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(54) FOLDING TAMPER-PROOF CASE WITH REINFORCING INSERTS

FALTBARER MANIPULATIONSSICHERER KOFFER MIT VERSTÄRKUNGSEINLAGEN

BOÎTIER PLIABLE INVOLABLE COMPORTANT DES INSERTS DE RENFORCEMENT

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Description

TECHNICAL FIELD

[0001] Aspects of the present disclosure relate to an improved case or portions thereof for shipping and storing various products, including bottled liquids, and, more particularly, for improving the storage, transport, and protection of products such as beverage bottles.

BACKGROUND

[0002] Wine and other beverage producers commonly use rectangular cases made of either wood or cardboard to transport bottles. These cases comprise internal compartments separated by wood, cardboard, plastic, or foam to provide a certain level of protection for the bottles inside. After the bottles are placed within the cases, the cases are closed and set out for shipment to the wholesaler, retailer, or customer. These closed cases of bottles present several problems due to the inherent flaws of the case designs. For example, a wholesaler, retailer, or customer may have difficulties viewing the contents of the case, determining if someone has tampered with the contents of the case, displaying the contents of the case, or any combination of these limitations.

[0003] Ordinarily, to view the contents within a bottle case, each individual bottle must be removed from the case. The handling of each bottle creates an opportunity to damage the bottle. Since each bottle in the case can be removed, a fraudster could also tamper with the contents of the bottle case. For example, someone inspecting the bottles can replace a bottle, or the liquid therein, with a different, less-valuable product. Finally, current methods do not provide an aesthetic system for displaying the bottles. The wooden case, for example, requires tools to wedge open the lid, which can be easily damaged when being pried apart from the body of the case. What is needed, therefore, is a system that prevents tampering, provides bottle viewability, provides protection for the bottles, and maintains an aesthetic form for displaying the bottles.

[0004] CH 674501 A5 describes a packet for long objects consisting of a box made of single cut-out section and having a back, four sides, one of which is joined to a lid and the opposite one joined to a strip parallel to the base. The two sides crosswise to the strip are in the form of prismatic hollow pieces with an outside, top side and inside. The inside of the hollow prism facing the interior of the packet a little distance from the inside, has a holder-strip made from the single cut-out section and which has cavities in containing the articles.

[0005] US 3115247 A describes a blank and packing for ampoules or the like formed of a cut-out and pre-folded semi-stiff material having a bottom surface adjacent to the ampoule rear ends and a covering surface adjacent to the ampoule front ends and two intermediate parallel surfaces provided with perforations arranged one above

the other for the purpose of guiding the ampoules.

[0006] CN 207524127 U describes a portable cushioning and shockproof packaging for red wine glasses, characterized by including cup body engaging parts, cross-locking parts, stepped load-bearing parts, bow-shaped cup seat engaging parts, handles, left liner, right liner, and packaging main body, wherein the upper side of the packaging main body is provided with a pair of handles, there is a cross-type locking part under the handle, a stepped load-bearing part is provided on the left side of the packaging body, and a bow-shaped cup is provided on the right side of the packaging body. The seat engaging part, the stepped load-bearing part is provided with the cup body engaging part, and the left and right lining boards are respectively provided at the left and right ends of the packaging main body.

[0007] DE 2422451 A1 describes a box for automatically inserted ampoules, for small bottles and other tubular items, having a base portion with two end panels and folding flaps, also a front panel, the latter folding on assembling and closing the box. The base comprises a number of folding sections, so that a prismatic item is formed with nearly square surfaces, having round openings in the outer surface and polygonal ones with rounded corners in the inner surface. Thus the ampoules etc. can be inserted in position by an automatic machine, before the box is sealed by folding its panels and gluing the front one to the others. The multisection folded base can have one or more intermediate walls with round openings in them and which reinforce it when folded, allowing the ampoules to be passed through them.

SUMMARY

[0008] The present disclosure address these concerns as well as other needs that will become apparent upon reading the description below in conjunction with the drawings. Briefly described, aspects of the present disclosure relate to an improved case or portions thereof for shipping and storing various products, including bottled liquids, and, more particularly, for improving the storage, transport, and protection of products such as beverage bottles.

[0009] The present invention provides a case system as set out in claim 1 and a method for securing a product within a tamper-proof case as set out in claim 8.

[0010] One aspect of the present disclosure provides a tamper-proof case and method of use. The case can be manufactured as a single sheet of material. A plurality of features can be formed into the single sheet, e.g., a flat and coplanar cardboard sheet, such that the case can be folded from an open, flat configuration to a closed configuration for storing bottles or other products.

[0011] The case includes a back panel, two sidewalls, an upper foldable section, and a lower foldable section. The upper foldable section and lower foldable section can include several panels foldably connected to one another, for example along a crease or perforation line in

the material. The upper foldable section includes a top panel, an upper front panel facing toward the customer, and an upper holder panel, for example. The upper holder panel includes apertures for holding a first end of the product in the case, such as the neck of a bottle. The lower foldable section includes a bottom panel, a lower front panel facing toward the customer, and a lower holder panel, for example. The lower holder panel includes apertures for holding the second end of the product in the case, such as the heel of a bottle.

[0012] The case can include a fastener on the upper foldable section. The fastener can include adhesive, tamper-evident tape, and/or another mechanical fastener. An example mechanical fastener described herein includes a foldable tuck-tab fastener. The folding tabs on the tuck-tab fastener can be pinched inwardly and inserted into fastener openings in the sidewalls. Once the fastener is secure, the case can be permanently secured such that the products cannot be removed from the case without the case showing evidence of the removal.

[0013] Additional foldable sections or panels are also described herein to increase the structural integrity and security of the case. A top flap and a bottom flap that provide support at the corners of the case are described. The top flap and the bottom flap can abut the back panel and run alongside the sidewalls. The top flap can also include a fastener opening that meets with the fastener opening in the sidewall and accepts the foldable fastener.

[0014] The case can also include a tamper-proofing tear strip that enables an end user to remove the contents of the case. The tear strip can be located on the upper holder panel proximate the apertures for holding the first end of the product. Once the tear strip is torn, a portion of the upper aperture can be removed to enable the product to be pulled outwardly from the apertures. The tear strip can also be positioned on the opposite end of the case, such that the tear strip is located proximate the lower apertures holding the second end of the product. A tear corner can be placed at an opening section of the case, for example on the upper front panel near a fastener tab that includes one of the foldable fasteners. The tear corner can form the front corner of the case, and can include a perforation line that can be broken to open the upper front panel with respect to the fastener tab. The fastener tab (and thus fastener) can remain intact after the tear corner is torn, and evidence of opening can be provided by the torn tear corner. The cases can also include a secondary fastener tear strip located near the fastener on the fastener tab. For example, the fastener tear strip can be used in addition to the tear corner such that the entire fastener tab can be torn from the case, and the upper front panel can be hinged upon to access the tops of the bottles once the fastener tab is removed. The faster tear strip can also be provided instead of the tear corner, and the fastener tear strip alone can be used to evidence if someone tries to pull out the fastener when the case is in a closed configuration.

[0015] The case includes one or more folding inserts,

including a lower insert, that is added to the bottom of the case to provide additional protection to the contents of the case, and can include an upper insert that can be added to the top of the case to provide additional protection to the contents of the case. The inserts can be die cut from a flat sheet of material and folded into a closed configuration. The lower insert includes an insert aperture. The upper insert can include an insert aperture. The insert apertures can be sized, shaped, and positioned to match upper and lower apertures in the upper holder panel and lower holder panel, respectively.

BRIEF DESCRIPTION OF THE FIGURES

[0016] Reference now will be made to the accompanying figures, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a top view of an unfolded case in an open configuration, according to some embodiments of the present disclosure;

FIG. 2A is a front view of an example case in a closed configuration, according to some embodiments of the present disclosure;

FIG. 2B is a perspective view of an example case in a closed configuration, according to some embodiments of the present disclosure;

FIGs. 3A and 3B are perspective views of a case in an open configuration, according to some embodiments of the present disclosure;

FIGs. 4A-4M depict an example process of packaging a bottle within an example case, according to some embodiments of the present disclosure;

FIGs. 5A-5I depict example steps and mechanisms to release a product from a closed case, according to some embodiments of the present disclosure;

FIGs. 6A-6D are perspective views of a case being positioned within an outer box, according to some embodiments of the present disclosure;

FIGs. 7A-7J are perspective views of an example lower insert insertable within the case to add support to the lower foldable section, according to some embodiments of the present disclosure;

FIGs. 8A-8D depict an example process for adding a lower insert to a case, according to some embodiments of the present disclosure;

FIGs. 9A-9F are perspective views of an example upper insert insertable within the case to add support to the upper foldable section, according to some embodiments of the present disclosure;

FIGs. 10A-10D depict an example process for adding an upper insert to a case, according to some embodiments of the present disclosure;

FIGs. 11A-11G depict an example process of enclosing bottles within a tamper-proof case, according to some embodiments of the present disclosure; and

FIGs. 12A-12N depict an example case with upper and lower foldable sections and no sidewalls, ac-

cording to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0017] The present disclosure can be understood more readily by reference to the following detailed description of exemplary embodiments and the examples included herein. Before the exemplary embodiments of the devices and methods according to the present disclosure are disclosed and described, it is to be understood that embodiments are not limited to those described within this disclosure. Numerous modifications and variations therein will be apparent to those skilled in the art and remain within the scope of the disclosure. It is also to be understood that the terminology used herein is for describing specific embodiments only and is not intended to be limiting. Some embodiments of the disclosed technology will be described more fully hereinafter with reference to the accompanying drawings. This disclosed technology may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth therein.

[0018] In the following description, numerous specific details are set forth. But it is to be understood that embodiments of the disclosed technology may be practiced without these specific details. In other instances, well-known methods, structures, and techniques have not been shown in detail in order not to obscure an understanding of this description. References to "one embodiment," "an embodiment," "example embodiment," "some embodiments," "certain embodiments," "various embodiments," etc., indicate that the embodiment(s) of the disclosed technology so described may include a particular feature, structure, or characteristic, but not every embodiment necessarily includes the particular feature, structure, or characteristic. Further, repeated use of the phrase "in one embodiment" does not necessarily refer to the same embodiment, although it may.

[0019] Unless otherwise noted, the terms used herein are to be understood according to conventional usage by those of ordinary skill in the relevant art. In addition to any definitions of terms provided below, it is to be understood that as used in the specification and in the claims, "a" or "an" can mean one or more, depending upon the context in which it is used. Throughout the specification and the claims, the following terms take at least the meanings explicitly associated herein, unless the context clearly dictates otherwise. The term "or" is intended to mean an inclusive "or." Further, the terms "a," "an," and "the" are intended to mean one or more unless specified otherwise or clear from the context to be directed to a singular form.

[0020] Unless otherwise specified, the use of the ordinal adjectives "first," "second," "third," etc., to describe a common object, merely indicate that different instances of like objects are being referred to and are not intended to imply that the objects so described must be in a given

sequence, either temporally, spatially, in ranking, or in any other manner.

[0021] Also, in describing the exemplary embodiments, terminology will be resorted to for the sake of clarity. It is intended that each term contemplates its broadest meaning as understood by those skilled in the art and includes all technical equivalents that operate in a similar manner to accomplish a similar purpose.

[0022] To facilitate an understanding of the principles and features of the embodiments of the present disclosure, exemplary embodiments are explained hereinafter with reference to their implementation in an illustrative embodiment. Such illustrative embodiments are not, however, intended to be limiting.

[0023] The materials described hereinafter as making up the various elements of the embodiments of the present disclosure are intended to be illustrative and not restrictive. Many suitable materials that would perform the same or a similar function as the materials described herein are intended to be embraced within the scope of the example embodiments. Such other materials not described herein can include, but are not limited to, materials that are developed after the time of the development of the disclosed technology, for example.

[0024] Reference numbers throughout the figures that are underlined indicate that a particular panel or object is being referred to. For example, an underlined "202" in the figures refers to the panel (e.g., the upper holder panel) being described.

[0025] Embodiments of the disclosed technology include a tamper-proof case for storing and transporting bottles of wine. In various embodiments, a tamper-proof case can provide improvements to protecting the integrity of the bottled wine, as well as features that allow a user to more easily use the wine case. A tamper-proof bottle case according to the present disclosure can be used by wine manufacturers to package bottles of wine and also can be used by consumers to store the wine bottles at home or to transport the bottles.

[0026] Throughout this disclosure, certain embodiments are described in exemplary fashion in relation to storing and transporting bottles of wine. But embodiments of the disclosed technology are not so limited. In some embodiments, the disclosed techniques may be effective in storing and transporting bottles or containers of many other types of liquids. For example, and not limitation, the upper and lower apertures, as will be described herein, can be configured for spirit bottles, beer bottles, water bottles, cosmetic bottles, and other bottles having different shapes and sizes. It will also be understood that the tamper-proof cases described herein can be configured to store products other than bottles, such as toys, electronics, or any other product.

[0027] Various devices and methods are disclosed for providing and using a tamper-proof case, and exemplary embodiments of the devices and methods will now be described with reference to the accompanying figures. FIG. 1 is a top view of an unfolded case 100 in an open

configuration, according to some embodiments of the present disclosure. As can be seen in the figure, a benefit of the present systems and methods is that a complete case 100 for storing and transporting items can be constructed from a single sheet of material. Referring to FIG. 2A for illustration, the example case 100 is in a closed configuration and is storing bottles 500. In FIG. 2A, each bottle 500 (three bottles in the example) is secured in the closed case. The example shown in FIG. 2A can be folded into this final, closed configuration from a single, coplanar sheet of material similar to the one shown in FIG. 1.

[0028] Referring again to FIG. 1, a case 100 can include a back panel 102, a first sidewall 104, a second sidewall 106, an upper foldable section 200, and a lower foldable section 300. When the upper foldable section 200, the lower foldable section 300, the first sidewall 104, and the second sidewall 106 are in their open configurations, as shown in the figure, each feature can be substantially coplanar with the back panel 102. This design provides several benefits. A case 100 can be manufactured, for example, from cutting a single sheet into a desired shape. Additionally, a large quantity of cases 100 can be stacked during shipment to the end user, and the open configuration greatly decreases the storage volume required for empty, open cases 100.

[0029] An upper foldable section 200 can include the various features required to store the top of an item, for example the neck of a bottle 500. The upper foldable section 200 includes an upper holder panel 202. The upper holder panel 202 includes one or more upper apertures 204 for holding one end of the items being stored in the case 100. For example, the upper apertures 204 can be sized to hold the neck of a bottle 500. The upper apertures 204 can be cut, stamped, etc. into the upper holder panel 202 to create the hole for holding the bottle 500. The upper aperture 204 can be circular if made to hold a circular neck, for example when storing wine. It is contemplated that the upper aperture 204 can be modified according to the shape of the contents being stored. A spirit bottle can be square, and the upper aperture 204 can be square; an electronic device or a toy can have any number of geometries, and the upper apertures 204 can be formed to hold those geometries. Using a bottle as an example, the dimensions of the upper aperture 204 can also be modified based on the dimensions of the particular bottle being stored in the case 100, since bottles can take many different shapes and sizes (e.g., piccolo or split (187.5 ml), demi or half (375 ml), standard (750 ml), magnum (1.5 L), double magnum (3.0 L), etc.).

[0030] The upper holder panel 202 is foldably connected to an upper front panel 206. The upper holder panel 202 and the upper front panel 206 are separated by a dotted line in the figure; dotted lines are used in FIG. 1 to indicate where a fold can be made. The use of the term "foldably" herein can be understood to mean that two features are connected but that one can be moved, or hinged, with respect to the other. This movement can be facilitated by providing an area in the material of the case

100 that is creased, perforated, and/or the like. Furthermore, the various "panels" herein can be described with reference to their location or purpose on the case 100 when the case 100 is in a closed configuration. An upper front panel 206, for example, is the panel that, once the case 100 is closed, is facing the front of the case 100; the upper holder panel 202 is facing toward the product within the case 100 (e.g., the bottle) to hold the item when the case 100 is closed. Referring to FIG. 2A for illustration, the upper front panel 206 is at the top of the closed case 100. A "top" panel can be on the top of the case 100 in FIG. 2A; similar is true for the lower front panel, bottom panel, and lower holder panel, which will be described in greater detail herein.

[0031] Referring again to FIG. 1, the upper front panel 206 is foldably connected to a top panel 208. Again, once the upper foldable section 200 is in a closed configuration, the top panel 208 can form the top of the closed case 100. The top panel 208 is foldably connected to the back panel 102. Once the upper holder panel 202, upper front panel 206, and top panel 208 are in a closed configuration, the three panels can form a box to hold and conceal the top of the bottle 500. Referring to FIG. 2A for illustration, the top of the case 100 comprises an upper box 210 that holds the neck of the bottle 500. The entirety of the upper box 210 can be created, for example, by folding the upper holder panel 202 inwardly to 90° with respect to the upper front panel 206 (i.e., perpendicular), folding the upper front panel 206 inwardly to 90° with respect to the top panel 208, and folding the top panel 208 inwardly 90° with respect to the back panel 102. This final folding step will cause the upper holder panel 202 to rest 90° with respect to the back panel 102.

[0032] The upper foldable section 200 can also include additional panels to increase the amount of material at the top and thus increase the protection of the bottles and the rigidity of the case 100. These panels, referred to as top internal supports 212, 214, 216, 218, can extend beyond and be foldably connected to the upper holder panel 202. When the upper foldable section 200 is in a closed configuration, the top internal supports 212, 214, 216, 218 can be found inside the upper box 210 formed by the upper holder panel 202, the upper front panel 206, and the top panel 208. An upper box 210 with a plurality of top internal supports 212, 214, 216, 218 can protect the bottles 500 within the case 100 and ensure they do not break. For example, a case 100 with a plurality of top internal supports 212, 214, 216, 218 can be dropped at the top corner of the case 100 from a distance of about 0.9 m without damaging the bottles therein. This is a significant improvement over legacy cases, as many cases use dry pulp to cover the bottles 500 to protect them. The present system can provide the protection without the addition of unattractive, bulky padding like dry pulp.

[0033] The upper foldable section 200 can include one or more top flaps 219 extending from the top panel 208. The top flap 219 can be folded inwardly prior to folding the upper foldable section 200 into its closed configura-

tion. One edge of the top flap 219 can rest, or abut, the back panel 102. The one or more top flaps 219 can provide additional structural support for the corners of the case 100 where the sidewalls 104,106 meet with the upper foldable section 200. The top flap 219 can prevent the case 100 from opening at those corners and also provide compression support if dropped on the corner.

[0034] The first sidewall 104 and the second sidewall 106 can be folded inwardly to approximately 90° with respect to the back panel 102, thereby forming the sides of the case 100. The first sidewall 104 and second sidewall 106 can include a first sidewall flap 108 and a second sidewall flap 110, respectively. The first sidewall 104 and second sidewall 106 can be folded inwardly to provide additional side support for the case 100. In example cases 100 with one or more top flaps 219 (or bottom flaps 319), the first sidewall flap 108 and/or second sidewall flap 110 can fold over the top flaps 219, thereby sandwiching the top flaps 219 between respective sidewalls 104,106 and sidewall flaps 108,110. This construction can also provide additional rigidity at the top corners of the case 100.

[0035] The first sidewall flap 108 and/or the second sidewall flap 110 can include one or more locking tabs 114 extending therefrom. The locking tab 114 can be an extension of the sidewall flap 108,110 that can extend into a respective tab slit 116 in the back panel 102. For example, once the sidewall flaps 108,110 are folded to the back panel 102, a locking tab 114 can extend into a tab slit 116 to prevent the sidewall flaps 108,110 from separating from the sidewalls 104,106 (for example like opening a book).

[0036] A lower foldable section 300 can include the various features required to store the bottom of an item, for example the heel of a bottle 500. The lower foldable section 300 includes a lower holder panel 302. The lower holder panel 302 can be similar to the upper holder panel 202 except that the lower holder panel 302 includes one or more lower apertures 304 for holding the second end of the product, e.g., the heel of the bottle 500. The lower apertures 304 can be sized according to the shape and dimensions of the product being stored.

[0037] The lower holder panel 302 is foldably connected to a lower front panel 306. The lower front panel 306 is foldably connected to a bottom panel 308. Once the lower foldable section 300 is in a closed configuration, the bottom panel 308 can form the bottom of the closed case 100. The bottom panel 308 is foldably connected to the back panel 102. Once the lower holder panel 302, lower front panel 306, and bottom panel 308 are in a closed configuration, the three panels can form a box to hold and conceal the bottom of the product. Referring to FIG. 2A for illustration, the bottom of the case 100 comprises a lower box 310 that holds the bottom of the product. The lower box 310 can be similar to the upper box 210. By folding the lower foldable section 300 similar to the upper foldable section 200, the lower holder panel 302 can rest 90° with respect to the back panel 102.

[0038] Similar to the upper foldable section 200, the lower foldable section 300 can also include additional panels to increase the amount of material at the bottom and thus increase the protection to the bottles and the rigidity of the case 100. These panels, referred to as bottom internal supports 312,314,316,318 can extend beyond and be foldably connected to the lower holder panel 302. The bottom internal supports 312,314,316,318 can be similar in all regards to the top internal supports 212,214,216,218 to provide drop protection at the bottom corners of the case 100.

[0039] The lower foldable section 300 can include one or more bottom flaps 319 extending from the bottom panel 308. The bottom flap 319 can be folded inwardly prior to folding the lower foldable section 300 into its closed configuration. One edge of the bottom flap 319 can rest, or abut, the back panel 102. The one or more bottom flaps 319 can provide additional structural support for the corners of the case 100 where the sidewalls 104,106 meet with the lower foldable section 300. The one or more bottom flaps 319 can be similar to the top flaps 219 of the upper foldable section 200. A sidewall flap 108,110 can be folded onto the lower holder flaps 320 in a final closed configuration. In other examples, the case 100 can include one or more base flaps 112 that can be folded over the bottom flaps 319 once the bottom flaps 319 are abutting the back panel 102.

[0040] The lower foldable section 300 can also include one or more lower holder flaps 320 extending from the lower holder panel 302. The lower holder flaps 320 can be folded such that, when the lower foldable section 300 is in a closed configuration, the lower holder flaps 320 are directed toward the upper foldable section 200. One edge of the lower holder flaps 320 can rest, or abut, the back panel 102. The lower holder flaps 320 can add additional structural support for the case and/or provide padding for the heel of a bottle 500. In some examples, a sidewall flap 108,110 can be folded onto the lower holder flaps 320 in a final closed configuration.

[0041] In some examples, the upper foldable section 200 can include a fastener 220 to permanently lock the case 100 when bottles 500 or other products are stored within the case 100. In FIG. 2A, for example, the upper front panel 206 and the lower front panel 306 are both in a closed configuration and are coplanar with one another. In this closed configuration, some example cases 100 enable the products to be stored such that they cannot be removed from the case 100 without evidence of such removal. As described above, legacy storage systems did not provide evidence of such tampering—a bottle 500 or other product could be removed from the case and the contents of the bottle 500 could be altered. In the case of wine bottles, this is a significant limitation, as someone can easily remove an expensive bottle and replace it with a less valuable bottle or, alternatively, someone can consume the contents of the bottle and replace the liquid with less valuable wine. The present systems for storing bottles solves this problem by providing a fastener 220

to permanently secure the bottles 500 or other products within the case 100. Throughout this disclosure, reference to "permanent storage" or "permanent attachment" can be understood to mean that the products cannot be removed and replaced without showing evidence of this tampering. The fastener 220 can be positioned on a fastener tab 221 that folds around the sidewalls 104,106 when the case 100 is in a closed configuration.

