, 120, 122, 124, including a main panel 118 for forming an upper ply of a top wall or an engaging panel of a carrier 190 (see Figure 4). The plurality of panels 112, 114, 116, 118, 120, 122, 124 may be arranged in a linear series hinged one to the next by corresponding fold lines 113, 115, 117, 119, 121, 123.

The blank 110 comprises a first outer side panel 116 hingedly connected to a first side edge of the main panel 118 by a hinged connection in the form of a fold line 117. A first inner side panel 114, in the form of a pair of connecting panels, is hingedly connected to the first outer side panel 116 by a hinged connection in the form of a fold line 115. The first outer side panel 116 comprises an extension or projection which is struck from material which would otherwise form the first inner side panel 114, the extension interrupts the fold line 115. The extension is defined at least in part by a cut line 125.

The blank 110 comprises a second outer side panel 120 hingedly connected to a second side edge of the main panel 118 by a hinged connection in the form of a fold line 119. The second side edge of the main panel 118 opposes the first side edge of the main panel 118. A second inner side panel 122, in the form of a pair of connecting panels, is hingedly connected to the second outer side panel 120 by a hinged connection in the form of a fold line 121. The second outer side panel 120 comprises an extension or projection which is struck from material which would otherwise form the second inner side panel 122, the extension interrupts the fold line 121. The extension is defined at least in part by a cut line 127.

The blank 110 comprises a first lap panel 112 hingedly connected to the first inner side panel 114 by a hinged connection in the form of a fold line 113. The extension of the first outer side panel 116 may interrupt the fold line 113 between the first lap panel 112 and the first inner side panel 114. A portion of the cut line 125 may interrupt or intersect with the fold line 113. A portion of the cut line 125 may be collinear with the fold line 113.

The blank 110 comprises a second lap panel 124 hingedly connected to the second inner side panel 122 by a hinged connection in the form of a fold line 123. The extension of the second outer side panel 120 may interrupt the fold line 123 between the second lap panel 124 and the second inner side panel 122. A portion of the cut line 127 may interrupt or intersect with the fold line 123. A portion of the cut line 127 may be collinear with the fold line 123.

The main panel 118 of the blank 110 includes at least one article retention structure. The main panel 118 comprises a plurality of article retention structures, specifically eight article retention structures arranged in 2 x 4 matrix or array. Each of the article retention structures comprise an opening or aperture A2, A3.

Each of the article retention structures are substantially similar in construction to each other and will be described in further detail by reference to the article retention structures illustrated in Figure 10. The article retention structure comprises a plurality of teeth T disposed about the perimeter of the aperture A3. The article retention structure may comprise nine teeth T disposed about the perimeter of the aperture A3.

The main panel 118 comprises cutaways C in the form of recesses or notches. The cutaways C are substantially "U" shaped, the cutaways C each define a portion of a notional circle N_{C1} see Figure 10. The notional circle N_{C1} comprises a radius R_1.

The cutaways C extend radially outward from the centre C_1 of the notional circle N_{C1}.

The teeth T are each defined, at least in part, by a pair of cutaways C. The cutaways C form relief elements extending radially away from the centre C_1 of the notional circle N_{C1}.

The plurality of teeth may occupy an arc or portion of the perimeter of the aperture A3 (or notional circle N_{C1}) which subtends about 270°.

The article retention structure comprises tooth free region E. The tooth free region E occupies an arc or portion of the perimeter of the aperture A3 which subtends about 90°.

The tooth free region E occupies an arc of the notional circle N_{C1} defined by a sector of the notional circle N_{C1} in which the radii of the sector subtend about 90°.

The tooth free region E comprises an arcuate edge or cut which is defined by a second notional circle N_{C2}. The second notional circle N_{C2} comprises a radius R_2 extending from a centre C_2.

The radius R_2 of the second notional circle N_{C2} is greater in length than the radius R_1 of the first notional circle N_{C1}.

The centre C_2 of the second notional circle N_{C2} is offset from the centre C_1 of the first notional circle N_{C1}. The centre C_2 of the second notional circle N_{C2} is inset with respect the first or second side edge of the main panel 118 to a greater extent, by a longer linear dimension, than the centre C_1 of the first notional circle N_{C1}.

The edge or cut defining the tooth free region E has the effect of truncating the aperture A3; when compared to the apertures A2, A3 of the embodiments of Figure 1. This has the benefit of spacing the apertures A2, A3 from the respective one of the first and second side edges of the main panel 118. This may be beneficial when packaging articles B_S having a slim or sleek design as illustrated in Figure 11B.

In this way the fold lines 117, 119 may be disposed in closer proximity to the side walls of the body M_S of the article B_S, thus the first and second outer side panels 116, 120 may be readily glued or adhered to the article B_S, as indicated by glue areas G in Figure 4.

The blank 110 may comprise optional fold lines 145, 147 extending longitudinally of the main panel 118. The fold line 145 may be interrupted by the first row of apertures A2. The fold line 147 may be interrupted by the second row of apertures A3. The fold lines 145, 147 may facilitate engagement of the main panel 118 with the articles B_S.

The tooth free region E of the apertures A2, A3 may interrupt the optional fold lines 145, 147.

The fold lines 145 may extend between one end of a tooth free region E of one of the apertures A2 and an end of a tooth free region E of an adjacently disposed aperture A2, or an end edge of the main panel 118; the fold line 147 may be similarly arranged with respect apertures A3.

In this way the tooth free region of the main panel 118 may be foldable with respect to the portion of the main panel 118 in which the teeth T are provided.

The tooth free regions E of the apertures A2, A3 are disposed adjacent or proximate to the side edges of the main panel 118.

The main panel 118 may optionally comprise a handle structure H2. The handle structure H2 comprises a first opening which may be formed, or defined, by a pair of foldable tabs 150A, 150B. The first opening is struck from the main panel 118 and is located in a region disposed centrally between a first pair of article retention structures and a second pair of article retention structures

The first and second lap panels 112, 124 may comprise a second openings formed at least in part by a second handle apertures A5. The second handle apertures A5 are struck from the first and second lap panels 112, 124 and arranged to be disposed in vertical registry with each other and with the first opening in the main panel 118. In a setup condition the handle structure comprise a three ply structure formed from each of the first and second lap panels 112, 124 and the main panel 118.

Each of the first and second outer side panels 116, 120 may comprise a third opening which may be formed, or defined, by a foldable tab 160A, 160B hingedly connected to the blank 110 by fold lines 161A, 161B. The third openings are struck from the first and second outer side panels 116, 120 and arranged to be aligned with a void or gap between or adjacent to a pair of article B_s.

The third opening and the first and second openings are arranged to be collinear with each other and may be medially disposed between opposing ends of the carrier 190.

Figure 6 illustrates a third embodiment and shows a blank 210 for forming a carrier (not shown), the third embodiment is substantially similar to the first embodiment of Figure 1 and comprises a plurality of panels 212, 214, 216, 218, 220, 222, 224, including a main panel 218 for forming an upper ply of a top wall or an engaging panel of a carrier. The plurality of panels 212, 214, 216, 218, 220, 222, 224 may be arranged in a linear series hinged one to the next by corresponding fold lines 213, 215, 217, 219, 221, 223.

The blank 210 comprises a first outer side panel 216 hingedly connected to a first side edge of the main panel 218 by a hinged connection in the form of a fold line 217. A first inner side panel 214 is hingedly connected to the first outer side panel 216 by a hinged connection in the form of a fold line 215.

The blank 210 comprises a second outer side panel 220 hingedly connected to a second side edge of the main panel 218 by a hinged connection in the form of a fold line 219. The second

side edge of the main panel 218 opposes the first side edge of the main panel 218. A second inner side panel 222 is hingedly connected to the second outer side panel 220 by a hinged connection in the form of a fold line 221.

The blank 210 comprises a first lap panel 212 hingedly connected to the first inner side panel 214 by a hinged connection in the form of a fold line 213.

The blank 210 comprises a second lap panel 224 hingedly connected to the second inner side panel 222 by a hinged connection in the form of a fold line 223.

The blank 210 of Figure 6 is configured to accommodate a plurality of articles B_S of the slim or sleek design shown in Figure 11B, the blank 210 employs article retention structures substantially similar in arrangement to those of the embodiment of Figures 3 and 10.

The blank 210 of Figure 6 is configured to employ handle structures substantially similar to those of Figure 3. The first and second lap panels 212, 224 comprises apertures A5 arranged to be in vertical registry with each other and with an opening in the main panel 218 provided by a pair of foldable tabs 250A, 250B.

Each of the first and second outer side panels 216, 220 may comprise a third opening which may be formed, or defined, by a foldable tab 260A, 260B hingedly connected to the blank 210 by fold lines 261A, 261B.

The third openings are struck from the first and second outer side panels 216, 220 and arranged to be aligned with a void or gap between or adjacent to a pair of article B_s.

Each of the first and second inner side panels 214, 222 may comprise a fourth opening which may be formed by an aperture A6, the apertures A6 arranged to be in registry with a third opening in a respective one of the first and second outer side panels 216, 220.

The first and second inner side panels 214, 222 comprise glue locations G for preparation with glue or other adhesive treatment such that each of the articles B_S are secured to an adjacent one of the first and second inner side panels 214, 222.

The first and second lap panels 212, 224 each comprise apertures A1, A4 for receiving an article B_S, the apertures A1, A4 may comprises a notch or recess extending substantially radially therefrom. The notch or recess configured to intersect or interrupt the fold line 213,

223 hinging the first or second lap panels 212, 224 to the respective one of the first and second inner side panels 214, 222. In this way the notch encourages folding along the fold lines 213, 223, and may reduce or inhibit distortion or undesirable folding in the first and second lap panels 212, 224. In this way the blank 210 may fold more accurately or consistently along the fold lines 213, 223.

Figure 7 illustrates a fourth embodiment and shows a blank 310 for forming a carrier (not shown), the fourth embodiment comprises a plurality of panels 312, 314, 316, 318, 320, including a main panel 314 for forming an upper ply of a top wall or an engaging panel of a carrier.

The blank 310 comprises a first side panel 318 hingedly connected to a first side edge of the main panel 314 by a hinged connection in the form of a fold line 317.

The blank 310 comprises a second side panel 320 hingedly connected to a second side edge of the main panel 314 by a hinged connection in the form of a fold line 319.

The blank 310 comprises a first lap panel 312 hingedly connected to a first end edge of the main panel 314 by a hinged connection in the form of a fold line 313.

The blank 310 comprises a second lap panel 316 hingedly connected to a second end edge of the main panel 314 by a hinged connection in the form of a fold line 315. The second end edge of the main panel 314 opposes the first end edge of the main panel 314.

The main panel 314 comprises a plurality article retention structures substantially similar in arrangement to those of the embodiment of Figures 1 and 1B, the blank 310 is configured to accommodate a plurality of articles B substantially of the type illustrated in Figure 11A.

The first lap panel 312 and second lap panel 316 are folded about fold lines 313, 315 respectively to be disposed in face to face relationship with the main panel 314. The first lap panel 312 comprises a plurality of apertures A1 arranged to be disposed in registry with a first group of apertures A2 in the main panel 314. The second lap panel 316 comprises a plurality of apertures A4 arranged to be disposed in registry with a second group of apertures A3 in the main panel 314.

The first lap panel 312 and second lap panel 316 each comprises a recess R1, R2 in a free end edge opposing their respective hinged connection to the main panel 314. The recesses

R1, R2 together define an opening in a lower ply of the carrier provided by the first and second lap panels 312, 316 the opening being in registry with a handle structure H in the main panel 314 in a setup carrier.

Each of the first and second side panels 318, 320 comprise glue locations G for preparation with glue or other adhesive treatment for securing each of the articles to be packaged to an adjacent one of the first and second side panels 318, 320.

Figure 8 illustrates a fifth embodiment and shows a blank 410 for forming a carrier (not shown), the fifth embodiment comprises a plurality of panels 412, 414, 416, 418, 420, including a main panel 414 for forming a top wall or an engaging panel of a carrier.

A first side panel 418 is hingedly connected to a first side of the main panel 414 by a hinged connection in the form of a fold line 417. A second side panel 420 is hingedly connected to a second side of the main panel 414 by a hinged connection in the form of a fold line 419.

The blank comprises a first end strap 426A/422A/412/422B/426B. The first end strap 426A/422A/412/422B/426B comprises a first end panel 412. A first corner panel 422A is hingedly connected to a first end of the first end panel 412 by a hinged connection in the form of a fold line 421A. A first securing panel 426A is hingedly connected to an end of the first corner panel 422A by a hinged connection in the form of a fold line 423A. A first gusset panel 428A is hingedly interconnected between the first securing panel 426A and a first end of the first side panel 418 by fold lines 425A, 427A.

A second corner panel 422B is hingedly connected to a second end of the first end panel 412 by a hinged connection in the form of a fold line 421B. A second securing panel 426B is hingedly connected to an end of the second corner panel 422B by a hinged connection in the form of a fold line 423B. A second gusset panel 428B is hingedly interconnected between the second securing panel 426B and a first end of the second side panel 420 by fold lines 425B, 427B.

The first end panel 412 is separated from, or severable from, the main panel 414. The blank 410 may comprise at least one cut line or frangible line for severing the first end panel 412 from the main panel 414.

The first corner panel 422A is separated from the main panel 414. The blank 410 may comprise an aperture separating, at least in part, the first corner panel 422A from the main

panel 414. The first corner panel 422A may be separated, at least in part, from the main panel 414 by a cut line or frangible line.

The second corner panel 422B is separated from the main panel 414. The blank 410 comprises an aperture separating, at least in part, the second corner panel 422B from the main panel 414. The second corner panel 422B may be separated, at least in part, from the main panel 414 by a cut line or frangible line.

The first end strap 426A/422A/412/422B/426B forms a first end wall of the carrier.

