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(54) CARRIER FOR CONTAINERS

(57) A carrier for holding a plurality of containers includes a first construct and a second construct. The first construct includes a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers. The second construct includes at least one panel, the at least one panel of the second construct positioned in at least partial face-to-face contact with the at least one attachment panel.

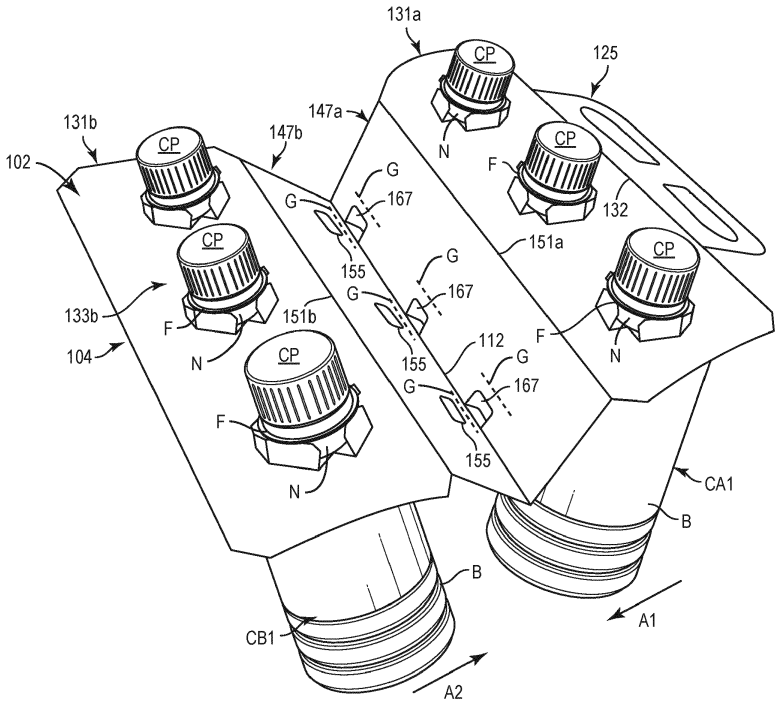

FIG. 3

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of each of U.S. Provisional Patent Application No. 62/952,839, filed on December 23, 2019, and U.S. Provisional Patent Application No. 62/956,882, filed on January 3, 2020.

INCORPORATION BY REFERENCE

[0002] The disclosures of each of U.S. Provisional Patent Application No. 62/779,689, filed on December 14, 2018, U.S. Provisional Patent Application No. 62/783,752, filed on December 21, 2018, U.S. Provisional Patent Application No. 62/796,830, filed on January 25, 2019, U.S. Provisional Patent Application No. 62/797,585, filed on January 28, 2019, U.S. Provisional Patent Application No. 62/810,015, filed on February 25, 2019, U.S. Provisional Patent Application No. 62/814,412, filed on March 6, 2019, U.S. Provisional Patent Application No. 62/817,120, filed on March 12, 2019, U.S. Provisional Patent Application No. 62/841,449, filed on May 1, 2019, U.S. Patent Application No. 16/426,050, filed on May 30, 2019, U.S. Patent Application No. 16/426,057, filed on May 30, 2019, U.S. Patent Application No. 16/426,060, filed on May 30, 2019, U.S. Patent Application No. 16/426,063, filed on May 30, 2019, U.S. Patent Application No. 16/426,066, filed on May 30, 2019, U.S. Design Patent Application No. 29/692,992, filed on May 30, 2019, U.S. Design Patent Application No. 29/692,993, filed on May 30, 2019, U.S. Design Patent Application No. 29/692,994, filed on May 30, 2019, U.S. Design Patent Application No. 29/692,996, filed on May 30, 2019, U.S. Design Patent Application No. 29/692,997, filed on May 30, 2019, U.S. Patent Application No. 16/598,282, filed on October 10, 2019, U.S. Design Patent Application No. 29/709, 918, filed on October 18, 2019, U.S. Provisional Patent Application No. 62/952,839, filed on December 23, 2019, and U.S. Provisional Patent Application No. 62/956,882, filed on January 3, 2020 are hereby incorporated by reference for all purposes as if presented herein in their entirety.

BACKGROUND OF THE DISCLOSURE

[0003] The present disclosure generally relates to cartons or carriers for holding, displaying, and/or transporting containers.

SUMMARY OF THE DISCLOSURE

[0004] According to one aspect of the disclosure, a carrier for holding a plurality of containers comprises a first construct and a second construct. The first construct comprises a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers. The second construct comprises at least one panel, the at least one panel of the second construct positioned in at least partial face-to-face contact with the at least one attachment panel.

[0005] According to another aspect of the disclosure, a first blank and a second blank are for forming a carrier for holding a plurality of containers. The first blank comprises a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers when the carrier is formed from the first blank and the second blank. The second blank comprises at least one panel, the at least one panel of the second blank for being positioned in at least partial face-to-face contact with the at least one attachment panel when the carrier is formed from the first blank and the second blank.

[0006] According to another aspect of the disclosure, a method of forming a carrier for holding a plurality of containers comprises obtaining a first blank comprising a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers. The method further comprises obtaining a second blank comprising at least one panel, the at least one panel of the second construct. The method further comprises folding the plurality of panels of the first blank to form a first construct, forming a second construct from the at least one panel of the second blank, and positioning the at least one panel of the second construct in at least partial face-to-face contact with the at least one attachment panel of the first construct.

[0007] According to another aspect of the disclosure, a package comprising a carrier holding a plurality of containers comprises a first construct and a second construct. The first construct comprises a plurality of panels including at least one central panel and at least one attachment panel receiving a portion of one or more containers of the plurality of containers, the at least one central panel is positioned between and attached to adjacent containers of the plurality of containers. The second construct comprises at least one panel, the at least one panel of the second construct positioned in at least partial face-to-face contact with the at least one attachment panel.

[0008] According to common practice, the various features of the drawings discussed below are not necessarily drawn to scale. Dimensions of various features and elements in the drawings may be expanded or reduced to more clearly illustrate the embodiments of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a plan view of an outer surface of a first blank for forming a package and carrier according to a first exemplary embodiment of the disclosure.

Fig. 1A is an enlarged view of a container retention feature 133a of the blank of Fig. 1.

Fig. 1B is an enlarged view of a container retention feature 133b of the blank of Fig. 1.

Fig. 2 is a plan view of an outer surface of a second blank for forming a package and carrier according to the first exemplary embodiment of the disclosure.

Fig. 2A is an enlarged view of a container retention feature 233 of the blank of Fig. 2.

Fig. 3 is a perspective view of a partially folded configuration of a package and carrier formed from the blank of Fig. 1.

Fig. 4 is a side view of a partially folded configuration of a package and carrier formed from the blank of Fig. 1.

Fig. 5 is another side view of the partially folded configuration of the package and carrier of Fig. 4.

Fig. 6 is a perspective view of the partially folded configuration of the package and carrier of Fig. 3 having the blank of Fig. 2 attached thereto.

Fig. 7 is a perspective view of a package and carrier formed from the blanks of Figs. 1 and 2.

Fig. 8 is a plan view of an outer surface of a first blank for forming a package and carrier according to a second exemplary embodiment of the disclosure.

Fig. 9 is a plan view of an outer surface of a second blank for forming a package and carrier according to the second exemplary embodiment of the disclosure.

Fig. 10 is a perspective view of a package and carrier formed from the blanks of Figs. 8 and 9.

Fig. 11 is a plan view of an outer surface of a first blank for forming a package and carrier according to a third exemplary embodiment of the disclosure.

Fig. 12 is a plan view of an outer surface of a second blank for forming a package and carrier according to the third exemplary embodiment of the disclosure.

Fig. 13 is a perspective view of a package and carrier formed from the blanks of Figs. 11 and 12.

[0010] Corresponding parts are designated by corresponding reference numbers throughout the drawings.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0011] The present disclosure generally relates to carriers, packages, constructs, sleeves, cartons, or the like, for holding and displaying containers such as jars, bottles, cans, etc. The containers can be used for packaging food and beverage products, for example. The containers can be made from materials suitable in composition for packaging the particular food or beverage item, and the materials include, but are not limited to, glass; plastics such as PET, LDPE, LLDPE, HDPE, PP, PS, PVC, EVOH, and Nylon; and the like; aluminum and/or other metals; or any combination thereof.

[0012] Carriers according to the present disclosure can accommodate containers of numerous different shapes. For the purpose of illustration and not for the purpose of limiting the scope of the disclosure, the following detailed description describes beverage containers (e.g., plastic bottles) at least partially disposed within the carrier embodiments. Carriers described herein can also be configured to accommodate other containers of food and/or beverage items without departing from the disclosure. In this specification, the terms "lower," "bottom," "upper," "top," "front," and "back" indicate orientations determined in relation to fully erected carriers.

[0013] As described herein, carriers may be formed by multiple overlapping panels, end flaps, and/or other portions of blanks. Such panels, end flaps, and/or other portions of the blanks can be designated in relative terms to one another, e.g., "first", "second", "third", etc., in sequential or non-sequential reference, without departing from the disclosure.

[0014] Turning to Fig. 1, an exterior surface 101 of a base blank or lower blank or first blank 103 for forming a carrier 205 is illustrated according to a first exemplary embodiment of the disclosure. As described herein, the first blank 103 can be provided in combination with a reinforcing blank or upper blank or second blank 203 (Fig. 2) to form the carrier 205. In one embodiment, the first blank 103 and the second blank 203 can be free from foldable connection to one another, though the blanks 103, 203 can be foldably connected without departing from the disclosure.

[0015] As shown in Fig. 7, the carrier 205 is sized to contain or support six containers, with three containers CA1, CA2, CA3 being attached to a front portion 206 of the carrier 205 and three containers CB1, CB2, CB3 being attached to a back portion 208 of the carrier 205. The front portion 206 and the back portion 208 of the carrier

205 can carry more or less than three containers without departing from the disclosure. The carrier 205 can be provided together with one or more containers as a package 210 (Fig. 8).

[0016] In the illustrated embodiment, the containers CA1, CA2, CA3, CB1, CB2, CB3 can be beverage bottles, for example, beverage bottles formed of a polymeric material such as polyethylene terephthalate (PET), with respective bottom portions B extending to a tapered upper neck portion N that terminates at a flange portion F upon which a cap CP is seated (Fig. 3). The containers described herein could be any other suitable type and size of container without departing from the disclosure.

[0017] As shown in Fig. 1, the first blank 103 has a longitudinal axis L1 and a lateral axis L2. A grain direction M1 of the first blank 103, e.g., a direction along which the fibers/fibrous components of the material from which the first blank 103 is formed (e.g., paperboard) generally lie, can be generally parallel to the longitudinal axis L1. It will be understood that the grain direction M1 can be generally parallel to the lateral axis L2 or can be defined along a direction oblique relative to the longitudinal axis L1 without departing from the disclosure.

[0018] In the illustrated embodiment, the first blank 103 has a front portion 107 for at least partially forming the front portion 206 of the carrier 205, and a back portion 109 for at least partially forming the back portion 208 of the carrier 105. The front portion 107 and the back portion 109 of the first blank 103 are foldably connected at a lateral fold line 112 that forms a lateral centerline CL of the blank 103, as shown.

[0019] As discussed in further detail below, the blank 103 is at least partially formed into the carrier 205 by folding the blank 103 at the fold line 112 along the centerline CL so that the front portion 107 and the back portion 109 of the blank 103 are overlapped in at least partial face-to-face contact. It will be understood that the designations of the portions 107, 109 of the blank 103 and the portions 106, 108 of the carrier 205 as respective "front" and "back" portions can be reversed without departing from the disclosure.

[0020] In the illustrated embodiment, the front portion 107 of the blank 103 comprises a handle panel 125 (broadly, "first handle panel") having a pair of handle flaps 127 at interior portions thereof, each defined by a respective cut 128 and each foldably connected to the handle panel 125 at respective lateral fold line 129. The respective cuts 128 and the respective handle flaps 127 formed therefrom include one or more curved and/or oblique portions and extend from one endpoint of the respective fold line 129 to the other endpoint of the respective fold line 129, but can have a different configuration without departing from the disclosure. As described herein, at least the handle panel 125 and/or the handle flaps 127 (and/or openings formed by the separation thereof) can be first handle features for at least partially forming a handle 251 of the carrier 205.

[0021] A front container retention panel or front attachment panel 131a (broadly, "first attachment panel") is foldably connected to the handle panel 125 at a lateral fold line 132a, and includes container retention features 133a for at least partially receiving and engaging the respective flange portions F and/or neck portions N of one or more of the containers CA1, CA2, CA3.

[0022] Each container retention feature 133a, as shown best in Fig. 1A, includes a container receiving aperture or container receiving opening 135a that is defined by the arrangement of a plurality of container retention flaps 137a, each of which are defined by respective cuts 139a, and which are foldably connected to the attachment panel 131a at respective oblique fold lines 141a. It will be understood that a different configuration of the container retention features 133a, such as a different number of container retention flaps 137a, or a different configuration of features, can be provided without departing from the disclosure.

[0023] A front central panel or front keel 147a is foldably connected to the attachment panel 131a at a lateral fold line 151a, and, as described further below, the front keel 147a is foldably connected to a back central panel or back keel 147b at the fold line 112. As shown, the fold line 112 is interrupted by and is collinear with a series of generally U-shaped cuts 157 to define a pair of protruding tabs 159 extending from the back portion 109 of the first blank 103 toward the front keel 147a. As described further herein, upon formation of the carrier 205 from the first blank 103 and the second blank 203, the tabs 159 separate from the front keel 147a to expose a pair of glue openings 167 (broadly, "front glue opening") along the front keel 147a (Fig. 3).