[0042] The fastener 220 can include any attachment that can secure the case 100 into a closed configuration. This can include but is not limited to adhesive, tamper-evident tape, and/or a mechanical fastener. Tamper-evident tape can include any tape known in the art that can be used to indicate whether the tape has been removed, broken, or cut. For example, tamper-evident tape can include wording that prohibits the tape from being realigned and reattached once removed. Tamper-evident tape can include language similar to "check contents if seal is broken" and the like. The tape can also include labels that evidence the opening of the case 100 if broken or torn.

[0043] A number of mechanical fasteners can also be used to permanently secure the case 100. Referring again to FIG. 1, a fastener 220 can include a tuck tab as shown in the figure. The tuck-tab fastener 220 includes one or more folding tabs 222 that can be pinched inward and inserted into a fastener opening (e.g., a slit or hole, as shown in the example as fastener opening 224a,b,c). Once inside the fastener opening 224a,b,c, the one or more folding tabs 222 can expand to lock the fastener 220 into place. FIGs. 4I-4M show the steps of using an example tuck-tab fastener 220 to secure a case 100. In some examples, the fastener opening can be disposed on the sidewalls 104,106 (e.g., fastener opening 224a). When a case 100 includes a sidewall flap 108,110, the sidewall flap 108,110 can include a fastener opening (e.g., fastener opening 224b) that meets with the first fastener opening 224a once the sidewall flap 108,110 is folded inward. When a case 100 includes one or more top flaps 219, the one or more top flaps 219 can include a fastener opening (e.g., fastener opening 224c) that meets with the first fastener opening 224a and/or second fastener opening 224b once the top flap 219 is folded inward. The inclusion of multiple fastener openings 224a,b,c can increase the stability and strength of the case 100 when a fastener 220 is inserted into each of the fastener openings 224a,b,c.

[0044] Another mechanical fastener 220 can include a tab extending from the fastener tab 221 that includes shaped card, which is shaped like an arrow that can pass in only one direction through a fastener opening 224a,b,c. In other examples, the mechanical fastener 220 can include securing a tab extending from the upper front panel 206 to the sidewalls 104,106 with a stapleless staple technique. The stapleless staple technique punctures a first portion of the material being stapled, folds that first portion over on top of the non-punctured portion of the material, and then tucks the first portion under a slit to

hold the material (or multiple layers of material) together. Other mechanical fasteners are contemplated, including but not limited to rivets, staples, and the like.

[0045] The material for the single-piece case 100 can include cardboard, corrugated cardboard, greyboard, paper, fiber pulp (including paper pulp) and/or the like or any combinations thereof. As described above, the several panels described herein can be foldably connected to any adjacent panel. To this end, the material can be sufficiently flexible to enable the folding of the panels. It is also contemplated that the various panels can be a more rigid material, such as wood and the like, and each panel can be foldably attached via a hinge. An example hinge can include a fabric hinge and/or a metal hinge, including but not limited to a butt hinge, a case hinge, a bi-fold hinge, a piano hinge, and the like.

[0046] The case 100 can also be manufactured from fiber that includes natural biomass materials. It is also contemplated that the materials used for a bottle case 100 can take advantage of the raw resources found at the bottling facilities. For example, wine bottlers may have an excess of biomass byproduct created from the winemaking process. This biomass byproduct can include vine clippings, leftover grape seeds, and leftover grape skins. A spirit bottler may, for example, have leftover barley, rye, sugarcane, or other fermentation byproducts. Therefore, it is contemplated the bottle case 100 may take advantage of this excess biomass. In some embodiments, the recycled cardboard can include waste from the liquid manufacturing processes, including but not limited to vine clippings, grape seeds, grape skins, barley, rye, and/or sugarcane. The percentage of natural biomass that is included into the fiber product can be 20% or more of the recycled product, e.g., vine waste. The case 100 can also include synthetic polymers, e.g., plastics, and/or a combination of synthetic polymers and natural materials. Any of the materials described can also include recycled materials.

[0047] As will be described in greater detail below, the case 100 can include features that indicate if a potential fraudster has tampered with the case, for example by trying to pry open the fastener 220 of the case 100 or any other section of the case. To alert a customer to such tampering, perforations, tearable corners, and the like can be used to enable the contents of the case 100 to be removed, yet prevent the case 100 from being re-closed without evidence of opening the case 100. One such tamper-preventing feature can include perforation lines at locations where two panels or tabs fold with respect to each other. As described above, foldable can be understood to mean that two features are connected but that one can be moved, or hinged, with respect to the other. The connection between these foldable sections can be perforated such that, if force is applied to that section of the case 100, the perforation can be broken. An example of this is shown in FIG. 1 at perforated fold line 450 positioned between each sidewall 104,106 and the base flaps 112. As will be described below with ref-

erence to FIGs. 4D and 5G, positioning a perforated fold line 450 at this location can prevent the fraudster from prying the lower front panel 306 downward such that the contents of the case 100 are pulled from the upper apertures 204 to a degree such that they can be removed from the case. If the lower front panel 306 is pulled down with a certain amount of force, the perforated fold line 450 can tear, thus evidence the tampering. It should be noted that a perforation line can be placed at other foldable sections, and the placement is not limited to the connection between each sidewall 104, 106 and the base flaps 112. For example, a perforated fold line can be placed between the top flap(s) 219 and the top panel 208, between the upper front panel 206 and the fastener tab 221 (described below as tear corner 280), between the lower holder panel 302 and the lower holder flaps 320, between the bottom panel 308 and the bottom flap(s) 319, and/or any other foldable section or combinations of foldable sections. Various additional embodiments of tamper-preventing features are described below.

[0048] FIG. 2A is a front view of an example case 100, according to some embodiments of the present disclosure. The example case 100 is shown storing three bottles, which is in accordance with the present disclosure. However, the case 100 is not limited to three bottles 500. For example, the case can be modified to include any bottle shape or quantity, including one bottle or any larger quantity.

[0049] The case 100 can be manufactured such that, once the bottles 500 are inserted into the case 100 and the panels are all in their closed configuration, the bottles 500 therein can be separated (i.e., raised) from the back panel 102 a certain distance. In other words, the bottles 500 can be suspended and supported only by the upper apertures 204 and lower apertures 304. The distance of separation between the bottle 500 and the back panel 102 can depend on the bottle 500 being stored. For example, a heavier bottle (e.g., double magnum (3L)) may require more separation than a single bottle (0.75L). If the case 100 impacts the ground, considering inertia for example, a larger bottle may move more in the upper apertures 204 and/or lower apertures 304 than a smaller bottle. As a non-limiting example, the bottles 500 can be separated from the back panel 102 by a distance of about 0.5 cm to about 1.5 cm.

[0050] In a fully closed configuration, as shown in FIG. 2A, the upper front panel 206 and lower front panel 306 (both facing toward the customer) can define an observation window 400. For example, a bottom edge 230 of the upper front panel 206 can define the top of an observation window 400, and a top edge 330 of the lower front panel 306 can define the bottom of the observation window 400. The observation window 400 enables a view of the bottle 500 without removing the bottle 500 from the case 100. As described above, previous systems for storing and transporting bottles included wood or ordinary cardboard cases. To view the bottles 500 within these previous designs, the bottles 500 had to be re-

moved from the case. The present design enables customers and industry stakeholders to quickly and easily access and read labels on the bottle 500, ensure the contents are correct, and apply additional labels to the bottle 500 if necessary. This can solve the issue of bottlenecks in the supply chain by speeding up the quality control inspection process while also dramatically improving the customer experience.

[0051] The dimensions of an observation window 400 can be customized based on the size of the one or more bottles 500 being stored in the case 100. The bottom edge 230 can be designed such that the upper front panel 206 does not obscure a view of the level of the liquid within the bottle 500. Consider, for example, a bottle 500 comprising wine. The bottom edge 230 can be positioned such that the upper front panel 206 does not extend over the top level of the wine. This can enable a customer to view the bottle to make sure that no liquid has been removed from the bottle 500. In some examples, the bottom edge 230 can extend from about 3.0 cm to about 6.0 cm from the top of the bottle 500. When the upper foldable section 200 includes top internal supports 212, 214, 216, 218 forming the upper box 210, the distance from the bottom edge 230 to the top panel 208 can be greater, for example from about 3.0 cm to about 8.0 cm. Similarly, it is contemplated that the top edge 330 of the lower front panel 306 does not obscure bottle labels. In some examples, the top edge 330 can extend from about 2.0 cm to about 5.0 cm from the bottom of the bottle 500. When the lower foldable section 300 includes bottom internal supports 312, 314, 316, 318 forming the lower box 310, the distance from the top edge 330 to the bottom panel 308 can be greater, for example from about 2.0 cm to about 8.0 cm. The upper front panel 206 and the lower front panel 306 also have the additional benefit of providing a surface branding on the case 100. For example, an example height of from about 4.0 cm to about 8.0 cm can provide a large flat surface for brand labels.

[0052] In some examples, the case 100 can include a lid, not shown in FIG. 2A, that slides over the entirety of the case 100 to conceal the contents therein. This enables the present case 100 design to also serve as the shipping container for the bottles 500. In some examples, the case 100 can be inserted into an exterior box or container for shipment.

[0053] As described above, once the case 100 is in a closed configuration and storing bottles 500 or other products, the case 100 can be permanently sealed. This can mean that, in order to remove any bottle 500 in the case, the material of the case 100 may be torn or destroyed—thus evidencing the tampering of the case. In some examples, the case 100 can include features to help facilitate the removal of the bottles 500. For example, the upper box 210 and/or lower box 310 can include features that help the customer open the permanently sealed case 100. These features can include, but are not limited to, perforation lines (e.g., tear corner 280), tear strips (e.g., tear strip 256), and/or the like or any combi-

nation thereof. FIG. 2B is a perspective view of the example case 100 shown in FIG. 2A.

[0054] FIGs. 3A and 3B are perspective views of a case in an open configuration, according to some embodiments of the present disclosure. The two figures show example reinforcement features that can be used within a case 100 to further increase its stability and integrity. As described above, an aim of the present disclosure is to provide sturdy packaging to protect the product in the case 100, even if the case 100 is dropped, for example from above 0.9m. Certain locations on the case 100 where the products are supported can include additional padding. For example, the case 100 can include lower pad 350 and/or an upper pad 250. The lower pad 350 and/or upper pad 250 can be a layer of material, which can be the same material as the case 100 or a different material, that increases the thickness of the case 100 at the bottom panel 308 and top panel 208, respectively. The case 100 can include a lower aperture pad 352 and/or an upper aperture pad 252 to protect the part of the case 100 around the lower apertures 304 and upper apertures 204, respectively. This padding, which also can be the same material or a different material than the case, can provide additional support directly around the product in the apertures 204, 304. Any panel of the case can include additional padding. The additional padding can be secured to the case 100 using adhesive, double-sided tape, and similar attachment mechanisms. FIG. 3A is a partially exploded view wherein the padding is elevated from the case 100; FIG. 3B shows the padding attached to the case 100. It has been shown that a case 100 manufactured according to the examples shown in FIGs. 3A and 3B is able to be dropped from 0.9 m without breaking bottles stored within the case 100. In addition, it has been shown that a case 100 manufactured according to the examples shown in FIGs. 3A and 3B can withstand a 10-drop sequence, one drop for each of 10 orientations, without breaking bottles stored within the case 100. These orientations included: the most fragile corner; the shortest edge radiating from the drop corner; the medium edge radiating from the drop corner; the longest edge radiating from the drop corner; a flat surface of the case on the smallest face; a flat surface opposite smallest face of the case; a flat surface on one of the medium faces; a flat surface opposite the medium face of the case; a flat surface on the largest face of the case; and a flat surface on the opposite large face of the case. The case according to the examples shown in FIGs. 3A and 3B is configured to pass various recognized drop tests such as, for example, the ISTA 1A drop test.

[0055] In some examples, the top flap(s) 219 and the bottom flap(s) 319 can include hooks that enable the two features to hook together when in the closed configuration. For example, a top hook 260 on the first top flap 219 can meet with a bottom hook 360 on the bottom flap 319 when the flaps 219, 319 are folded inwardly in the closed configuration. These hooks 260, 360 can enable the flaps 219, 319 to engage and increase the integrity of the sides

of the case 100. This hooking mechanism can be seen in detail in FIG. 4C.

[0056] In some examples, the case 100 can include a tear tab 254 to help facilitate the removal of the products within the case 100 when the case 100 is in a closed configuration. As described above, once the case 100 is closed, it can be permanently sealed around the products, e.g., bottles. A mechanism to remove the products from the case 100 includes a tear tab 254 that can be pulled to remove a tear strip 256 located on one of the upper holder panel 202 or the lower holder panel 302. Referring to the case 100 in FIG. 3B for illustration, the tear strip 256 can be a portion of the upper holder panel 202 that can be torn from the case 100 to open (or remove) a portion of the upper apertures 204. The tear strip 256 can be a strip defined by perforations in the surface of the case 100. In other examples, the tear strip 256 can include a strip of material 258 that helps remove a portion of the panel. For example, the strip of material 258 can be disposed on the surface of the panel or inside the layers of the panel. The strip of material 258 can be attached to or end at the tear tab 254. When the tear tab 254 is pulled, the strip of material 258 tears along the tear strip 256 to remove the portion of the upper holder panel 202 or the lower holder panel 302.

[0057] To further facilitate the release of the bottles or other products from the closed case 100, the junction between the upper front panel 206 and the fastener tab 221 can include a tear corner 280. The tear corner 280 can include perforations or other tear lines that enable the upper front panel 206 to separate (or hinge) with respect to the upper front panel 206. This tearing and hinging of the upper front panel 206 can facilitate the removal of the upper part of the product (e.g., neck of the bottle) from an upper aperture 204. The tear tab 254, tear strip 256, and tear corner 280 are discussed in greater detail below with reference to FIGs. 5A-5I.

[0058] FIGs. 4A-4M depict an example process of packaging a bottle 500 within an example case 100, according to some embodiments of the present disclosure. The process shown in FIGs. 4A-4M is merely exemplary and is illustrative of a possible boxing/packaging process. Some example cases may include more, less, or different features than the case 100 shown in FIGs. 4A-4M. Additionally, and as described throughout this disclosure, the cases 100 described herein can store and secure products other than bottles.

[0059] In FIG. 4A, the example case 100 is provided in an open configuration, wherein the entirety of the packaging is flat, and all of the respective foldable panels are coplanar. As described above, the case 100 can include padding features at various panels (e.g., lower pad(s) 350, upper pad(s) 250, upper aperture pad(s) 252, lower aperture pad(s) 352, etc.). In FIG. 4B, the upper foldable section 200 (i.e., top panel 208, upper front panel 206, upper holder panel 202, and a top internal support 212) is folded inwardly and toward the back panel 102, and the lower foldable section 300 (i.e., bottom panel 308,

lower front panel 306, lower holder panel 302) is folded inwardly and toward the back panel 102.

[0060] In FIG. 4C, the top flaps 219 and bottom flaps 319 are folded inwardly to create sides of the case 100. As described above, the top flap(s) 219 can include a top hook 260 that engages with a bottom hook 360 on the bottom flap(s) 319. Engaging the top hook 260 and the bottom hook 360 can create a study wall along the side of the case 100, formed by the top flaps 219 and bottom flaps 319.

[0061] In FIG. 4D, the sidewalls 104, 106 and sidewall flaps 108, 110 are folded inwardly and perpendicular to the back panel 102. The lower holder panel 302 can also be folded outwardly, and away from the internal cavity of the case 100. The lower holder flaps 320 can be folded outwardly. Once the sidewalls 104, 106 are folded inwardly, they will abut and rest adjacent to the top flaps 219 and bottom flaps 319. Fastener openings 224a on the sidewalls 104, 106 can now align with the fastener openings 224c on the top flaps 219. FIG 4D also shows an example placement of a perforated fold line 450. As described above, the perforated fold line 450 can be added between the sidewall 104, 106 and the base flaps 112 to prevent the case 100 from being pried open by exerting force on the bottom of the case, at least without evidencing the tampering.

[0062] In FIG. 4E, the lower holder panel 302 and lower holder flaps 320 are folded inside of the cavity formed by the sidewalls 104, 106, bottom panel 308, and top panel 208. This folding can create the platform to accept and hold the bottom of the product (e.g., the heel of the bottle).

[0063] In FIG. 4F, the sidewall flaps 108, 110 are folded inwardly and over the top flaps 219 and bottom flaps 319, thereby concealing the top flaps 219 and bottom flaps 319 between the sidewalls 104, 106 and sidewall flaps 108, 110 (and protecting the hooks 260, 360 if included in the case 100). At this step, the fastener openings 224b on the sidewall flaps 108, 110 can align with the already aligned fastener openings 224a, c, thereby creating a three-layer fastener opening 224a, b, c.

[0064] In FIG. 4G, the top internal support 212 and upper holder panel 202 are folded inwardly and toward the back panel 102. Folding the upper holder panel 202 inwardly can position the upper apertures 204 toward the bottom panel 308. For example, as the upper holder panel 202 flattens, the top of the bottle can be inserted into an upper aperture 204, and the upper front panel 206 can be pushed downward to create the substantially 90° construction for holding the bottles. In FIG. 4H, the bottom of a product (e.g., heel of a bottle 500) can be positioned in the lower apertures 304, and the top of the product (e.g., neck of the bottle 500) can be placed within the upper apertures 204. Once the top of the product is inserted into the upper aperture(s) 204, the product can be fully seated and the upper foldable section 200 can be moved into its closed configuration. For example, once the bottles are inserted into the upper apertures 204, the bottles and/or upper front panel 206 can be pushed from

a first position (as shown in FIG. 4H) to a second position (as shown in FIG. 4I) wherein the upper front panel 206 and upper holder panel 202 are substantially perpendicular. From the position where the top of the product is inserted into the upper aperture 204 to the position where the product is fully seated, the top of the product can drop from about 1.0 cm to about 3.0 cm toward the back panel 102.

[0065] In FIG. 4I, the bottle 500 is fully seated and the upper holder panel 202 can abut the back panel 102. At this point, the fastener openings 224a, b, c are only visible on the outside of the case 100 (e.g., on the sidewalls 104, 106). On the inside of the case 100, the fastener openings 224a, b, c can be concealed by the upper box 210 created by the upper holder panel 202, the top panel 208, and the back panel 102. This design can help prevent tampering with the case 100 when the fasteners 220 are fully locked into the fastener openings 224a, b, c. The example fastener 220 in FIGs. 4A-4M is a tuck-tab fastener 220. The tuck-tab fastener 220 includes two folding tabs 222 that can be pinched inward and inserted into a fastener openings 224a, b, c.

[0066] A case 100 according to the present disclosure can also include a tear corner 280 (as described above) and/or a fastener tear strip 512 located between the fastener tab 221 and the fastener 220. The fastener tear strip 512 can be used to indicate if someone has attempted to pry open the case 100 near the fastener 220. The fastener tear strip 512 is discussed in greater detail below with reference to FIG. 5I.

[0067] In FIG. 4J, the folding tabs 222 of the fastener 220 are pinched inwardly, and the pinched folding tabs 222 are inserted into the fastener openings 224a, b, c. FIGs. 4K and 4L are partial-cutaway views such that the folding tabs 222 are visible within the upper box 210. In FIG. 4K, the folding tabs 222 unfold, thereby locking the fastener tab 221 in place and permanently securing the products into the closed case 100. FIG. 4M shows the end result, wherein the fastener tab 221 is secured. In some examples, the corner defined by the fastener tab 221 folded with respect to the upper front panel 206 can be a tearable corner (e.g., the tear corner 280 described above) to facilitate opening the case 100. This opening is described below with reference to FIGs. 5A-5I.

[0068] FIGs. 5A-5I depict example steps to release a product from a closed case 100, according to some embodiments of the present disclosure. In FIG. 5A, the products (bottles 500 in this example) are fully sealed into the case 100. The example case 100 includes a tear tab 254 and a tear strip 256 on the upper holder panel 202. The tear strip 256 is positioned such that at least a portion of the perimeter of the upper apertures 204 is defined by the tear strip 256. This can help facilitate the removal of the first end of the product from the case 100.

[0069] In FIG. 5B, the tab 254 is pulled, thereby pulling the tear strip 256 from the upper holder panel 202. As described above, the tear strip 256 can be defined by a perforation line on the upper holder panel 202 and/or can

include a secondary material (such as an internal piece of plastic, fabric, etc.) that assists in tearing the upper holder panel 202.

[0070] In FIG. 5C, the tear strip 256 is completely removed. Removing the tear strip 256 can create an opening 502 in the upper apertures 204 (e.g., the portion of the perimeter that is defined by the tear strip 256) to remove the product. In some examples, the corner defined by the fastener tab 221 folded with respect to the upper front panel 206 can be a tearable corner (e.g., the tear corner 280) that facilitates opening of the upper front panel 206. The tear corner 280 can be a perforation line disposed between the fastener tab 221 and the upper front panel 206. The tear corner 280 can be a perforation line to assist in opening the case 100 at the upper front panel 206. The perforation line can evidence tampering and prohibit fraudulent repair, and a variety of designs for perforation lines may be used for this purpose. Simple perforation holes, or slotted perforation holes, can be used to create the tear corner 280. In other examples, the tear corner 280 can include other designs to alert the consumer of possible tampering. For example, some designs can create a wider, more jagged edge once torn. An example perforation line can include a series of alternating crescents, or half circles. If the alternating crescents are torn, the resulting tear will be a curving line that is difficult to repair. Another example perforation line can include a series of alternating wishbone shapes. If the alternating wishbone shapes are torn, the resulting tear line will include a series of knobs remaining from the wishbone shapes. These knobs may, again, be difficult to repair without showing significant damage to the perforation line. Another example perforation line can include a series of alternating caret shapes. If the alternating caret shapes are torn, the resulting sawtooth tear line would be difficult to repair and hide the tampering. The above perforation shapes are merely exemplary and are not intended to be limiting. An additional perforation line shape for the tear corner 280, for example, is discussed in greater detail below with reference to FIG. 5H.

[0071] In FIG. 5D, the tear corner 280 is torn, and the upper front panel 206 is hinged up, thereby uncovering the top portion of the product in the case 100. At this point, top of the product can be pulled outwardly from the opening 502 (and from the opened upper box 210) and removed from the case 100, as seen in FIG. 5E.

[0072] The tear corner(s) 280 can be provided along with the tear strip 256 to enable opening the upper front panel 206. In other examples, the case 100 can include only the tear corner(s) 280 and not include a tear strip 256. In these cases, the upper front panel 206 can be pushed upwards to break the tear corner(s) 280. This can enable the upper holder panel 202 to hinge upwards, and the upper part of the product (e.g., the neck of the bottle 500) can be removed from the upper apertures 204. FIGs. 5F and 5G provide an illustration of this example. In FIG. 5F, the upper holder panel 202 does not include a tear strip 256. The bottles 500 can be removed

by tearing the tear corner(s) 280 (e.g., by lifting the upper holder panel 202 and/or by pushing the upper front panel 206 inward) and hinging the upper front panel 206 upward, thereby providing clearance for the upper part of the bottle 500 to be pulled from the upper apertures 204. As the upper front panel 206 moves upwards, the upper holder panel 202 can flatten with respect to the upper front panel 206. As the upper holder panel 202 flattens and the upper front panel 206 moves upwards, the neck(s) of the bottle(s) 500 move diagonally upwards and out of the case 100. When more than one bottle 500 is stored in the case 100, the neck of each bottle 500 can raise simultaneously, providing an aesthetic presentation as the case 100 is opened. This aesthetic presentation of the bottles 500 being lifted from the case 100 is shown in FIG. 5G. When the tear corner(s) 280 are broken, example cases can provide audible feedback of such tearing. This audible feedback of the tear corner(s) 280 breaking can also notify an end user than someone is opening, or attempting to open, the case 100.