The blank comprises a second end strap 430A/424A/416/424B/430B. The second end strap 430A/424A/416/424B/430B comprises a second end panel 416. A third corner panel 424A is hingedly connected to a first end of the second end panel 416 by a hinged connection in the form of a fold line 429A. A third securing panel 430A is hingedly connected to an end of the third corner panel 424A by a hinged connection in the form of a fold line 431A. A third gusset panel 432A is hingedly interconnected between the third securing panel 430A and a second end of the first side panel 418 by fold lines 433A, 435A.

A fourth corner panel 424B is hingedly connected to a second end of the second end panel 416 by a hinged connection in the form of a fold line 429B. A fourth securing panel 430B is hingedly connected to an end of the fourth corner panel 424B by a hinged connection in the form of a fold line 431B. A fourth gusset panel 432B is hingedly interconnected between the fourth securing panel 430B and a second end of the second side panel 420 by fold lines 433B, 435B.

The second end panel 416 is separated from, or severable from, the main panel 414. The blank 410 may comprise at least one cut line or frangible line severing the second end panel 416 from the main panel 414.

The third corner panel 424A is separated from the main panel 414. The blank 410 comprises an aperture separating, at least in part, the third corner panel 424A from the main panel 414. The third corner panel 424A may be separated, at least in part, from the main panel 414 by a cut line or frangible line.

The fourth corner panel 424B is separated from the main panel 414. The blank 410 comprises an aperture separating, at least in part, the fourth corner panel 424B from the main panel 412.

The fourth corner panel 424B may be separated, at least in part, from the main panel 414 by a cut line or frangible line.

The second end strap 430A/424A/416/424B/430B forms a second end wall of the carrier.

The main panel 414 of the blank 410 includes at least one article retention structure RT1, RT2. The main panel 414 comprises a plurality of article retention structures, specifically eight article retention structures arranged in 2 x 4 matrix or array. Each of the article retention structures comprise an opening or aperture A1, A2.

In the embodiment of Figure, endmost article retention structures RT1, comprise six teeth defined, at least in part, by seven relief elements C1, C2, C3, C4, C5, C6, C7. The endmost article retention structures RT1 each comprises a toothless region TFR providing three continuous supporting edges and two relief elements C9, C10. The toothed segment or arc TR of each endmost retention structure occupies substantially 180° of the perimeter of the respective aperture A1. The toothless segment or arc TFR of each endmost retention structure occupies substantially 180° of the perimeter of the respective aperture A1.

In the embodiment of Figure 8, each of medial article retention structures RT2 comprises three teeth defined, at least in part, by four relief elements C1, C2, C3, C4. The medial article retention structures RT2 each comprises a toothless region TFR providing four continuous supporting edges and three relief elements. The toothed segment or arc TR of each medial retention structure occupies substantially 90° of the perimeter of the respective aperture A2. The toothless segment or arc TFR of each medial retention structure occupies substantially 270° of the perimeter of the respective aperture A2.

The article retention structure RT1, RT2 comprises a toothed segment or arc TR as shown in and a second segment or arc TFR.

The first segment or arc TR is 'toothed', the second segment or arc TFR is 'toothless'. That is to say the aperture A1, A2 comprises a plurality of teeth disposed about the first arc TR (the main panel 414 comprises a plurality of teeth defining the toothed segment or arc of the aperture A1, A2, in a perimeter region of the aperture A1, A2 defined by the first segment or arc TR. A perimeter region, second arc, of the aperture A1, A2 defined by the second segment or arc TFR is free from teeth.

The apertures A1, A2 comprises a perimeter which may approximate, or define, a notional circle having a centre.

The 'toothed' region of the main panel 414 surrounding the aperture A1 comprises cutaways C1, C2, C3, C4, C5, C6, C7 in the form of recesses or notches. The cutaways C1, C2, C3, C4, C5, C6, C7 are substantially "U" shaped, in other embodiments the cutaways C1, C2, C3, C4, C5, C6, C7 may be alternatively shaped such as but not limited to "V" shaped. The cutaways C1, C2, C3, C4, C5, C6, C7 extend radially outward from the notional circle.

The cutaways C1, C2, C3, C4, C5, C6, C7 define, at least in part, the teeth of the first segment TR. The teeth are defined between adjacent pairs C1/C2, C2/C3, C3/C4, C4/C5, C5/C6, C6/C7 of the cutaways C1, C2, C3, C4, C5, C6, C7.

The 'toothed' region of the main panel 414 surrounding the aperture A2 comprises cutaways C1, C2, C3, C4, in the form of recesses or notches. The cutaways C1, C2, C3, C4, are substantially "U" shaped, in other embodiments the cutaways C1, C2, C3, C4, may be alternatively shaped such as but not limited to "V" shaped. The cutaways C1, C2, C3, C4, extend radially outward from the notional circle.

The cutaways C1, C2, C3, C4, define, at least in part, the teeth of the first segment TR. The teeth are defined between adjacent pairs C1/C2, C2/C3, C3/C4 of the cutaways C1, C2, C3, C4.

The toothless or tooth free region/segment TFR of the main panel 414 surrounding the aperture A1, A2 comprises at least one supporting edge. The at least one supporting edge may be curvilinear or arcuate in shape.

The endmost article retention structures RT1 comprises two relief elements C1, C7, each of which defines an end of a tooth, between which the toothless region/segment TFR is defined.

The toothless or tooth free region/segment TFR of the main panel 414 surrounding the aperture A1 may comprise at least one relief element C9, C10 in the form of recess notched out of the perimeter of the aperture A1. The segment of the perimeter of the aperture A1 provides three continuous supporting edges each of which is curvilinear or arcuate in shape. The supporting edges each comprises an arc length defined between a pair of relief elements C1/C9, C9/C10, C7/C10.

The medial article retention structures RT2 comprises two relief elements C1, C4, each of which defines an end of a tooth, between which the toothless region/segment TFR is defined.

The toothless or tooth free region/segment TFR of the main panel 414 surrounding the aperture A2 may comprise at least one relief element C5, C6, C7 in the form of recess notched out of the perimeter of the aperture A2. The segment of the perimeter of the aperture A1 provides four continuous supporting edges each of which is curvilinear or arcuate in shape. The supporting edges each comprises an arc length defined between a pair of relief elements C1/C7, C6/C7, C5/C16, C4/C5.

In the toothless or tooth free region/segment TFR of the main panel 414 surrounding the aperture A1, A2 two adjacent relief elements define a continuous supporting edge if a notional line y-y is in tangential contact with both of said relief elements (recesses or notches) contacts or intersects with the notional circle of the aperture A1, A2 or intersects with or contacts the edge of the aperture A1, A2.

Figure 8 also illustrates a notional tangential line x-x in the toothed region/segment TFR of the main panel 414. The notional tangential line x-x is in tangential contact with both relief elements defining a single tooth, the notional tangential line x-x does not contact or intersect with the notional circle of the aperture A1, A2 nor does it intersect with or contact the edge of the aperture A1, A2.

Figure 9 illustrates a sixth embodiment and shows a blank 510 for forming a carrier (not shown), the sixth embodiment comprises a plurality of panels 512, 514, 516, 518, including a main panel 518 for forming an upper ply of a top wall or an engaging panel of a carrier.

The plurality of panels 512, 514, 516, 518 may be arranged in a linear series hinged one to the next by corresponding fold lines 513, 515, 517.

The blank 510 is arrange to accommodate a plurality of four articles B_S arranged in a 1 x 4 matrix or array.

The blank 510 comprises a first outer side panel 116 hingedly connected to a first side edge of the main panel 518 by a hinged connection in the form of a fold line 517. A first inner side panel 514, in the form of a pair of connecting panels, is hingedly connected to the first outer side panel 516 by a hinged connection in the form of a fold line 515. The first outer side panel 516 comprises an extension or projection which is struck from material which would otherwise

form the first inner side panel 514, the extension interrupts the fold line 515. The extension is defined at least in part by a cut line 525.

The blank 510 comprises a first lap panel 512 hingedly connected to the first inner side panel 514 by a hinged connection in the form of a fold line 513. The extension of the first outer side panel 516 may interrupt the fold line 513 between the first lap panel 512 and the first inner side panel 514. A portion of the cut line 525 may interrupt or intersect with the fold line 513. A portion of the cut line 525 may be collinear with the fold line 513.

The main panel 518 comprises a plurality article retention structures substantially similar in arrangement to those of the embodiment of Figures 3 and 10, the blank 510 is configured to accommodate a plurality of articles B_S substantially of the type illustrated in Figure 11B.

Referring now to Figures 12 to 14, there are shown additional embodiments of the present disclosure. In the seventh and eighth illustrated embodiments like numerals have, where possible, been used to denote like parts, albeit with the addition of the prefix "600", "700", to indicate that these features belong to the seventh and eighth embodiments respectively. The additional embodiments share many common features with the previous embodiments and therefore only the differences from the embodiments illustrated in Figures 1 to 11B will be described in detail.

Figure 12 illustrates a seventh embodiment and shows a blank 610 for forming a carrier (not shown), the seventh embodiment comprises a plurality of panels 612, 614, 616, 618, 620, including a main panel 614 for forming a top wall or an engaging panel of a carrier.

A first side panel 618 is hingedly connected to a first side of the main panel 614 by a hinged connection in the form of a fold line 617. A second side panel 620 is hingedly connected to a second side of the main panel 614 by a hinged connection in the form of a fold line 619.

The blank 610 comprises a first end strap 626A/622A/612/622B/626B and a second end strap 630A/624A/616/624B/630B substantially similar in construction to the end straps of the embodiment of Figure 8. Each of the end straps comprises a plurality of panels and may be referred to collectively as an end panel.

In the seventh embodiment the first side panel 618 and the second side panel 620 each comprise a pair of glue locations G on inner surfaces thereof, at which glue locations G the

first and second side panels 618, 620 are adhesively secured to two of the adjacently disposed articles.

Each of a first securing panel 626A, a second securing panel 626B, a third securing panel 630A and a fourth securing panel 630B comprises a glue location G on an inner surface, at which glue location G the respective securing panel 626A, 626B, 630A, 630B is adhesively secured to an adjacently disposed article. The securing panels 626A, 626B, 630A, 630B are secured to a respective article when folded between said article and the respective one of the first and second side panels 618, 620.

The securing panels 626A, 626B, 630A, 630B are secured to endmost articles whilst the first and second side panels 618, 620 are secured to intermediate or inner articles.

Figures 13 and 14 illustrate an eighth embodiment and show a blank 710 for forming a carrier 790 respectively. The eighth embodiment comprises a plurality of panels 712, 714, 716, 718, 730, including a main panel 714 for forming a top wall or an engaging panel of a carrier.

The blank 710 includes a first side panel 718 hingedly connected to a first side of the main panel 714 by a hinged connection in the form of a fold line 717, more specifically the first side panel 718 is hingedly connected to a first outer shoulder panel 714E forming part of the main panel 714. The blank 710 includes a second side panel 720 hingedly connected to a second side of the main panel 714 by a hinged connection in the form of a fold line 719, more specifically the second side panel 720 is hingedly connected to a second outer shoulder panel 714F forming part of the main panel 714.

The first outer shoulder panel 714E is hinged to a first top panel 714A by a hinged connection in the form of a fold line 773A. The second outer shoulder panel 714F is hinged to a second top panel 714B by a hinged connection in the form of a fold line 773B. The main panel 714 further comprises a first inner shoulder panel 714C and a second inner shoulder panel 714D. The first inner shoulder panel 714C is hinged to a first top panel 714A by a hinged connection in the form of a fold line 775A. The first inner shoulder panel 714C is hinged to the second inner shoulder panel 714D by a hinged connection in the form of a fold line 776. The second inner shoulder panel 714D is hinged to the second top panel 714B by a hinged connection in the form of a fold line 775B.

The first inner shoulder panel 714C and the second inner shoulder panel 714D form a keel structure disposed between two rows of articles B.

Each of the first and second top panels 714A, 714B includes opposed pairs of article-engaging devices 770A, 772A (and 770B, 772B) formed therein and generally along respective fold lines 773A, 775A (and 773B, 775B). Fold lines 773A, 775A hingedly interconnect the respective series of article-engaging devices 770A, 772A. Fold lines 773B, 775B hingedly interconnect the respective series of article-engaging devices 770B, 772B. In the illustrated embodiment, each of the article-engaging devices 770A, 772A, 770B, 772B takes the form of a curved slit. The slits may be considered to interrupt a respective one of the fold lines 773A, 775A 773B, 775B, between the first and second top panels 714A, 714B and the inner and outer shoulder panels 714C, 714D, 714E, 714F. In other embodiments, each of the article-engaging devices may be formed by a series of curved frangible lines. In other embodiments, the article-engaging devices 770A, 772A, 770B, 772B may comprise apertures for receiving upper parts of articles B held by the carrier 790. It will be understood that many mechanisms exist for clipping, locking, or engaging the tops or other portions of articles B (such as radially protruding portions or flanges) for holding the articles B in an assembled and secure group so that a number of articles B may easily be purchased and transported at the same time. In the illustrated embodiment, the article-engaging devices 770A, 772A, 770B, 772B take the form of C-shaped slits which form openings when the top panels 714A, 714B are folded about the fold lines 773A, 775A, 773B, 775B, each thereby providing an article-engaging edge. Once opened, the slits are sized similarly to or substantially equal to the rim edge of an article B. Each article-engaging device 770A, 772A, 770B, 772B provides a pair of openings for receiving a portion of an article B.

In the illustrated embodiment, the fold lines 773A, 775A (and 773B, 775B) that hingedly interconnect the series of article-engaging devices 770A, 772A (and 770B, 772B) are slightly arcuate in shape (in other embodiments they may be linear or straight) with their convex sides disposed toward the interiors of respective adjacent top panels 714A, 714B.

First and second outer shoulder panels 714E, 714F each include one or more second or stress-reducing fold lines 771A, 771B that extend alongside at least part of respective fold lines 773A, 773B. In the illustrated embodiment, stress-reducing fold lines 771A, 771B are generally arcuate (in other embodiments they may be linear or straight) with their concave sides disposed toward the interiors of respective adjacent top panels 714A, 714B. The stress-reducing fold lines 771A, 771B can be disposed between two adjacent ones of cut lines 770A, 770B.