[0024] In the illustrated embodiment, the back portion 109 of the blank 103 includes a back top panel or back container retention panel or back attachment panel 131b (broadly, "top container retention panel" or "top attachment panel" or "second attachment panel") foldably connected to the back keel 147b at a lateral fold line 151b and having associated features that are generally a mirror-image of the corresponding panels and flaps of the front portion 107 of the blank 103. The details of the container retention features 133b of the back attachment panel 131b are shown best in Fig. IB.

[0025] Corresponding components (e.g., panels, flaps, fold lines, cuts, etc.) have been designated by corresponding reference numbers that differ by the "a" or "b" suffix, with the "a" components corresponding to the front portion 107 of the blank 103 and the "b" components corresponding to the back portion 109 of the blank 103. While the back portion 109 of the blank 103 is shown without a handle panel attached thereto, it will be understood that a handle panel can be attached to the back attachment 131b, and/or another handle feature can be provided in the back portion 109 of the blank 103, without departing from the disclosure.

[0026] The back keel 147b, as shown, includes a series of glue openings 155 (broadly, "back glue opening") each having a top edge that is spaced a greater longitudinal

distance D2 from the fold line 112 than a longitudinal distance D1 from the fold line 112 at which a top edge of the cuts 157 are spaced. The top edge of the cuts 157 correspond to the top edge of the glue openings 167 upon separation of the tabs 159 from the keel 147a, as described further herein.

[0027] Any of the panels, flaps, fold lines, cuts, or other features could be otherwise shaped, arranged, and/or omitted from the blank 103 without departing from the disclosure. The blank 103 could be sized and/or shaped to accommodate more or less than six containers without departing from this disclosure.

[0028] As also shown, glue G can be applied to one or more portions of the respective keels 147a, 147b. While the glue G has been shown schematically on the exterior surface 101 of the blank 103 for positional reference, it will be understood that the glue G can be applied to the interior surface 102 of the blank 103, as described further herein.

[0029] In one embodiment, the glue G can have a foam or foamed configuration, e.g., such that pockets of fluids such as gas are interspersed with solid, semi-solid, and/or liquid components of adhesive. In this regard, the glue G can be injected/infused with a fluid, e.g., gaseous, component that influences the glue G to expand from an originally-defined volume, over a change in time, to occupy a larger volume. In one embodiment, the glue G can comprise about 50% solid/semi-solid/liquid adhesive and about 50% gaseous components.

[0030] In other embodiments, the glue G can comprise a different ratio of adhesive to gaseous components, for example, about 10% adhesive/about 90% gaseous components, about 20% adhesive/about 80% gaseous components, about 30% adhesive/about 70% gaseous components, about 40% adhesive/about 60% gaseous components, about 60% adhesive/about 40% gaseous components, about 70% adhesive/about 30% gaseous components, about 80% adhesive/about 20% gaseous components, about 90% adhesive/about 10% gaseous components, or other integer or non-integer percentage ratios therebetween. The glue G can be any suitable adhesive without departing from the disclosure.

[0031] Referring additionally to Fig. 2, an exterior surface of 201 of the second blank 203 is illustrated according to an exemplary embodiment of the disclosure. A grain direction M2 of the second blank 203, can be generally parallel to the lateral axis L2, though the grain direction M2 can be generally parallel to the longitudinal axis L1 or can be defined along a direction oblique relative to the lateral axis L2 without departing from the disclosure.

[0032] As shown, the second blank 203 includes a body or central panel 261 that includes a plurality of container retention features 233 that are substantially similar to the container retention features 133a, 133b, e.g., such that each container retention feature 233 includes the respective container receiving aperture or container receiving opening 235a that is defined by the arrangement of a plurality of respective container retention flaps 237a, each of which are defined by respective cuts 239a and are foldably connected to the central panel 261 at respective fold lines 241a, the features of which are best shown in Fig. 2A.

[0033] Still referring to Fig. 2, a handle panel 225 (broadly, "second handle panel") can be foldably connected to the central panel 261 at a fold line 231, and can have a configuration that is substantially similar to the handle panel 125 described above, e.g., such that each handle flap 127 is defined by the respective cut 128 and such that each handle flap 127 is foldably connected to the handle panel 225 at a respective lateral fold line 129. As described herein, at least the handle panel 225 and/or the handle flaps 127 (and/or openings formed by the separation thereof) can be second handle features for at least partially forming a handle 251 of the carrier 205.

[0034] Turning to Fig. 3 the first blank 103 can be oriented with the exterior surface 101 facing downwardly and the exterior surface 102 facing upwardly, and the front attachment panel 131a and back attachment panel 131b can be lowered or otherwise brought into engagement with the respective containers CA1, CA2, CA3, CB1, CB2, CB3 such that respective top portions thereof that include at least the respective caps CP and respective flange portions F are at least partially received through the respective openings 135a, 135b of the respective container retention features 133a, 133b.

[0035] Such engagement of the container retention features 133a, 133b with the respective containers CA1, CA2, CA3, CB1, CB2, CB2 can cause the respective container retention flaps 137a, 137b to separate from the respective attachment panel 131a, 131b and/or each other at the respective cuts 139a, 139b and to fold upwardly at the respective fold lines 141a, 141b. In this regard, one or more of the container retention flaps 137a, 137b can rest against the neck portions N of the respective containers CA1, CA2, CA3, CB1, CB2, CB3 and distal edges thereof can be positioned to abut the respective flange portions F of the respective containers CA1, CA2, CA3, CB1, CB2, CB3. Portions of the respective container retention panel 131a, 131b adjacent the container retention flaps 137a, 137b can also be urged upwardly toward or into engagement with a portion of the respective containers CA1, CA2, CA3, CB1, CB2, CB3.

[0036] As shown, the front keel 147a and the back keel 147b can be folded downwardly relative to the respective attachment panels 131a, 131b at the respective fold lines 151a, 151b and such that the keels 147a, 147b also fold at the fold line 112 as the keels 147a, 147b are moved into at least partial face-to-face contact in the direction of the respective arrows A1, A2. Such folding can draw the containers CA1, CA2, CA3 and CB1, CB2, CB3 toward each other in an arrangement separated by the overlapped keels 147a, 147b to at least partially define the front portion 206 of the carrier 205 and the back portion 208 of the carrier 205.

[0037] Upon folding of the keel 147b at the fold line 112, the tabs 159 can separate from the front keel 147a at the respective cuts 157 to extend in a generally downward arrangement and such that series of discontinuities or front glue openings 167 can be defined along the front keel 147a. In this regard, the glue openings 167 of the front keel 147a are positioned to be longitudinally offset from the glue openings 155 of the back keel 147b, with a top edge of the glue openings 155 of the back keel 147b spaced the greater distance D2 (Fig. 5) from the fold line 112 than the distance D2 (Fig. 4) from the fold line 112 at which a top edge of the glue openings 167 of the front keel 147a are positioned.

[0038] In this regard, when the keels 147a, 147b are positioned in at least partial face-to-face contact, the glue openings 155 of the back keel 147b are positioned above the glue openings 167 of the front keel 147a such that the glue openings 167 expose respective portions of the back keel 147b and such that the glue openings 155 expose respective portions of the front keel 147a (shown best in Figs. 4 and 5).

[0039] The above-described folded arrangement of the first blank 103 forms a first construct 104 that at least partially forms the carrier 205. The lines or other arrangements of glue G disposed along the front keel 147a and exposed at the glue openings 167 can adhere the containers CA1, CA2, CA3 to respective exposed portions of the back keel 147b, and lines of glue G exposed at the glue openings 155 of the back keel 147b can also adhere the containers CB1, CB2, CB3 to respective exposed portions of the front keel 147a. The glue G can also maintain the keels 147a, 147b in at least partial-face-to-face contact.

[0040] The glue G and/or the glue openings 155, 167 could be otherwise shaped, arranged, positioned, and/or configured without departing from the disclosure. For example, in one embodiment, one or more of the glue openings 155, 167 can be provided with a circular or elliptical/ovoid configuration to provide clearance for radial expansion of the foamed glue G exposed therethrough. In this regard, the edge of the keel 147b, 147a surrounding the respective glue opening 155, 167 can influence the expansion of the applied foamed glue G, for example, by promoting a generally bulbous/mushroom-shaped expansion of the foamed glue G outwardly from the respective keel 147b, 147a and radially away from the respective glue opening 155, 167. In other embodiments, the glue G can be configured so as to not foam/expand upon application to the carrier 205.

[0041] The attachment of the containers CA1, CA2, CA3, CB1, CB2, CB3 to the respective keels 147a, 147b can provide retention and support of the respective containers, e.g., such that the containers do not detach from the carrier 205 under their own weight, in addition to or alternative to the container retention and support provided by the respective container retention features 133a, 133b. For example, in one embodiment, one or more of the containers CA1, CA2, CA3, CB1, CB2, CB3 can be attached to respective keels 147a, 147b with glue G, without additional retention and support provided by an attachment panel as described above.

[0042] Referring to Fig. 7, upon the aforementioned folding of the first blank 103 and formation of the first construct 104, the second blank 203 can be overlaid upon the first construct 104 in at least partial face-to-face contact therewith such that the container retention features 233 of the second blank 203 align with and overlie the respective container retention features 133a, 133b of the first construct 104. The above-described positioning of the second blank 203 on the first construct 104 forms a second construct 204 of the carrier 205.

[0043] In this regard, the container retention features 233 of the second construct 204 engage the respective containers CA1, CA2, CA3, CB1, CB2, CB3 in a manner similar to that described above with respect to the container retention features 133a, 133b. For example, at least the respective caps CP and respective flange portions F of the respective containers CA1, CA2, CA3, CB1, CB2, CB3 are at least partially received through the respective openings 235 of the container retention features 233 and such that one or more of the container retention flaps 237 is urged by movement of the respective containers thereby to abut the neck portions N of the respective containers CA1, CA2, CA3, CB1, CB2, CB3, with the distal edges of the respective container retention flaps positioned to abut the respective flange portions F of the respective containers CA1, CA2, CA3, CB1, CB2, CB3.

[0044] Further, in the above-described overlapping arrangement of the second construct 204 with the first construct 104, the handle panel 225 of the second construct 204 can be positioned to be aligned with and in at least partial face-to-face contact with the handle panel 125 of the first construct 104 to provide the multi-ply handle 251 of the carrier 205/package 210.

[0045] As shown in Figs. 6 and 7, the carrier 205/package 210 can be provided in a first or storage/shipping/retail configuration in which the handle panel 225 is folded downwardly relative to the central panel 261 and the attachment panels 131a, 131b. The aligned overlapped handle panels 225, 125 can be folded upwardly at the overlapped fold lines 233, 132 in the direction of the arrow A3 into an at least partially upright arrangement relative to the panels 261, 131a, 131b to define/present the handle 251 in a second or carrying configuration of the carrier 205/package 210.

[0046] Upon lifting or carrying of the carrier 205/package 210 by a consumer, the containers that are positioned closest to the handle 251 can at least partially rest upon the respective containers that are positioned farthest from the handle 251. In addition, the containers are adhered to the keels 147a, 147b with glue G and are additionally secured to the attachment panels 131a, 131b and the central panel 261 through respective container retention features 133a, 133b, and 233.

[0047] Furthermore, a consumer or other user can separate the respective handle flaps 127 from the handle

panel 125 at the respective cuts 128 and can separate the respective handle flaps 227 from the handle panel 225 at the respective cuts 228 and can fold the respective handle flaps 127, 227 at the respective fold lines 129, 229 into at least partial overlapping/face-to-face contact with the handle panels 125, 225 to provide a four-ply arrangement of a portion of the handle 225, e.g., provided by the aligned arrangement of the handle flaps 127, 227 and respective portions of the handle panels 225, 125.

[0048] The aforementioned combination of the first construct 104 and the second construct 204 provides a carrier 205/package 210 with a robust and rigid configuration provided by the overlapping first blank 103/construct 104 having the grain direction M1 and the second blank 203/second construct 204 having the grain direction M2 that is perpendicular to the grain direction M1 such that a cross-grain configuration is provided. Such cross-grain configuration of the carrier 205/package 210 can provide enhanced strengthening properties and resistance to tearing, e.g., since the carrier 205/package 210 is resistant to tearing in a direction perpendicular to the grain direction M1 as well as in a direction perpendicular to the grain direction M2. In this regard, the cross-grain configuration of the carrier 205/package 210 is such that enhanced resistance to tearing is provided along two perpendicular axes.

[0049] The package 210 described above provides a carrier 205 with a compact structure that can also, for example, provide materials savings and waste reduction. Additionally, the arrangement of the glue G between the containers and respective portions of the keels 247a, 247b, in addition to the engagement of the container retention features 133a, 133b, 233 with respective containers, provides multiple points of attachment that results in a robust structure for holding and carrying the containers. Further, the exposure of one or more portions of the containers on exterior portions of the carrier 205/package 210 provides a consumer with a clear view of labeling or surface graphics associated with the containers as well as providing convenient access to remove one or more of the containers from the carrier 205/package 210, for example, by moving respective containers through the respective openings 135a, 135b, 235 of respective container retention features 133a, 133b, 233, and peeling a respective container away from the keels 147a, 147b as described above.