[0073] FIG. 5G also highlights a location of an optional perforated fold line 450, as described above. The perforated fold line 450 can, in some examples, be hidden by a slight overhang by the lower front panel 306, thus the perforated fold line 450 can be hidden from a front view, as shown in FIG. 5G. In other examples, the perforated fold line 450 can be visible from the front face of the case 100.

[0074] It will be understood that, although FIGs. 5A-5G show a case 100 wherein the locking features (e.g., fastener 220, fastener tab 221, and/or tear corner(s) 280) are placed at the top of the case 100 near the upper holder panel 202, it will be understood that the locking features can be positioned on the bottom of the case 100 near the lower holder panel 302. The changes to the design to accommodate this embodiment include moving the features to the opposite end of the case. To illustrate, in these examples, the top of the bottle can first be inserted into an upper aperture 204. As the lower holder panel 302 flattens, the bottom of the bottle can be inserted into a lower aperture 304. The bottle can be at an angle with respect to the back panel 102. The lower front panel 306 can be pushed downward to create the substantially 90° construction wherein the lower front panel 306 is substantially perpendicular to the lower holder panel 302. The locking features (e.g., fastener 220, fastener tab 221, etc.) can be located proximate the lower front panel 306, and the case 100 can then be locked into a closed configuration with the fasteners 220. The products can, in these examples, be removed by removing the bottom of the product from the case 100 and then pulling the product downwardly out of the case 100.

[0075] Referring again to FIG. 5G, in some examples, the upper apertures 204 and/or lower apertures 304 can include slits 504 cut into the periphery of the apertures. The slits 504 can define a plurality of aperture fingers 506 for holding the product. The aperture fingers 506 can enable the apertures 204, 304 to accommodate products

(e.g., bottles) of varying sizes. As the product is enclosed within the case 100 (for example as shown in FIG. 4H), the aperture fingers 506 can deflect to accommodate larger products. This feature can be beneficial for storing bottles of wine, as different wine varietals may require differently shaped bottles, even if the bottles hold the same volume of liquid. The aperture fingers 506 can enable the differently shaped bottles to be used within the same case 100.

[0076] FIG. 5H depicts an example perforation line for the tear corner 280, as introduced above with reference to FIG. 5C. The upper front panel 206 can include a series of diagonal strips 508 cut into the material of the upper front panel 206. In cases 100 that include this type of perforation, if the upper front panel 206 is pulled open, the connecting sections 510 between the diagonal strips 508 can tear. Once the diagonal strips 508 are cut or torn, the tear corner 280 will have a noticeably rigid edge, providing visible indication of opening and making it impossible to replace/repair fraudulently without the consumer knowing the case 100 was opened.

[0077] As described above with reference to FIG. 4I, the case 100 can include a fastener tear strip 512 located between the fastener tab 221 and the fastener 220. FIG. 5I shows an example fastener tear strip 512. The fastener tear strip 512 can include a perforation line that enables the fastener 220 to be torn with respect to the fastener tab 221. This example can improve the tamper-proofing of the case 100. If a potential fraudster attempts to pull the fastener 220 out of the case 100 once the case 100 is locked into a closed configuration, the fastener tear strip 512 can rip with any undue pressure. If the fastener tear strip 512 is ripped, the customer can be alerted that the case has been opened and the contents of the case 100 may have been adulterated. The fastener tear strip 512 can take the form of any of the perforation lines described herein. The fastener tear strip 512 can have a similar form as the tear corner 280. For example, the fastener tear strip 512 can include diagonal strips 514 that are similar to the diagonal strips 508 of the tear corner 280; and the fastener tear strip 512 can include connecting sections 516 between the diagonal strips 514 that can tear, similar to the connecting sections 510 of the tear corner 280.

[0078] The fastener tear strip 512 can be used alone or in conjunction with the tear corner 280 to evidence tampering and to provide a means to open the case 100. For example, in some cases, the tear corner 280 can be provided alone to evidence tampering. In these cases, the tear corner 280 can be torn by pressing down on the upper front panel 206, or pulling up on the upper holder panel 202, until the tear corner 280 tears, and the case can then be opened. In alternative designs, the case 100 can include only the fastener tear strip 512. In these examples, the fastener tear strip 512 near the fastener 220 can be torn to allow the case to open. In yet other alternative designs, the case 100 can include both the tear corner 280 and the fastener tear strip 512. In these ex-

amples, the fastener tab 221 can be torn entirely from the case 100 at the perforations of the tear corner 280 and the fastener tear strip 512. Once the fastener tab 221 is torn from the case 100, the upper front panel 206 can be hinged open to access the bottles. In this example, the fastener tab 221 acts as a tear strip that can be torn by putting one's finger under the fastener tab 221, pulling outwardly, and releasing the upper front panel 206.

[0079] FIGs. 6A-6D are perspective views of a case 100 being positioned within an outer box 600, according to some embodiments of the present disclosure. As one aspect of the present designs is to provide a case 100 that enables the contents stored therein to be viewed, an outer box 600 can be provided to ship the products to the end user. This can ensure the contents are protected as the product is handled during shipment.

[0080] FIGs. 7A-7J are perspective views of a lower insert 700 insertable within the case 100 to add support to the lower foldable section 300, according to the present invention. As described above, one aspect of the presently described tamper-proof case 100 is the ability to protect the contents of the case while also providing an aesthetic form. In the description above with reference to FIGs. 3A and 3B, the example case 100 therein includes a lower pad 350 attachable to the bottom panel 308 and a lower aperture pad 352 attachable to the lower holder panel 302. These pads are attachable, for example via glues or other adhesives, to the respective panels to provide increased drop protection for the contents of the case 100. FIGs. 7A-7J provide an alternative to these attachable pads in the form of a separate lower insert 700 that is insertable into the cavity or enclosure created in the lower section after the case 100 is folded into its closed configuration (i.e., the lower box 310 that is created by folding the case 100). FIGs. 8A-8D provide a detailed example of how the lower insert 700 can be inserted into the case 100.

[0081] Referring to FIG. 7A, the lower insert 700 can be a flat sheet of material, for example cardboard, corrugated cardboard, greyboard, paper, fiber pulp (including paper pulp) and/or the like or any combinations thereof, that is cut and/or die cut into its final shape. Similar to the case 100 itself, the lower insert 700 has an open configuration (as shown in FIG. 7A) and a closed configuration (as shown in FIG. 7D). The lower insert 700 includes one or more lower insert apertures 702. The lower insert apertures 702 can be sized, shaped, and positioned to align with one or more lower apertures 304 of the case 100 once the lower insert 700 is inserted into the case 100. The lower insert 700 can be separated into an aperture section 711 (that includes the lower insert aperture(s) 702) and a flat section 712, which are separated by one or more fold lines 710, facilitating the lower insert 700 folding into the closed configuration.

[0082] A reinforcing panel 750 can be combined with the lower insert 700 to provide additional protection to the contents within the case 100. The reinforcing panel 750 can have panel apertures 752 sized, shaped, and

positioned to align with one or more lower insert apertures 702. Referring again to the lower insert 700, the insert can include one or more slots 704 sized to engage one or more insert tabs 754 on the reinforcing panel 750. Further, the lower insert 700 can include a male tab 706 at one end of the lower insert 700 sized to engage a female slot 708 at the other end of the lower insert 700. The lower insert apertures 702 and/or panel apertures 752 can include aperture fingers 506 for holding the product, as described above.

[0083] Referring to FIG. 7B, the reinforcing panel 750 can be positioned proximate the reinforcing panel 750 such that the panel apertures 752 align with the lower insert apertures 702, and the one or more insert tabs 754 align with the one or more slots 704 on the lower insert 700. As shown in FIG. 7C, the lower insert 700 can be transitioned from the open, substantially flat configuration to a closed configuration by folding the lower insert 700 about the one or more fold lines 710. Folding the lower insert 700 can cause the insert tabs 754 of the reinforcing panel 750 to extend through or partially through the one or more slots 704 on the lower insert 700. Engaging the insert tabs 754 with the slots 704 can, therefore, cause the reinforcing panel 750 to connect with the lower insert 700 without the user of additional glues or other adhesives. As shown in FIG. 7D, the lower insert 700 can be closed such that the male tab 706 at one end of the lower insert 700 engages the female slot 708 at the other end of the lower insert 700, creating a box-like construct to provide additional support to the lower foldable section 300 of the case 100.

[0084] The example lower insert 700 in FIGs. 7A-7E depict an example design wherein the reinforcing panel 750 is a separate component, attachable to the lower insert 700. In an alternative design, the reinforcing panel 750 can be integrated with the folding lower insert 700, as shown in FIGs. 7F-7J. The reinforcing panel 750 can be connected to the lower insert 700 along one side of the lower insert 700 via a hinge line 760. In this example, instead of laying the reinforcing panel 750 onto the lower insert 700, the reinforcing panel 750 can be hinged from an open, substantially flat configuration into a closed configuration where the panel aperture(s) 752 rest proximate the lower insert aperture(s) 702. FIG. 7G shows the attached and hingeable reinforcing panel 750 folded over and onto the bottom of the aperture section 711 in the figure. In this design, the integrated lower insert 700 / reinforcing panel 750 can be cut and/or die cut into a single sheet, facilitating both easy assembly by the final user and manufacturability for the supplier.

[0085] Any of the example fold lines (e.g., fold lines 710) described herein can include fluting lines (e.g., fluting lines 762 in FIG. 7F) to facilitate each panel folding from open, substantially flat configurations to closed configurations. FIGs. 7F-7J also depict an example design wherein the male tab 706 at one end of the lower insert 700 can engage with a female aperture 714 (e.g., as opposed to a slot 708 as shown in FIGs. 7A-7E).

[0086] Referring to the process for folding the example lower insert 700 shown in FIGs. 7F-7J, in FIG. 7F the integrated lower insert 700 can start in an open, substantially flat configuration. The reinforcing panel 750 can then be folded along the hinge line 760 such that one or more panel aperture(s) 752 fold to rest proximate one or more respective lower insert aperture(s) 702, as shown in FIG. 7G. In FIG. 7H, the flat section 712 of the lower insert 700 can be folded over the aperture section 711, folding at the one or more fold lines 710. In FIG. 7I, the male tab 706 can engage with the female aperture 714 to create a box-like construct to provide additional support to the lower foldable section 300 of the case 100. FIG. 7J depicts an example of the lower insert 700 in a fully closed configuration for assembly with the case 100.

[0087] FIGs. 8A-8D depict an example process for adding a lower insert 700 to a case 100, according to some embodiments of the present disclosure. As described above with reference to FIGs. 7A-7J, the example lower insert 700 described herein provides additional support at the lower section of the case without the need for additional pads (e.g., lower pad 350 and/or lower aperture pad 352) adhered to the case 100. The folding lower insert 700 enables the distributor, manufacturer, or other stakeholder to secure the contents of the case without requiring the additional step of gluing or attaching the pads to their respective panel, waiting for the adhesive to dry, etc. All components can be cut and/or die cut into shape, and then folded into their final configurations. Further, the lower insert 700 provides stability at the bottom of the case 100. To this end, it is contemplated that cases 100 that include a lower insert 700 do not necessarily require the bottom flaps 319 described above with reference to FIGs. 1, 3A, and 3B (the same is also true for the top flaps 219, which is described below with reference to FIGs. 10A-10D). Removal of these flaps also provides additional folding processes for the case 100, giving the manufacturer, distributor, etc. the ability to choose different methods of enclosing the products within the case.

[0088] Referring to FIG. 8A, one method of inserting the lower insert 700 into the case is to first fold the bottom internal support 318 inwardly toward the back panel 102, then fold the lower holder panel 302 inwardly toward the back panel 102, and the lower front panel 306 inwardly toward the back panel 102. Once these panels are folded inwardly, they can create an enclosure for accepting the lower insert 700. As shown in FIG. 8B, the lower insert 700 can be slid in from the side of this enclosure. In FIG. 8C, the lower insert 700 is seated within the enclosure defined by the bottom internal support 318, the lower holder panel 302, and the lower front panel 306. At this point the lower insert aperture(s) 702 and/or panel apertures 752 can substantially align with the lower apertures 304. The panels can then be folded inwardly toward the back panel 102 such that the lower apertures 304 are facing the upper section of the case 100 and are perpendicular to the back panel 102. The first sidewall 104 and

second sidewall 106 can then be folded inwardly to abut the lower holder flaps 320, and the first sidewall flap 108 and a second sidewall flap 110 can be folded inwardly to cover the lower holder flaps 320.

[0089] FIG. 8D depicts an example of loading a lower insert 700, as shown in FIGs. 7F-7J, into the enclosure defined by the bottom internal support 318, the lower holder panel 302, and the lower front panel 306. The loading process for the example lower insert 700 shown in FIGs. 7F-7J is substantially the same as for the lower insert 700 shown in FIGs. 7A-7E.

[0090] Alternatively to the process depicted in FIGs. 8A-8D, the assembled and closed lower insert 700 can be positioned on the back panel 102, and the bottom internal support 318, the lower holder panel 302, and the lower front panel 306 can all be folded inwardly to surround and enclose the lower insert 700. The bottom internal support 318 can be tucked behind the lower insert 700 and between the lower insert 700 and the back panel 102.

[0091] FIGs. 9A-9F are perspective views of an example upper insert 900 insertable within the case 100 to add support to the upper foldable section 200, according to some embodiments of the present disclosure. The upper insert 900 can be substantially similar to the lower insert 700 described above. The upper insert 900 can provide additional stability to the top of the case (i.e., protection for the top of the products being stored within the case 100), and this additional stability and protection can remove the need for the upper pad 250 and/or upper aperture pad 252 described above with reference to FIGs. 3A and 3B. Further, the upper insert 900 can be a flat sheet of material, for example cardboard, corrugated cardboard, greyboard, paper, fiber pulp (including paper pulp) and/or the like or any combinations thereof, that can be cut and/or die cut into its, substantially flat shape. This means the reinforcement of the case 100 can be facilitated by folding the upper insert 900 into its final shape, without the need for additional adhesives, glues, etc. that may be required by gluing the upper pad 250 and/or upper aperture pad 252 to their respective panels. Not only does this reduce the number of steps and amount of time needed to assembly the case, it is more sustainable and environmentally friendly than using additional adhesives.

[0092] Referring to FIG. 9A, the upper insert 900 can include one or more upper insert apertures 902 that are sized, shaped, and positioned to align with one or more upper apertures 204 of the case 100 once the upper insert 900 is inserted into the case 100. The upper insert 900 can be separated into an c (which includes the upper insert aperture(s) 902) and a flat section 912, which are separated by one or more fold lines 908, facilitating the upper insert 900 folding into the closed configuration (as shown in FIG. 9C). Further, the upper insert 900 can include a male tab 904 at one end of the upper insert 900 sized to engage a female slot 906 at the other end of the upper insert 900. As shown in FIG. 9B, the upper insert

900 can be transitioned from the open, substantially flat configuration to a closed configuration by folding the upper insert 900 about the one or more fold lines 908. As shown in FIG. 9C, the upper insert 900 can be closed such that the male tab 904 at one end of the upper insert 900 engages the female slot 906 at the other end of the upper insert 900, creating a box-like construct to add additional support to the upper foldable section 200 of the case 100. It should be noted that, although FIGs. 9A-9F do not show an additional upper reinforcing panel like the reinforcing panel 750 in FIGs. 7A-7J, it is contemplated that the upper insert 900 can also engage with a similar reinforcing panel. The upper insert apertures 902 can include aperture fingers 506 for holding the product, as described above.

[0093] FIGs. 9D-9F are perspective views of an alternative design for an upper insert 900 to that shown in FIGs. 9A-9C. The aperture section 911 can be connected to the flat section 912 via an inset panel 960. The inset panel 960 can be connected via the fold lines 908, which can be recessed slightly from the ends of the aperture section 911 and the flat section 912. Further, the male tab 904 at one end of the upper insert 900 can be attached to an end panel 961, which can also be connected to the aperture section 911 via a fold line 908 recessed slightly from the end of the flat section 911. Recessing the end panel 961 and inset panel 960 can cause the panels to be positioned interior to the outer edges of the folded, closed upper insert 900 (as shown in FIG. 9F).

[0094] FIGs. 9D-9F also depict an example design wherein the male tab 904 at one end of the upper insert 900 can engage with a female aperture 914 (e.g., as opposed to a slot 906 as shown in FIGs. 9A-9C). Further, as described above, any of the example fold lines (e.g., fold lines 908) described herein can include fluting lines (e.g., fluting lines 962 in FIG. 9D) to facilitate each panel folding from open, substantially flat configurations to closed configurations.

[0095] FIGs. 10A-10D depict an example process for adding an upper insert 900 to a case 100, according to some embodiments of the present disclosure. As described above with reference to FIGs. 9A-9F, the example upper insert 900 described herein provides additional support at the upper section of the case without the need for additional pads (e.g., upper pad 250 and/or upper aperture pad 252) adhered to the case 100. The folding upper insert 900 enables the distributor, manufacturer, or other stakeholder to secure the contents of the case without requiring the additional step of gluing or attaching the pads to their respective panel, waiting for the adhesive to dry, etc. All components can be cut and/or die cut into shape, and then folded into their final configurations. Further, the upper insert 900 provides stability at the top of the case 100. To this end, it is contemplated that cases 100 that include an upper insert 900 do not necessarily require the top flaps 219 described above with reference to FIGs. 1, 3A, and 3B. Removal of these flaps also provides additional folding processes for the case 100, giv-

ing the manufacturer, distributor, etc. the ability to choose different methods of enclosing the products within the case.

[0096] Referring to FIG. 10A, one method of inserting the upper insert 900 into the case is to first fold the top internal supports 212 inwardly toward the back panel 102, then fold the upper holder panel 202 inwardly toward the back panel 102, and then fold the upper front panel 206 inwardly toward the back panel 102. Once these panels are folded inwardly, they can create an enclosure for accepting the upper insert 900 (i.e., the upper box 210 that is created by folding the case 100). As shown in FIG. 10B, the upper insert 900 can be slid in from the side of this enclosure. In FIG. 10C, the upper insert 900 is seated within the enclosure defined by the top internal support 218, the upper holder panel 202, and the upper front panel 206. At this point the upper insert aperture(s) 902 can substantially align with the upper apertures 204. The panels can then be folded inwardly toward the back panel 102 such that the upper apertures 204 are facing the lower section of the case 100 and are perpendicular to the back panel 102.

[0097] FIG. 10D depicts an example of loading an upper insert 900 as shown in FIGs. 9D-9F into the enclosure defined by the top internal support 218, the upper holder panel 202, and the upper front panel 206. The loading process for the example upper insert 900 shown in FIGs. 9D-9F is substantially the same as for the upper insert 900 shown in FIGs. 9A-9C.

[0098] Alternatively to the process depicted in FIGs. 10A-10D, the assembled and closed upper insert 900 can be positioned on the back panel 102, and the top internal support 218, the upper holder panel 202, and the upper front panel 206 can all be folded inwardly to surround and enclose the upper insert 900. The top internal support 218 can be tucked behind the upper insert 900 and between the upper insert 900 and the back panel 102.

[0099] FIGs. 11A-11G depict an example process of enclosing bottles 500 within a tamper-proof case 100, according to some embodiments of the present disclosure. FIG. 11A begins with the bottles 500 being aligned with the lower apertures 304 of the case 100, and in FIG. 11B, the bottles are inserted into the lower apertures 304. The upper section of the case 100 can include an upper insert 900, and the lower section of the case 100 can include a lower insert 700, as described above. In FIG. 11C, the upper portion of the case 100 is lowered onto the tops of the bottles 500, and the upper apertures 204 can be aligned with the tops of the bottles 500 as the top is lowered. As the tops of the bottles 500 insert into the upper apertures 204, the top can be seated such that the upper front panel 206 is facing forward, and the upper holder panel 202 is substantially parallel to the lower holder panel 302 and the bottles 500 are secured, as shown in FIG. 11D.

[0100] In FIG. 11E, a fastener tab 221 on each side of the case can fold around the sidewalls 104, 106. In FIG.

11F, the foldable fasteners 220 foldably connected to the fastener tabs 221 can be folded inwardly and toward the fastener openings 224a in the sidewalls 104, 106. In FIG. 11G, the case is in a fully closed configuration, wherein the foldable fastener 220 is inserted into the fastener opening 224a.

[0101] FIGs. 12A-12N depict an example process for enclosing bottles 500 (or other products) within a folding case 1200, according to some embodiments of the present disclosure. The example case 1200 shown in FIGs. 12A-12N is substantially similar to the tamper-proof case 100 shown in, for example, FIGs. 1, 3A, and 3B. The case 1200 in these figures, however, does not necessarily include sidewalls (e.g., first sidewall 104 and second sidewall 106). To create a tamper-proof construct with case 1200, the case can be inserted into an outer box or case, or the upper and lower foldable sections can be attached via tamper-evident tape, adhesive, and the like, for example to the back panel 102.

[0102] Referring to FIG. 12A, the case 1200 can have an open, substantially flat (i.e., planar) configuration. The case 1200 can include a top internal support 212, which is foldably connected to an upper holder panel 202, which is foldable connected to an upper front panel 206, which is foldably connected to a top panel 208, which is foldably connected to a back panel 102. The top internal support 212, upper holder panel 202, and upper front panel 206 can define an upper foldable section (e.g., upper foldable section 200). Similarly, the case 1200 can include a bottom internal support 318, which is foldably connected to a lower holder panel 302, which is foldably connected to a lower front panel 306, which is foldably connected to a bottom panel 308, which is foldably connected to the back panel 102. The bottom internal support 318, lower holder panel 302, and lower front panel 306 can define a lower foldable section (e.g., lower foldable section 300). The case 1200 can include a flange 1202 sized to engage a flange groove 1204 positioned between the back panel 102 and the top panel 208. Engaging the flange 1202 with the flange groove 1204 can help ensure the upper foldable section 200 stays folded once the case is in its closed configuration (see, for example, FIG. 12N).

[0103] Referring to FIG. 12B, the bottom internal support 318 can be folded inwardly toward the back panel 102, the lower holder panel 302 can be folded inwardly toward the back panel 102, and the lower front panel 306 can be folded inwardly, until the panels form a box (e.g., lower box 310) at the bottom of the case 1200. The lower holder panel 302 and the one or more lower apertures 304 can be perpendicular to the back panel 102, as shown in FIG. 12C.

[0104] In FIG. 12D, the top internal support 212 can be folded inwardly toward the back panel 102, the upper holder panel 202 can be folded inwardly toward the back panel 102, and the upper front panel 206 can be folded inwardly, until the panels form a box (e.g., upper box 210) at the top of the case 1200. Further, the flange 1202 can be positioned within the flange groove 1204 at this point

in the procedure.

[0105] In FIG. 12E-12G, a lower insert 700 (e.g., as shown in FIGs. 7A-7J) can be inserted into an enclosure created by the bottom internal support 318, the lower front panel 306, and the lower holder panel 302. The lower insert 700 can be slid axially until the lower insert apertures 702 and/or panel apertures 752 align with the lower apertures 304 on the lower holder panel 302. In FIG. 12H-12J, an upper insert 900 (e.g., as shown in FIGs. 9A-9F) can be inserted into an enclosure created by the top internal support 212, the upper front panel 206, and the upper holder panel 202. The upper insert 900 can be slid axially until the upper insert apertures 902 align with the upper apertures 204 on the upper holder panel 202.