In the illustrated embodiment, first and second inner shoulder panels 714C, 714D also include one or more second or stress-reducing fold lines 777A, 777B that extend alongside at least part of respective fold lines 775A, 775B. Stress-reducing fold lines 777A, 777B may generally mirror the stress-reducing fold lines 771A, 771B disposed on the first and second outer shoulder panels 714E, 714F. Stress-reducing fold lines 777A, 777B may facilitate the contouring of inner shoulder panels 714C, 714D to corresponding portions of the necks N of adjacent articles.

Inner shoulder panels 714C, 714D include at opposite ends thereof oblique fold lines 781A, 783A, 781B, 783B that are generally disposed between an outermost end of an outermost slit 772A, 772B and an adjacent outermost edge of the shoulder panel 714C, 714D. The oblique fold lines 781A, 783A, 781B, 783B extend generally parallel to the adjacent outermost edges of their respective shoulder panels 714C, 714D as shown. The outermost edges of the inner shoulder panels 714C, 714D are defined at least in part by a cutaway in the form of an aperture A10. Oblique fold lines 781A, 783A, 781B, 783B may facilitate the contouring of inner shoulder panels 714C, 714D to the neck portions of adjacent articles B.

The blank 710 comprises a first end strap 726A/722A/712/722B/726B and a second end strap 730A/724A/716/724B/730B substantially similar in construction to the end straps of the embodiments of Figures 8 and 12.

In the eighth illustrated embodiment the first side panel 718 and the second side panel 720 each comprise a pair of article glue locations G on inner surfaces thereof, at which article glue locations G the first and second side panels 718, 720 are adhesively secured to two of the adjacently disposed articles B.

Each of a first securing panel 726A, a second securing panel 726B, a third securing panel 730A and a fourth securing panel 730B comprises an article glue location G on an inner surface, at which article glue location G the respective securing panel 726A, 726B, 730A, 730B is adhesively secured to an adjacently disposed article B. The securing panels 726A, 726B, 730A, 730B are secured to a respective article when folded between said article and the respective one of the first and second side panels 718, 720.

The securing panels 726A, 726B, 730A, 730B are secured to endmost articles B whilst the first and second side panels 718, 720 are secured to intermediate or inner articles B.

The first side panel 718 and the second side panel 720 may each comprise a pair of panel glue locations G2 on inner surfaces thereof, at which panel glue locations G2 the first and second side panels 718, 720 are adhesively secured to a respective one of securing panel 726A, 726B, 730A, 730B.

The panel glue locations G2 facilitate securing the end straps 726A/722A/712/722B/726B, 730A/724A/716/724B/730B to the first and second side panels 718, 720.

The present disclosure provides a carrier of the top engaging type having improved article retention structures or article top engaging devices.

The carrier comprises a main panel having one or more article retention structures for receiving and securing the main panel to a respective article. The carrier comprises at least one wing panel, which may take the form of a side panel. The wing panel provides a surface for display of indicia or information such as but not limited to advertising or branding information. In some embodiments a pair of wing panels may be provided in the form of a pair of opposing side panels. The at least one wing panel is hinged to the main panel which provides a primary top engaging panel. The wing panel is secured or securable to the packaged articles. This may increase the integrity of the package as well as prevent or inhibit rotation of the or each packaged article; and may serve to retain each packaged article at the optimum or best graphic-presenting display position or orientation.

A fugitive glue may be employed to secure the wing, side or securing panels to the articles. An example of a specific glue is Swift®melt 7044 manufactured by HB Fuller. Use of a fugitive glue is optional, an advantage of a fugitive glue is its tendency to remain attached to the carrier when the articles are disengaged from the carrier (this may be more desirable than having the glue remain attached to the articles). In alternative embodiments other adhesives maybe employed such as, but not limited to, hot-melt glue.

The carrier may comprise at least one lap panel disposed in face to face relationship with the main panel. The at least one lap panel may comprises one or more opening for receiving a portion of an article.

The at least one lap panel may be hingedly connected directly to the main panel by a fold or crease line.

The at least one lap panel may be hingedly connected to the main panel by at least one further panel. The at least one further panel may include the wing panel.

The present disclosure further provides a carrier having an article engaging device comprising a main or engaging panel having at least one top-receiving opening.

The top-receiving opening comprising a partially toothed engaging aperture having toothed perimeter section and toothless perimeter section wherein the toothless perimeter section has a radius of curvature R_2 which is greater than the radius R_1 of a notional circle N_{C1} defined by the engaging aperture.

The present disclosure further provides a carrier having a handle structure. The carrier comprising a main or top panel and a pair of side or wing panels hingedly connected to opposing sides of the main or top panel by respective corner fold lines.

The carrier comprises a pair of handle openings disposed on the opposite sides of a corner fold line between a top-engaging panel and a side panel.

The carrier may comprise a handle opening in each of the pair of side or wing panels.

The carrier may comprise a further handle opening in the main or top panel, the user may engage with the handle opening in the main or top panel and with one of the handle openings in one of the pair of side or wing panels.

The carrier may comprise a further handle opening in the main or top panel may comprise a pair of foldable tabs forming cushioning flaps, hinged to the main or top panel, the foldable tabs hinged in opposition to each other and each being foldable towards one of the handle openings in one of the pair of side or wing panels.

The handle opening in each of the pair of side or wing panels may be defined at least in part by a foldable tab, hinged to the respective side or wing panels or to the top panel.

The side or wing panel may be a two ply structure comprising an inner wing panel and an outer wing panel in face to face relationship. The inner wing panel comprising a handle opening disposed in registry or alignment with a handle opening in the outer wing panel.

The inner wing panel may be hingedly connected to the outer wing panel.

The handle opening in the inner wing panel may be provided by an extension of the outer wing panel struck from the inner wing panel which creates an opening therein when the outer wing panel is folded with respect to the inner wing panel.

The present disclosure also provides an article carrier 90; 190; 790 for packaging at least one article B; Bs. The carrier 90; 190; 790 comprises a main panel 18; 118; 218; 314; 414; 518; 614; 714 having at least one top-engaging article device for receiving and securing the main panel to a respective article B; Bs the carrier 90; 190; 790 further comprising at least one wing panel 14, 16, 20, 22; 114, 116, 120, 122; 214, 216, 220, 222; 318, 318; 412, 416, 418, 420; 511, 516; 612, 616, 618, 620; 712, 716, 718, 720 the at least one wing panel being hinged to the main panel 18; 118; 218; 314; 414; 518; 614; 714 and wherein the wing panel is adhereable to the at least one article B; Bs.

The at least one top-engaging article device comprises at least one top-receiving opening for receiving and securing the main panel to a respective article.

The at least one top-engaging article device may comprise at least one top-receiving opening for partially receiving a respective article so as to and secure the main panel to said article.

The at least one top-engaging article device may comprise a pair of top-receiving openings for partially receiving a respective article so as to and secure the main panel to said article.

The at least one wing panel comprises a side panel hinged to the main panel and may comprise an end panel, the end panel may be adhered to at least one article.

The end panel may comprise a securing portion, the securing portion is disposed in overlapping relationship with the side panel. The securing portion may be adhered to the at least one article. The securing portion may be adhered to the side panel.

It will be recognised that as used herein, directional references such as "top", "bottom", "base", "front", "back", "end", "side", "inner", "outer", "upper" and "lower" do not necessarily limit the respective panels to such orientation, but may merely serve to distinguish these panels from one another.

As used herein, the terms “hinged connection” and “fold line” refer to all manner of lines that define hinge features of the blank, facilitate folding portions of the blank with respect to one

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

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

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

The phrase "in registry with" as used herein refers to the alignment of two or more elements in an erected carton, such as an aperture formed in a first of two overlapping panels and a second aperture formed in a second of two overlapping panels. Those elements in registry with each other may be aligned with each other in the direction of the thickness of the overlapping panels. For example, when an aperture in a first panel is "in registry with" a second aperture in a second panel that is placed in an overlapping arrangement with the first panel, an edge of the aperture may extend along at least a portion of an edge of the second aperture

and may be aligned, in the direction of the thickness of the first and second panels, with the second aperture.

CLAIMS

1. An article carrier for packaging at least one article, the carrier comprising a main panel having at least one top-engaging article device for receiving a respective article to secure the main panel to the respective article, the at least one top-engaging article device comprising at least one engaging feature comprising at least one of: a plurality of teeth, a slit, and an opening,

   wherein the at least one engaging feature provides an engaging edge configured to at least partially engage with an upper portion of the respective article;

   the carrier further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the main panel.

2. An article carrier according to claim 1, wherein the wing panel is adhereable to the at least one article.

3. An article carrier according to claim 1 or claim 2, wherein each of the at least one top-engaging article device comprises at least one top-receiving opening for at least partially receiving the respective article to secure the main panel to said article.

4. An article carrier according to claim 1, wherein the at least one wing panel comprises a side panel hinged directly to the main panel and hinged to an end panel, wherein the end panel is adhereable to the at least one article.

5. An article carrier according to claim 4, wherein the end panel comprises a securing portion, the securing portion being disposed in an overlapping relationship with the side panel.

6. An article carrier according to claim 5, wherein the securing portion is: (i) adhered to the at least one article, or (ii) adhered to the side panel, or (iii) adhered to both the at least one article and the side panel.

7. An article carrier according to claim 1, wherein a maximum length of the at least one wing panel is less than a maximum length of the main panel, and wherein the at least one article comprises a generally cylindrical can.

8. A package comprising an article carrier and at least one article, the carrier comprising an engaging panel having at least one top-receiving opening, each of the at least one article being received in each of the at least one top-receiving openings, respectively, so as to be secured to the engaging panel,

wherein the at least one top-receiving opening provides an engaging edge configured to at least partially engage with an upper portion of the respective article;

the carrier further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the engaging panel.

9. A package according to claim 8, wherein the carrier comprises at least one lap panel disposed in face-to-face relationship with the engaging panel.

10. A package according to claim 9, wherein the at least one lap panel comprises at least one opening for receiving a portion of the at least one article, respectively.

11. A package according to any one of claims 8 to 10, wherein the at least one wing panel comprises a pair of wing panels in the form of a pair of opposing side panels hinged directly to opposing side edges of the engaging panel.

12. A package according to any one of claims 8 to 11, wherein the at least one lap panel is either hingedly connected directly to the engaging panel by a fold or crease line or hingedly connected to the main panel by at least one further panel.

13. A package according to any one of claims 8 to 12, wherein the wing panel is adhered to the at least one articlel.

14. An article carrier according to claim 3, wherein the at least one top-receiving opening comprises an engaging aperture that is at least partially toothed around its periphery, having a toothed perimeter section and a toothless perimeter section, wherein the toothless perimeter section has a radius of curvature (R_2) that is greater than the radius (R_1) of a notional circle (N_{C1}) defined by the engaging aperture.

15. An article carrier according to claim 1, wherein the at least one wing panel is hingedly connected to a side edge of the main panel by a corner fold line, wherein the carrier comprises a handle structure including a pair of handle openings disposed on opposite sides of the corner fold line between the main panel and the wing panel.

16. An article carrier according to claim 15, wherein the at least one wing panel comprises a pair of wing panels in the form of opposing side panels, and wherein the carrier comprises a handle opening in each of the pair of wing panels.

17. An article carrier according to claim 16, wherein the carrier comprises a further handle opening in the main panel.

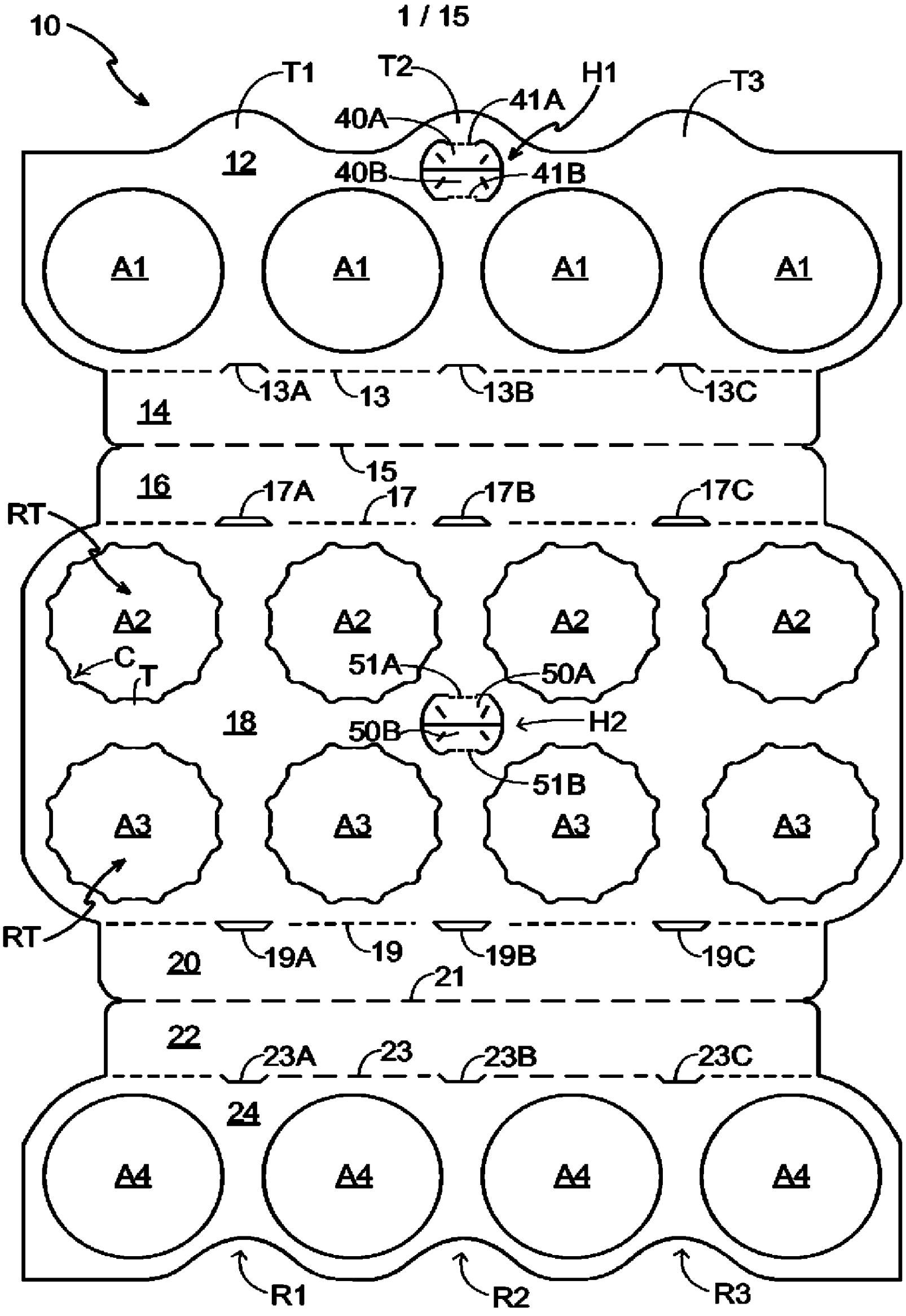
18. An article carrier according to claim 17, wherein the further handle opening in the main panel comprises a pair of foldable tabs forming cushioning flaps hinged to the top panel, the foldable tabs hinged in opposition to each other and one of the pair of foldable flaps being foldable towards the handle opening in one of the pair of wing panels and the other one of the pair of foldable flaps being foldable towards the handle opening in the other of the pair of wing panels.