[0050] In one embodiment, the glue G can be selected from a material provided to remain on the respective keels 147a, 147b, e.g., such that substantially little or no glue G remains on the container as it is removed. One or more of the containers CA1, CA2, CA3, CB1, CB2, CB3, in one embodiment, can be reattached to the respective keels 147a, 147b following therefrom by pressing the container against a respective region of glue G.

[0051] While the carrier 205/package 210 has been described as configured to hold three containers CA1, CA2, CA3, CB1, CB2, CB3 in a 2x3 arrangement, the carrier 205/package 210 could be otherwise shaped and configured to hold more or less than six containers in an alternative arrangement without departing from the scope of the disclosure.

[0052] Turning to Fig. 8, an exterior surface 301 of a first blank 303 for forming a carrier 405 according to a second exemplary embodiment of the disclosure is illustrated. As described herein, the first blank 303 can be combined with a second blank 403 (Fig. 9) to form the carrier 405 (Fig. 11). In one embodiment, the first blank 303 and the second blank 403 can be free from foldable connection to one another, though the blanks 303, 403 can be foldably connected without departing from the disclosure. The carrier 405 can be provided in combination with one or more containers to form a package 410.

[0053] The first blank 303, as shown, has one or more features that are substantially similar to those of the first blank 103 described above, and like or similar features are designated with like or similar reference numerals. As shown, the first blank 303 includes the handle panel 125, the front attachment panel 131a, the front keel 147a, the back keel 147b, and the back attachment panel 131b.

[0054] In the illustrated embodiment, the front attachment panel 131a includes a pair of the container retention features 133a for at least partially receiving a pair of containers CA1, CA2 and the back attachment panel 131b includes a pair of the container retention features 133b for at least partially receiving a pair of containers CB1, CB2. As also shown, the handle panel 125 includes a single handle flap 127.

[0055] Turning to Fig. 9, an exterior surface 401 of a reinforcing blank or upper blank or second blank 403 according to the second exemplary embodiment of the disclosure is illustrated. The second blank 403 has one or more features that are substantially similar to those of the second blank 203 described above, and like or similar features are designated with like or similar reference numerals.

[0056] The second blank 403 includes the handle panel 225 and the central panel 261. The handle panel 225 can include a single handle flap 227, as shown, and the central panel 261 includes a plurality of the container retention features 233 for being aligned with the respective container retention features 133a, 133b of the first blank 303.

[0057] As also shown, a billboard or back panel 463 can be foldably connected to the central panel 261 at a lateral fold line 465, though the back panel 463 could be omitted without departing from the disclosure. In one embodiment, the back panel 463 can provide a presentation surface that allows printing of indicia such as product advertising, labeling, promotional information, etc. that is readily visible to a consumer.

[0058] The first blank 303 and/or the second blank 403 could be alternatively sized, shaped, and/or configured without departing from the scope of the disclosure.

[0059] The first blank 303 can be folded in the manner described above with regard to the first blank 103, e.g., with the attachment panels 131a, 131b engaged with the

containers CA1, CA2, CB1, CB2 via the respective container retention features 133a, 133b. As also described above, the keels 147a, 147b are folded at the fold line 112 into at least partial face-to-face contact with one another such that the glue openings 155, 167 are arranged to be vertically offset from one another.

[0060] In this regard, each glue opening 155 is vertically spaced from each respective glue opening 167 such that respective portions of the back keel 147a are exposed through the respective glue openings 155 and such that respective portions of the front keel 147b are exposed through the respective glue openings 167. In addition, the attachment panels 131a, 131b extend away from the keels 147a, 147b in generally perpendicular relation thereto. The above-described arrangement of the first blank 303 forms a first construct 304 for at least partially forming the carrier 405.

[0061] Referring to Fig. 10, the second blank 403 can be overlaid upon the first construct 304 in at least partial face-to-face contact therewith such that the container retention features 233 of the second construct 404 align with and overlie the respective container retention features 133a, 133b of the first construct 304 to at least partially receive the containers CA1, CA2, CB1, CB2 in the manner described above with respect to the carrier 205/package 210. The above-described positioning of the second blank 403 upon the first construct 304 forms a second construct 404 of the carrier 405/package 410.

[0062] Further, in the above-described overlapping arrangement of the second construct 404 with the first construct 104, the handle panel 225 of the second construct 204 is positioned in at least partial face-to-face contact with the handle panel 125 of the first construct 104 to provide a multi-ply handle 251 for the carrier 405/package 410. The handle 251 of the carrier 405/package 410 is positionable between a first or storage/shipping/retail configuration in which the handle 251 is folded downwardly relative to the central panel 261 and a second or carrying configuration in which the handle 251 is raised upwardly or is upright relative to the central panel 261 as described above with respect to the carrier 205/package 210.

[0063] The configuration of the carrier 405/package 410 provides a compact and robust holding and carrying structure for the containers CA1, CA2, CB1, CB2 with the advantages described above with respect to the carrier 205/package 210. For example, the grain direction M1 of the first blank 303 and the grain direction M2 of the second blank 403 that is perpendicular to the grain direction M1 provides a cross-grain configuration for the carrier 405/package 410 that is resistant to tearing along two perpendicular axes.

[0064] While the carrier 405/package 410 has been described as configured to hold four containers CA1, CA2, CB1, CB2, in a 2x2 arrangement, the carrier 405/package 410 could be otherwise shaped and configured to hold more or less than four containers in an alternative arrangement without departing from the scope of the disclosure.

[0065] Turning to Fig. 11, an exterior surface 501 of a first blank 503 for forming a carrier 605 according to a third exemplary embodiment of the disclosure is illustrated. As described herein, the first blank 503 can be combined with a second blank 603 (Fig. 12) to form the carrier 605 (Fig. 13). In one embodiment, the first blank 503 and the second blank 603 can be free from foldable connection to one another, though the blanks 503, 603 can be foldably connected without departing from the disclosure. The carrier 605 can be provided in combination with one or more containers to form a package 610.

[0066] The first blank 503, as shown, has one or more features that are substantially similar to those of the first blanks 103, 303 described above, and like or similar features are designated with like or similar reference numerals. As shown, the first blank 503 includes the handle panel 125, the front attachment panel 131a, the front keel 147a, the back keel 147b, and the back attachment panel 131b.

[0067] In the illustrated embodiment, the front attachment panel 131a includes container retention features 133a for at least partially receiving respective containers CA1, CA2, CA3 and the back attachment panel 131b includes container retention features 133b for at least partially receiving respective containers CB1, CB2, CB3.

[0068] As also shown, a pair of finger or handle openings 527a are defined in the front keel 147a, and a pair of handle reinforcement flaps 528a are foldably connected to the front attachment panel 131a at a respective longitudinal fold line 529a. The handle reinforcement flaps 528a are at least partially defined by respective curved cuts 531a that extend from an endpoint of the respective fold line 529a to intersect a respective portion of the fold line 151a. In this regard, a free edge of the respective handle reinforcement flaps 528a interrupts and is collinear with the fold line 151a, and is positioned abutting the respective handle openings 527a.

[0069] Similarly, a pair of finger or handle openings 527b are defined in the back keel 147b, and a pair of handle reinforcement flaps 528b are foldably connected to the back attachment panel 131b at a respective longitudinal fold line 529b. The handle reinforcement flaps 528b are at least partially defined by respective curved cuts 529b. As described herein, at least the handle openings 527a, 527b and/or the handle reinforcement flaps 528a, 528b (and/or openings formed by the separation thereof) can form first handle features of the carrier 605.

[0070] While the first blank 503 has been illustrated without a handle panel or a back panel, it will be understood that the first blank 503 can include a handle panel and/or a back panel without departing from the disclosure.

[0071] Referring additionally to Fig. 12, an exterior surface 601 of a reinforcing blank or upper blank or second blank 603 according to the third exemplary embodiment of the disclosure is illustrated. The second blank 603 has one or more features that are substantially similar to

those of the second blanks 203, 403 described above, and like or similar features are designated with like or similar reference numerals.

[0072] The second blank 603 includes the central panel 261 with container retention features 233 for being aligned with the respective container retention features 133a, 133b of the first blank 503.

[0073] In addition, a pair of handle flaps 627 are foldably connected to the central panel 261 at respective lateral fold lines 629, and are at least partially defined by respective curved cuts 631 that extend from one endpoint of the respective fold line 629 to the other endpoint of the respective fold line 629. As described herein, at least the handle flaps 627 and/or openings formed from the separation thereof can form second handle features of the carrier 605.

[0074] The first blank 503 and/or the second blank 603 could be alternatively sized, shaped, and/or configured without departing from the scope of the disclosure. For example, in one embodiment, one or more of the handle flaps 627 and the handle reinforcement flaps 528a, 528b can include additional lines of weakening and/or relief cuts to facilitate movement and manipulation thereof by a consumer.

[0075] The first blank 503 can be folded in the manner described above with regard to the first blanks 103, 303, e.g., with the attachment panels 131a, 131b engaged with the containers CA1, CA2, CA3, CB1, CB2, CB3 via the respective container retention features 133a, 133b. As also described above, the keels 147a, 147b are folded at the fold line 112 into at least partial face-to-face contact with one another such that the glue openings 155, 167 are arranged to be vertically offset from one another.

[0076] In this regard, each glue opening 155 is vertically spaced from each respective glue opening 167 such that respective portions of the back keel 147a are exposed through the respective glue openings 155 and such that respective portions of the front keel 147b are exposed through the respective glue openings 167. In addition, the attachment panels 131a, 131b extend away from the keels 147a, 147b in generally perpendicular relation thereto. The above-described arrangement of the first blank 503 forms a first construct 504 for at least partially forming the carrier 605.

[0077] Referring to Fig. 13, the second blank 603 can be overlaid upon the first construct 504 in at least partial face-to-face contact therewith such that the container retention features 233 of the second blank 603 align with and overlie the respective container retention features 133a, 133b of the first construct 504 to at least partially receive the containers CA1, CA2, CA3, CB1, CB2, CB3 in the manner described above with respect to the carrier 205/package 210 and the carrier 405/package 410. In addition, the handle flaps 627 are positioned to be aligned with at least a portion of the respective handle openings 527a, 527b and/or the respective handle reinforcement flaps 528a, 528b. The above-described positioning of the second blank 603 on the first construct 405 forms a second construct 604 of the carrier 605.

[0078] In order to engage and/or lift the carrier 605/package 610, a consumer or other operator can separate one or both of the handle flaps 627 from the central panel 261 at a respective cut 631 and fold the respective handle flap 627 downwardly into a respective handle opening 527a, 527b aligned with the respective handle flap 627. Depending on the direction of movement of the respective handle flap 627, a respective handle flap 528b can also be separated from the respective attachment panel 131a, 131b at a respective cut 529a, 529b and folded at a respective fold line 529a, 529b with the movement of the respective handle flap 627 to provide a two-ply structure that can, for example, cushion, protect, buffer etc. one or more of a consumer's fingers engaged with the carrier 605/package 610. In this regard, a consumer or other operator can engage the carrier 605/package 610 through an opening provided by at least one of the handle flaps 627 and can engage and edge or underside of a respective attachment panel 131a, 131b to lift, move, and/or carry the carrier 605/package 610.

[0079] The configuration of the carrier 605/package 610 provides a compact and robust holding and carrying structure for the containers CA1, CA2, CA3, CB1, CB2, CB3 with the advantages described above with respect to the carrier 205/package 210 and carrier 405/package 410. For example, the grain direction M1 of the first blank 503 and the grain direction M2 of the second blank 603 that is perpendicular to the grain direction M1 provides a cross-grain configuration for the carrier 605/package 610 that is resistant to tearing along two perpendicular axes.

[0080] While the carrier 605/package 610 has been described as configured to hold six containers CA1, CA2, CA3, CB1, CB2, CB3 in a 2x3 arrangement, the carrier 605/package 610 could be otherwise shaped and configured to hold more or less than six containers in an alternative arrangement without departing from the scope of the disclosure.

[0081] In general, the blank may be constructed from paperboard having a caliper so that it is heavier and more rigid than ordinary paper. The blank can also be constructed of other materials, such as cardboard, or any other material having properties suitable for enabling the carrier to function at least generally as described above. The blank can be coated with, for example, a clay coating. The clay coating may then be printed over with product, advertising, and other information or images. The blanks may then be coated with a varnish to protect information printed on the blanks. The blanks may also be coated with, for example, a moisture barrier layer, on either or both sides of the blanks. The blanks can also be laminated to or coated with one or more sheet-like materials at selected panels or panel sections.

[0082] As an example, a tear line can include: a slit that extends partially into the material along the desired line of weakness, and/or a series of spaced apart slits that extend partially into and/or completely through the

material along the desired line of weakness, or various combinations of these features. As a more specific example, one type tear line is in the form of a series of spaced apart slits that extend completely through the material, with adjacent slits being spaced apart slightly so that a nick (e.g., a small somewhat bridging-like piece of the material) is defined between the adjacent slits for typically temporarily connecting the material across the tear line. The nicks are broken during tearing along the tear line. The nicks typically are a relatively small percentage of the tear line, and alternatively the nicks can be omitted from or torn in a tear line such that the tear line is a continuous cut line. That is, it is within the scope of the present disclosure for each of the tear lines to be replaced with a continuous slit, or the like. For example, a cut line can be a continuous slit or could be wider than a slit without departing from the present disclosure.