In FIGs. 12K and 12L, a bottom (e.g., heel) of one or more bottles 500 can be positioned into the one or more lower apertures 304, lower insert apertures 702, and/or panel apertures 752. In FIG. 12M, the upper holder panel 202 can be hinged toward a top (e.g., neck) of the one or more bottles 500 such that the top of each bottle 500 or other product inserts into a respective upper aperture 204 on the upper holder panel 202. In FIG. 12N, the case 1200 is in a fully closed configuration. At this position, the case 1200 can be tamper-proofed by inserting the closed case 1200 into an outer shell, for example a full box or partial box that enables the front of the case (e.g., upper front panel 206 and/or lower front panel 306) to face outwardly for inspection. Further, the panels can be further attached by providing tamper-evident tape, adhesive, and/or the like. For example, tape or adhesive can be applied between the bottom internal support 318 and the back panel 102 and/or the top internal support 212 and the back panel 102.

Claims

1. A case system comprising:

a folding tamper-proof case comprising:

a back panel (102);

an upper foldable section (200) comprising:

a top panel (208) foldably connected to the back panel (102);

an upper front panel (206) foldably connected to the top panel (208); and

an upper holder panel (202) foldably connected to the upper front panel (206) and comprising a first upper aperture (204) configured to hold a top of a first product; and

a lower foldable section (300) comprising:

a bottom panel (308) foldably connect-

ed to the back panel (102);

a lower front panel (306) foldably connected to the bottom panel (308); and
a lower holder panel (302) foldably connected to the lower front panel (306) and comprising a first lower aperture (304) configured to hold a bottom of the first product;

wherein each of the upper foldable section (200) and the lower foldable section (300) have an open configuration and a closed configuration, wherein, in their open configurations, the upper foldable section (200) and the lower foldable section (300) are substantially coplanar with the back panel (102), and

wherein, in their closed configurations, the upper foldable section (200) and the lower foldable section (300) are configured to secure the first product within the folding tamper-proof case, the case system being **characterised in that** it comprises a lower insert (700) foldable from an open and substantially flat configuration to a closed configuration and comprising a first lower insert aperture (702) configured to hold the bottom of the first product.

2. The case system of Claim 1, further comprising a reinforcing panel (750) comprising a first panel aperture (752) sized to correspond to the first lower insert aperture (702).

3. The case system of Claim 2, wherein:

the lower insert (700) comprises one or more slots (704);

the reinforcing panel (750) comprises one or more insert tabs (754) sized and positioned to engage the one or more slots (704) of the lower insert when the lower insert is in the closed configuration; and

when the lower insert (700) and the folding tamper-proof case are in their closed configurations, the lower insert aperture (702), the first panel aperture (752), and the first lower aperture (304) are configured to substantially align.

4. The case system of Claim 2, wherein the reinforcing panel (750) is foldably connected to the lower insert (700).

5. The case system of any of Claims 1 to 4 further comprising an upper insert (900) foldable from an open and substantially flat configuration to a closed configuration and comprising a first upper insert aperture (902) configured to hold the top of the first product.

6. The case system of any of Claims 1 to 5 further com-

prising a tear strip (256) on the upper holder panel (202) and proximate the first upper aperture (204) and configured to remove a portion of the first upper aperture (204) upon being removed.

7. The case system of any of Claims 1 to 6, wherein at least one of the first upper aperture (204) or the first lower aperture (304) comprises a plurality of aperture fingers (506).

8. A method for securing a product within a tamper-proof case comprising:

folding a bottom internal support (312, 314, 316, 318) inwardly toward a back panel (102);
folding a lower holder panel (302) foldably connected to the bottom internal support (312, 314, 316, 318) inwardly toward the back panel (102) such that the lower holder panel (302) and the bottom internal support (312, 314, 316, 318) are substantially perpendicular;

folding a lower front panel (306) foldably connected to the lower holder panel (302) inwardly toward the back panel (102) such that the lower front panel (306) and the lower holder panel (302) are substantially perpendicular;

folding a lower insert (700) from a substantially flat configuration to a closed configuration;
sliding the lower insert (700) into an enclosure created by the bottom internal support (312, 314, 316, 318), the lower holder panel (302), and the lower front panel (306) until a first lower insert aperture (702) on the lower insert aligns with a first lower aperture (304) on the lower holder panel (302);

inserting a bottom of the product into the first lower aperture (304) and the first lower insert aperture (702);

folding a top internal support (212, 214, 216, 218) inwardly toward the back panel (102);

folding an upper holder panel (202) foldably connected to the top internal support (212, 214, 216, 218) inwardly toward the back panel (102) such that the upper holder panel (202) and the top internal support (212, 214, 216, 218) are substantially perpendicular;

folding an upper front panel (206) foldably connected to the upper holder panel (202) inwardly toward the back panel (102) such that the upper front panel (206) and the upper holder panel (202) are substantially perpendicular;

hinging the upper holder panel (202) toward a top of the product such that the top of the product inserts into an upper aperture (204) on the upper holder panel (202); and

securing the product within the tamper-proof case.

9. The method of Claim 8, further comprising:

folding an upper insert (900) from a substantially flat configuration to a closed configuration; and
sliding the upper insert (900) into an enclosure created by the top internal support (212, 214, 216, 218), the upper holder panel (202), and the upper front panel (206) until a first upper insert aperture (902) on the upper insert (900) aligns with the upper aperture (204).

10. The method of Claim 8 or 9, further comprising, prior to folding the lower insert (700) from the substantially flat configuration to the closed configuration, aligning a first panel aperture (752) of a reinforcing panel (750) with the first lower insert aperture (702) of the lower insert (700).

11. The method of Claim 10, further comprising aligning one or more insert tabs (754) on the reinforcing panel (750) with one or more slots (704) on the lower insert (700) prior to folding the lower insert (700) from the substantially flat configuration to the closed configuration.

12. The method of any of Claims 8 to 11, further comprising folding a reinforcing panel (750) foldably connected to the lower insert (700) such that a first panel aperture (752) of the reinforcing panel (750) aligns with the first lower insert aperture (702) of the lower insert (700).

13. The method of any of Claims 8 to 12, further comprising pulling a tear strip (256) of the upper holder panel (202) to create an opening in the upper aperture (204).

14. The method of any of Claims 8 to 13, wherein, subsequent to securing the product within the tamper-proof case, the product is separated from the back panel (102) from between 0.5 cm and 1.5 cm.

15. The method of any of Claims 8 to 14, wherein the upper front panel (206) and the lower front panel (306) define an observation window when the upper front panel (206) is approximately coplanar with the lower front panel (306).

Patentansprüche

1. Behältersystem, umfassend:

einen faltbaren, manipulationssicheren Behälter mit:

einer Rückwand (102);

einem oberen faltbaren Abschnitt (200) mit:

eine Deckplatte (208), die faltbar mit der Rückwand (102) verbunden ist; eine obere Frontplatte (206), die faltbar mit der Deckplatte (208) verbunden ist; und

eine obere Halteplatte (202), die faltbar mit der oberen Frontplatte (206) verbunden ist und eine erste obere Öffnung (204) umfasst, die konfiguriert ist, um ein Oberteil eines ersten Produkts zu halten; und

einem unteren faltbaren Abschnitt (300), umfassend:

eine Bodenplatte (308), die faltbar mit der Rückwand (102) verbunden ist; eine untere Frontplatte (306), die faltbar mit der Bodenplatte (308) verbunden ist; und

eine untere Halteplatte (302), die faltbar mit der unteren Vorderplatte (306) verbunden ist und eine erste untere Öffnung (304) umfasst, die konfiguriert ist, um ein Unterteil des ersten Produkts zu halten;

wobei sowohl der obere faltbare Abschnitt (200) als auch der untere faltbare Abschnitt (300) eine offene Konfiguration und eine geschlossene Konfiguration aufweisen,

wobei in ihren offenen Konfigurationen der obere faltbare Abschnitt (200) und der untere faltbare Abschnitt (300) im Wesentlichen koplanar mit der Rückwand (102) sind, und wobei in ihren geschlossenen Konfigurationen der obere faltbare Abschnitt (200) und der untere faltbare Abschnitt (300) konfiguriert sind, um das erste Produkt innerhalb des faltbaren manipulationssicheren Behälters zu sichern, wobei das Behältersystem **dadurch gekennzeichnet ist, dass** es einen unteren Einsatz (700) umfasst, der von einer offenen und im Wesentlichen flachen Konfiguration in eine geschlossene Konfiguration faltbar ist und eine erste untere Einsatzöffnung (702) umfasst, die konfiguriert ist, um das Unterteil des ersten Produkts zu halten.

2. Behältersystem nach Anspruch 1, das ferner eine Verstärkungsplatte (750) mit einer ersten Plattenöffnung (752) umfasst, die entsprechend der ersten unteren Einsatzöffnung (702) bemessen ist.

3. Behältersystem nach Anspruch 2, bei dem:

der untere Einsatz (700) einen oder mehrere Schlitze (704) umfasst;

die Verstärkungsplatte (750) eine oder mehrere Einsatzlaschen (754) umfasst, die bemessen und angeordnet sind, um in die ein oder mehreren Schlitze (704) des unteren Einsatzes einzugreifen, wenn sich der untere Einsatz in der geschlossenen Konfiguration befindet; und wenn sich der untere Einsatz (700) und der faltbare, manipulationssichere Behälter in ihren geschlossenen Konfigurationen befinden, die untere Einsatzöffnung (702), die erste Plattenöffnung (752) und die erste untere Öffnung (304) so konfiguriert sind, dass sie im Wesentlichen fluchten.

4. Behältersystem nach Anspruch 2, bei dem die Verstärkungsplatte (750) faltbar mit dem unteren Einsatz (700) verbunden ist.

5. Behältersystem nach einem der Ansprüche 1 bis 4, das ferner einen oberen Einsatz (900) umfasst, der aus einer offenen und im Wesentlichen flachen Konfiguration in eine geschlossene Konfiguration faltbar ist und eine erste obere Einsatzöffnung (902) umfasst, die konfiguriert ist, um das Oberteil des ersten Produkts zu halten.

6. Behältersystem nach einem der Ansprüche 1 bis 5, das ferner einen Aufreißstreifen (256) auf der oberen Halteplatte (202) und in der Nähe der ersten oberen Öffnung (204) umfasst, der konfiguriert ist, um, wenn er entfernt wird, einen Teil der ersten oberen Öffnung (204) zu entfernen.

7. Behältersystem nach einem der Ansprüche 1 bis 6, bei dem die erste obere Öffnung (204) und/oder die erste untere Öffnung (304) eine Mehrzahl von Öffnungsfingern (506) umfasst.

8. Verfahren zum Sichern eines Produkts in einem manipulationssicheren Behälter, mit den Schritten:

Falten eines unteren inneren Trägers (312, 314, 316, 318) nach innen in Richtung einer Rückwand (102);

Falten einer unteren Halteplatte (302), die faltbar mit dem unteren inneren Träger (312, 314, 316, 318) verbunden ist, nach innen in Richtung der Rückwand (102), so dass die untere Halteplatte (302) und der untere innere Träger (312, 314, 316, 318) im Wesentlichen senkrecht sind; Falten einer unteren Frontplatte (306), die faltbar mit der unteren Halteplatte (302) verbunden ist, nach innen in Richtung der Rückwand (102), so dass die untere Frontplatte (306) und die untere Halteplatte (302) im Wesentlichen senkrecht sind;

Falten eines unteren Einsatzes (700) aus einer im Wesentlichen flachen Konfiguration in eine

geschlossene Konfiguration;
 Einschieben des unteren Einsatzes (700) in ein Gehäuse, das durch den unteren inneren Träger (312, 314, 316, 318), die untere Halteplatte (302) und die untere Frontplatte (306) gebildet ist, bis eine erste untere Einsatzöffnung (702) an dem unteren Einsatz mit einer ersten unteren Öffnung (304) an der unteren Halteplatte (302) fluchtet;
 Einsetzen eines Unterteils des Produkts in die erste untere Öffnung (304) und die erste untere Einsatzöffnung (702);
 Falten eines oberen inneren Trägers (212, 214, 216, 218) nach innen in Richtung der Rückwand (102);
 Falten einer oberen Halteplatte (202), die faltbar mit dem oberen inneren Träger (212, 214, 216, 218) verbunden ist, nach innen in Richtung der Rückwand (102), so dass die obere Halteplatte (202) und der obere innere Träger (212, 214, 216, 218) im Wesentlichen senkrecht sind;
 Falten einer oberen Frontplatte (206), die faltbar mit der oberen Halteplatte (202) verbunden ist, nach innen in Richtung der Rückwand (102), so dass die obere Frontplatte (206) und die obere Halteplatte (202) im Wesentlichen senkrecht sind;
 Schwenken der oberen Halteplatte (202) in Richtung eines Oberteils des Produkts, so dass das Oberteil des Produkts in eine obere Öffnung (204) an der oberen Halteplatte (202) eingreift; und
 Sichern des Produkts in dem manipulationssicheren Behälter.

9. Verfahren nach Anspruch 8, ferner mit den Schritten:

Falten eines oberen Einsatzes (900) aus einer im Wesentlichen flachen Konfiguration in eine geschlossene Konfiguration; und
 Schieben des oberen Einsatzes (900) in ein Gehäuse, das durch den oberen inneren Träger (212, 214, 216, 218), die obere Halteplatte (202) und die obere Frontplatte (206) gebildet wird, bis eine erste obere Einsatzöffnung (902) am oberen Einsatz (900) auf die obere Öffnung (204) ausgerichtet ist.

10. Verfahren nach Anspruch 8 oder 9, ferner mit dem Schritt: vor dem Falten des unteren Einsatzes (700) aus der im Wesentlichen flachen Konfiguration in die geschlossene Konfiguration Ausrichten einer ersten Plattenöffnung (752) einer Verstärkungsplatte (750) auf die erste untere Einsatzöffnung (702) des unteren Einsatzes (700).

11. Verfahren nach Anspruch 10, ferner mit dem Schritt: Ausrichten einer oder mehrerer Einsatzlaschen

(754) an der Verstärkungsplatte (750) auf einen oder mehrere Schlitze (704) an dem unteren Einsatz (700) vor dem Falten des unteren Einsatzes (700) von der im Wesentlichen flachen Konfiguration in die geschlossene Konfiguration.

12. Verfahren nach einem der Ansprüche 8 bis 11, ferner mit dem Schritt: Falten einer Verstärkungsplatte (750), die faltbar mit dem unteren Einsatz (700) verbunden ist, so dass eine erste Plattenöffnung (752) der Verstärkungsplatte (750) auf die erste untere Einsatzöffnung (702) des unteren Einsatzes (700) ausgerichtet ist.

13. Verfahren nach einem der Ansprüche 8 bis 12, ferner mit dem Schritt: Ziehen eines Aufreißstreifens (256) der oberen Halterungsplatte (202), um ein Loch in der oberen Öffnung (204) zu erzeugen.

14. Verfahren nach einem der Ansprüche 8 bis 13, bei dem nach dem Befestigen des Produkts in dem manipulationssicheren Behälter das Produkt von der Rückwand (102) zwischen 0,5 cm und 1,5 cm entfernt ist.

15. Verfahren nach einem der Ansprüche 8 bis 14, bei dem die obere Frontplatte (206) und die untere Frontplatte (306) ein Betrachtungsfenster definieren, wenn die obere Frontplatte (206) ungefähr koplanar mit der unteren Frontplatte (306) ist.

Revendications

1. Système de boîtier comprenant :

un boîtier inviolable pliable comprenant :

un panneau arrière (102) ;
 une section pliable supérieure (200) comprenant :

un panneau supérieur (208) relié de manière pliable au panneau arrière (102) ;
 un panneau avant supérieur (206) relié de manière pliable au panneau supérieur (208) ; et

un panneau de maintien supérieur (202) relié de manière pliable au panneau avant supérieur (206) et comprenant une première ouverture supérieure (204) configurée pour maintenir une partie supérieure d'un premier produit ; et

une section pliable inférieure (300) comprenant :

un panneau inférieur (308) relié de manière pliable au panneau arrière (102) ;
 un panneau avant inférieur (306) relié de manière pliable au panneau inférieur (308) ; et
 un panneau de maintien inférieur (302) relié de manière pliable au panneau avant inférieur (306) et comprenant une première ouverture inférieure (304) configurée pour maintenir une partie inférieure du premier produit ;

dans lequel chacune de la section supérieure pliable (200) et de la section inférieure pliable (300) présente une configuration ouverte et une configuration fermée,

dans lequel, dans leurs configurations ouvertes, la section supérieure pliable (200) et la section inférieure pliable (300) sont sensiblement coplanaires avec le panneau arrière (102), et dans lequel, dans leurs configurations fermées, la section pliable supérieure (200) et la section pliable inférieure (300) sont configurées pour fixer le premier produit à l'intérieur du boîtier inviolable pliable, le système de boîtier étant **caractérisé en ce qu'il** comprend un insert inférieur (700) pliable d'une configuration ouverte et sensiblement plate à une configuration fermée et comprenant une première ouverture d'insert inférieur (702) configurée pour maintenir la partie inférieure du premier produit.

2. Système de boîtier selon la revendication 1, comprenant en outre un panneau de renforcement (750) comprenant une première ouverture de panneau (752) dimensionnée pour correspondre à la première ouverture d'insert inférieur (702).
3. Système de boîtier selon la revendication 2, dans lequel :

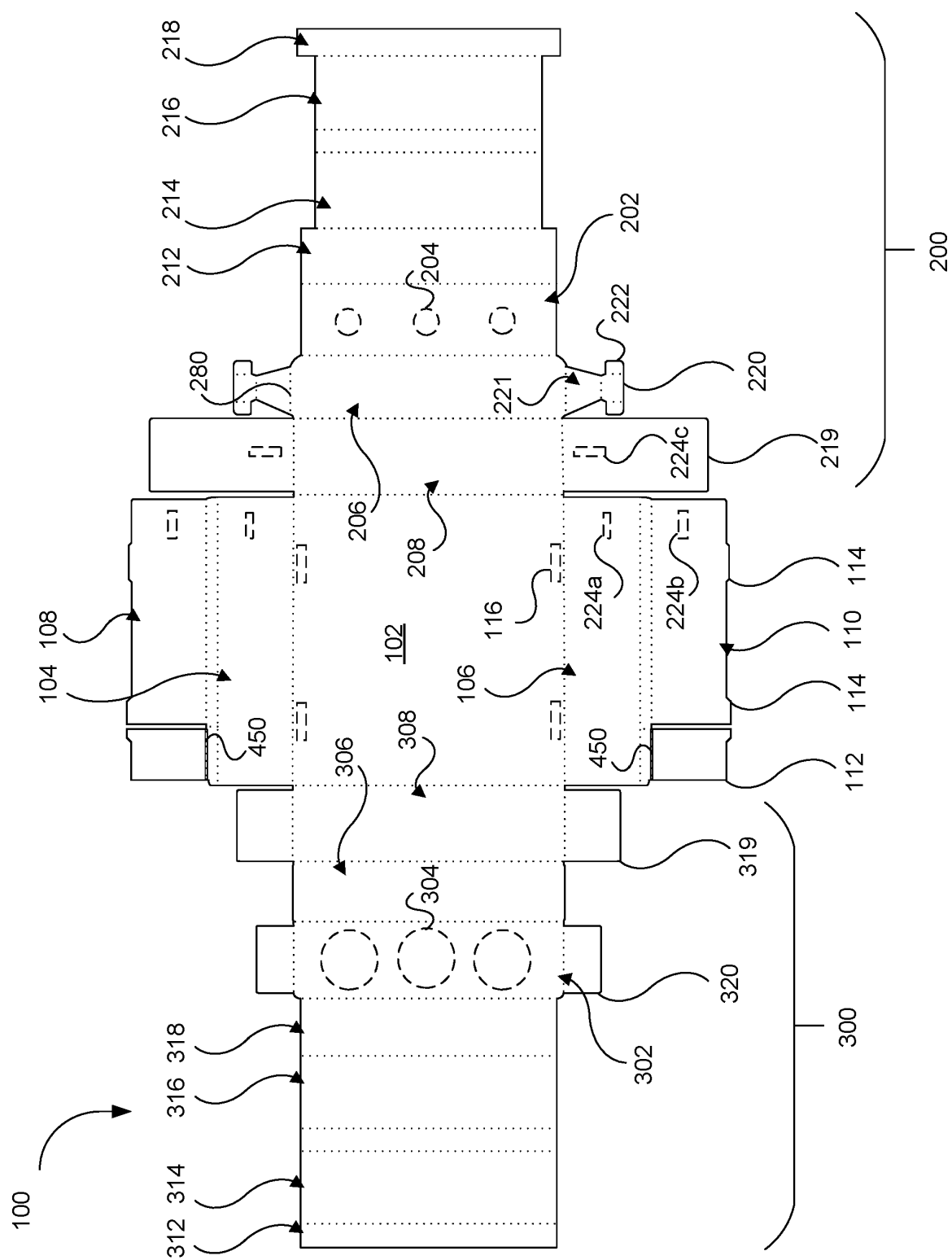
l'insert inférieur (700) comprend une ou plusieurs fentes (704) ;
 le panneau de renforcement (750) comprend une ou plusieurs languettes d'insert (754) dimensionnées et positionnées pour venir en prise avec les une ou plusieurs fentes (704) de l'insert inférieur lorsque l'insert inférieur est dans la configuration fermée ; et
 lorsque l'insert inférieur (700) et le boîtier inviolable pliable sont dans leurs configurations fermées, l'ouverture d'insert inférieur (702), la première ouverture de panneau (752) et la première ouverture inférieure (304) sont configurées pour s'aligner sensiblement.
4. Système de boîtier selon la revendication 2, dans

lequel le panneau de renforcement (750) est relié de manière pliable à l'insert inférieur (700).