19. An article carrier according to claim 16, wherein the handle opening in each of the pair of wing panels is defined, at least in part, by a foldable tab that is either hinged to the respective wing panel or hinged to the main panel.

20. A blank for forming an article carrier configured to hold a plurality of generally cylindrical cans, the blank comprising an engaging panel having at least one top-receiving opening for receiving a respective article to secure the engaging panel to the respective article, the at least one top-receiving opening comprising at least one engaging feature comprising at least one of: a plurality of teeth, a slit, and an opening,

wherein the at least one engaging feature provides an engaging edge configured to at least partially engage with an upper portion of the respective article;

the blank further comprising at least one wing panel, the at least one wing panel being hingedly connected to a side edge of the engaging panel.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T1
T2
H1
T3
41A
40A
12
40B
41B
A1
A1
A1
A1
13A
13
13B
13C
14
15
16
17A
17
17B
17C
RT
A2
A2
A2
A2
C
T
51A
50A
18
50B
H2
51B
A3
A3
A3
A3
RT
19A
19
19B
19C
20
21
22
23A
23
23B
23C
24
A4
A4
A4
A4
R1
R2
R3

FIG. 1

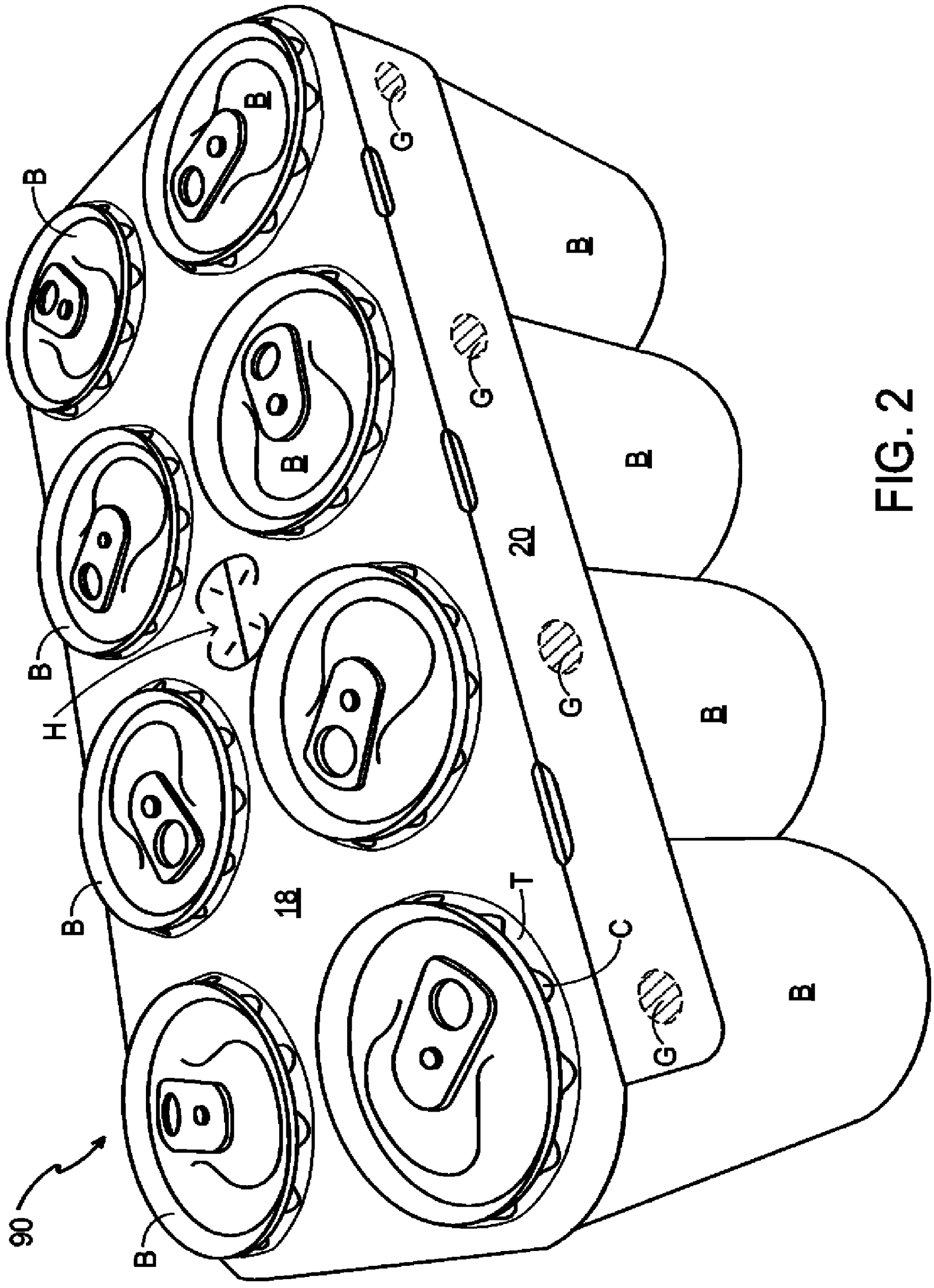


FIG. 2

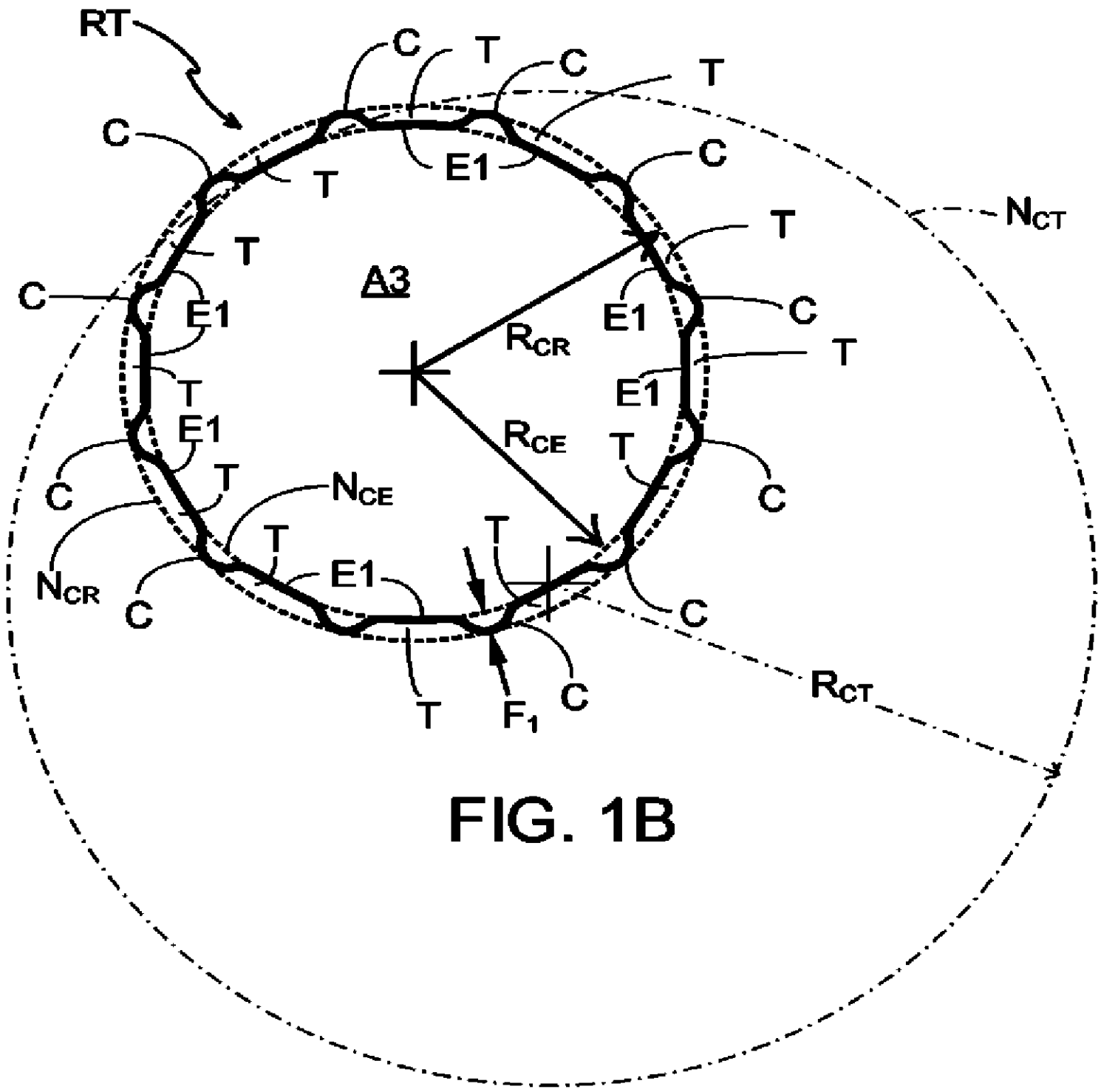

RT
C
T
C
T
C
T
E1
C
T
T
C
E1
Δ3
T
E1
C
R_{CR}
T
E1
R_{CE}
T
C
N_{CE}
T
T
N_{CR}
E1
C
C
T
F_1
C
R_{CT}
N_{CT}

FIG. 1B

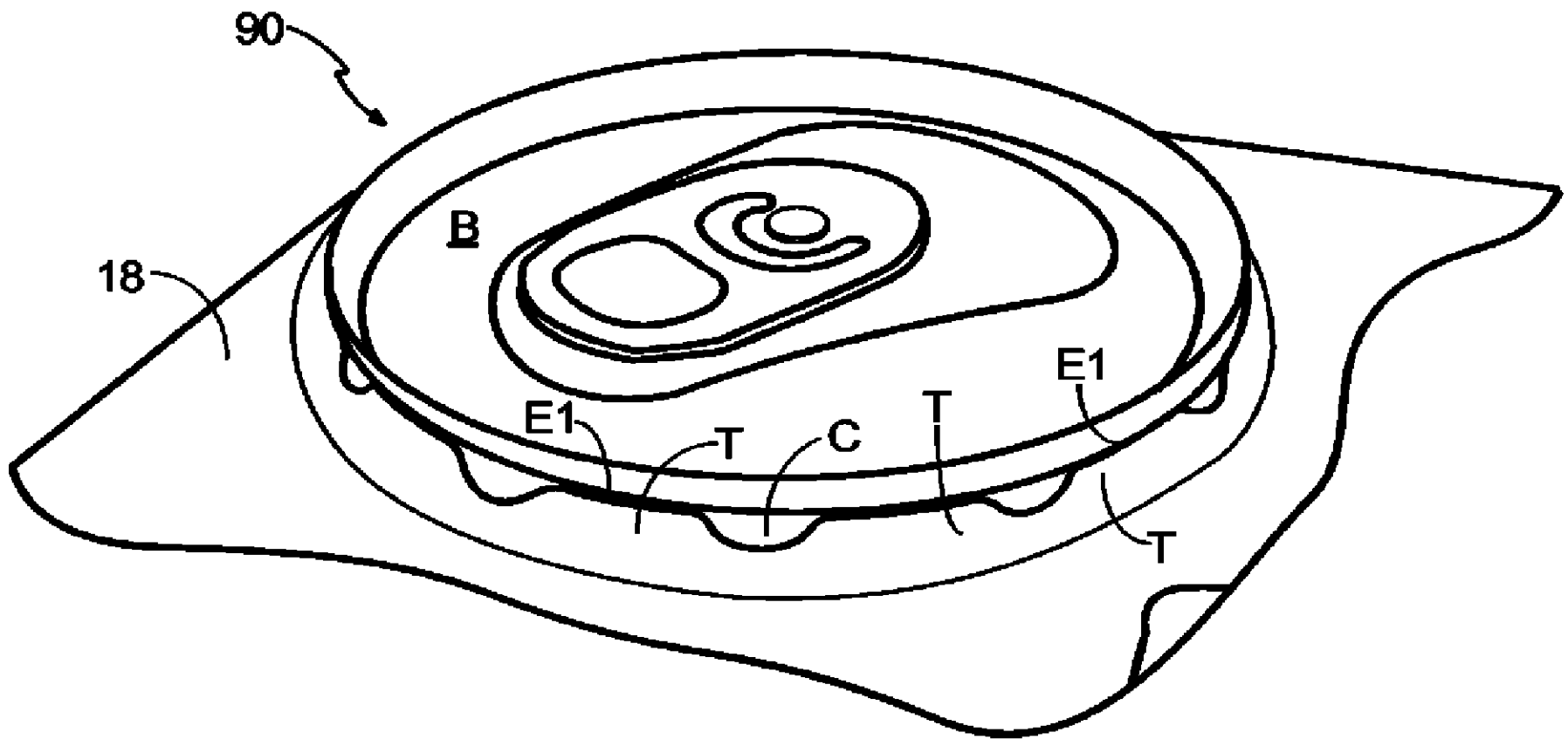

90
18
B
E1
T
C
T
E1
T

FIG. 2B

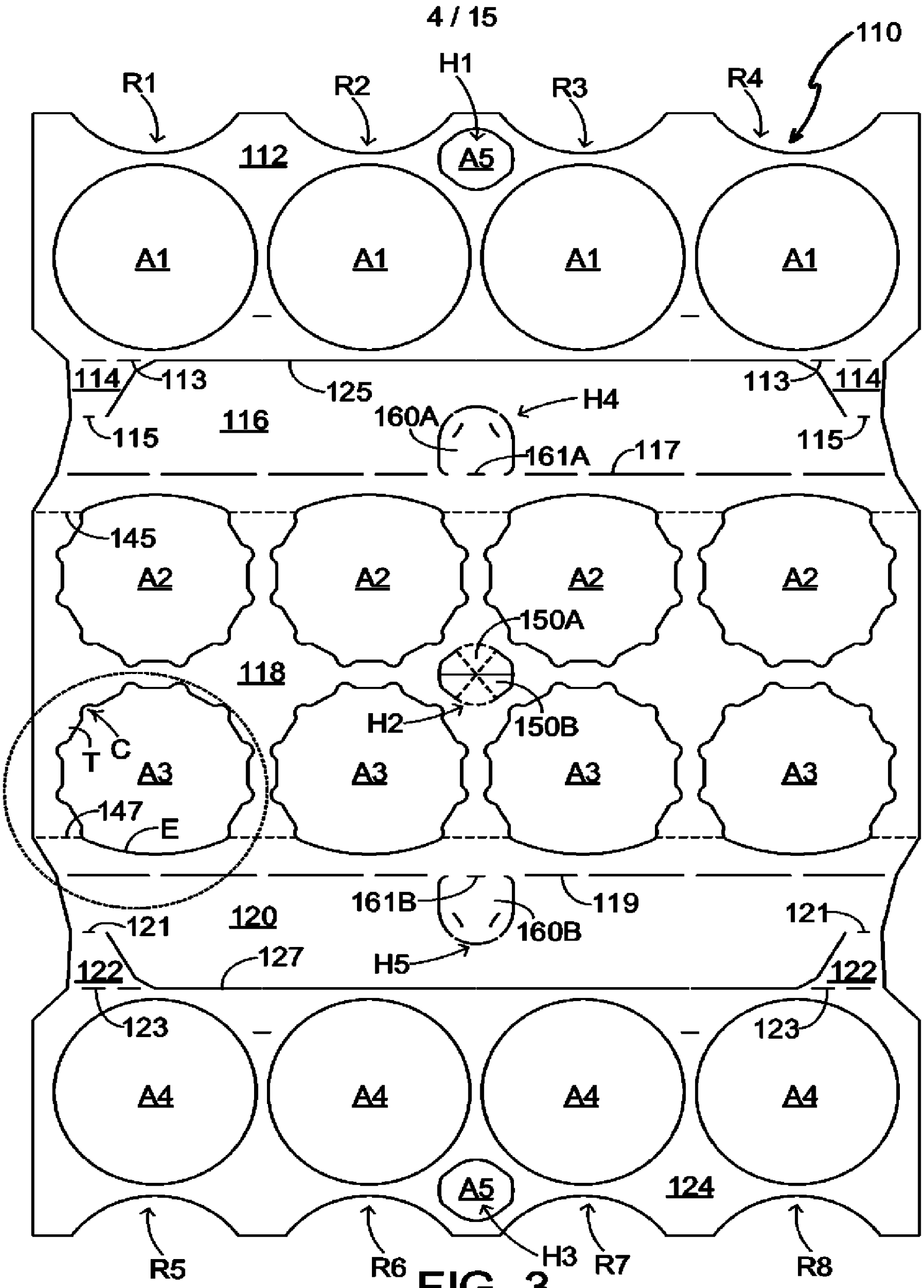

110
R1
R2
H1
R3
R4
112
A5
A1
A1
A1
A1
114
113
125
H4
113
114
116
160A
115
115
161A
117
145
A2
A2
A2
A2
150A
118
H2
150B
T
C
A3
A3
A3
A3
147
E
161B
119
121
120
121
160B
H5
127
122
122
123
123
A4
A4
A4
A4
A5
124
R5
R6
H3
R7
R8