[0083] In accordance with the exemplary embodiments, a fold line can be any substantially linear, although not necessarily straight, form of weakening that facilitates folding therealong. More specifically, but not for the purpose of narrowing the scope of the present disclosure, fold lines include: a score line, such as lines formed with a blunt scoring knife, or the like, which creates a crushed or depressed portion in the material along the desired line of weakness; a cut that extends partially into a material along the desired line of weakness, and/or a series of cuts that extend partially into and/or completely through the material along the desired line of weakness; and various combinations of these features. In situations where cutting is used to create a fold line, typically the cutting will not be overly extensive in a manner that might cause a reasonable user to incorrectly consider the fold line to be a tear line.

[0084] The above embodiments may be described as having one or more panels adhered together by glue during erection of the carrier embodiments. The term "glue" is intended to encompass all manner of adhesives commonly used to secure carrier panels in place.

[0085] The foregoing description of the disclosure illustrates and describes various exemplary embodiments. Various additions, modifications, changes, etc., could be made to the exemplary embodiments without departing from the spirit and scope of the disclosure. It is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. Additionally, the disclosure shows and describes only selected embodiments of the disclosure, but the disclosure is capable of use in various other combinations, modifications, and environments and is capable of changes or modifications within the scope of the inventive concept as expressed herein, commensurate with the above teachings, and/or within the skill or knowledge of the relevant art. Furthermore, certain features and characteristics of each embodiment may be selectively interchanged and applied to other illustrated and non-illustrated embodiments of the disclosure.

Claims

1. A carrier for holding a plurality of containers, the carrier comprising:

   a first construct comprising a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers; and

   a second construct comprising at least one panel, the at least one panel of the second construct positioned in at least partial face-to-face contact with the at least one attachment panel.

2. The carrier of claim 1, wherein the first construct is comprised of a material having a first grain direction and the second construct is comprised of a material having a second grain direction, the first grain direction is perpendicular to the second grain direction.

3. The carrier of claim 1, wherein the at least one attachment panel comprises at least one container retention feature and the at least one panel of the second construct comprises at least one container retention feature aligned with the at least one container retention feature of the at least one attachment panel.

4. The carrier of claim 1, wherein the at least one container retention feature of the at least one attachment panel comprises a plurality of container retention flaps foldably connected to the at least one attachment panel and arranged to define a container receiving opening therebetween.

5. The carrier of claim 1, wherein the first construct further comprises first handle features and the second construct further comprises second handle features aligned with the first handle features.

6. The carrier of claim 5, wherein the first handle features comprise a first handle panel foldably connected to the at least one attachment panel and the second handle features comprise a second handle panel foldably connected to the at least one panel of the second construct, the second handle panel of the second construct is in at least partial face-to-face contact with the first handle panel of the first construct.

7. The carrier of claim 5, wherein the first construct comprises at least one handle opening in the at least one attachment panel, and the second construct comprises at least one handle flap foldably connect-

ed to the at least one panel and aligned with the at least one handle opening.

8. The carrier of claim 7, wherein the first handle features further comprise a handle reinforcement flap foldably connected to the at least one attachment panel and positioned adjacent the at least one handle opening.

9. The carrier of claim 1, wherein the at least one central panel comprises at least one glue opening.

10. The carrier of claim 9, wherein the at least one central panel is a front central panel and the plurality of panels further comprises a back central panel foldably connected to the front central panel, the at least one glue opening is an at least one front glue opening in the front central panel, and the back central panel comprises at least one back glue opening.

11. The carrier of claim 10, wherein the front central panel is in at least partial face-to-face contact with the back central panel such that a portion of the back central panel is exposed through the at least one front glue opening and a portion of the front central panel is exposed through the at least one back glue opening.

12. The carrier of claim 11, wherein the front central panel is foldably connected to the back central panel at a fold line, the at least one front glue opening is spaced a first distance from the fold line, and the at least one back glue opening is spaced a second distance from the fold line, the second distance is greater than the first distance

13. The carrier of claim 1, wherein the second construct is free from foldable connection to the first construct.

14. The carrier of claim 1, further comprising a back panel foldably connected to the at least one panel of the second construct.

15. The carrier of claim 1, wherein the first construct is a lower construct and the second construct is an upper construct.

16. A first blank and a second blank for forming a carrier for holding a plurality of containers, the first blank comprising:
a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers when the carrier is formed from the first blank and the second blank; and
the second blank comprising:
at least one panel, the at least one panel of the second blank for being positioned in at least partial face-to-face contact with the at least one attachment panel when the carrier is formed from the first blank and the second blank.

17. The first blank and the second blank of claim 16, wherein the first blank is comprised of a material having a first grain direction and the second blank is comprised of a material having a second grain direction, the first grain direction is perpendicular to the second grain direction.

18. The first blank and the second blank of claim 16, wherein the at least one attachment panel comprises at least one container retention feature and the at least one panel of the second construct comprises at least one container retention feature for being aligned with the container retention feature of the at least one attachment panel when the carrier is formed from the first blank and the second blank.

19. The first blank and the second blank of claim 16, wherein the at least one container retention feature of the at least one attachment panel comprises a plurality of container retention flaps foldably connected to the at least one attachment panel and arranged to define a container receiving opening therebetween.

20. The first blank and the second blank of claim 16, wherein the first blank further comprises first handle features and the second blank further comprises second handle features aligned with the first handle features when the carrier is formed from the first blank and the second blank, the first handle features comprise a first handle panel foldably connected to the at least one attachment panel and the second handle features comprise a second handle panel foldably connected to the at least one panel of the second blank, the second handle panel of the second blank is for being positioned in at least partial face-to-face contact with the first handle panel of the first blank when the carrier is formed from the blank.

21. The first blank and the second blank of claim 16, wherein the first blank further comprises first handle features and the second blank further comprises second handle features aligned with the first handle features when the carrier is formed from the first blank and the second blank, the first blank comprises at least one handle opening in the at least one attachment panel, and the second blank comprises at least one handle flap foldably connected to the at least one panel and for being aligned with the at least one handle opening when the carrier is formed from the first blank and the second blank.

22. The first blank and the second blank of claim 16, wherein the at least one central panel comprises at least one glue opening.

23. The first blank and the second blank of claim 22, wherein the at least one central panel is a front central panel and the plurality of panels further comprises a back central panel foldably connected to the front central panel, the at least one glue opening is an at least one front glue opening in the front central panel, and the back central panel comprises at least one back glue opening,
the front central panel is for being positioned in at least partial face-to-face contact with the back central panel when the carrier is formed form the first blank and the second blank such that a portion of the back central panel is exposed through the at least one front glue opening and a portion of the front central panel is exposed through the at least one back glue opening,
the front central panel is foldably connected to the back central panel at a fold line, the at least one front glue opening is spaced a first distance from the fold line, and the at least one back glue opening is spaced a second distance from the fold line, the second distance is greater than the first distance.

24. A method of forming a carrier for holding a plurality of containers, the method comprising:

obtaining a first blank comprising a plurality of panels including at least one central panel and at least one attachment panel configured to receive a portion of one or more containers of the plurality of containers, the at least one central panel is for being positioned between and attached to adjacent containers of the plurality of containers;
obtaining a second blank comprising at least one panel;
folding the plurality of panels of the first blank to form a first construct;
forming a second construct from the at least one panel of the second blank; and
positioning the at least one panel of the second construct in at least partial face-to-face contact with the at least one attachment panel of the first construct.

25. The method of claim 24, wherein the first construct is comprised of a material having a first grain direction and the second construct is comprised of a material having a second grain direction, the first grain direction is perpendicular to the second grain direction.

26. The method of claim 24, wherein the at least one attachment panel comprises at least one container retention feature and the at least one panel of the second construct comprises at least one container retention feature aligned with the container retention features of the at least one attachment panel.

27. The method of claim 24, wherein the at least one container retention feature of the at least one attachment panel comprises a plurality of container retention flaps foldably connected to the at least one attachment panel and arranged to define a container receiving opening therebetween.

28. The method of claim 24, wherein the first construct further comprises first handle features and the second construct further comprises second handle features aligned with the first handle features, the first handle features comprise a first handle panel foldably connected to the at least one attachment panel and the second handle features comprise a second handle panel foldably connected to the at least one panel of the second construct, the second handle panel of the second construct is in at least partial face-to-face contact with the first handle panel of the first construct.

29. The method of claim 24, wherein the first construct further comprises first handle features and the second construct further comprises second handle features aligned with the first handle features, the first construct comprises at least one handle opening in the at least one attachment panel, and the second construct comprises at least one handle flap foldably connected to the at least one panel and aligned with the at least one handle opening,
the first handle features further comprise a handle reinforcement flap foldably connected to the at least one attachment panel and positioned adjacent the at least one handle opening.

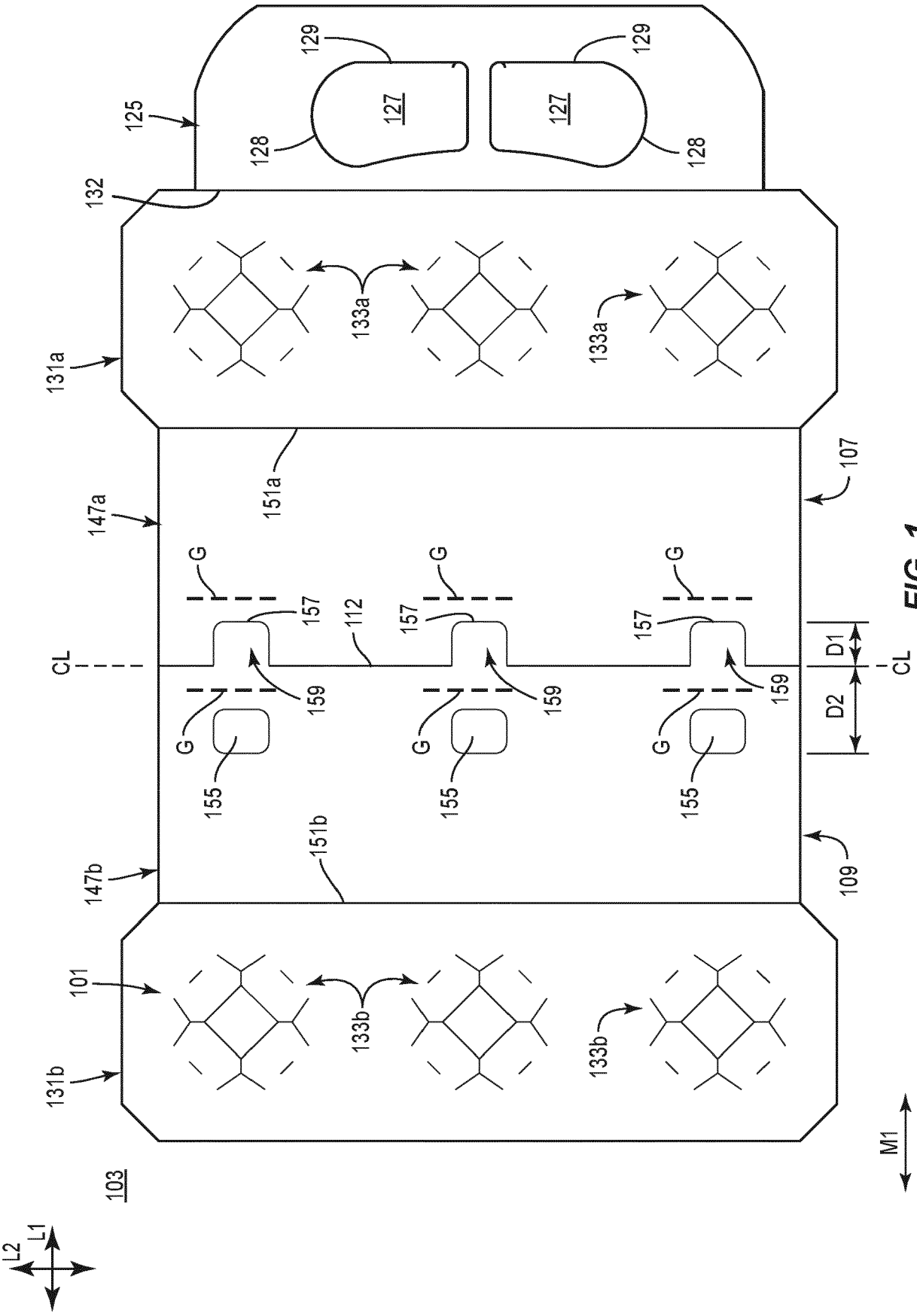
30. The method of claim 24, wherein the at least one central panel comprises at least one glue opening.

31. The method of claim 30, wherein the at least one central panel is a front central panel and the plurality of panels further comprises a back central panel foldably connected to the front central panel, the at least one glue opening is an at least one front glue opening in the front central panel, and the back central panel comprises at least one back glue opening,
the plurality of panels of the first blank are folded such that the front central panel is in at least partial face-to-face contact with the back central panel such that a portion of the back central panel is exposed through the at least one front glue opening and a portion of the front central panel is exposed through the at least one back glue opening,
the front central panel is foldably connected to the back central panel at a fold line, the at least one front

glue opening is spaced a first distance from the fold line, and the at least one back glue opening is spaced a second distance from the fold line, the second distance is greater than the first distance.

32. The method of claim 24, wherein the second construct is free from foldable connection to the first construct.

33. The method of claim 24, further comprising positioning the at least one central panel between adjacent containers of the plurality of containers and attaching the at least one central panel to adjacent containers of the plurality of containers, and receiving by the at least one attachment panel a portion of one or more containers of the plurality of containers.