5. Système de boîtier selon l'une quelconque des revendications 1 à 4, comprenant en outre un insert supérieur (900) pliable d'une configuration ouverte et sensiblement plate à une configuration fermée et comprenant une première ouverture d'insert supérieur (902) configurée pour maintenir la partie supérieure du premier produit.
6. Système de boîtier selon l'une quelconque des revendications 1 à 5, comprenant en outre une bande de déchirure (256) sur le panneau de maintien supérieur (202) et à proximité de la première ouverture supérieure (204) et configurée pour libérer une partie de la première ouverture supérieure (204) lorsqu'elle est retirée.
7. Système de boîtier selon l'une quelconque des revendications 1 à 6, dans lequel au moins l'une de la première ouverture supérieure (204) ou de la première ouverture inférieure (304) comprend une pluralité de doigts d'ouverture (506).
8. Procédé de fixation d'un produit dans un boîtier inviolable, comprenant les étapes consistant à :

plier un support interne inférieur (312, 314, 316, 318) vers l'intérieur en direction d'un panneau arrière (102) ;
 plier un panneau de maintien inférieur (302) relié de manière pliable au support interne inférieur (312, 314, 316, 318) vers l'intérieur en direction du panneau arrière (102) de sorte que le panneau de maintien inférieur (302) et le support interne inférieur (312, 314, 316, 318) soient sensiblement perpendiculaires ;
 plier un panneau avant inférieur (306) relié de manière pliable au panneau de maintien inférieur (302) vers l'intérieur en direction du panneau arrière (102) de telle sorte que le panneau avant inférieur (306) et le panneau de maintien inférieur (302) soient sensiblement perpendiculaires ;
 plier un insert inférieur (700) d'une configuration sensiblement plate à une configuration fermée ;
 faire glisser l'insert inférieur (700) dans une enceinte créée par le support interne inférieur (312, 314, 316, 318), le panneau de maintien inférieur (302) et le panneau avant inférieur (306) jusqu'à ce qu'une première ouverture d'insert inférieur (702) sur l'insert inférieur s'aligne avec une première ouverture inférieure (304) sur le panneau de maintien inférieur (302) ;
 insérer une partie inférieure du produit dans la première ouverture inférieure (304) et la première ouverture d'insert inférieur (702) ;

- plier un support interne supérieur (212, 214, 216, 218) vers l'intérieur en direction du panneau arrière (102) ;
 plier un panneau de maintien supérieur (202) relié de manière pliable au support interne supérieur (212, 214, 216, 218) vers l'intérieur en direction du panneau arrière (102) de telle sorte que le panneau de maintien supérieur (202) et le support interne supérieur (212, 214, 216, 218) soient sensiblement perpendiculaires ;
 plier un panneau avant supérieur (206) relié de manière pliable au panneau de maintien supérieur (202) vers l'intérieur en direction du panneau arrière (102) de telle sorte que le panneau avant supérieur (206) et le panneau de maintien supérieur (202) soient sensiblement perpendiculaires ;
 articuler le panneau de maintien supérieur (202) vers une partie supérieure du produit de sorte que la partie supérieure du produit s'insère dans une ouverture supérieure (204) sur le panneau de maintien supérieur (202) ; et
 fixer le produit dans le boîtier inviolable.
9. Procédé selon la revendication 8, comprenant en outre les étapes consistant à :
- plier un insert supérieur (900) d'une configuration sensiblement plate à une configuration fermée ; et
 faire glisser l'insert supérieur (900) dans une enceinte créée par le support interne supérieur (212, 214, 216, 218), le panneau de maintien supérieur (202) et le panneau avant supérieur (206) jusqu'à ce qu'une première ouverture d'insert supérieur (902) sur l'insert supérieur (900) s'aligne avec l'ouverture supérieure (204).
10. Procédé selon la revendication 8 ou 9, comprenant en outre, avant de plier l'insert inférieur (700) de la configuration sensiblement plate à la configuration fermée, l'alignement d'une première ouverture de panneau (752) d'un panneau de renforcement (750) avec la première ouverture d'insert inférieur (702) de l'insert inférieur (700).
11. Procédé selon la revendication 10, comprenant en outre l'alignement d'une ou plusieurs languettes d'insert (754) sur le panneau de renforcement (750) avec une ou plusieurs fentes (704) sur l'insert inférieur (700) avant de plier l'insert inférieur (700) de la configuration sensiblement plate à la configuration fermée.
12. Procédé selon l'une quelconque des revendications 8 à 11, comprenant en outre le pliage d'un panneau de renforcement (750) relié de manière pliable à l'insert inférieur (700) de telle sorte qu'une première ouverture de panneau (752) du panneau de renforcement (750) s'aligne avec la première ouverture d'insert inférieur (702) de l'insert inférieur (700).
13. Procédé selon l'une quelconque des revendications 8 à 12, comprenant en outre la traction d'une bande de déchirure (256) du panneau de maintien supérieur (202) pour créer une ouverture dans l'ouverture supérieure (204).
14. Procédé selon l'une quelconque des revendications 8 à 13, dans lequel, après fixation du produit à l'intérieur du boîtier inviolable, le produit est séparé du panneau arrière (102) de 0,5 cm à 1,5 cm.
15. Procédé selon l'une quelconque des revendications 8 à 14, dans lequel le panneau avant supérieur (206) et le panneau avant inférieur (306) définissent une fenêtre d'observation lorsque le panneau avant supérieur (206) est approximativement coplanaire avec le panneau avant inférieur (306) .