FIG. 3

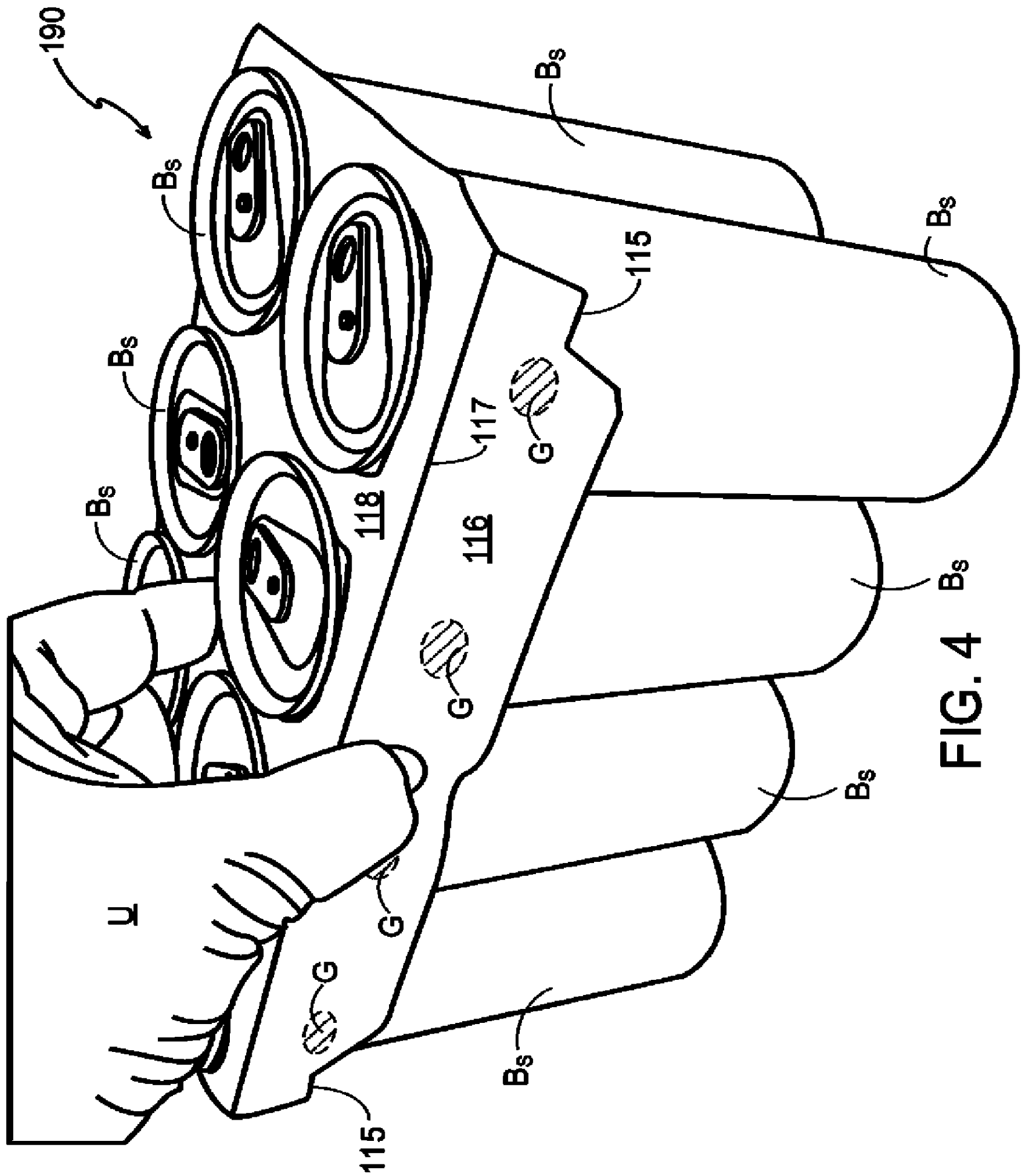


FIG. 4

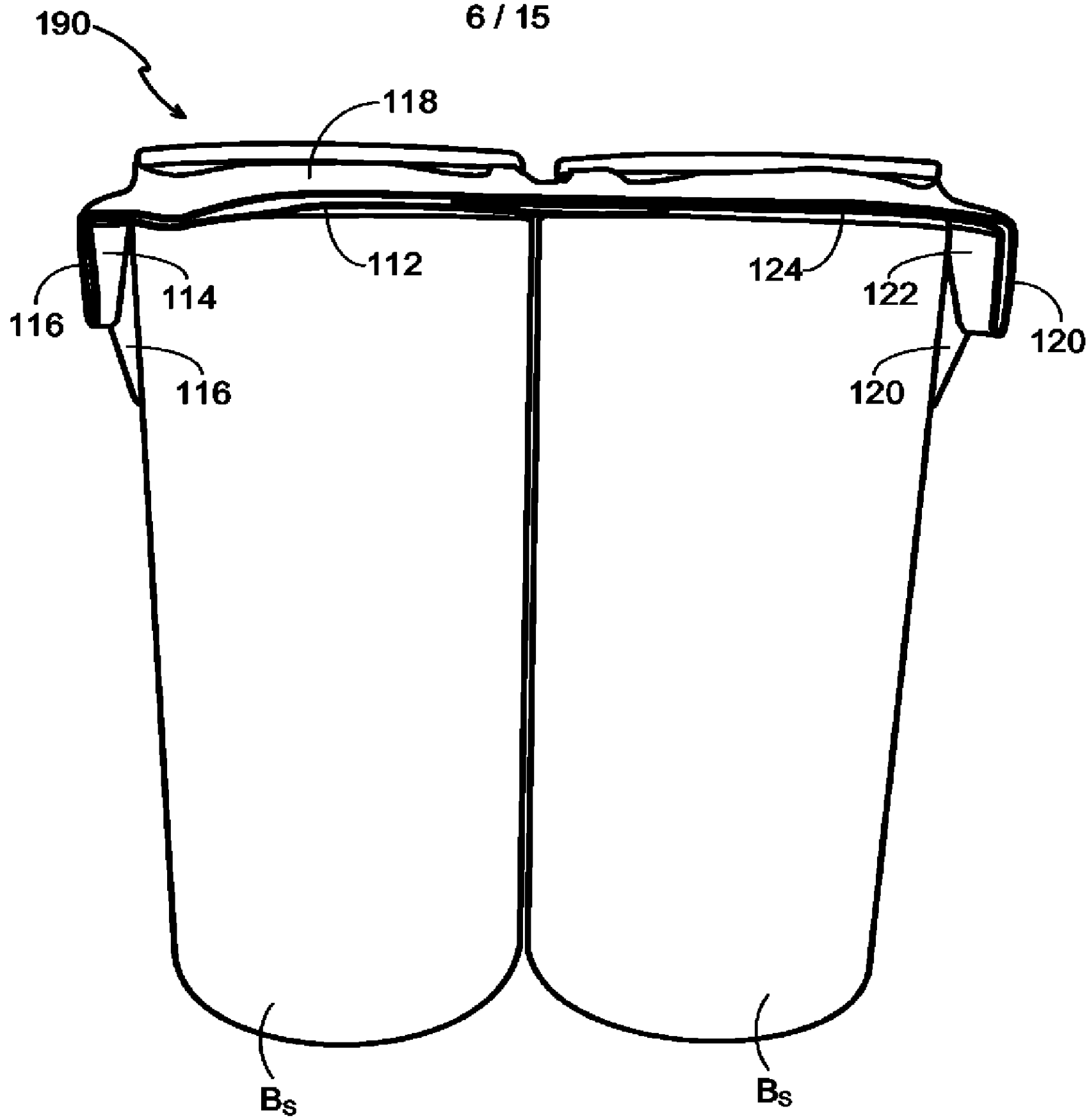


FIG. 5

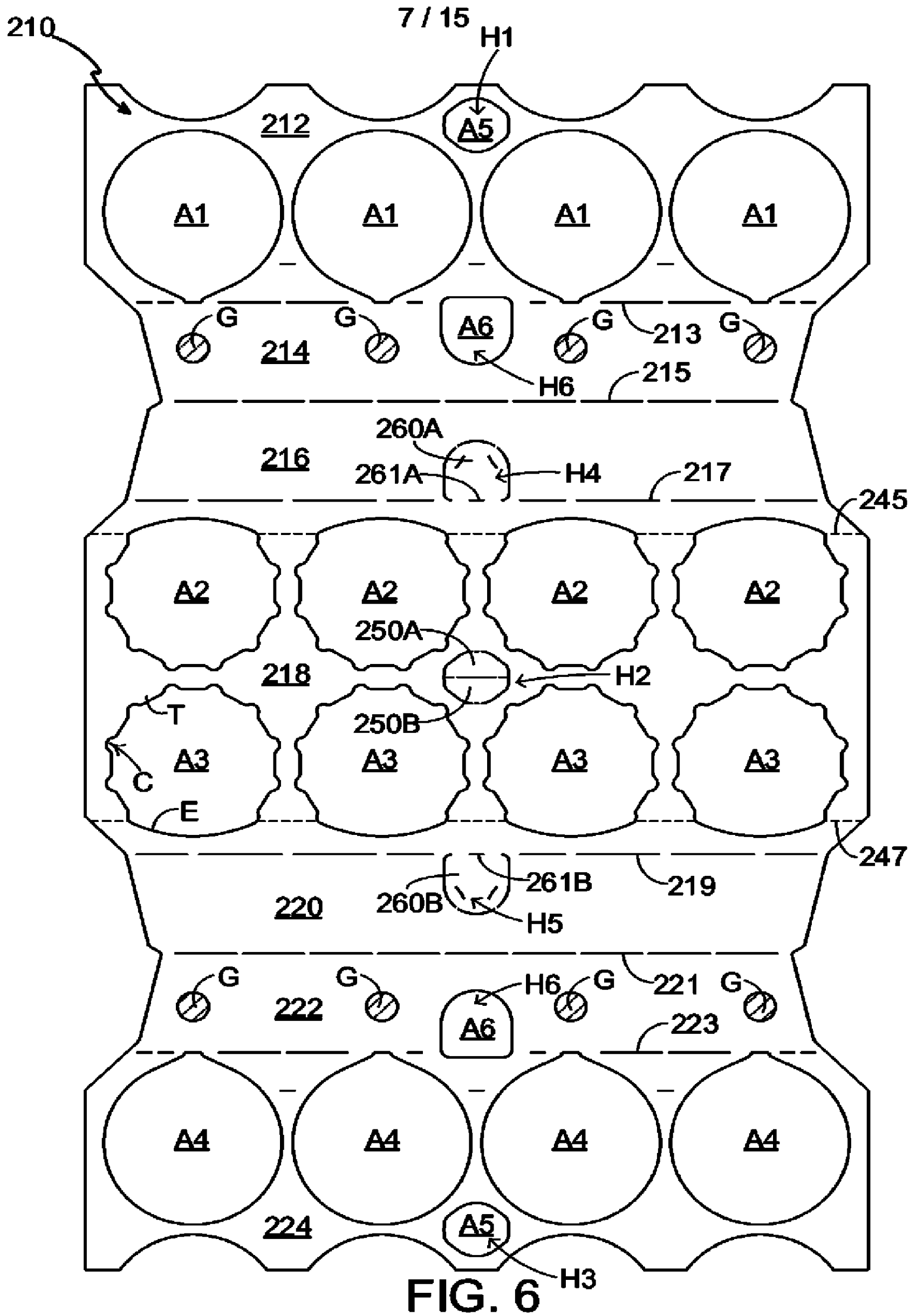

210
H1
212
A5
A1
A1
A1
A1
G
G
A6
G
G
213
214
H6
215
260A
216
261A
H4
217
245
A2
A2
A2
A2
250A
218
H2
T
250B
A3
A3
A3
A3
C
E
247
261B
219
260B
220
H5
G
G
H6
G
221
G
222
A6
223
A4
A4
A4
A4
224
A5
H3

FIG. 6

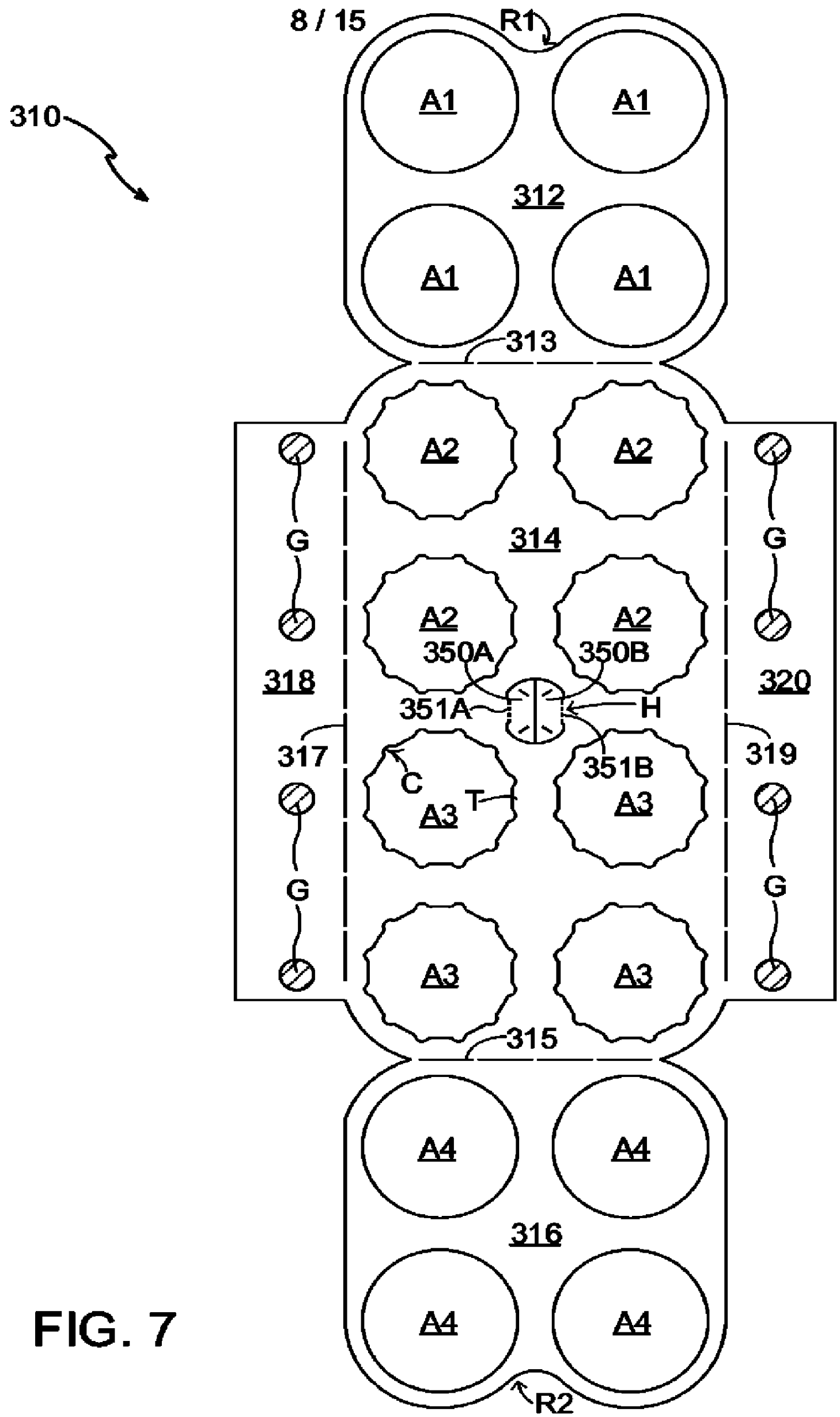

310
R1