125
129
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128
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131a
133a
147a
151a
107
G
157
112
CL
159
155
D1
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133b
103
M1
L2
L1

FIG. 1

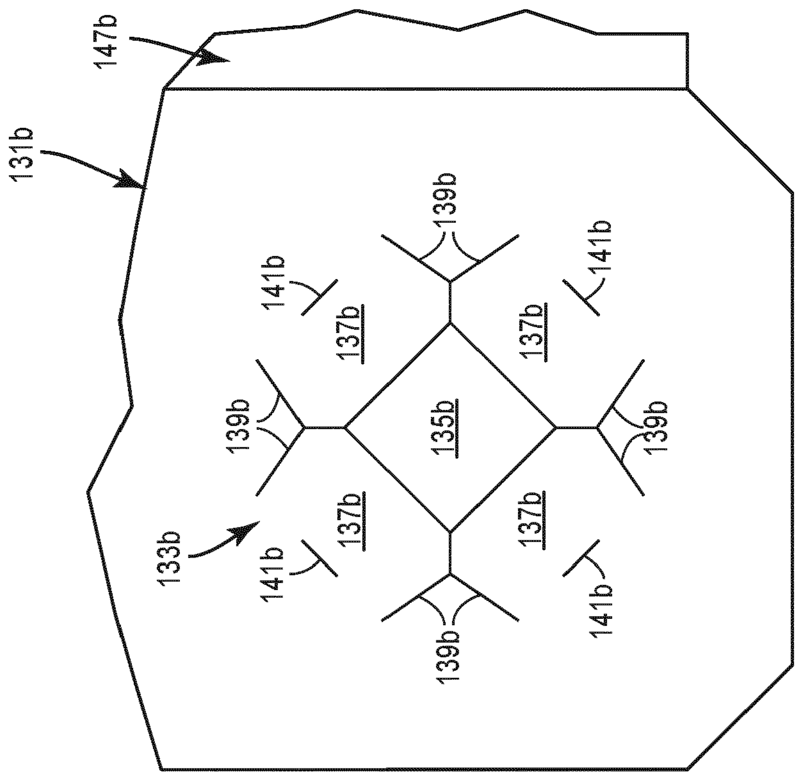

147b
131b
139b
141b
137b
135b
133b

FIG. 1B

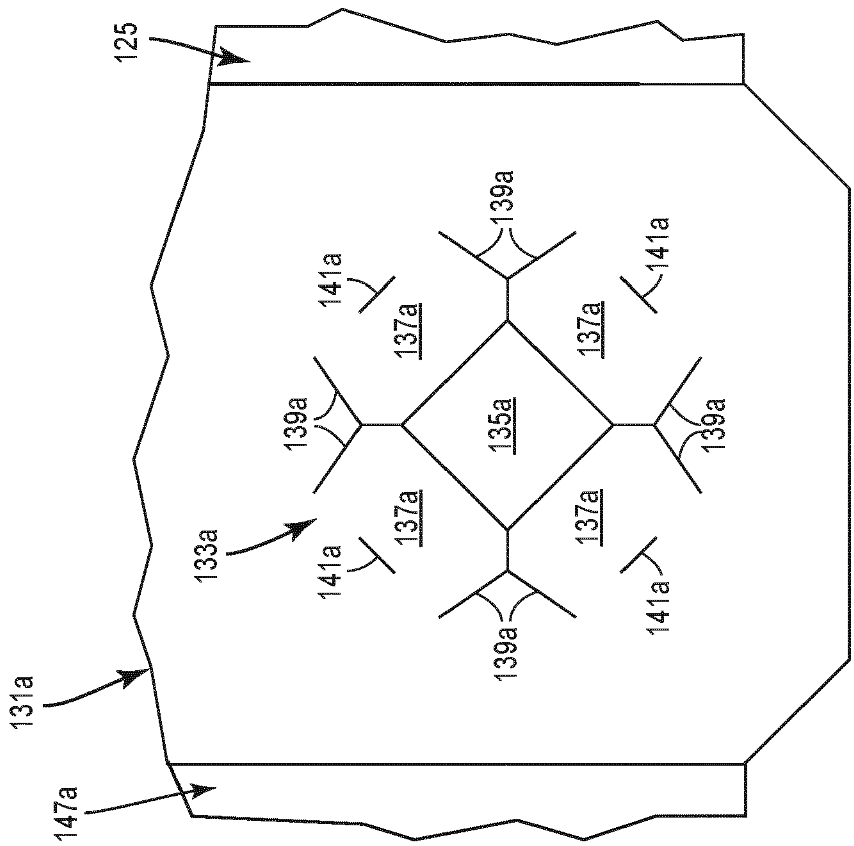

125
139a
141a
137a
135a
133a
131a
147a

FIG. 1A

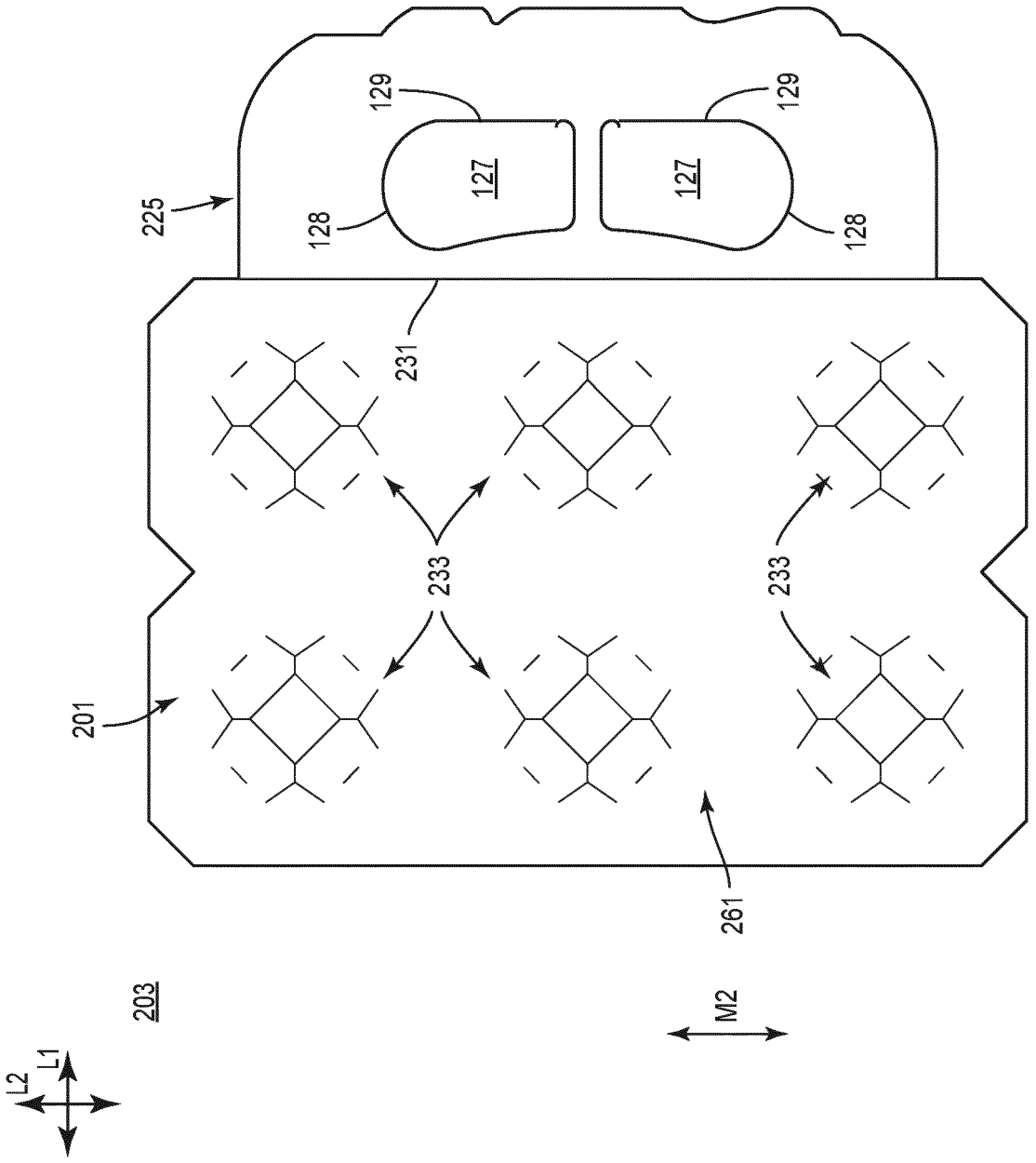


FIG. 2

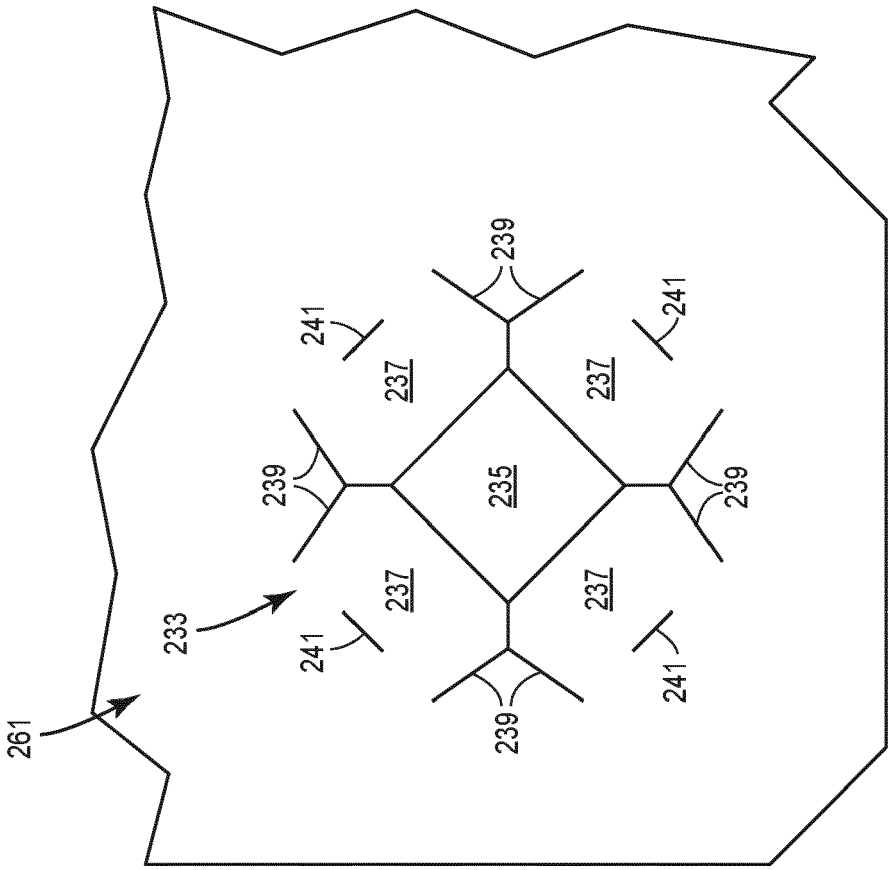
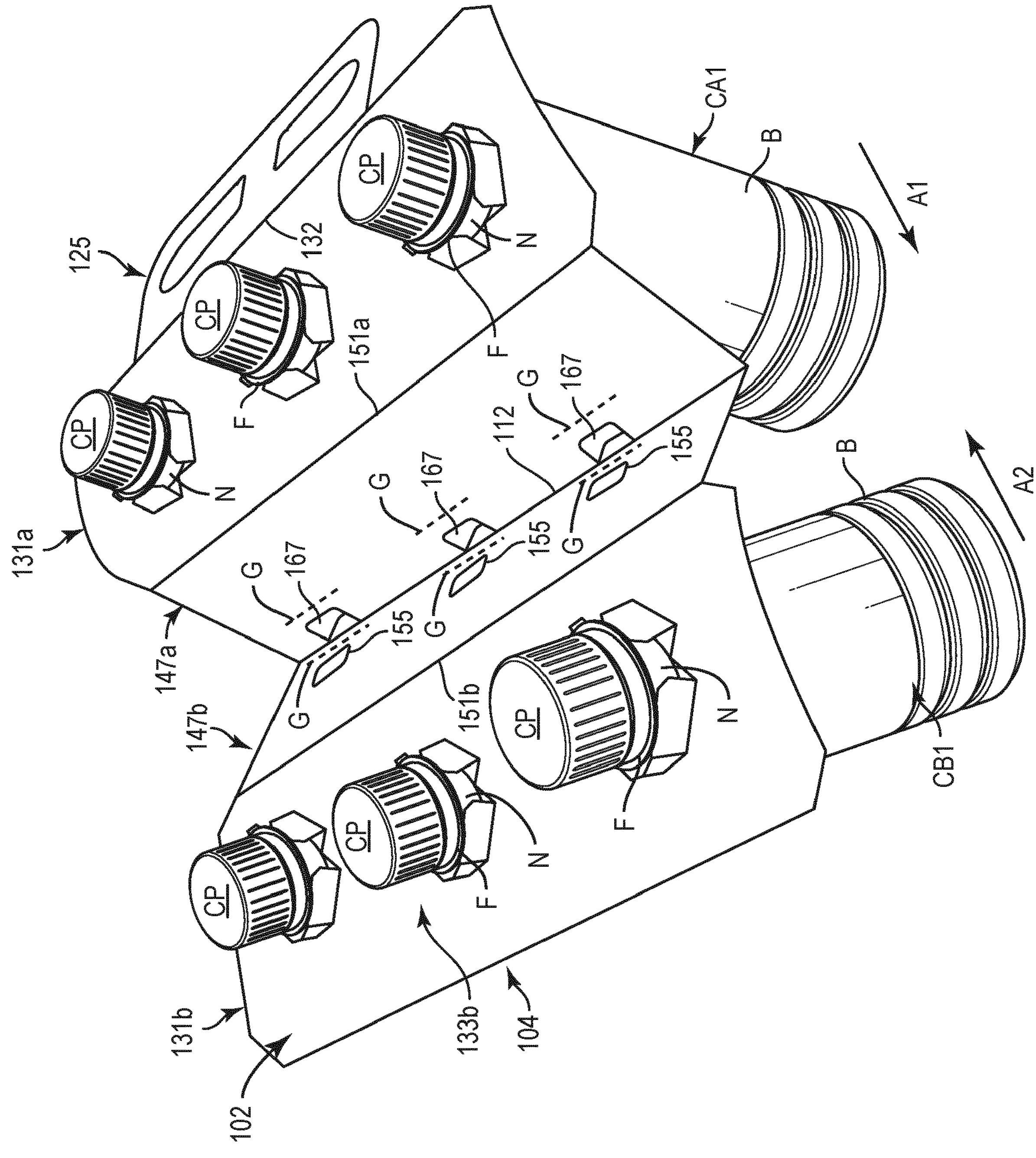