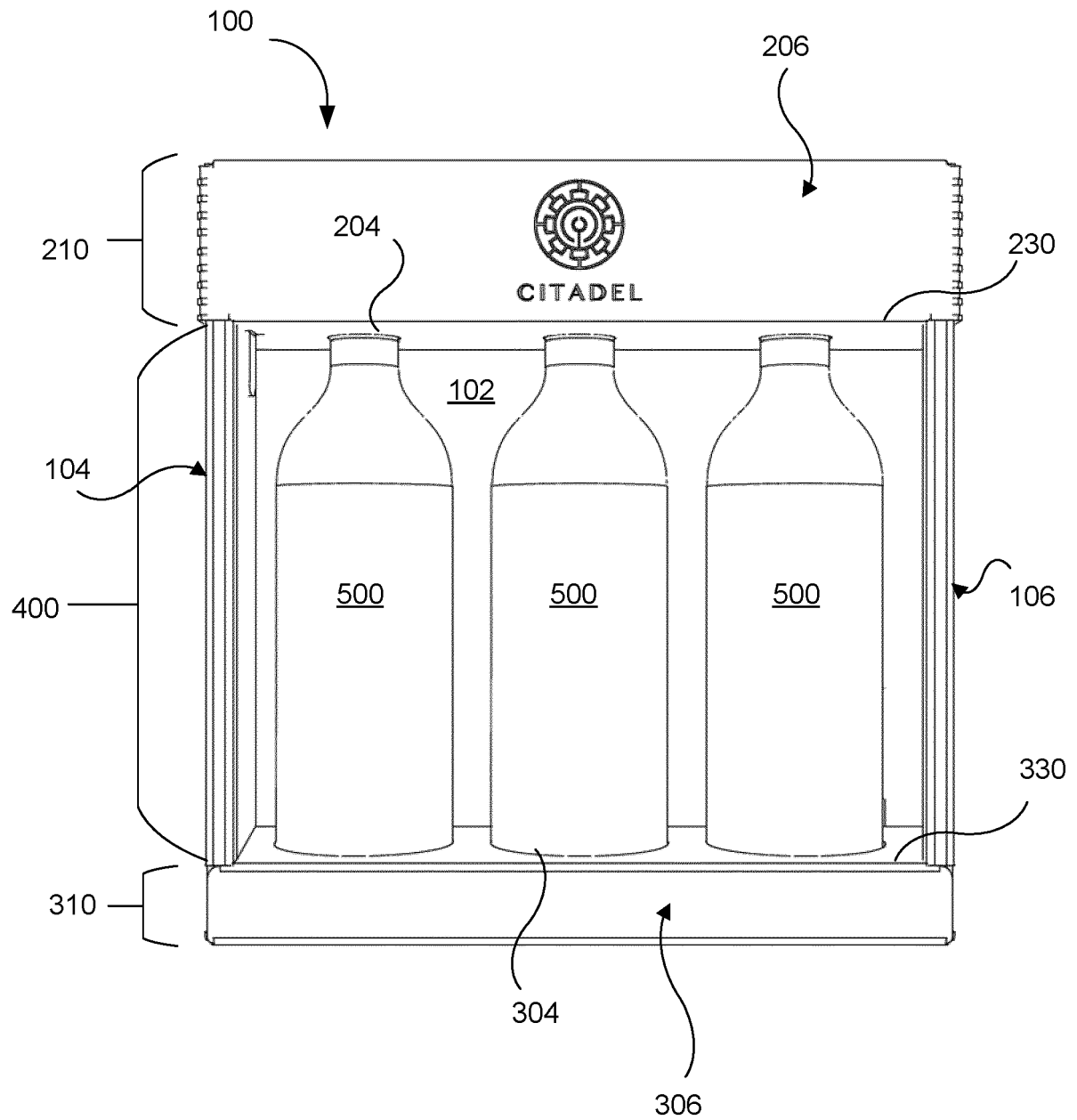


FIG. 2A

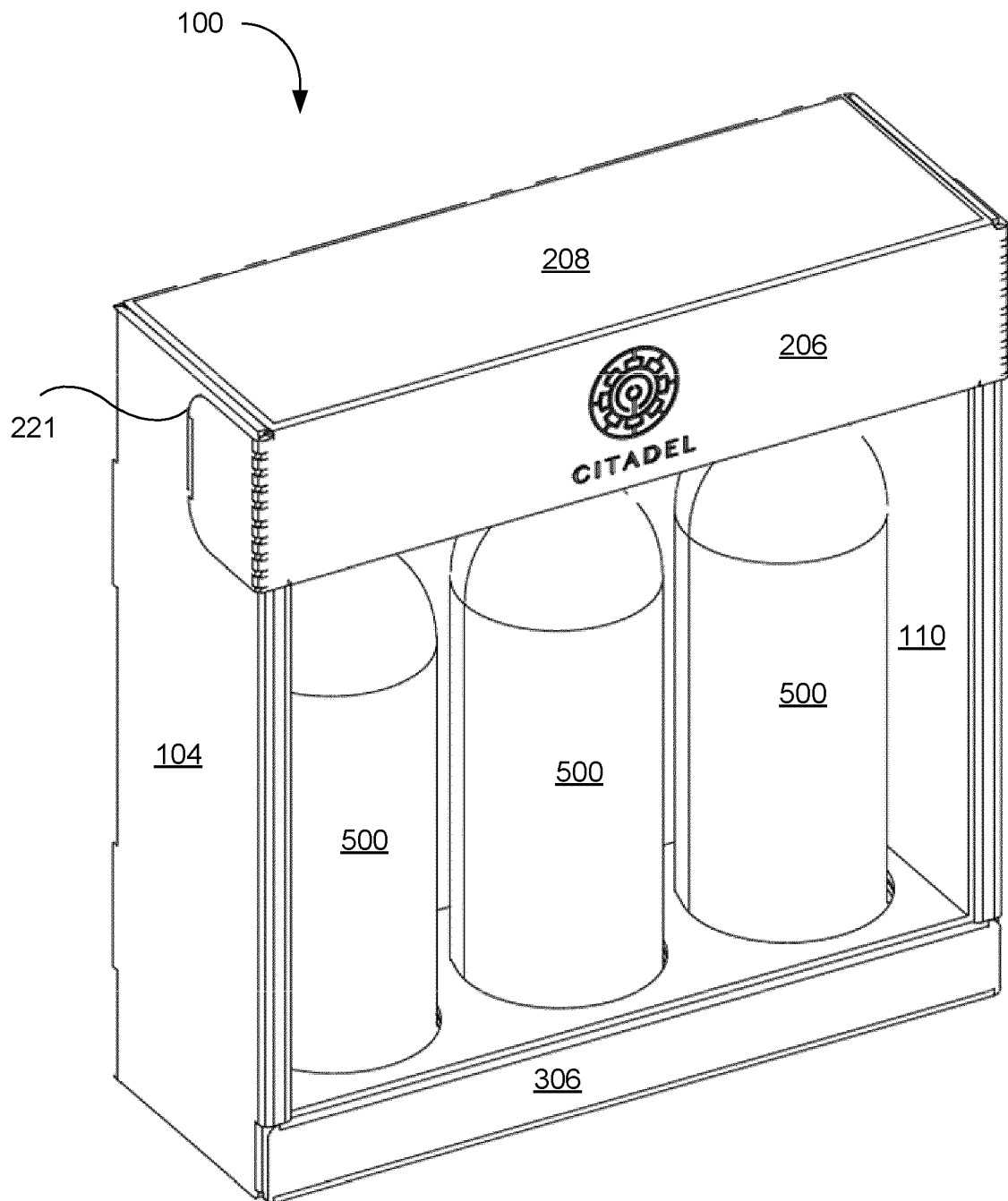


FIG. 2B

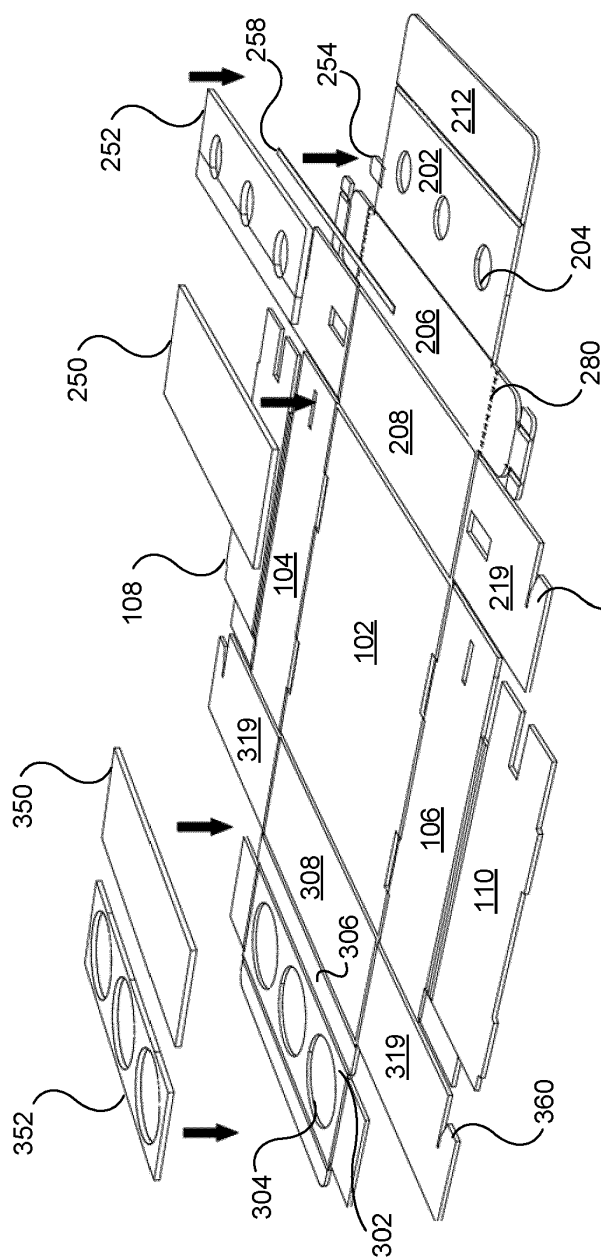


FIG. 3A

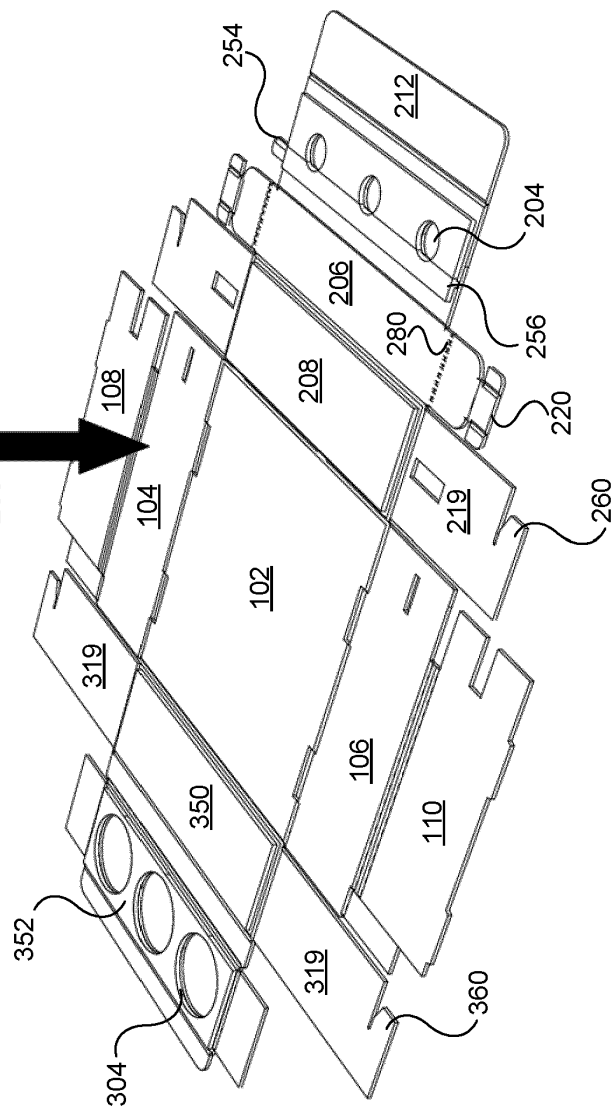


FIG. 3B

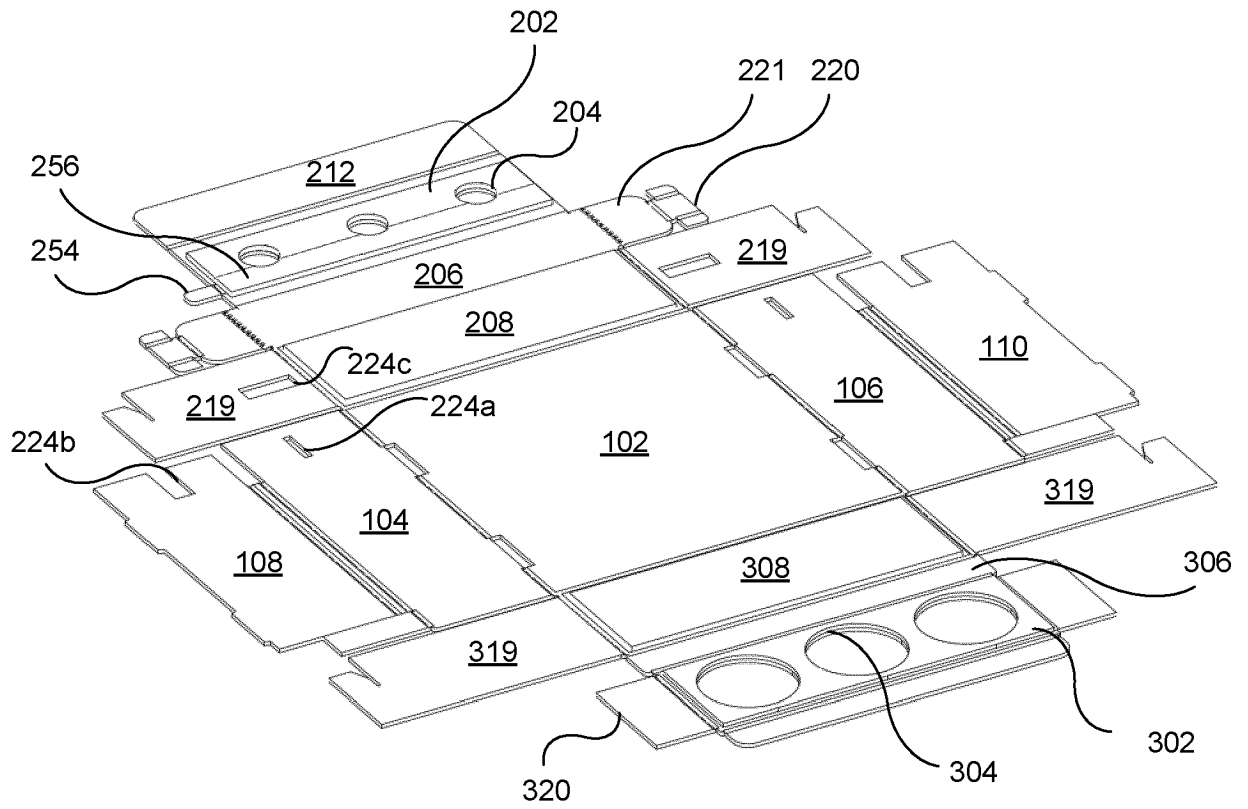


FIG. 4A

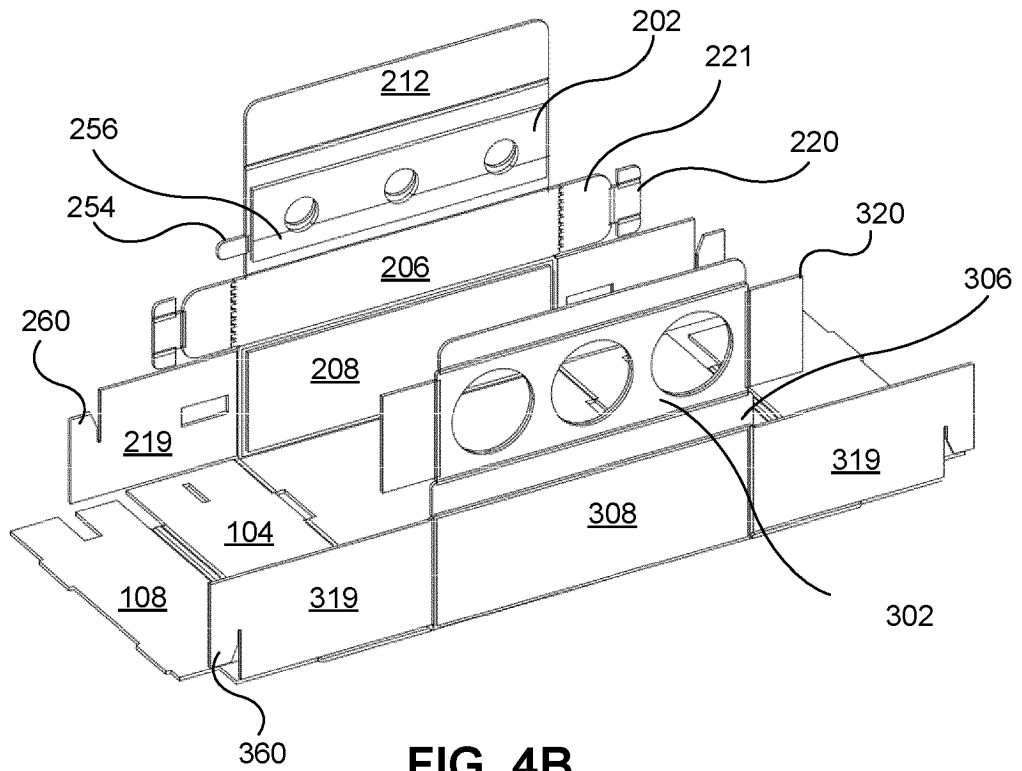


FIG. 4B

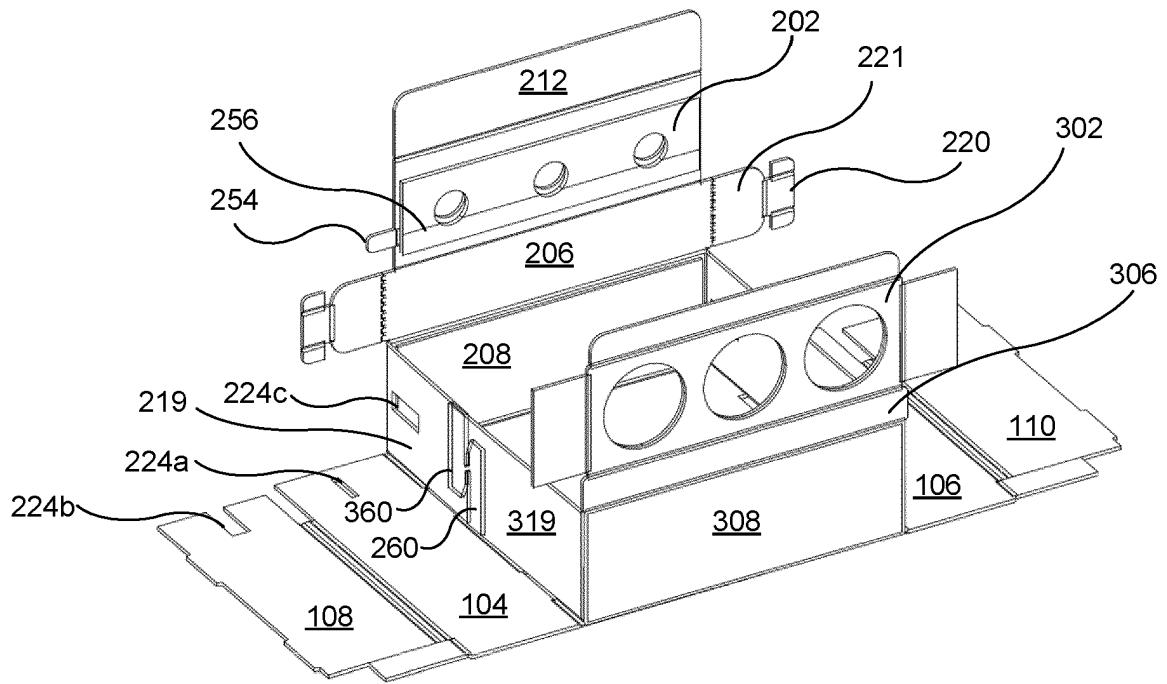


FIG. 4C

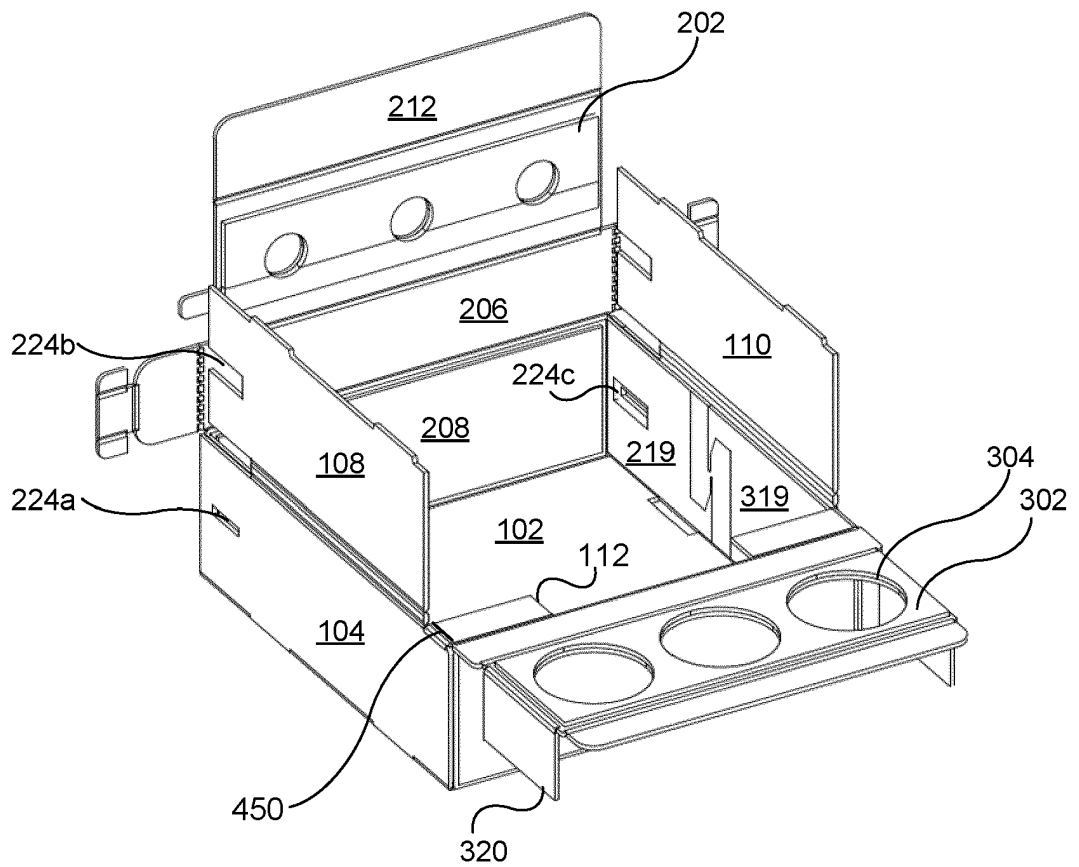


FIG. 4D

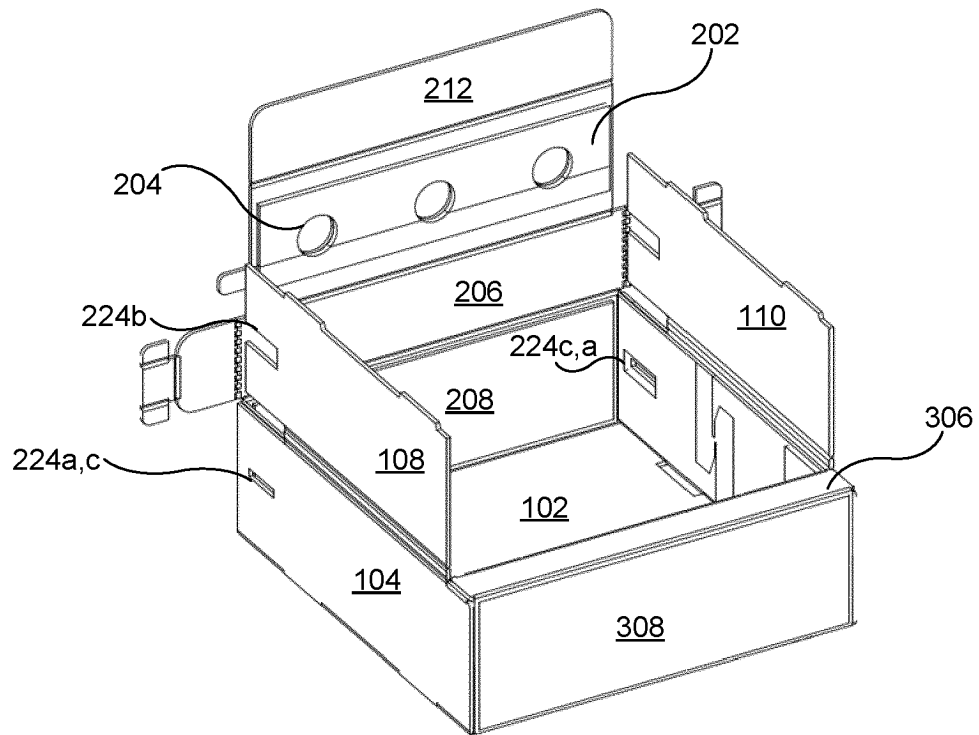


FIG. 4E

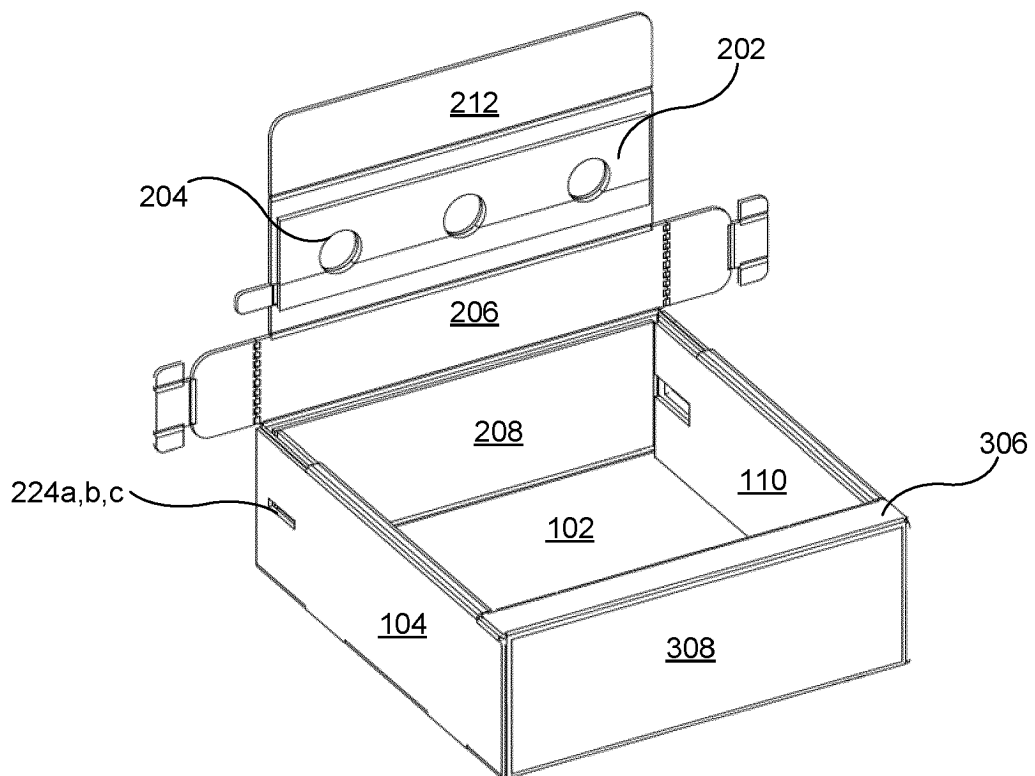


FIG. 4F

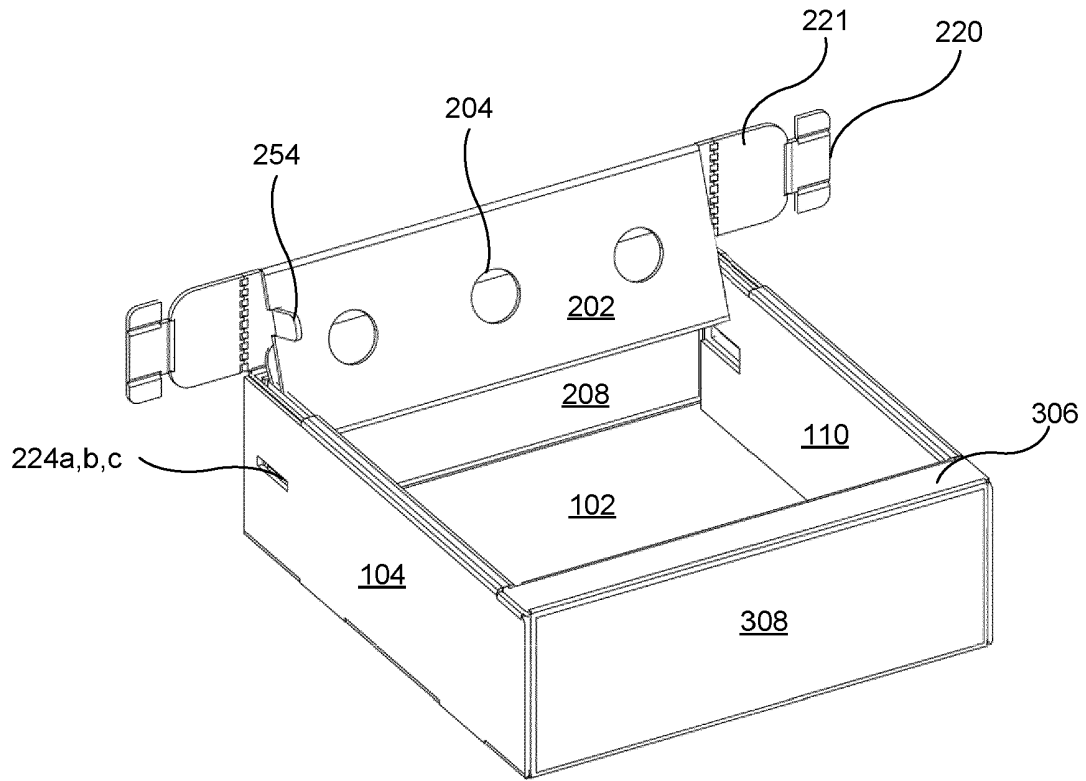


FIG. 4G

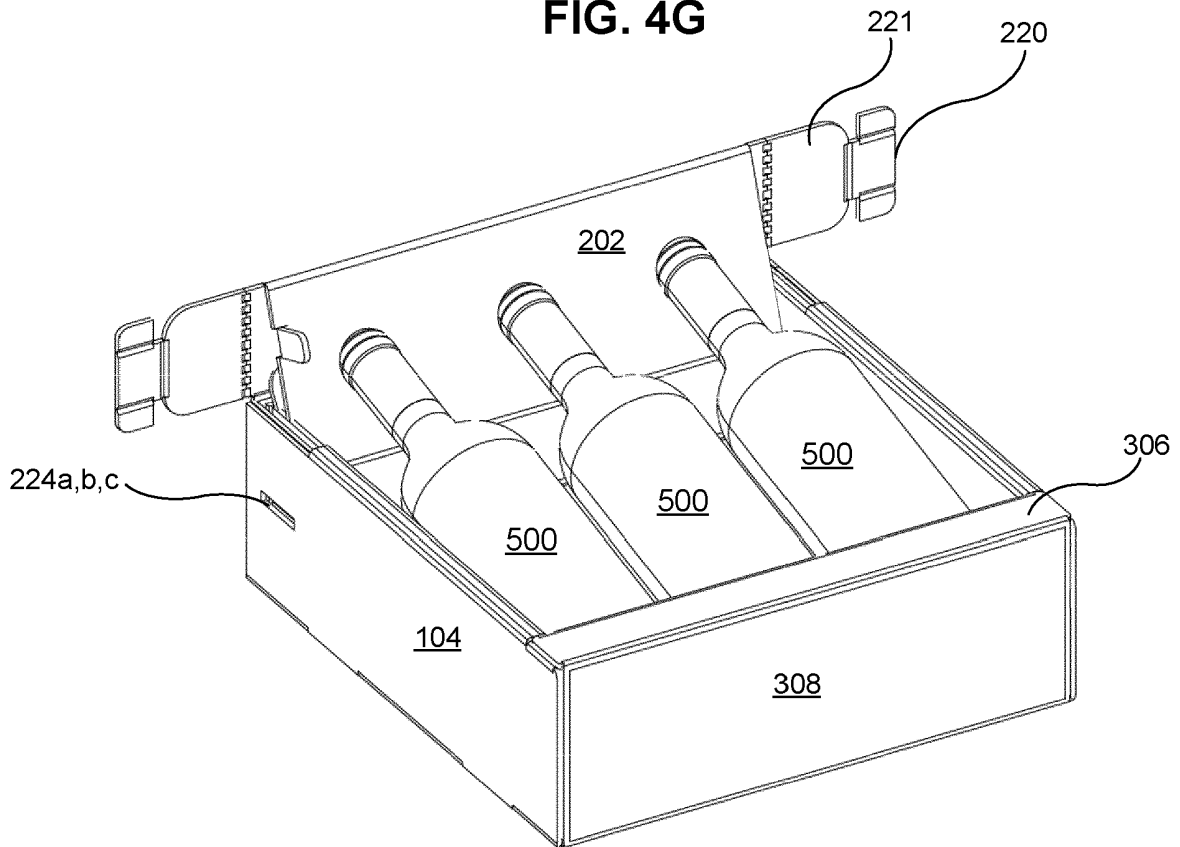


FIG. 4H

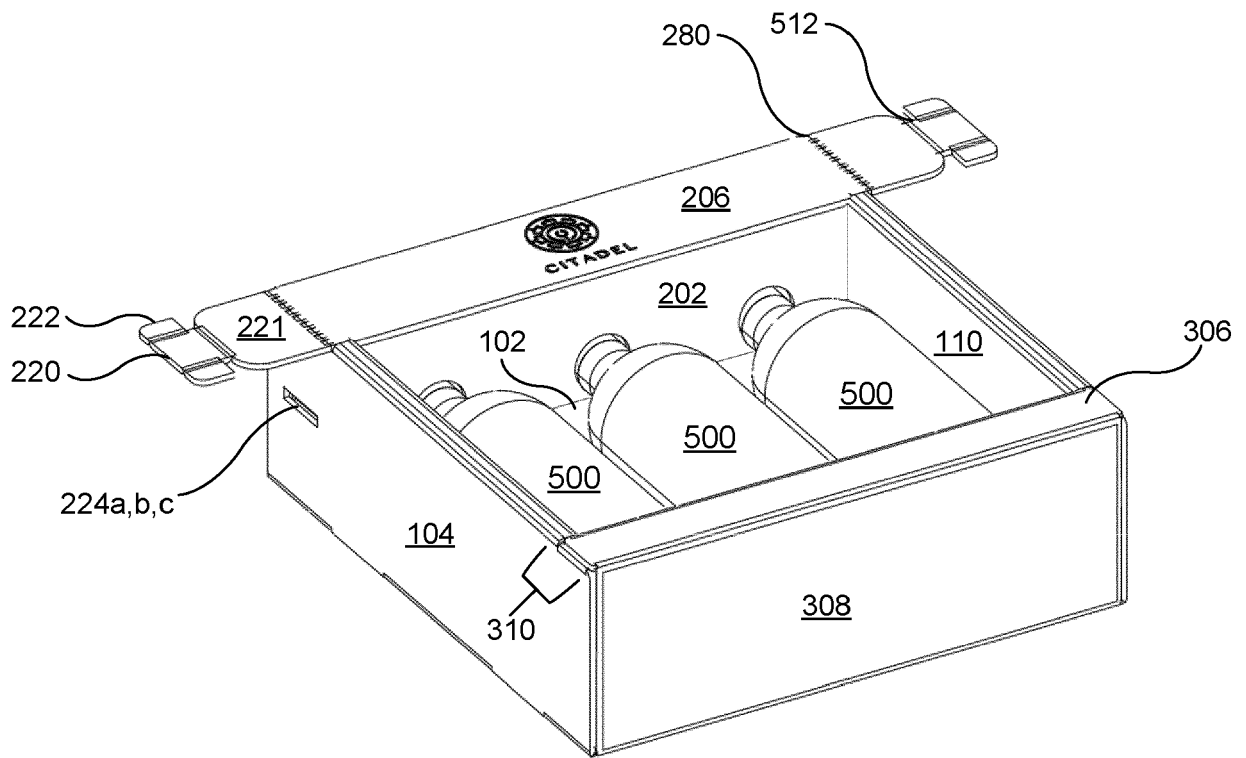


FIG. 4I

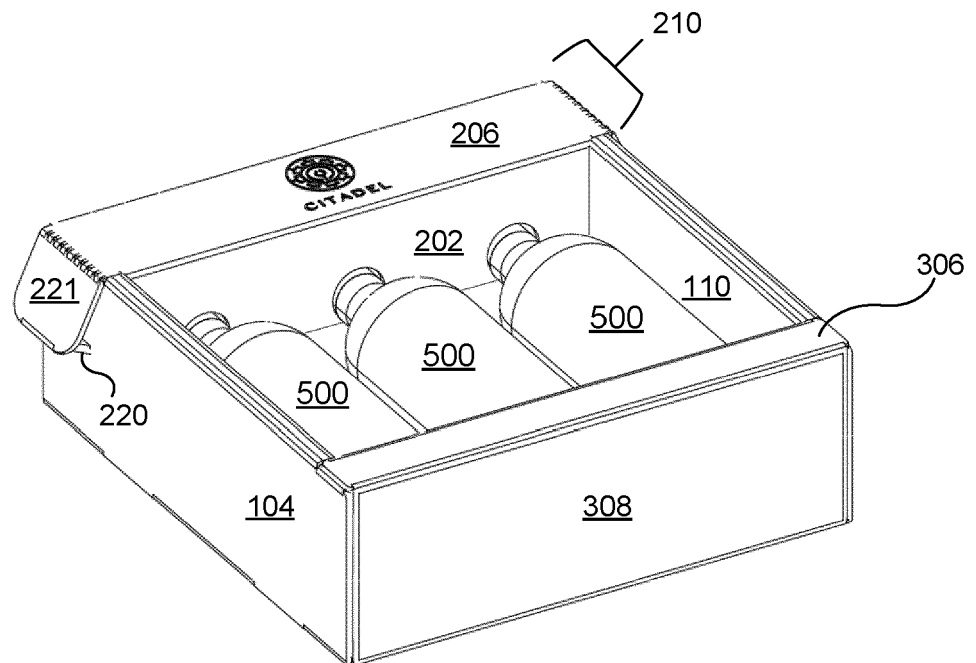


FIG. 4J

FIG. 4K

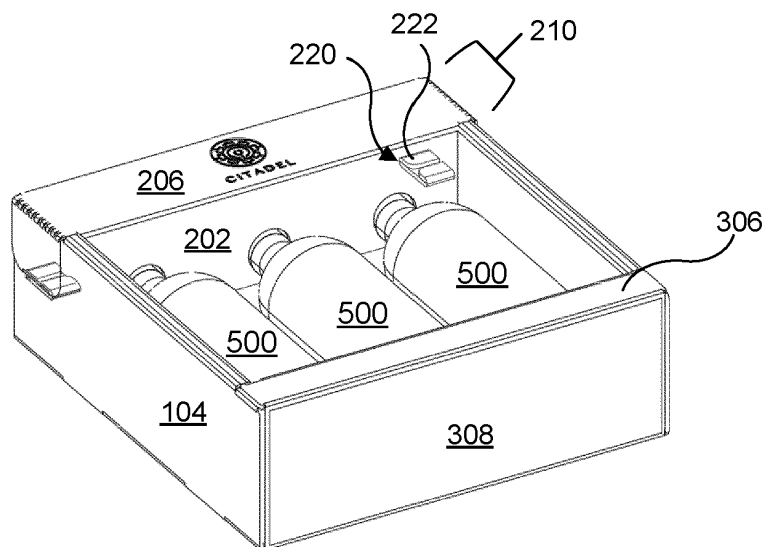


FIG. 4L

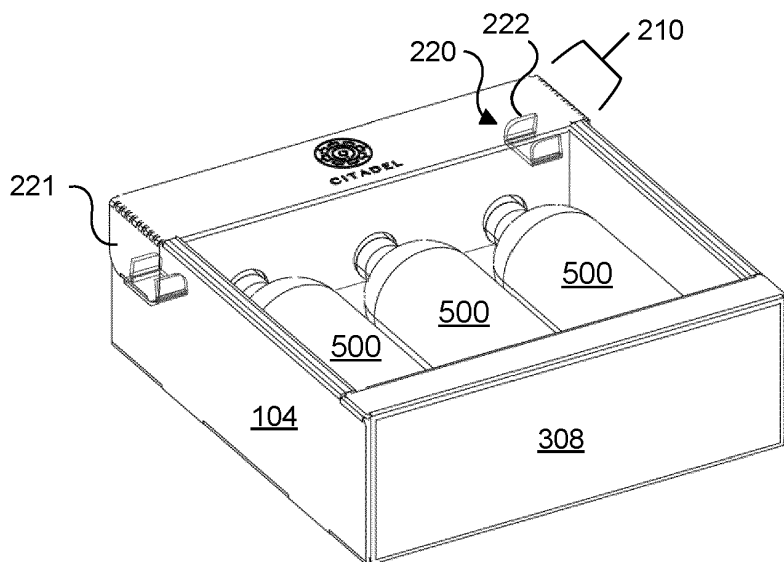
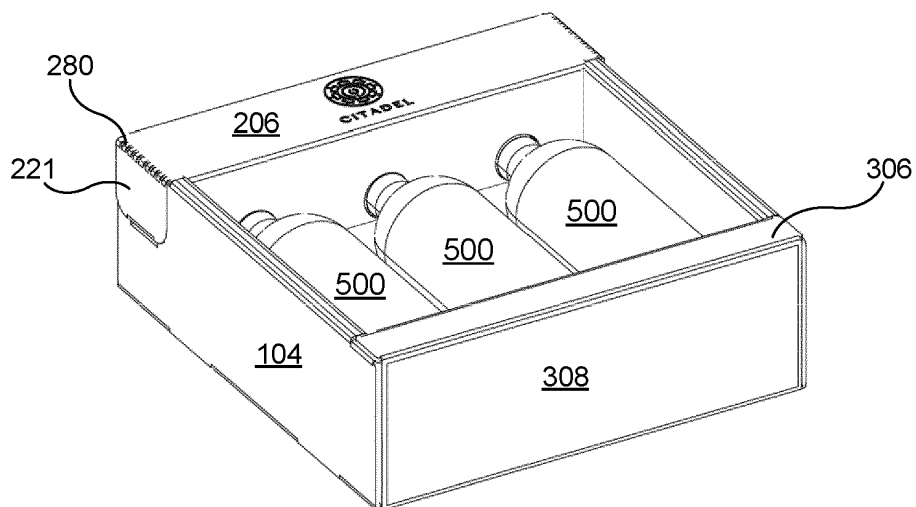