A1
A1
312
A1
A1
313
A2
A2
314
G
G
A2
350A
A2
350B
318
320
351A
H
317
319
351B
C
A3
T
A3
G
G
A3
A3
315
A4
A4
316
A4
A4
R2

FIG. 7

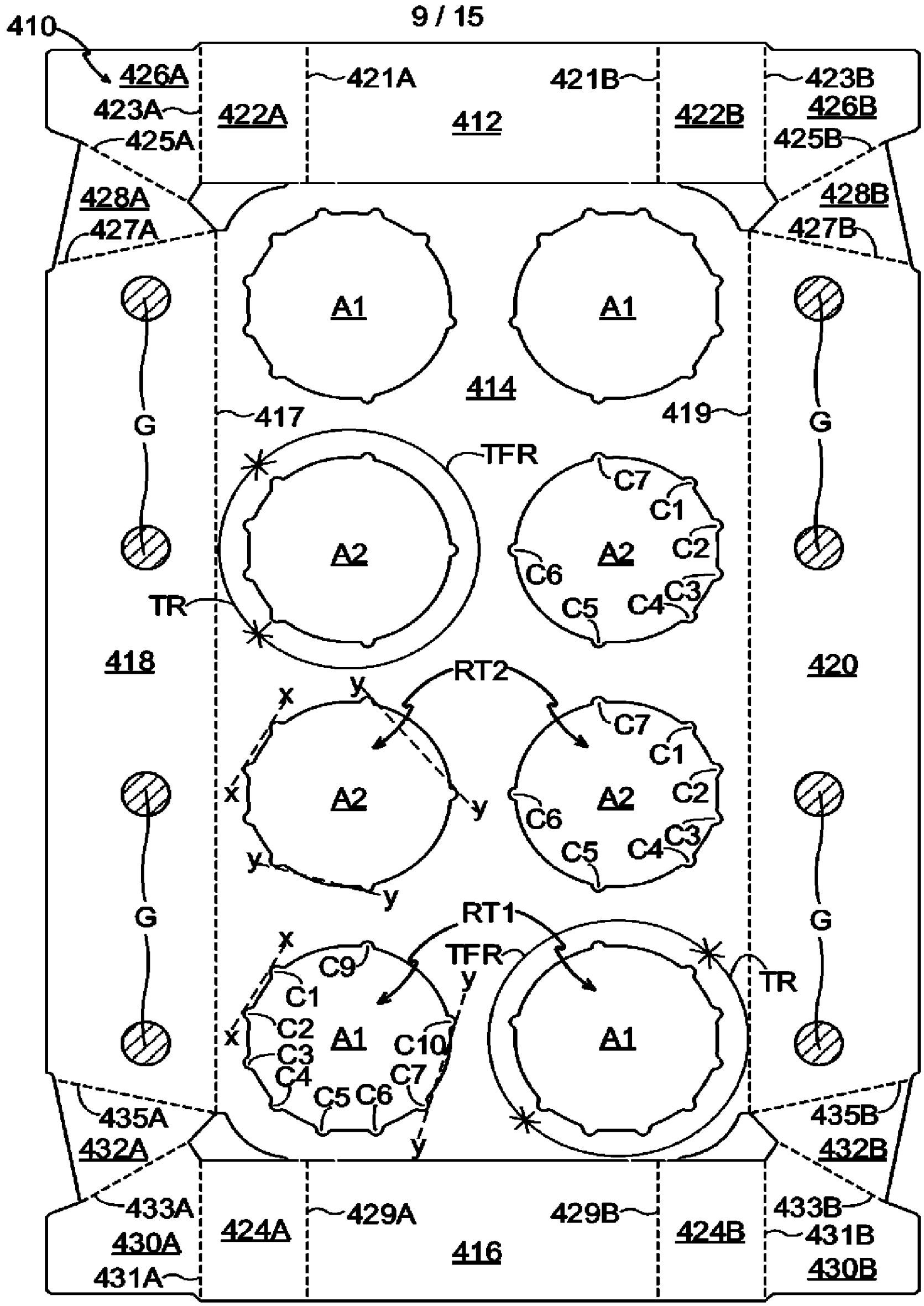

410
426A
423A
425A
428A
427A
422A
421A
412
421B
422B
423B
426B
425B
428B
427B
A1
A1
414
417
419
G
G
TFR
TR
A2
C7
C1
C2
C6
C5
C4
C3
418
420
RT2
x
y
RT1
C9
C10
435A
432A
435B
432B
433A
430A
431A
424A
429A
416
429B
424B
433B
431B
430B