FIG. 2A


125
132
CP
CA1
B
A1
N
F
151a
G
167
112
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131a
147a
147b
151b
102
131b
133b
104
CB1
A2

FIG. 3

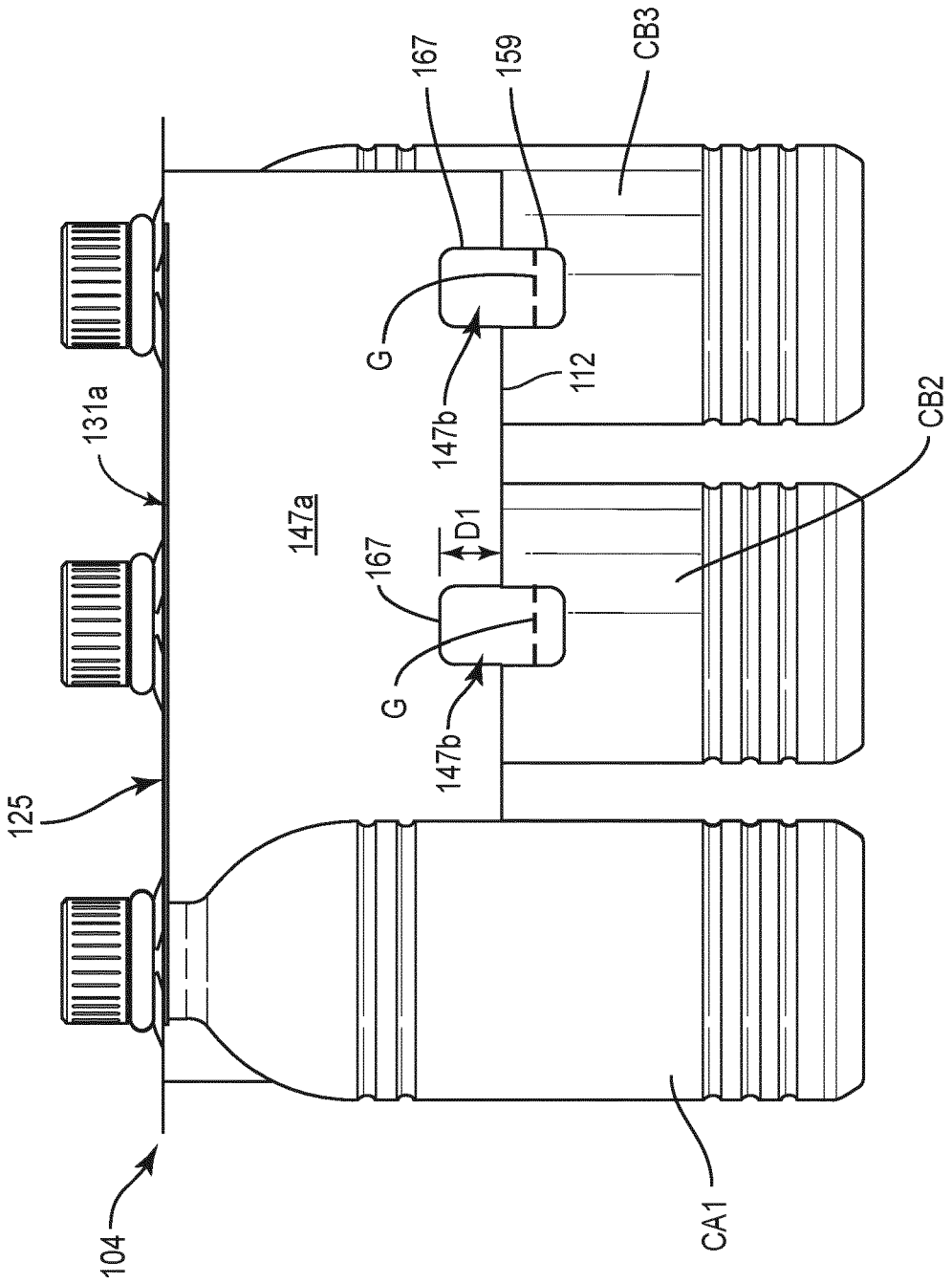


FIG. 4

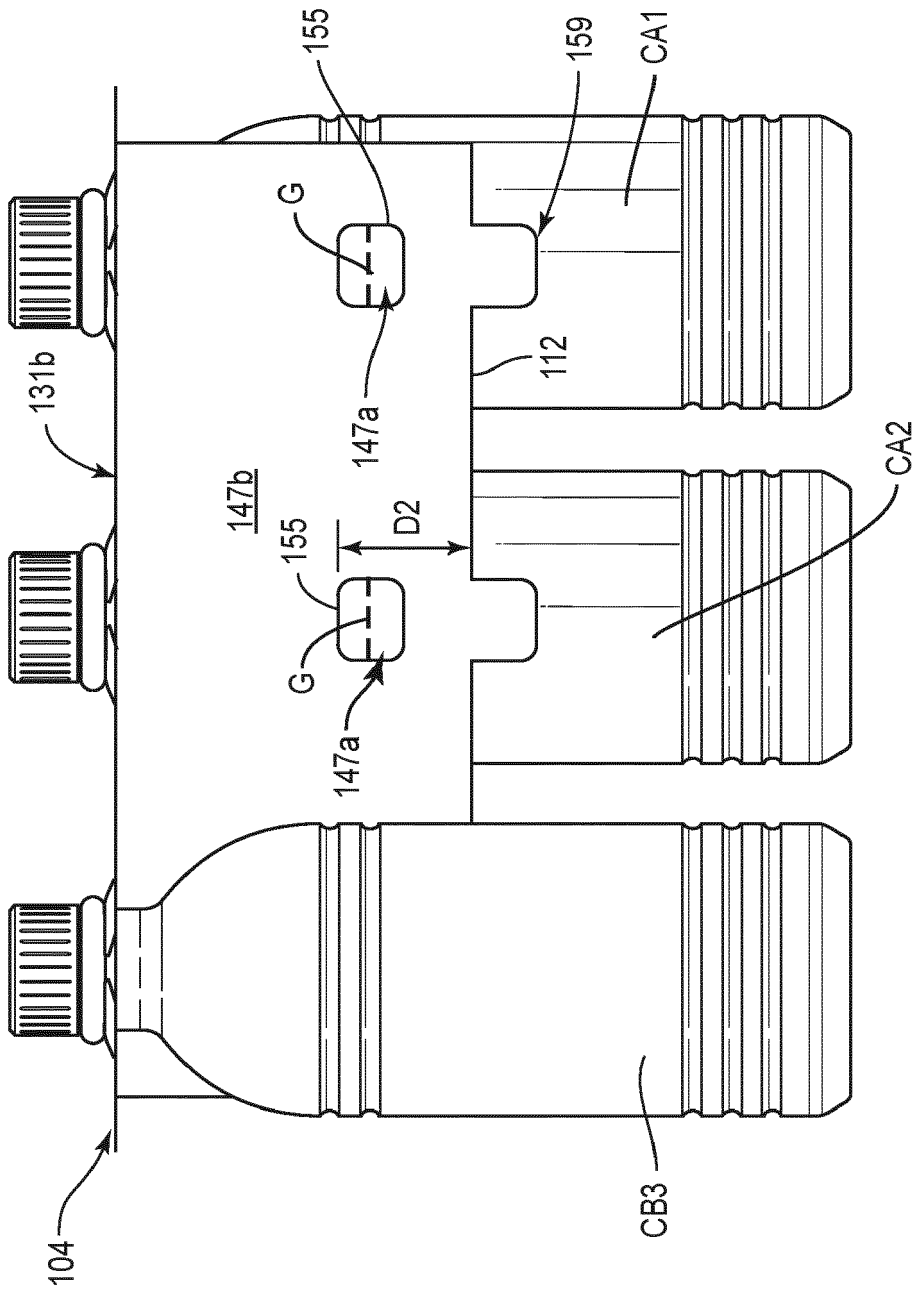
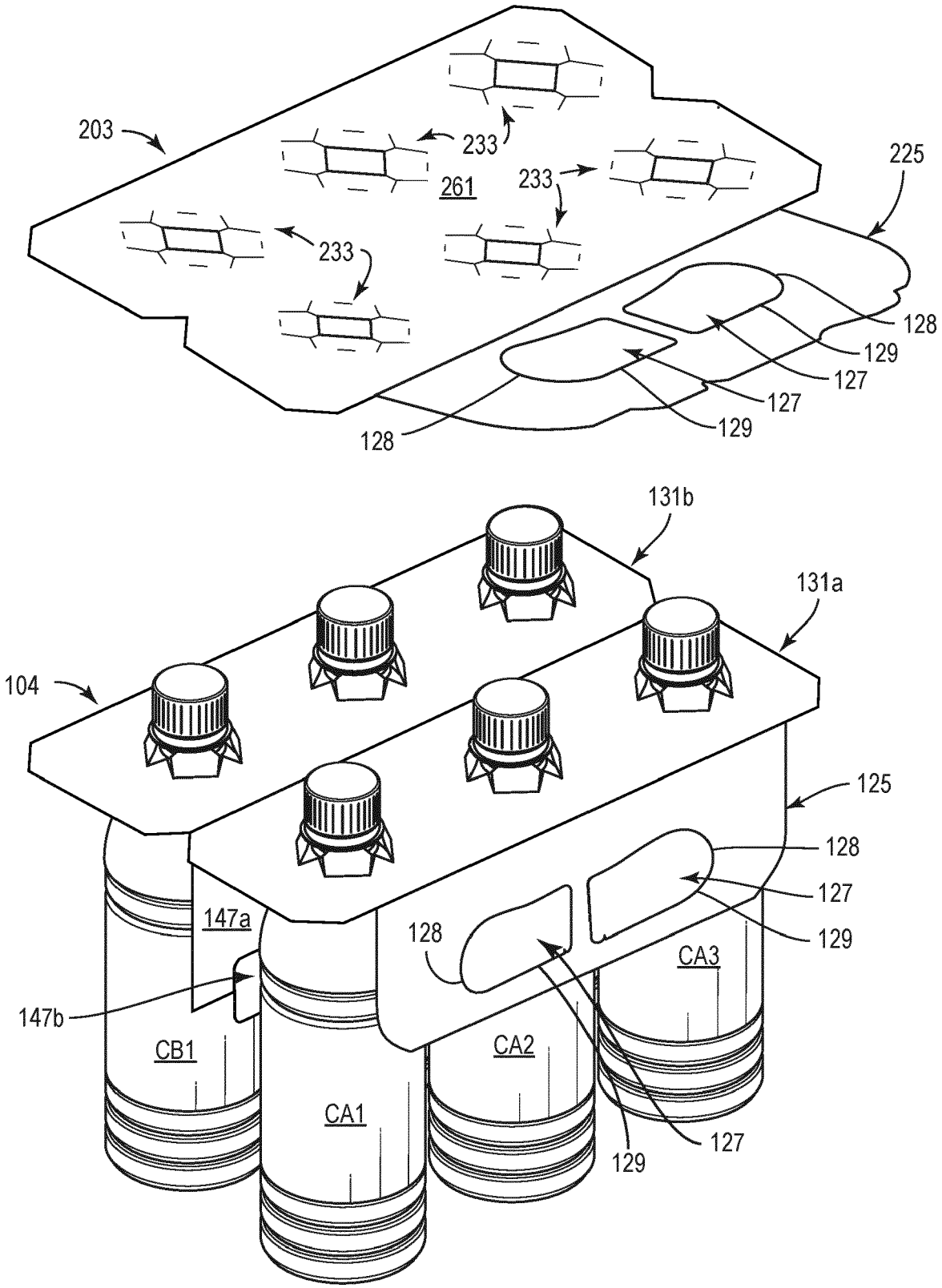


FIG. 5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233
261
233
225
233
128
129
127
127
129
128
131b
131a
104
125
128
127
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147a
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147b
CB1
CA1
CA2
CA3
129
127