FIG. 4M



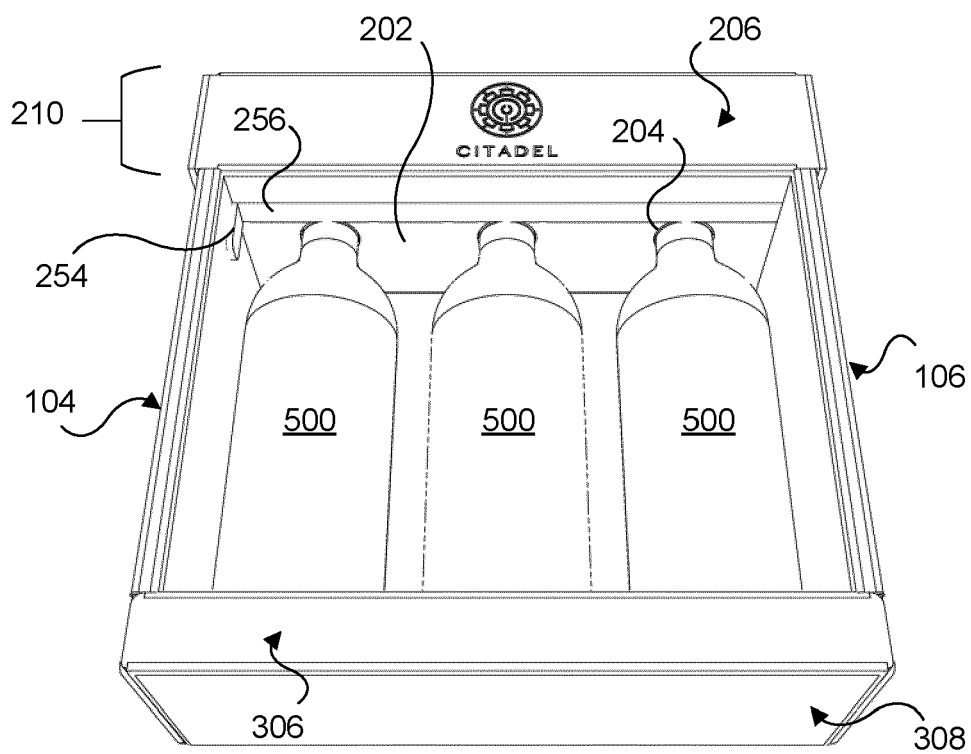


FIG. 5A

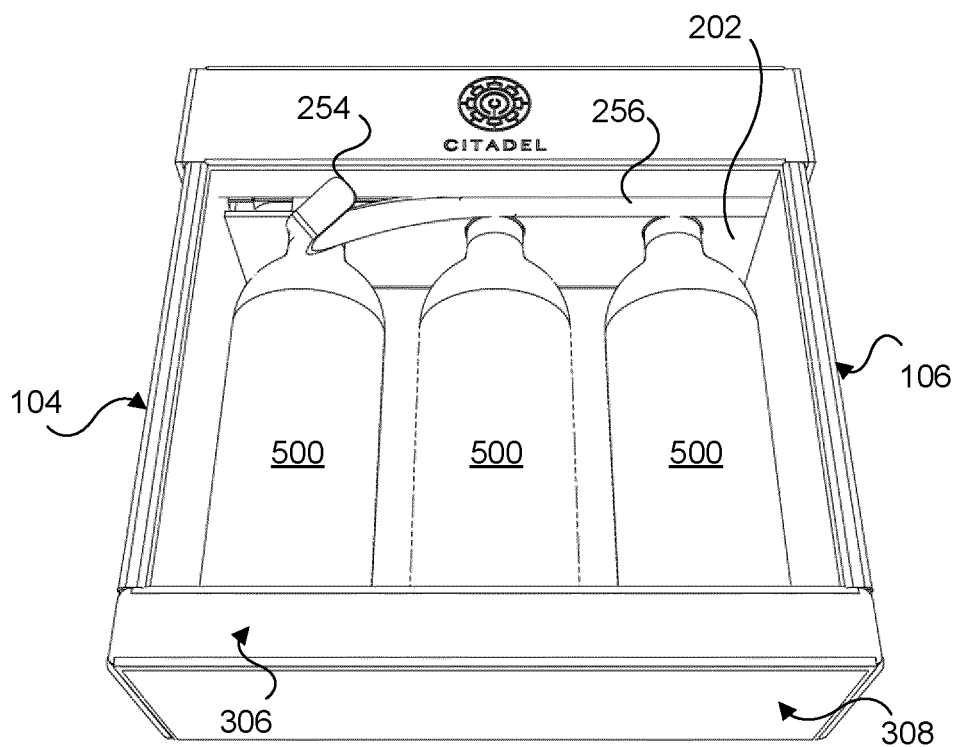


FIG. 5B

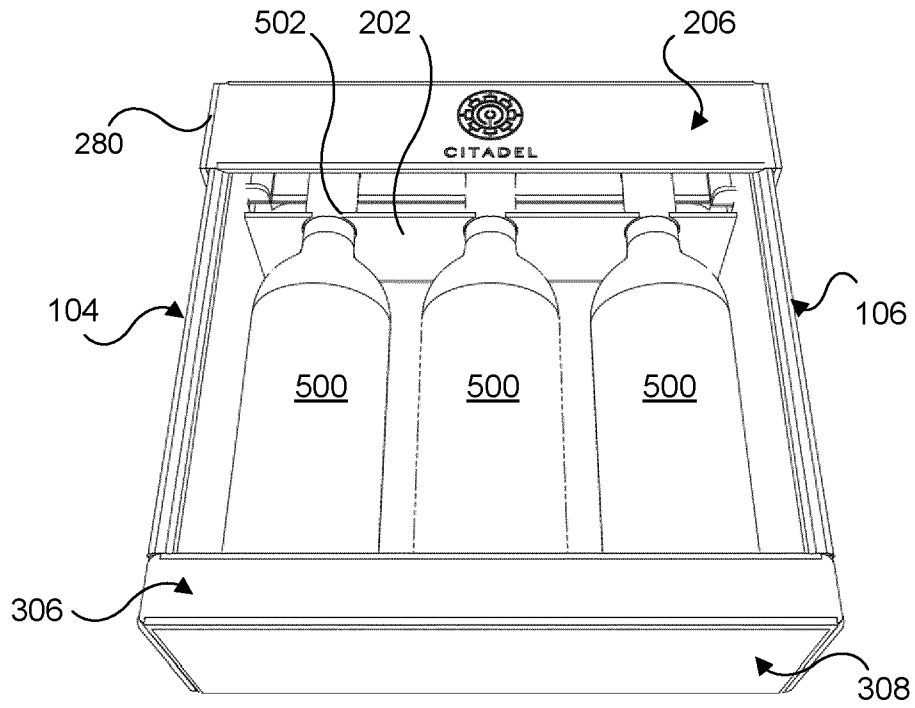


FIG. 5C

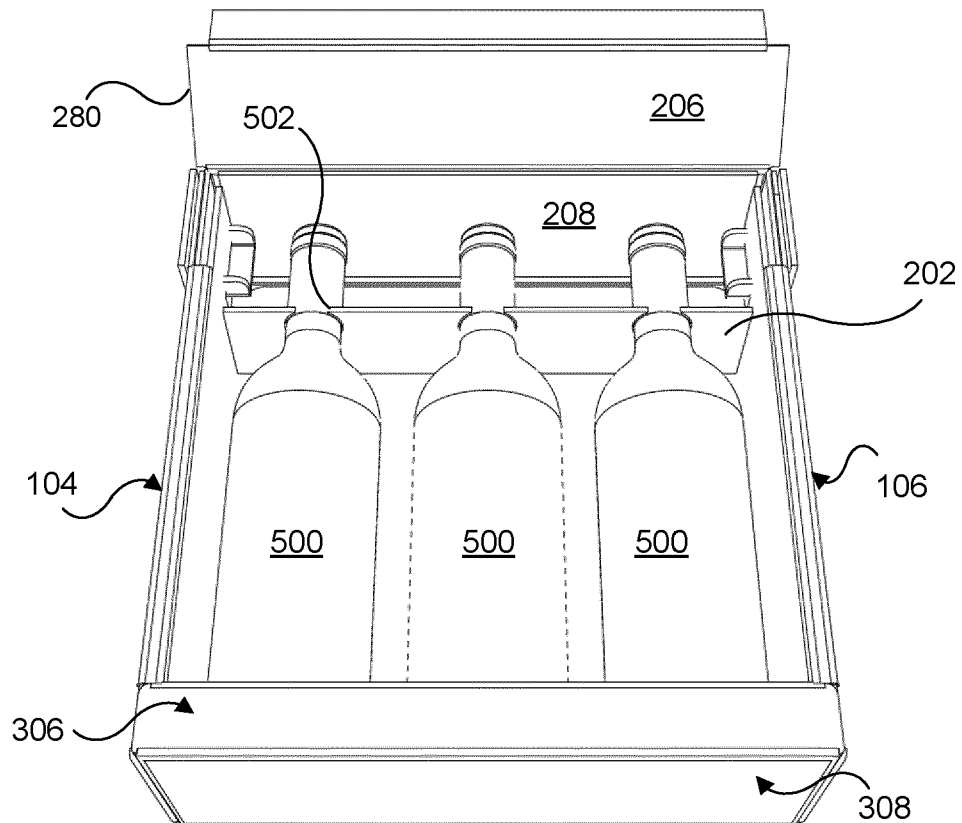


FIG. 5D

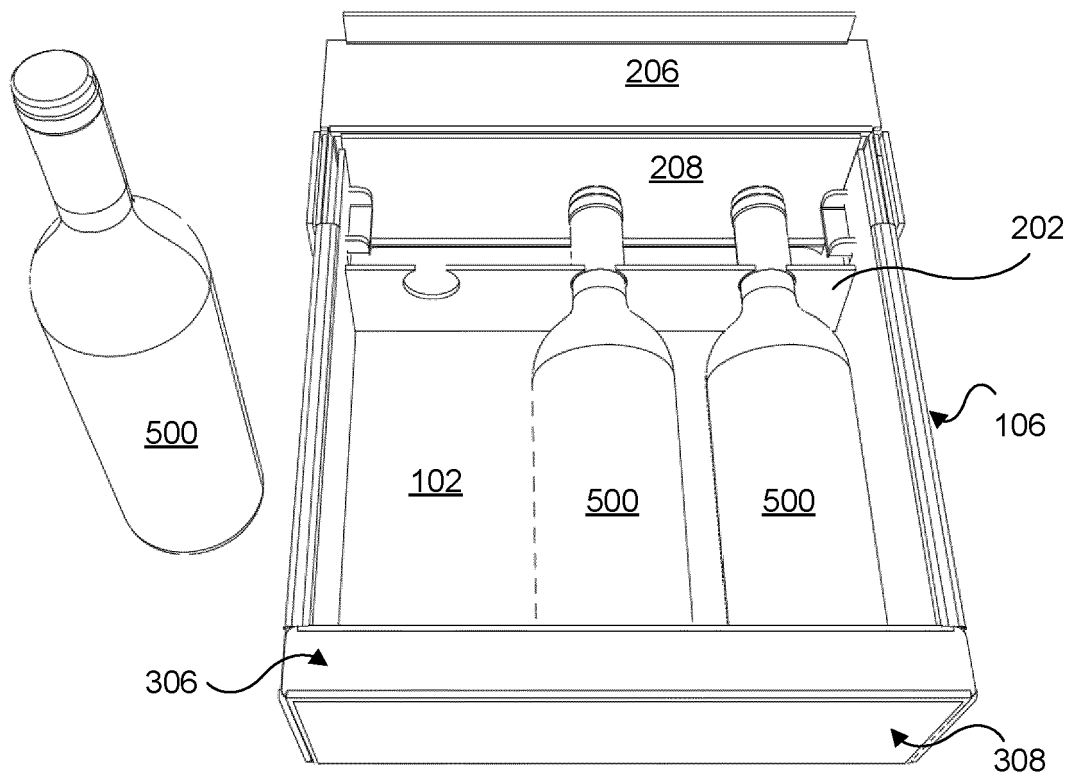


FIG. 5E

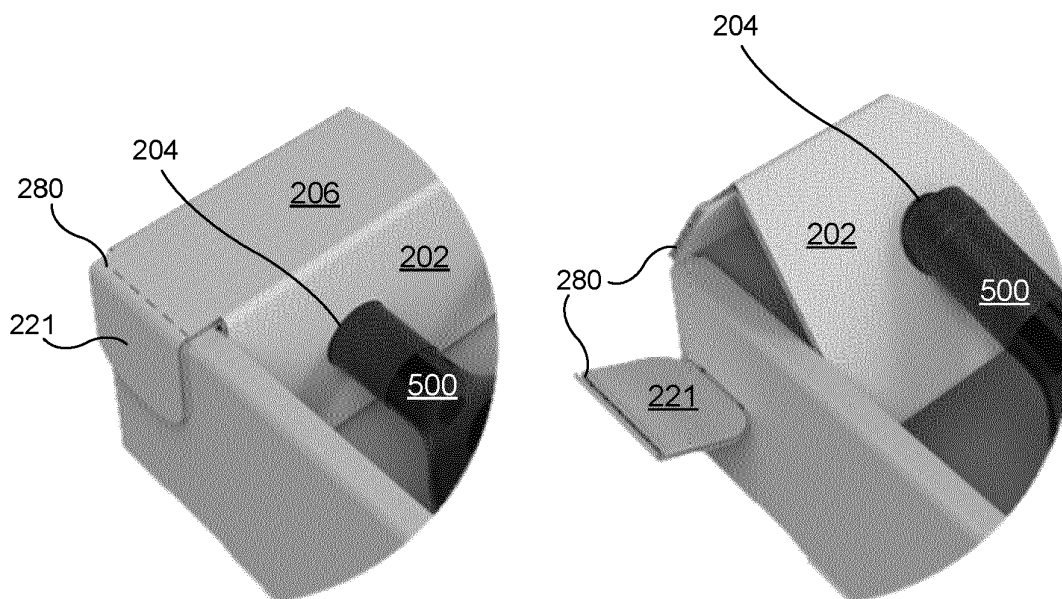


FIG. 5F

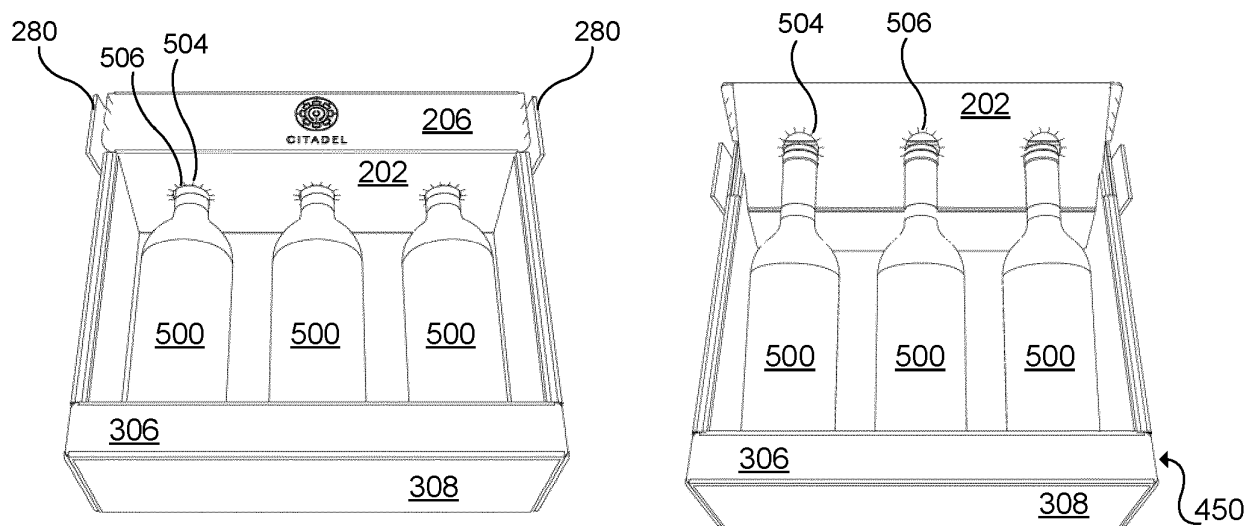


FIG. 5G

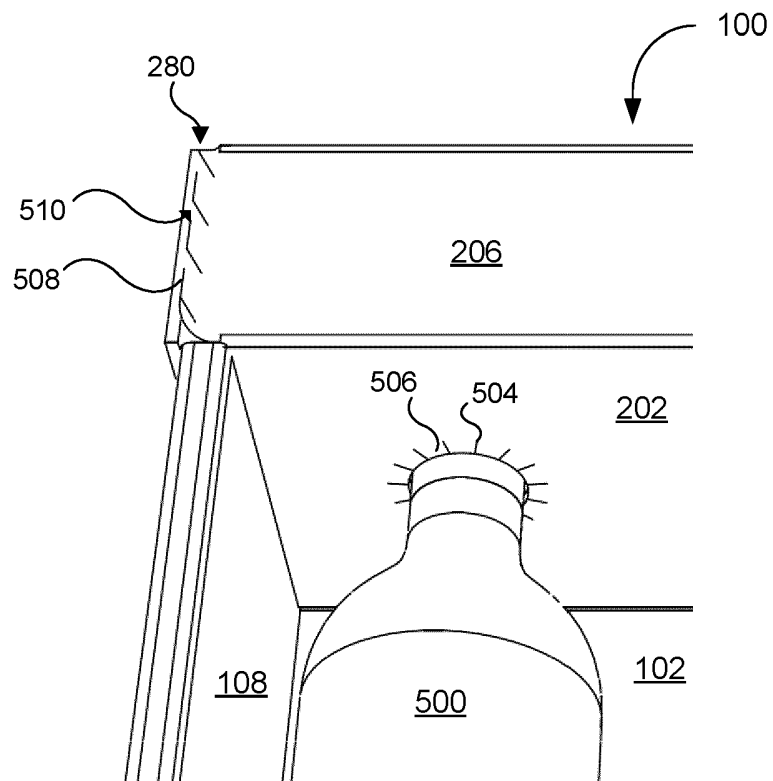


FIG. 5H

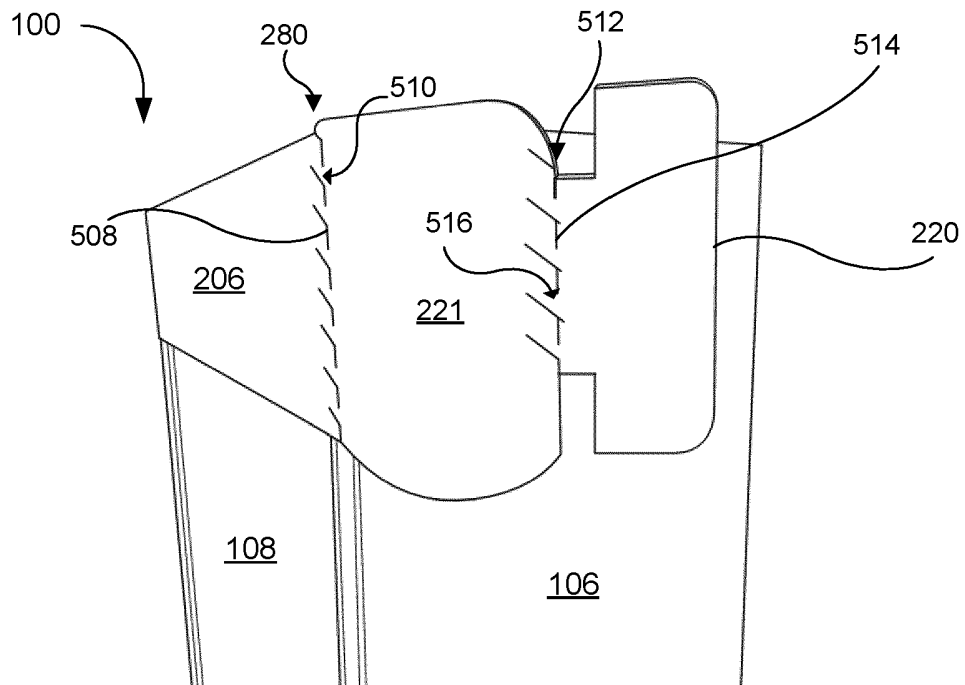


FIG. 5I

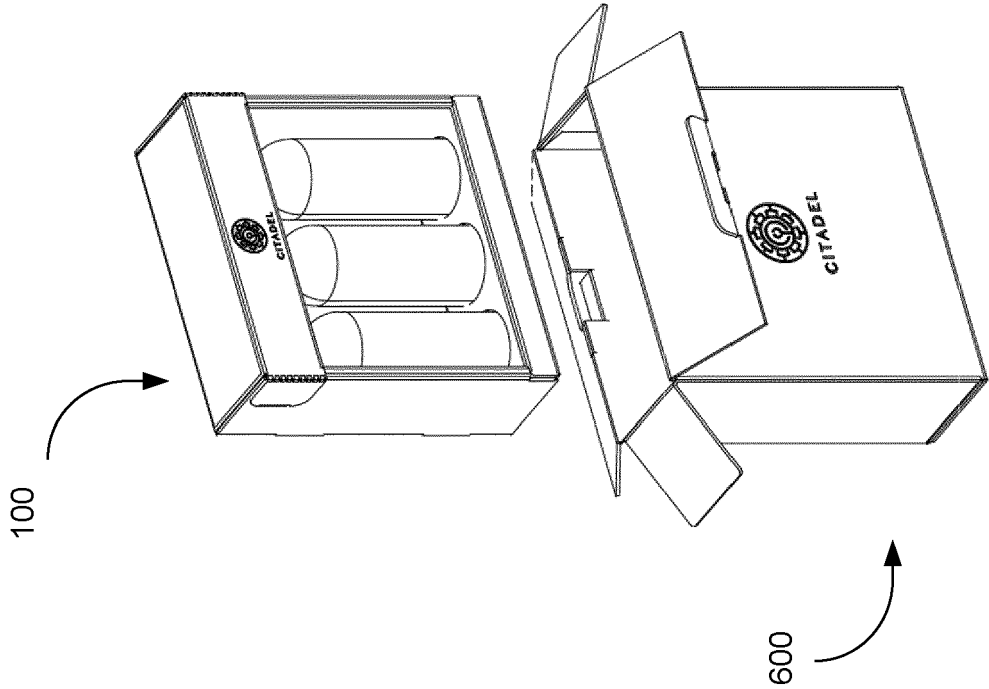


FIG. 6A

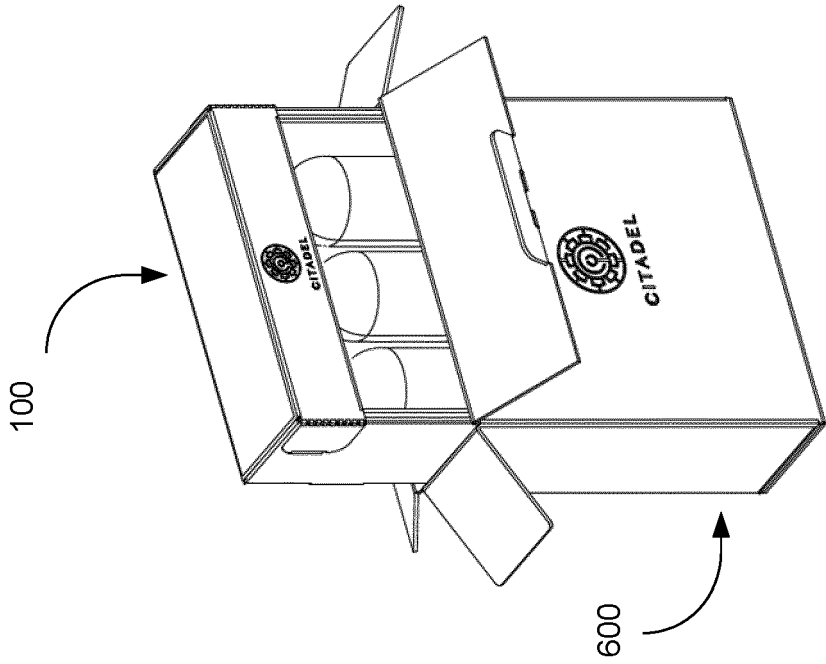