FIG. 8

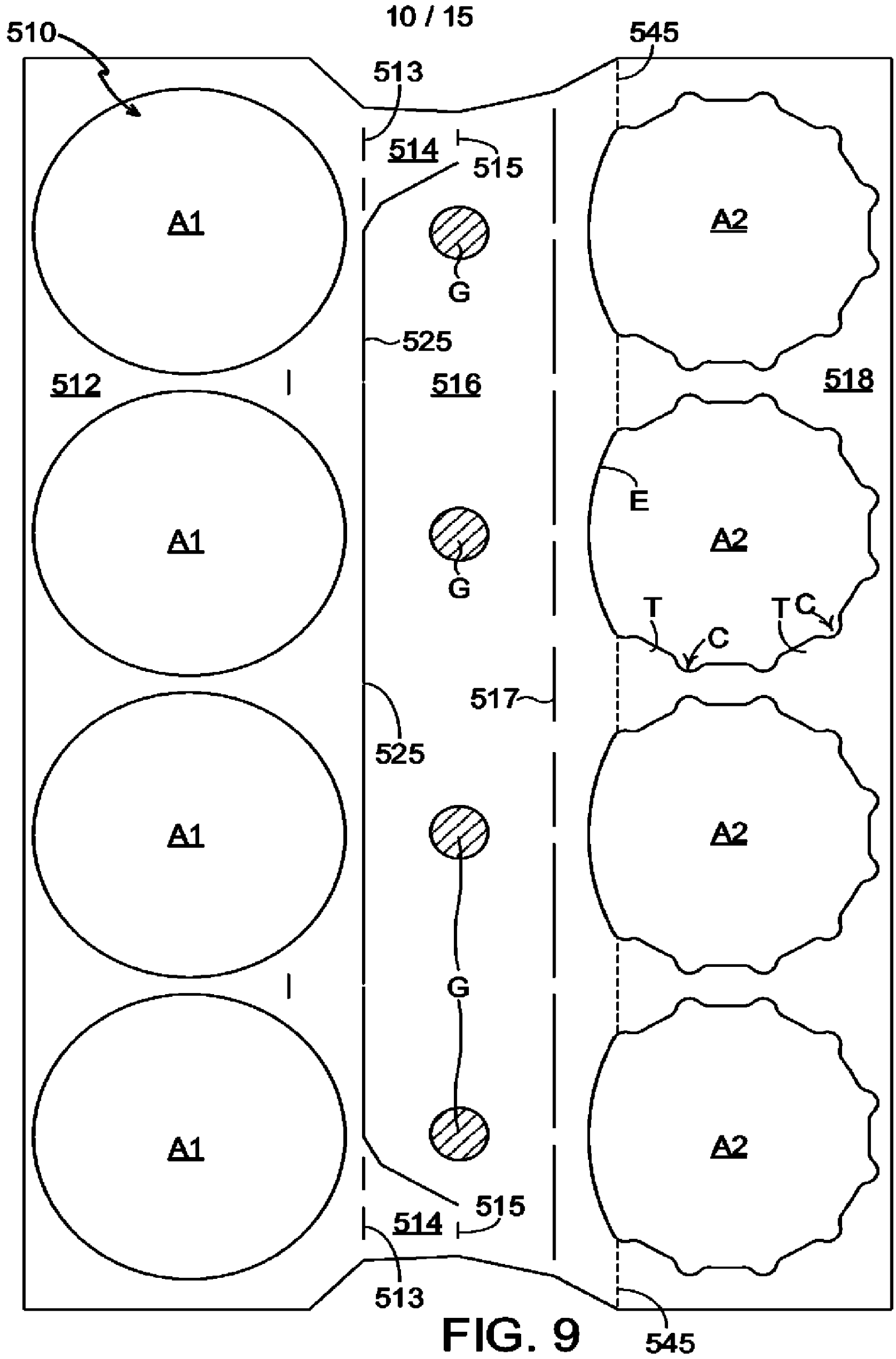


FIG. 9

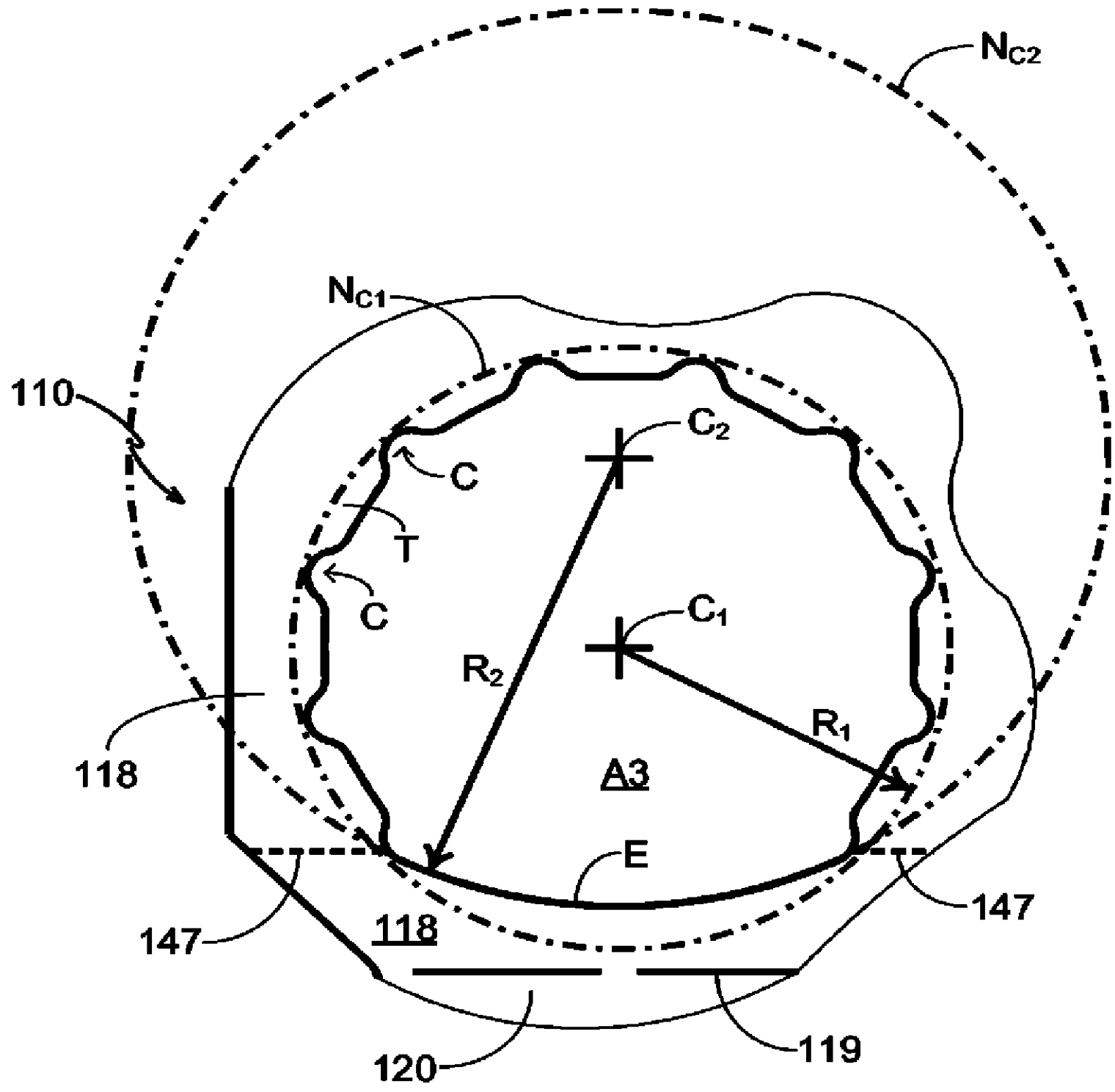


FIG. 10

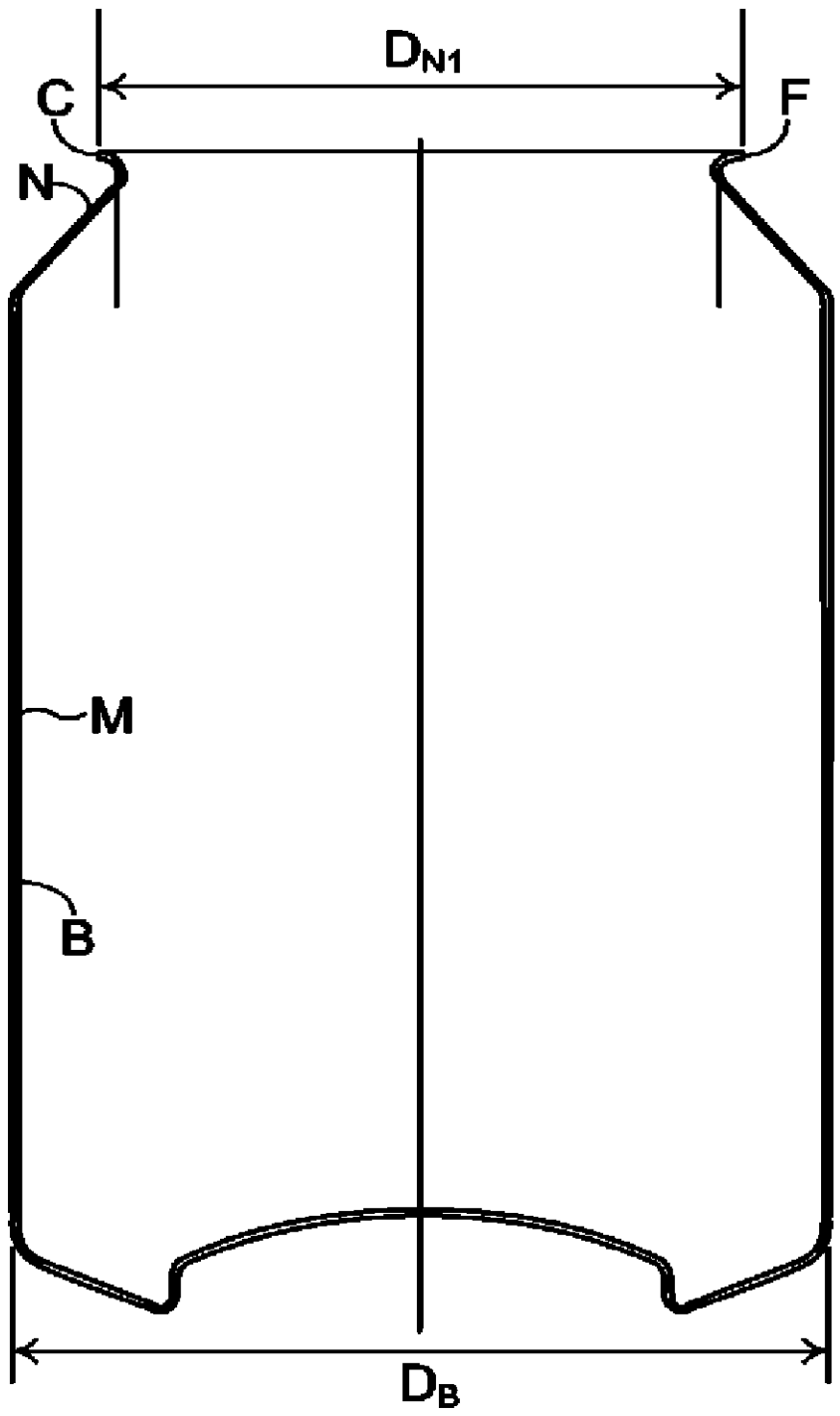


FIG. 11A

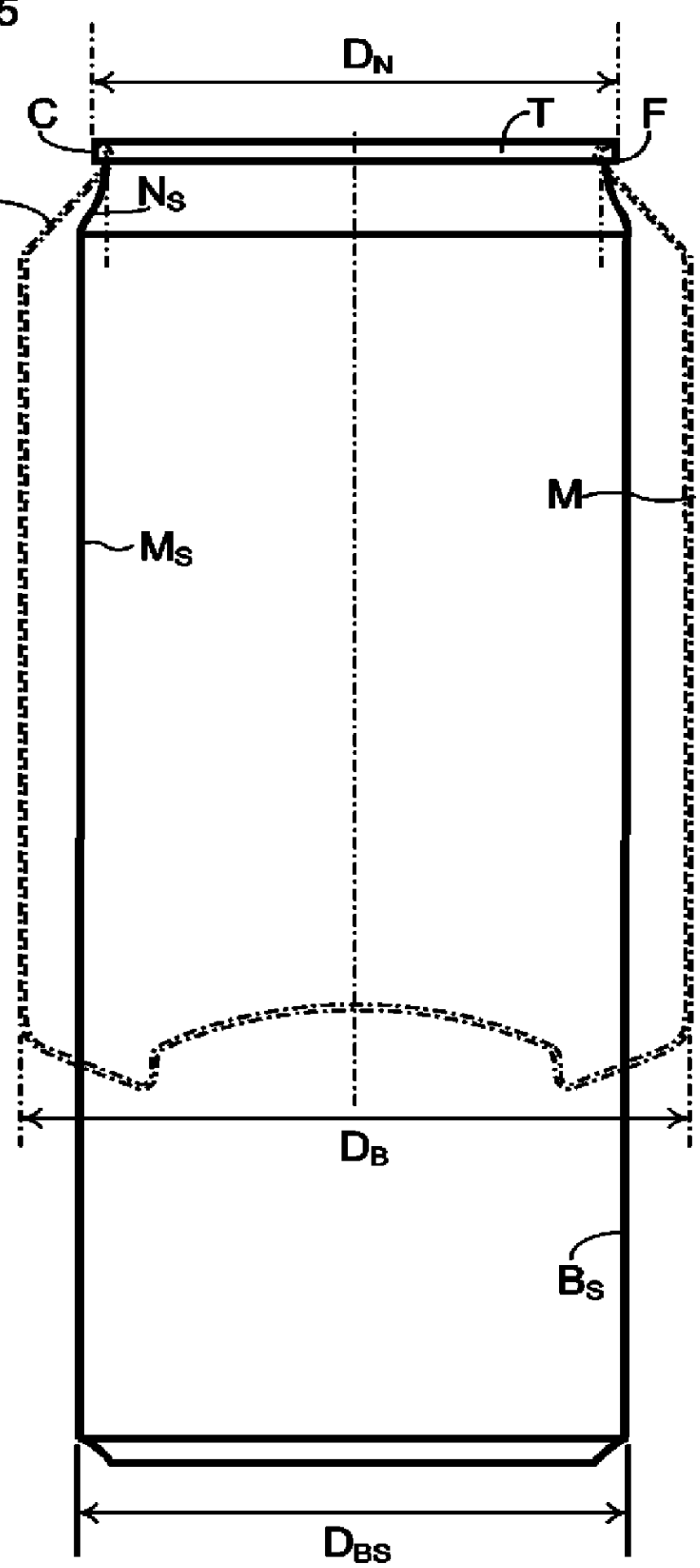


FIG. 11B

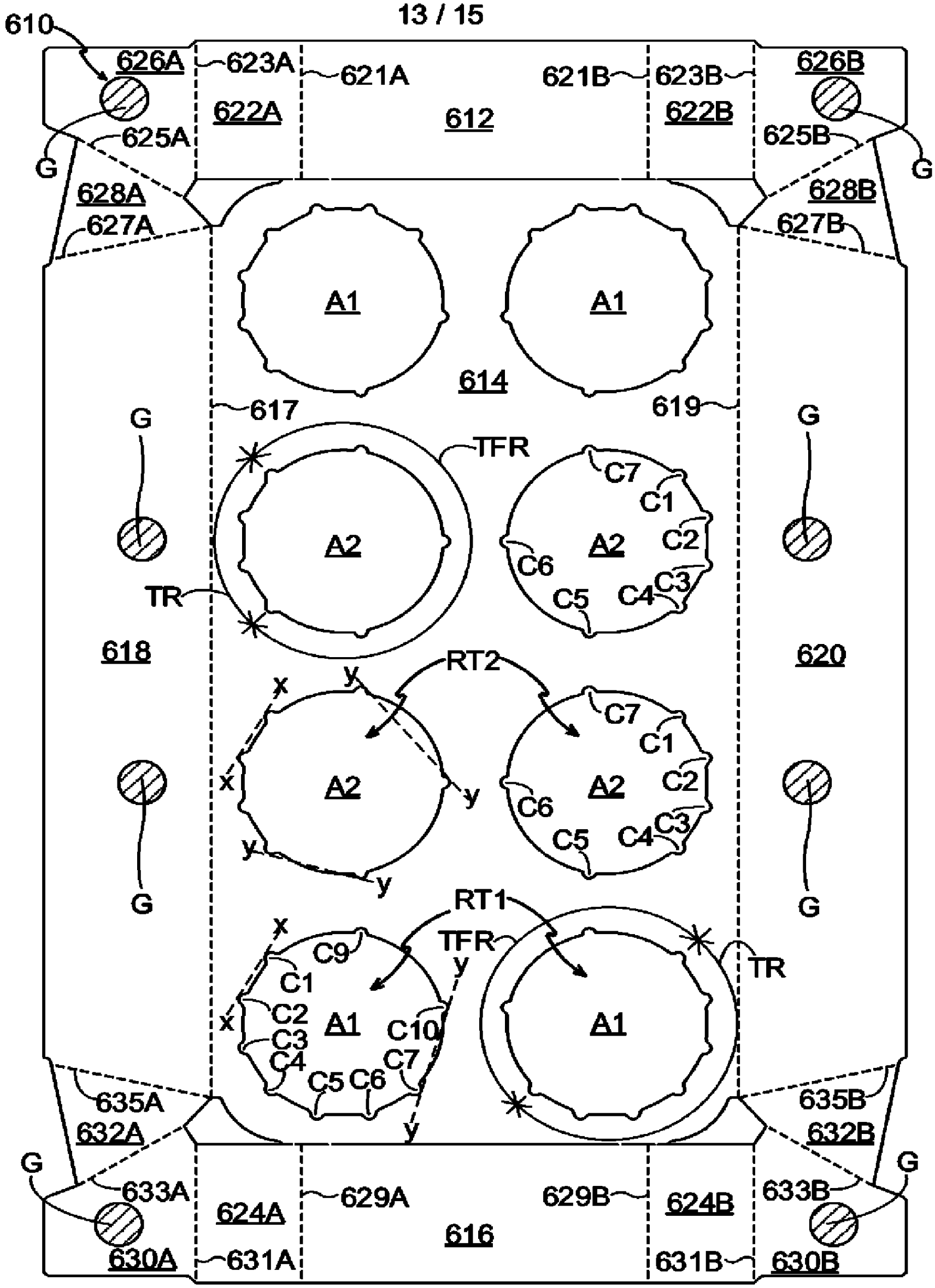
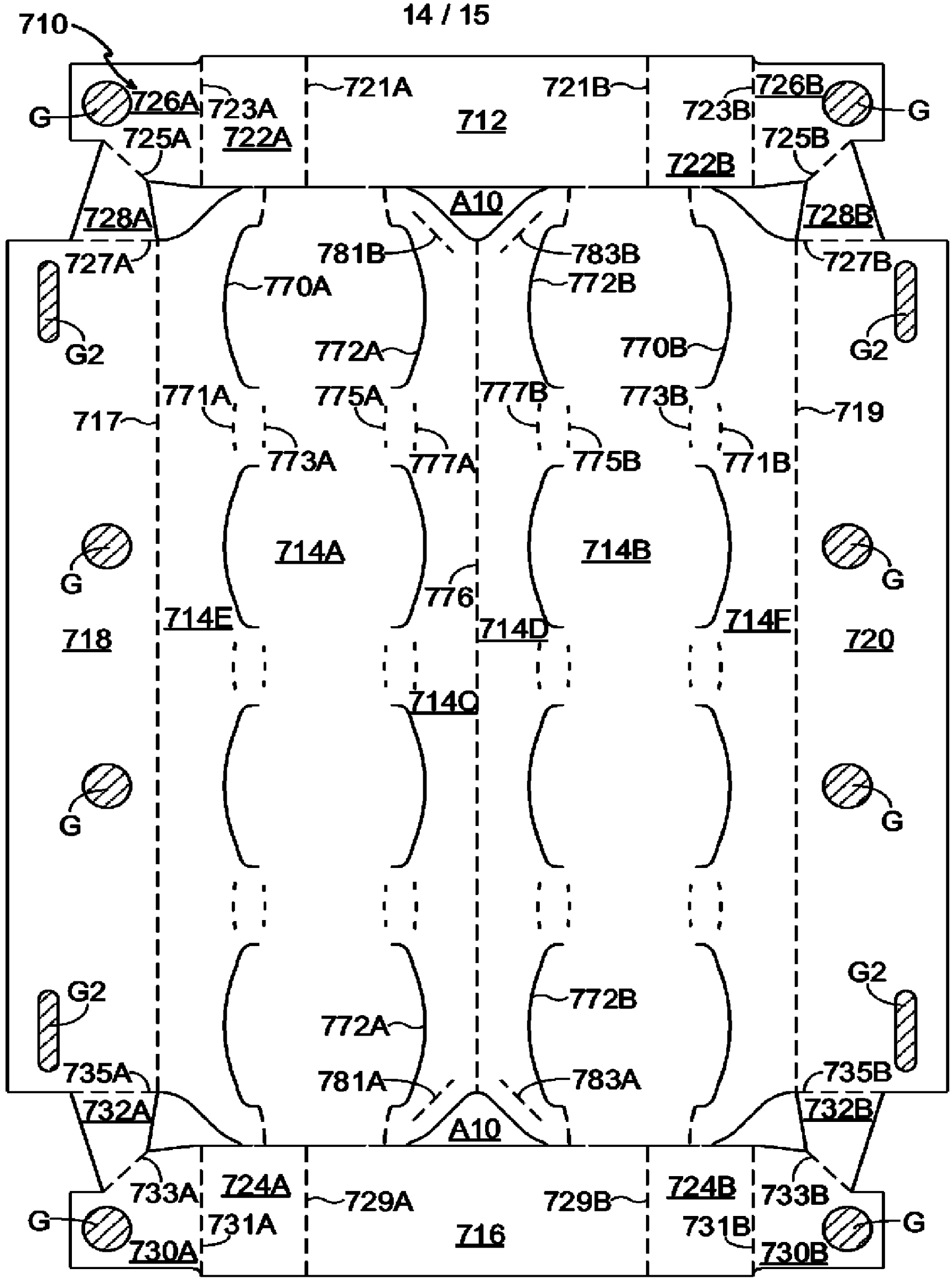

610
626A
623A
621A
621B
623B
626B
622A
612
622B
625A
625B
G
G
628A
628B
627A
627B
A1
A1
614
617
619
G
G
TFR
A2
C7
C1
C2
C6
A2
C5
C4
C3
TR
618
620
RT2
x
y
x
A2
y
y
C7
C1
C2
C6
A2
C5
C4
C3
G
G
RT1
x
C9
TFR
y
TR
C1
C2
A1
C10
x
C3
C4
C7
C5
C6
A1
y
635A
635B
632A