FIG. 6

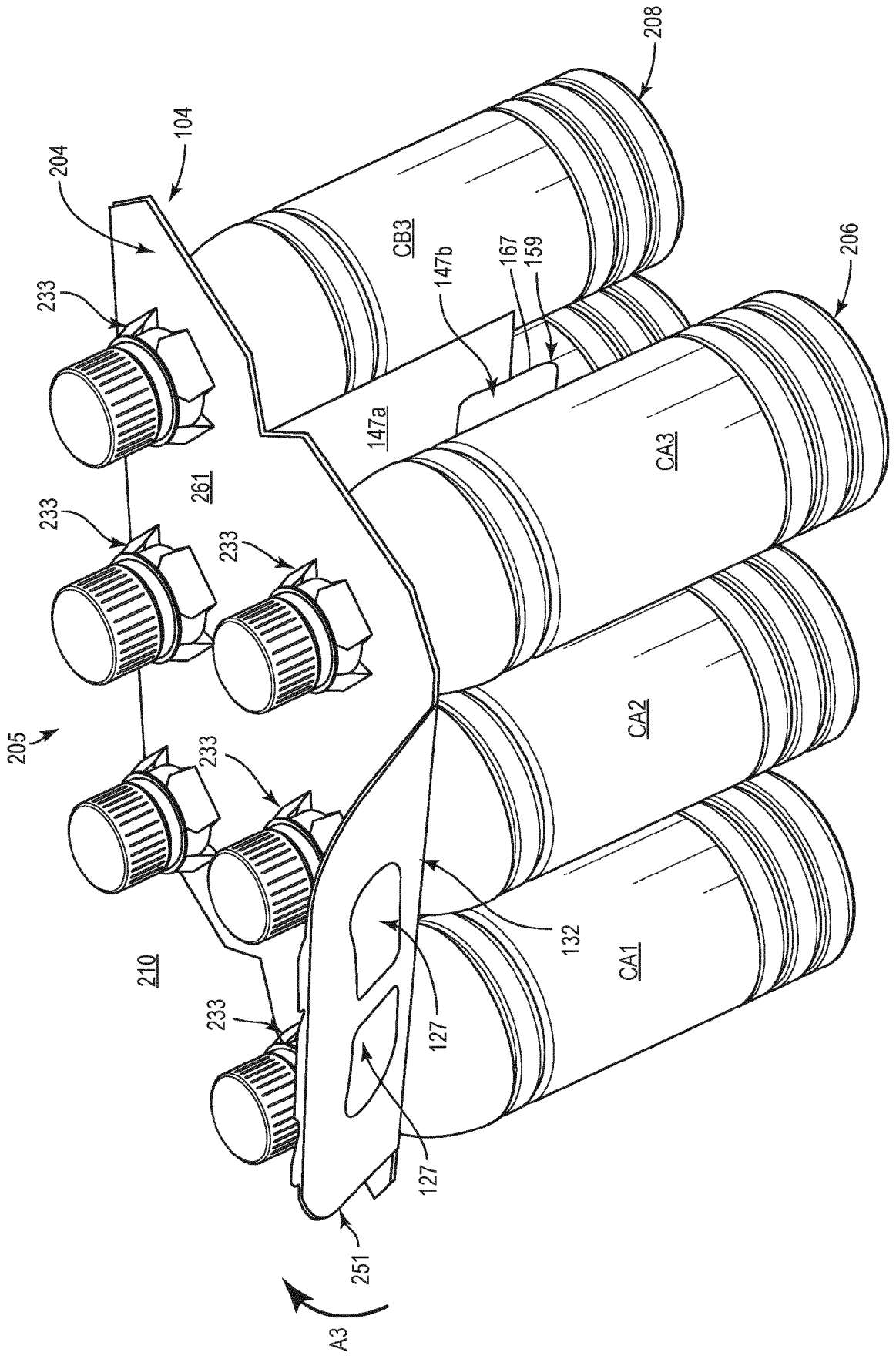

208
104
204
CB3
147b
167
159
206
233
147a
CA3
261
233
233
205
CA2
233
132
210
CA1
233
127
127
251
A3

FIG. 7

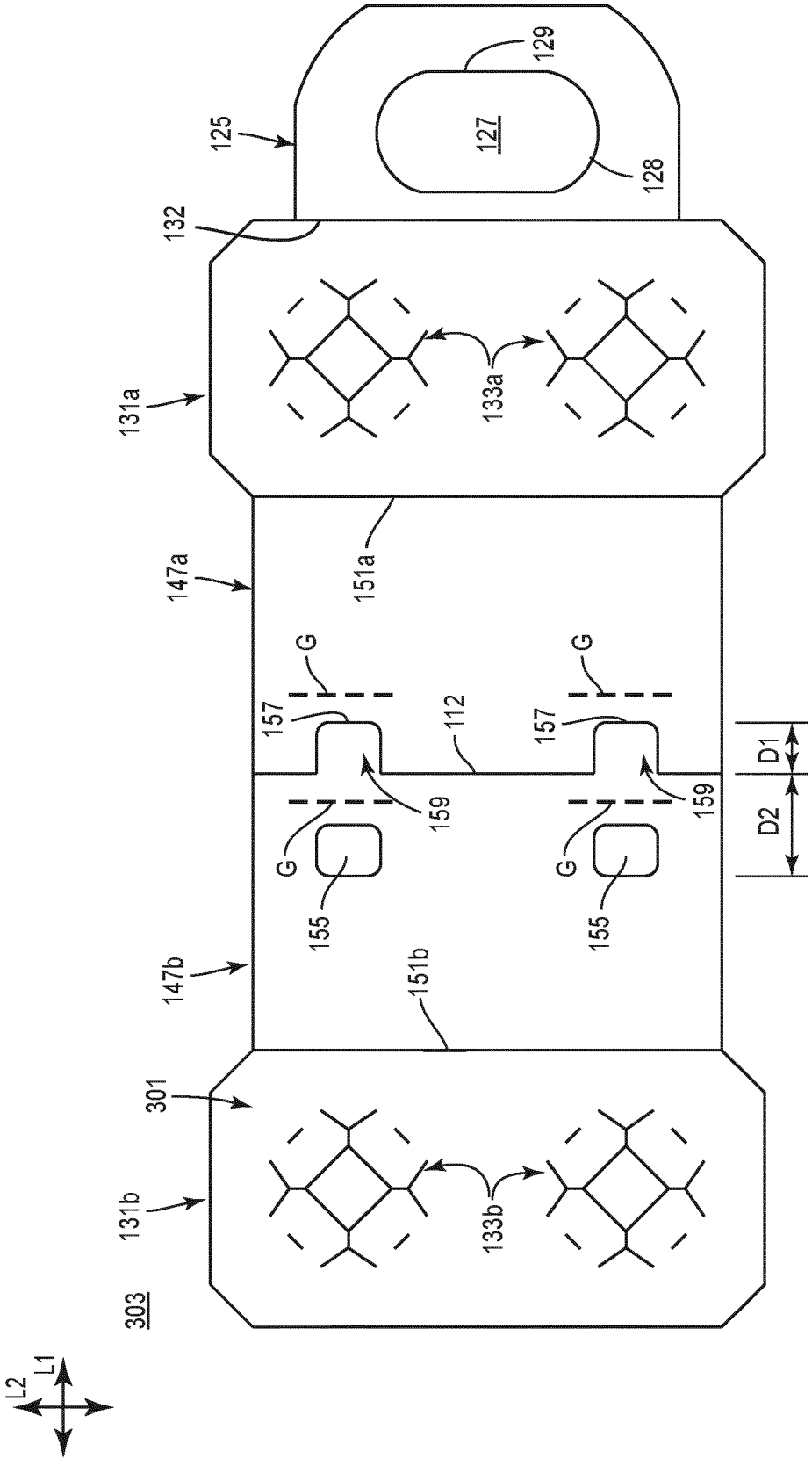

125
129
127
128
132
131a
133a
147a
151a
G
157
112
159
155
147b
151b
301
131b
133b
303
D1
D2
L2
L1
M1

FIG. 8

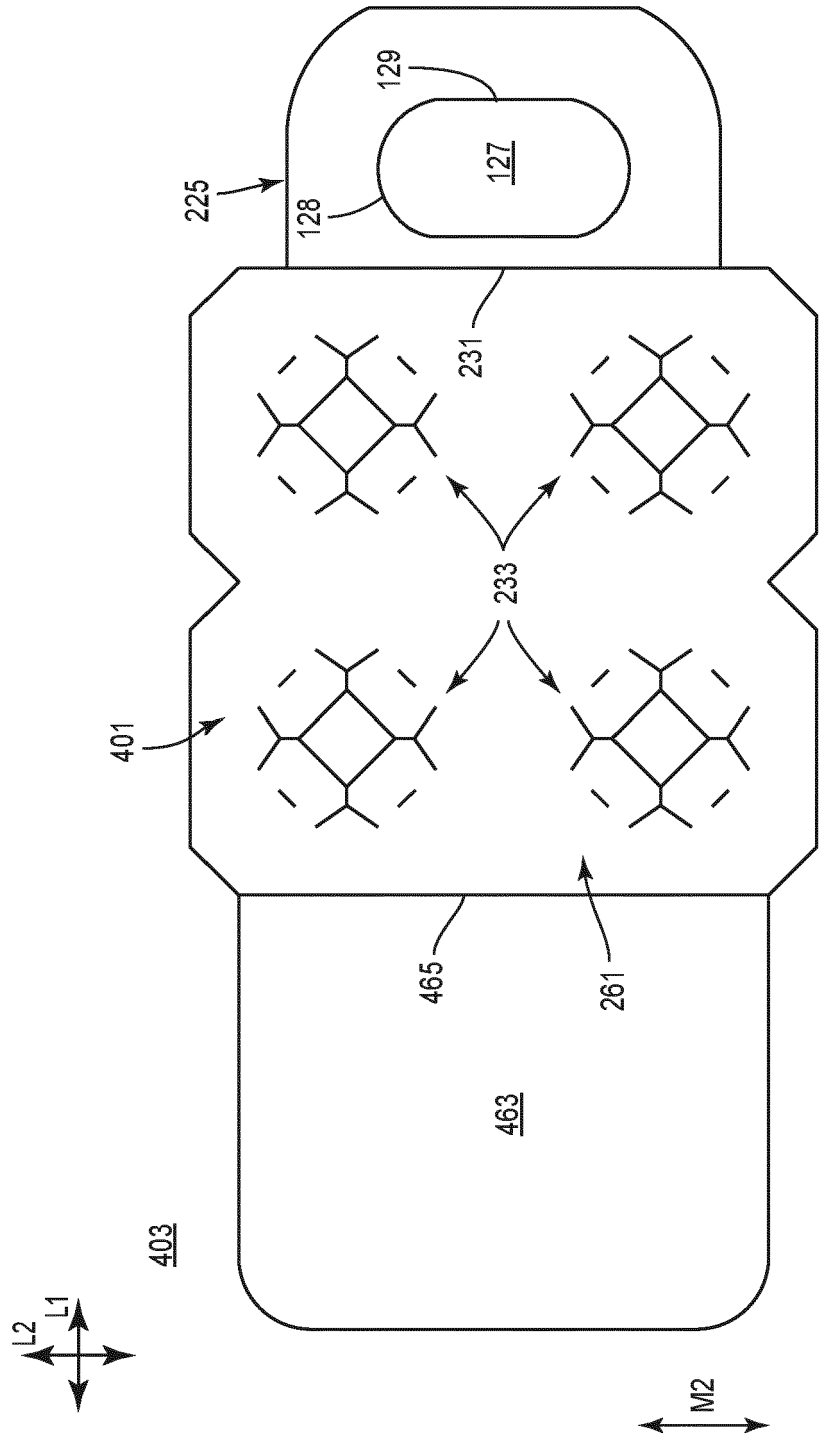
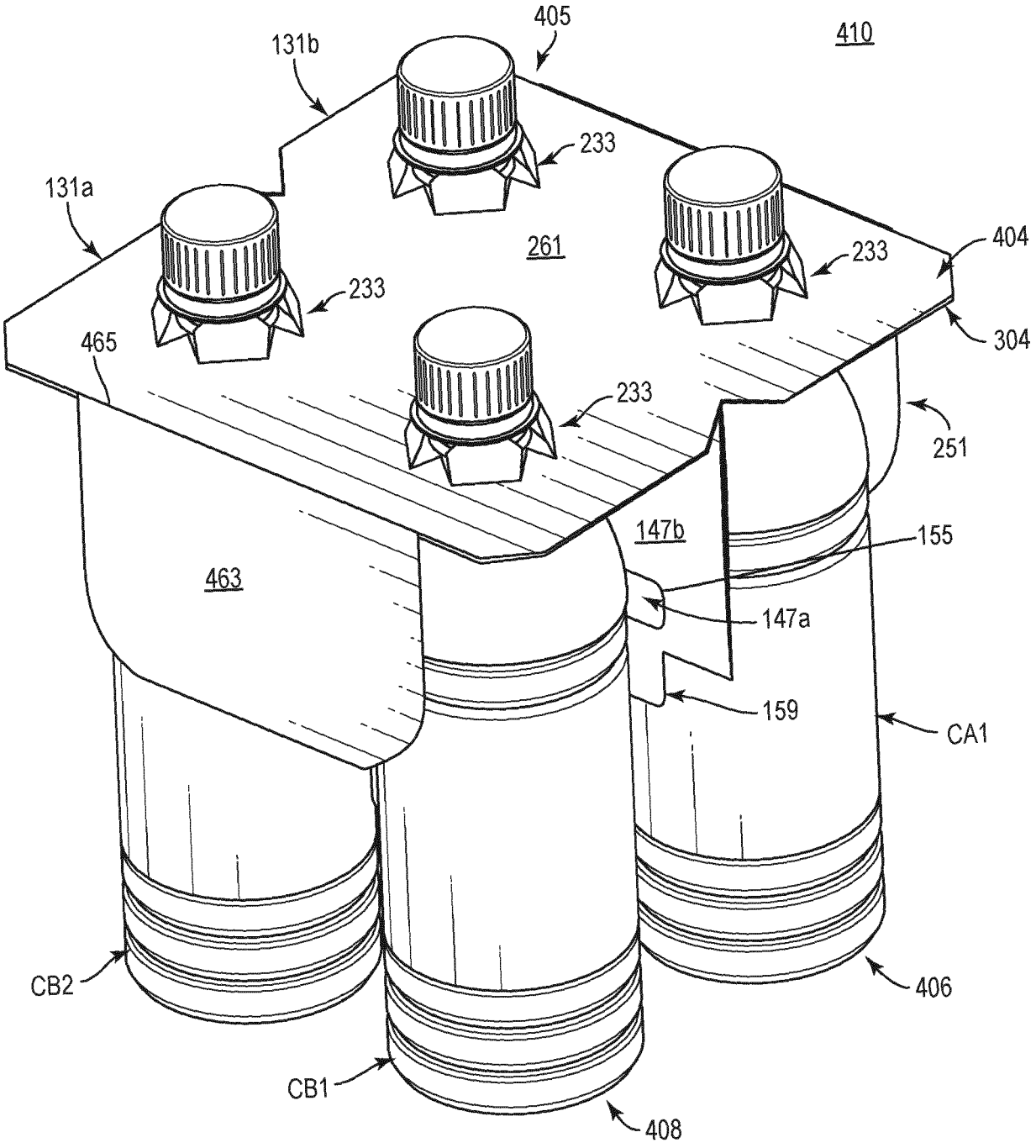