632B
G
G
633A
629A
629B
633B
624A
624B
616
630A
631A
631B
630B

FIG. 12


710
726A
723A
721A
721B
726B
G
712
723B
G
725A
722A
725B
722B
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728A
728B
781B
783B
727A
727B
770A
772B
G2
772A
770B
G2
771A
775A
777B
773B
717
719
773A
777A
775B
771B
714A
714B
G
G
776
714E
714D
714E
718
720
714Q
G
G
G2
772A
772B
G2
735A
781A
783A
735B
732A
732B
A10
733A
724A
729A
729B
724B
733B
G
731A
716
731B
G
730A
730B

FIG. 13

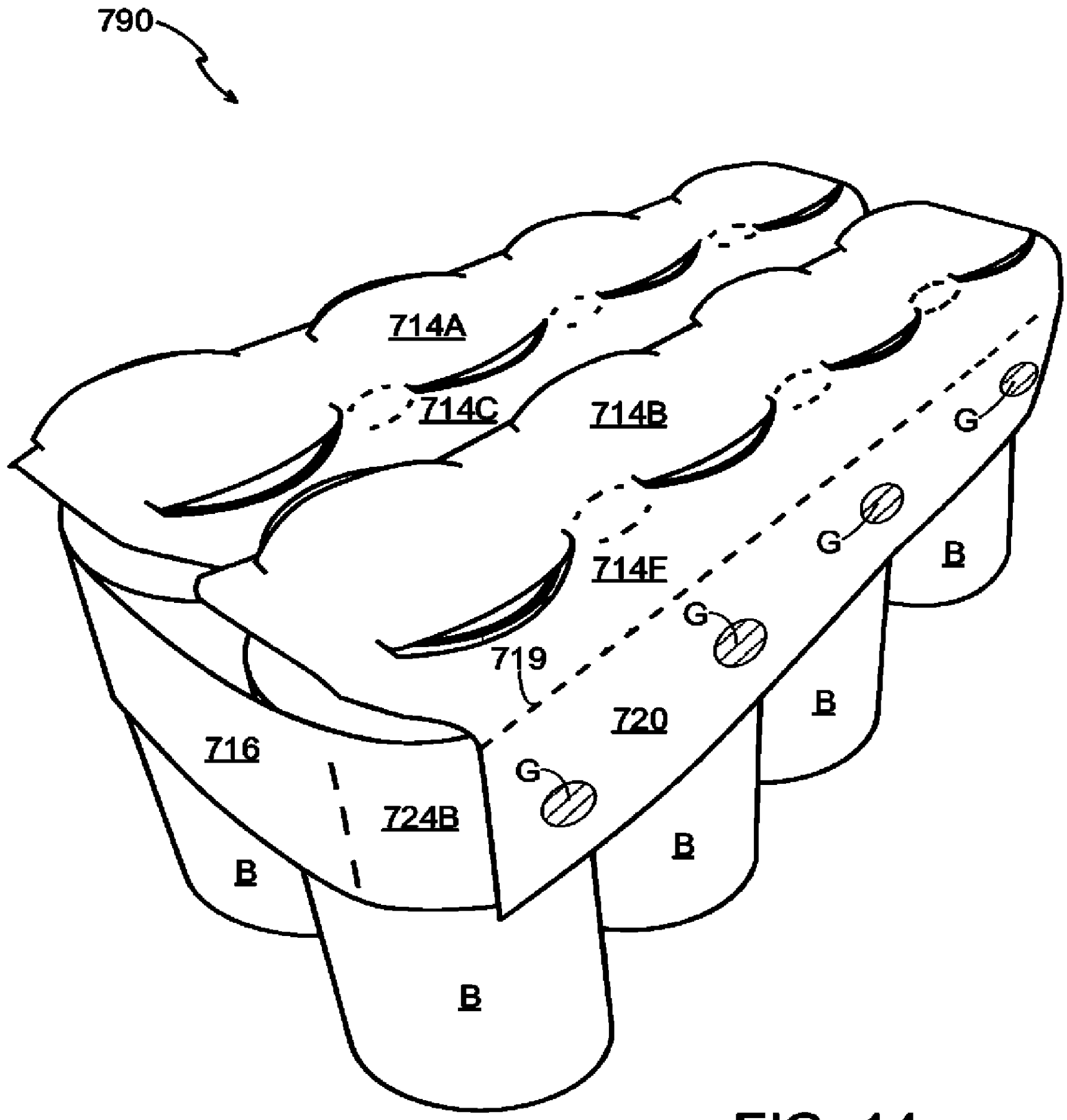

FIG. 14

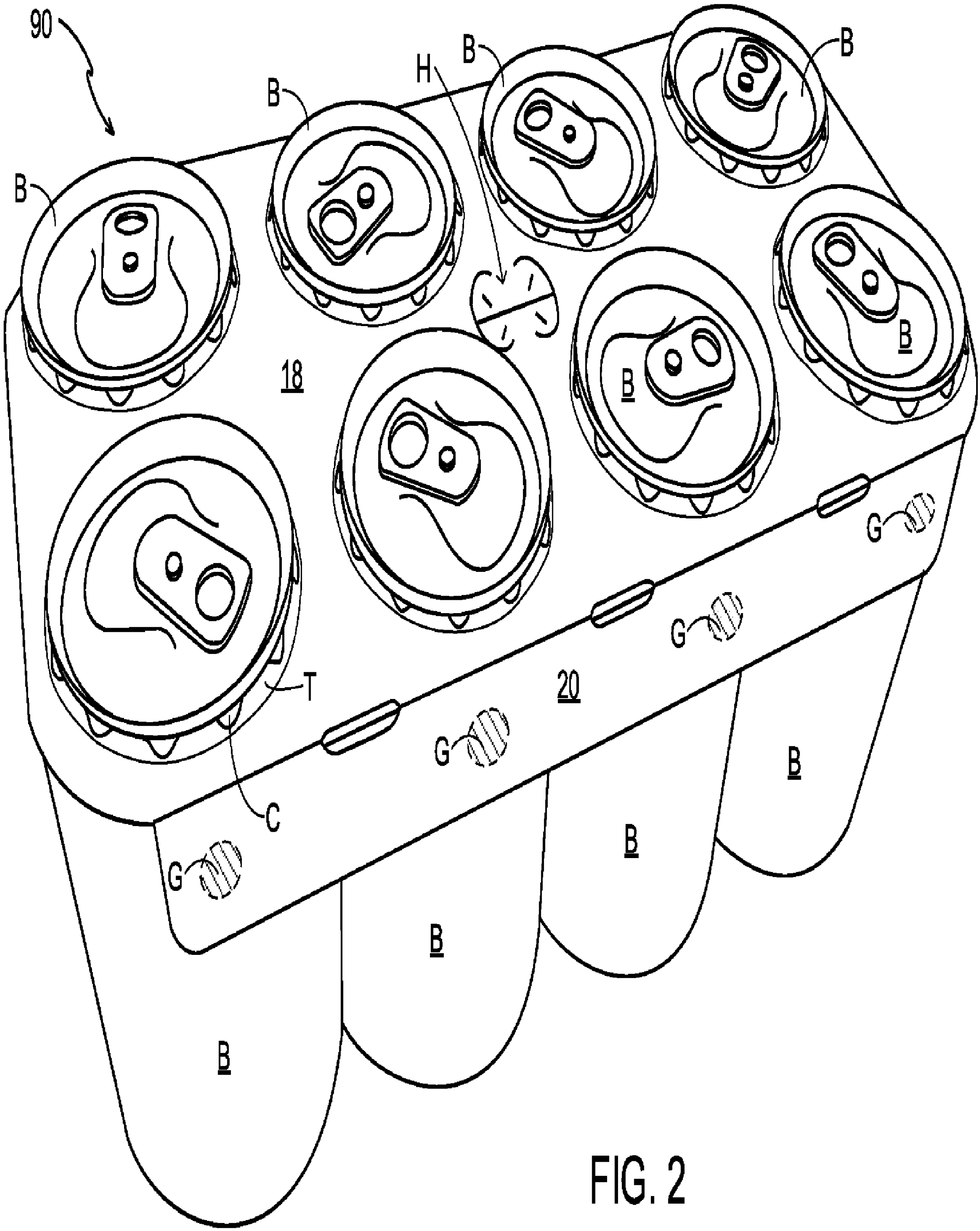

FIG. 2