FIG. 9


405
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233
131a
261
233
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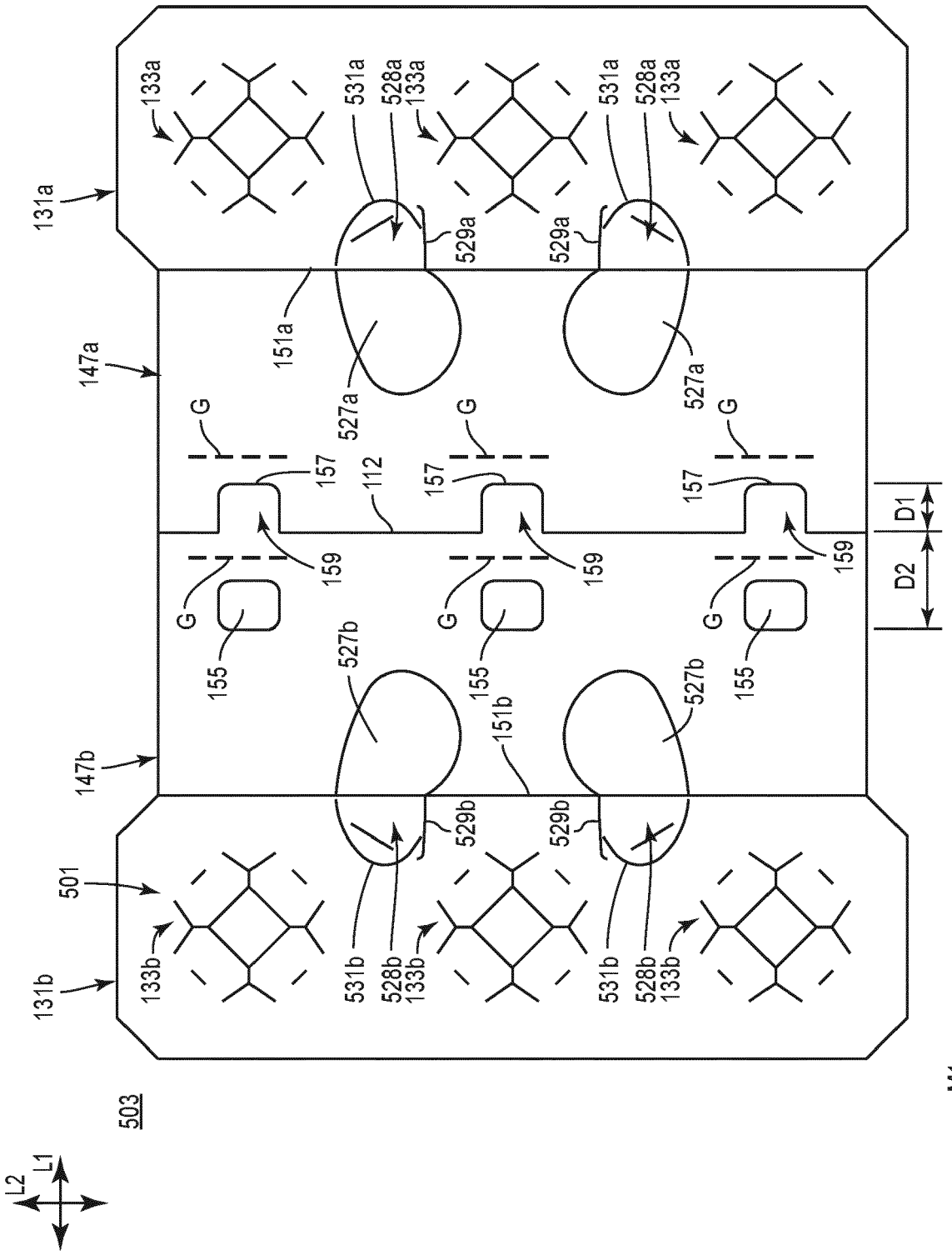
233
251
147b
155
463
147a
159
CA1
CB2
406
CB1
408

FIG. 10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133a
531a
528a
529a
151a
527a
147a
G
157
112
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155
527b
151b
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131b
133b
531b
528b
529b
503
L2
L1
M1
D1
D2

FIG. 11

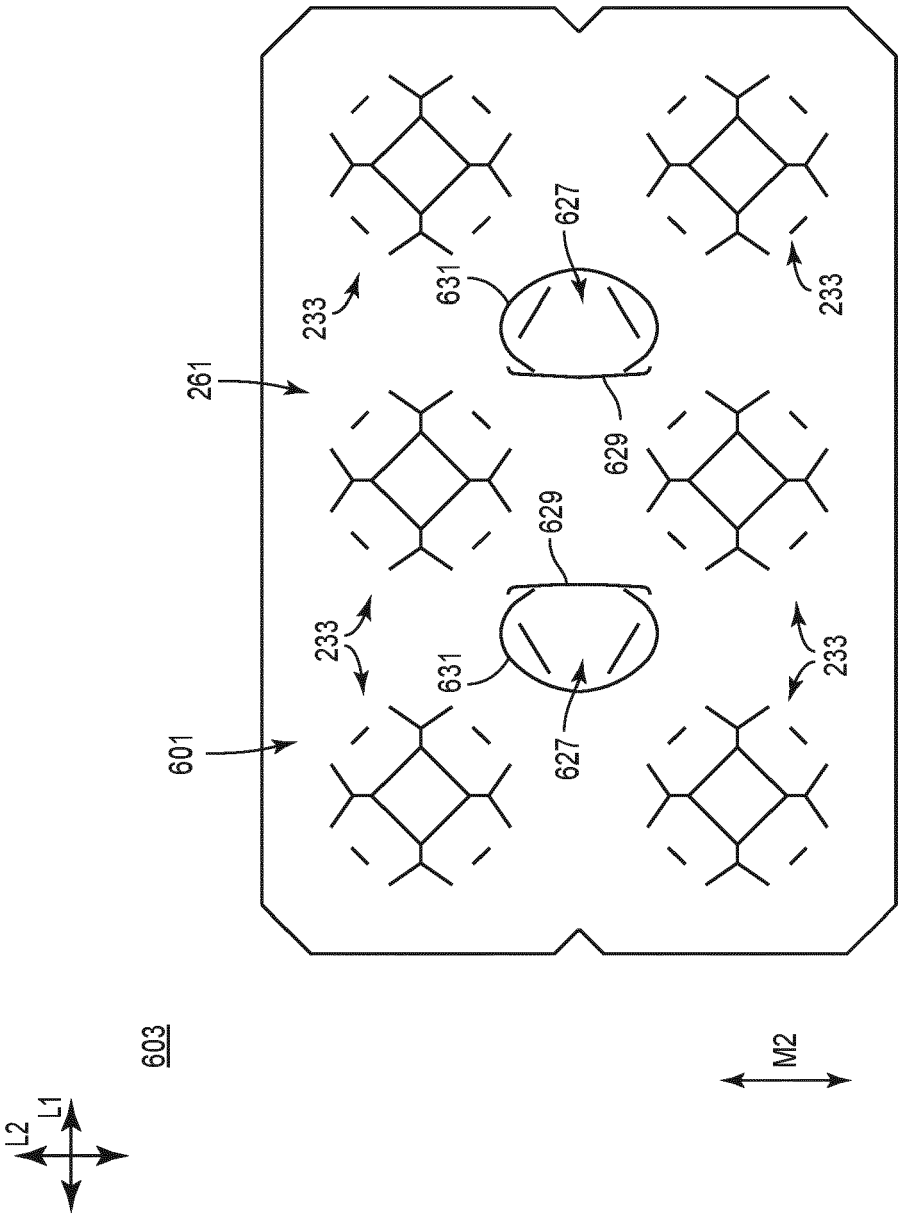
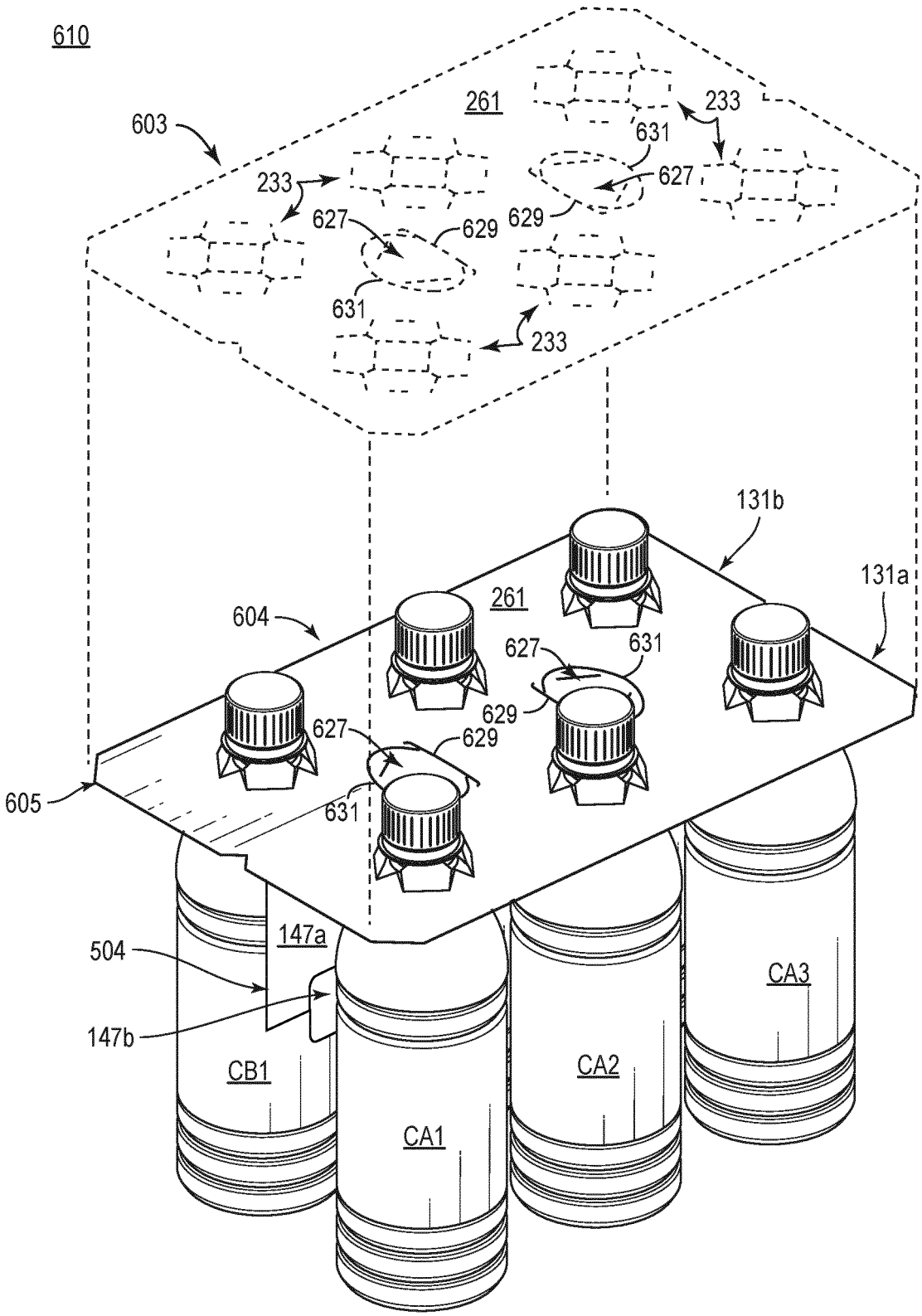


FIG. 12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131a
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627
629
631
605
147a
504
147b
CB1
CA1
CA2
CA3

FIG. 13

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EUROPEAN SEARCH REPORT

Application Number
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