FIG. 6B

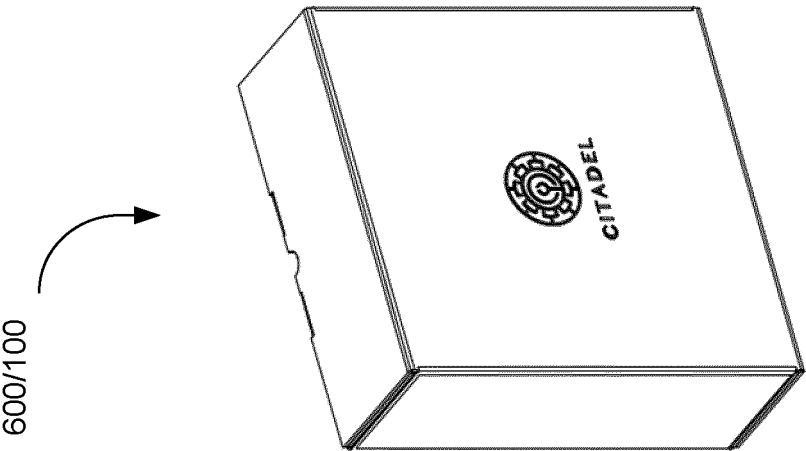


FIG. 6D

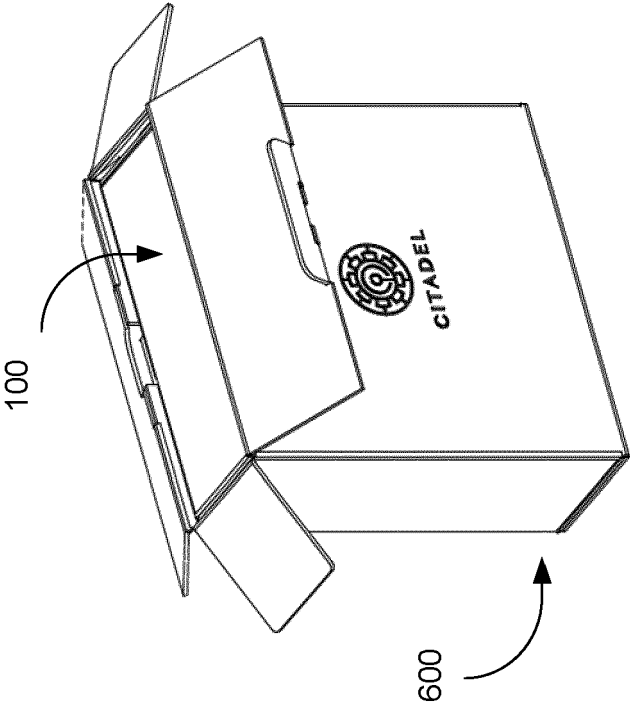


FIG. 6C

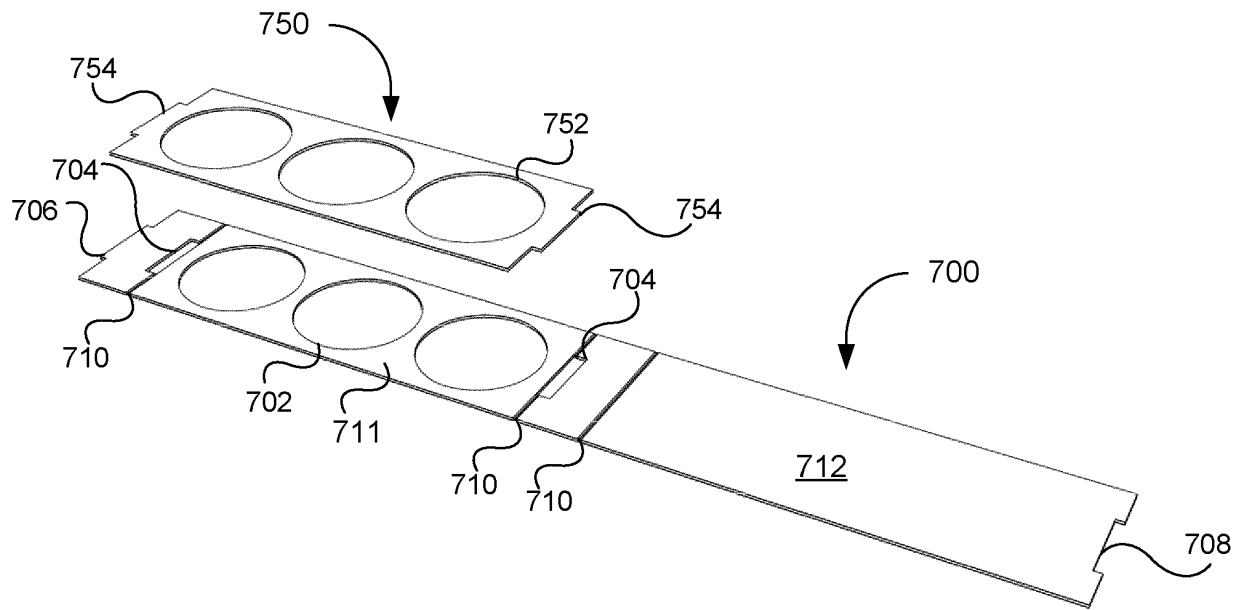


FIG. 7A

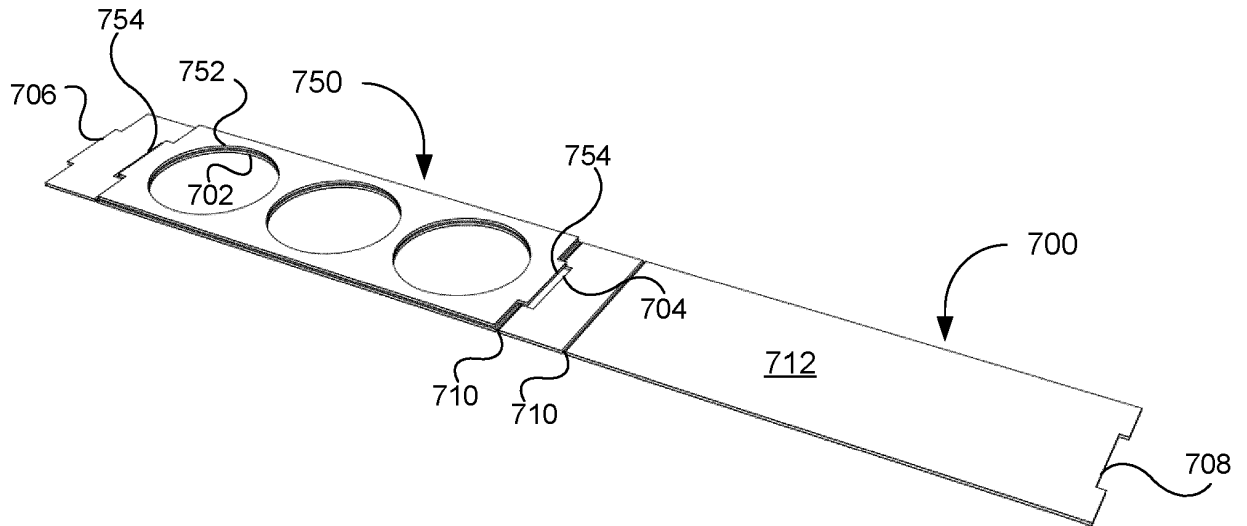
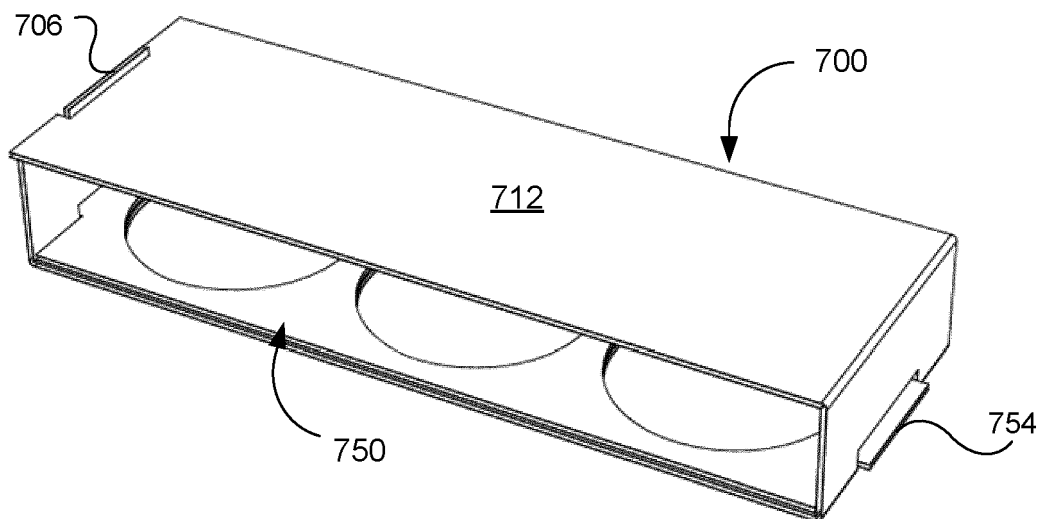
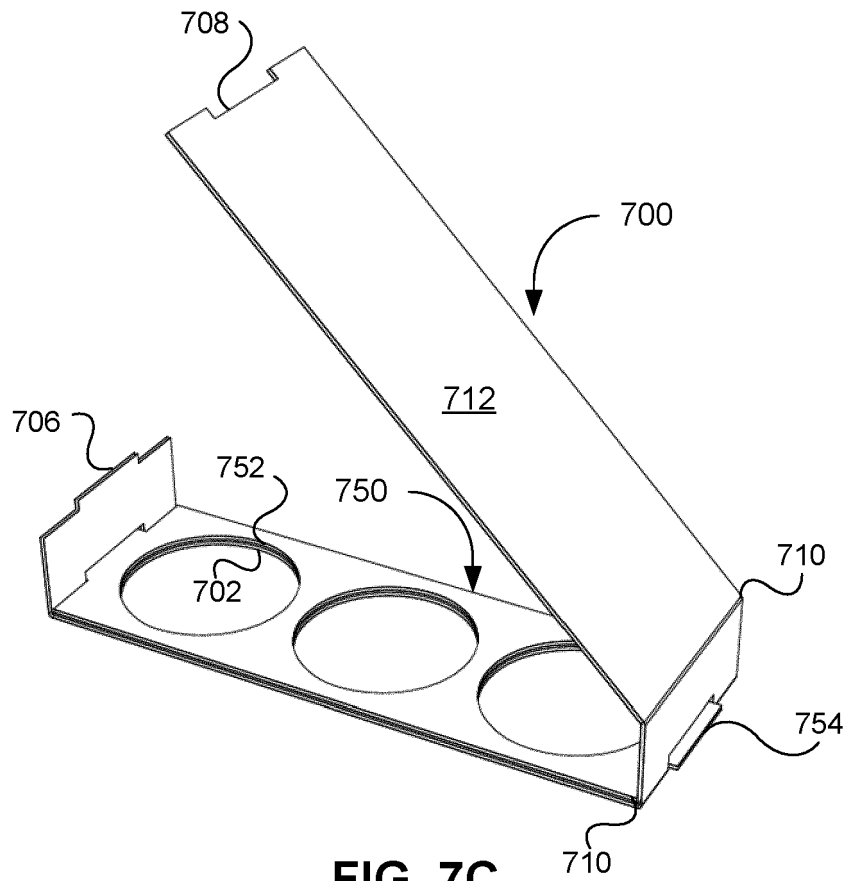


FIG. 7B



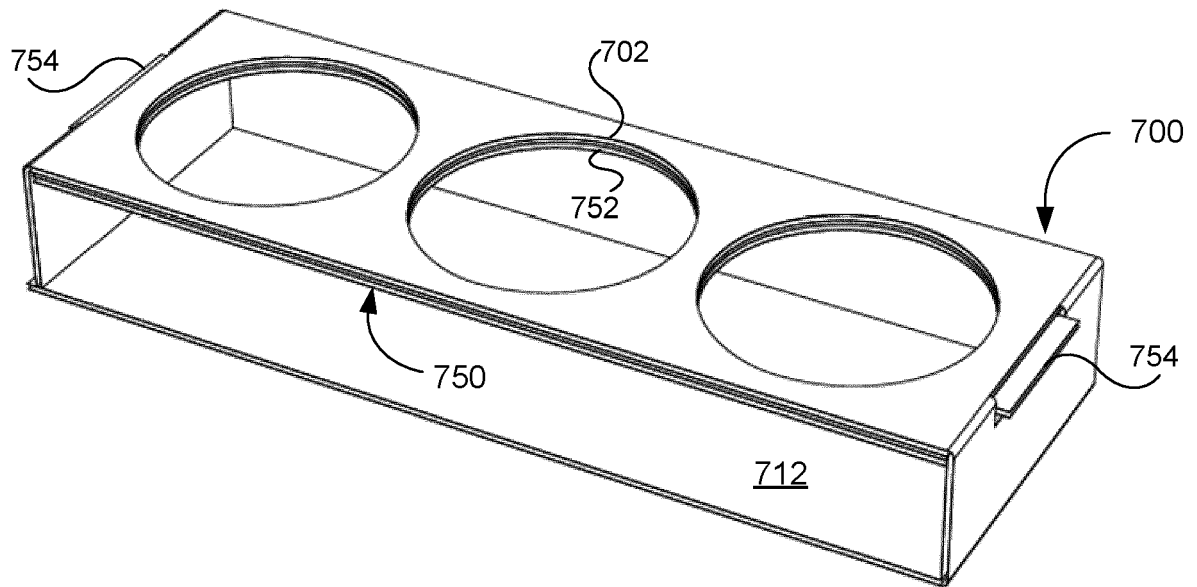


FIG. 7E

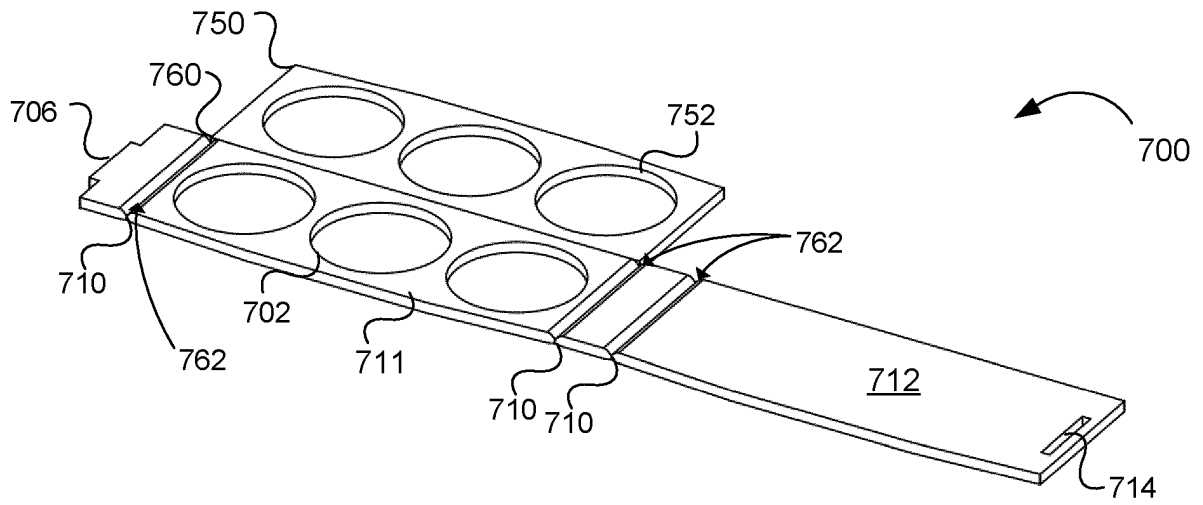


FIG. 7F

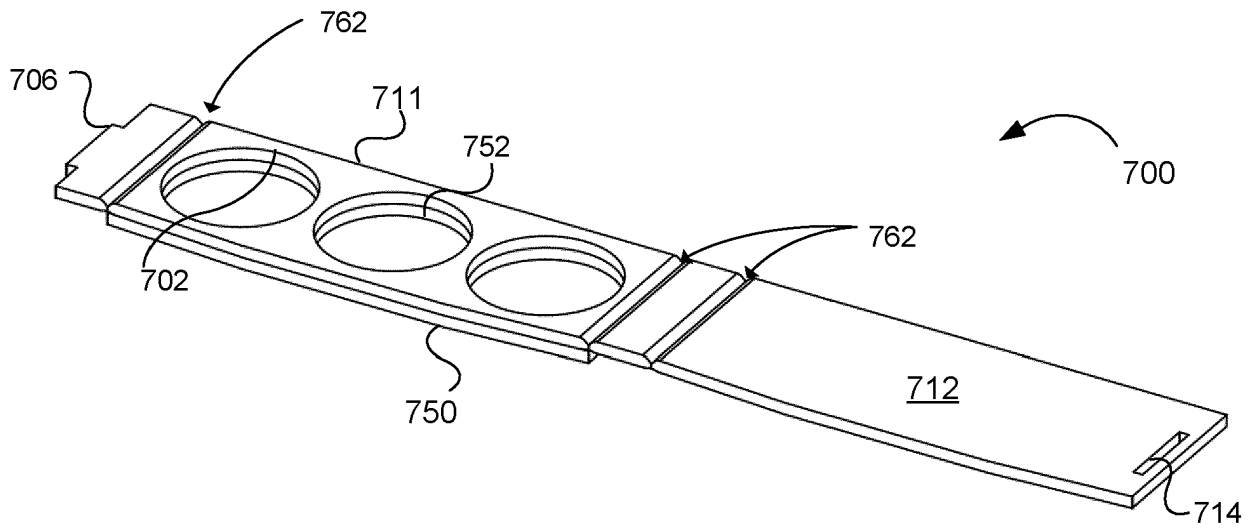


FIG. 7G

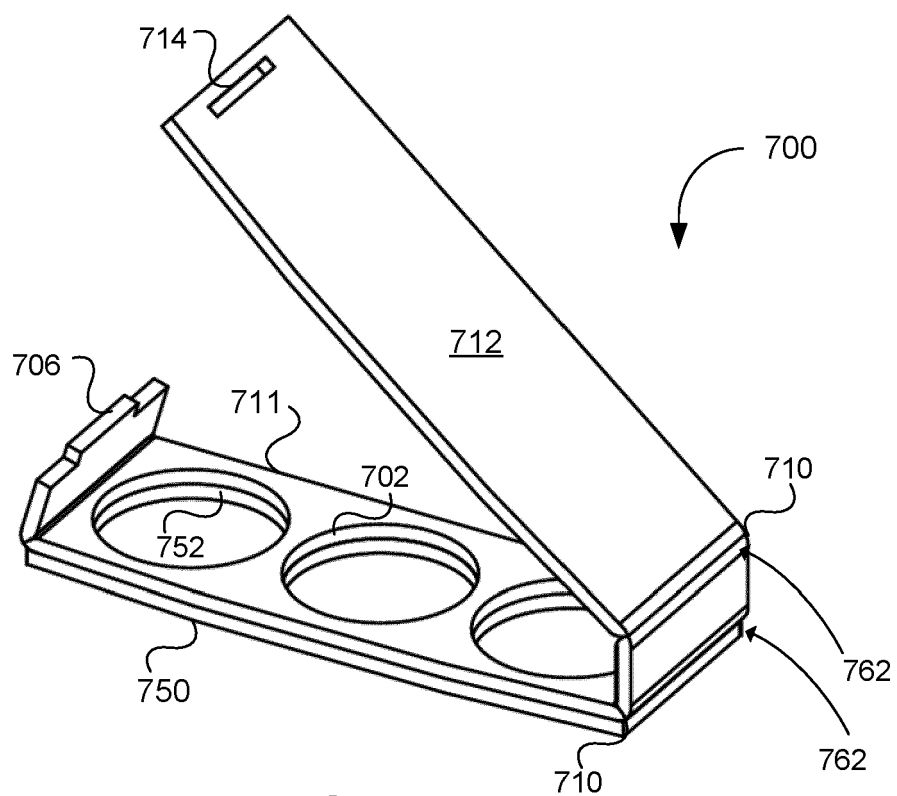


FIG. 7H

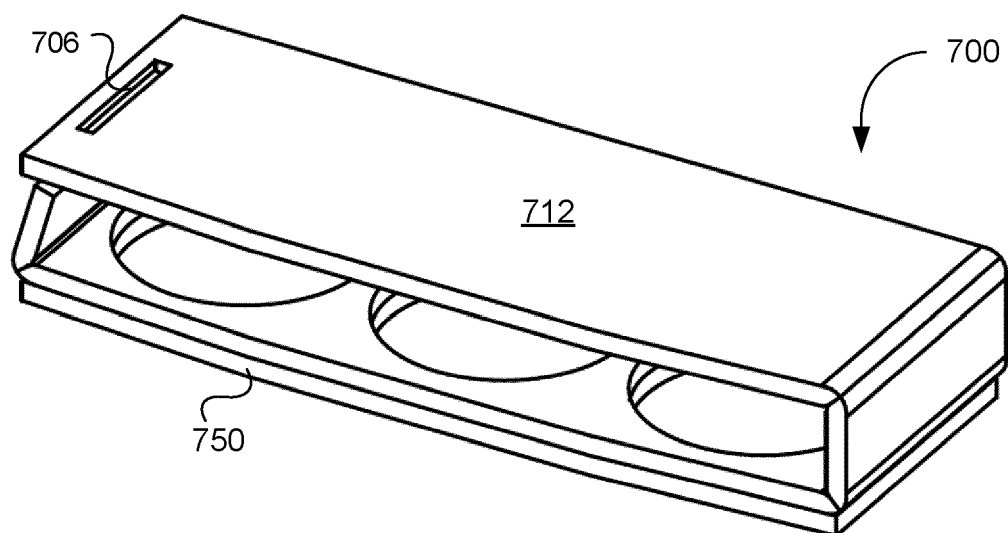


FIG. 71

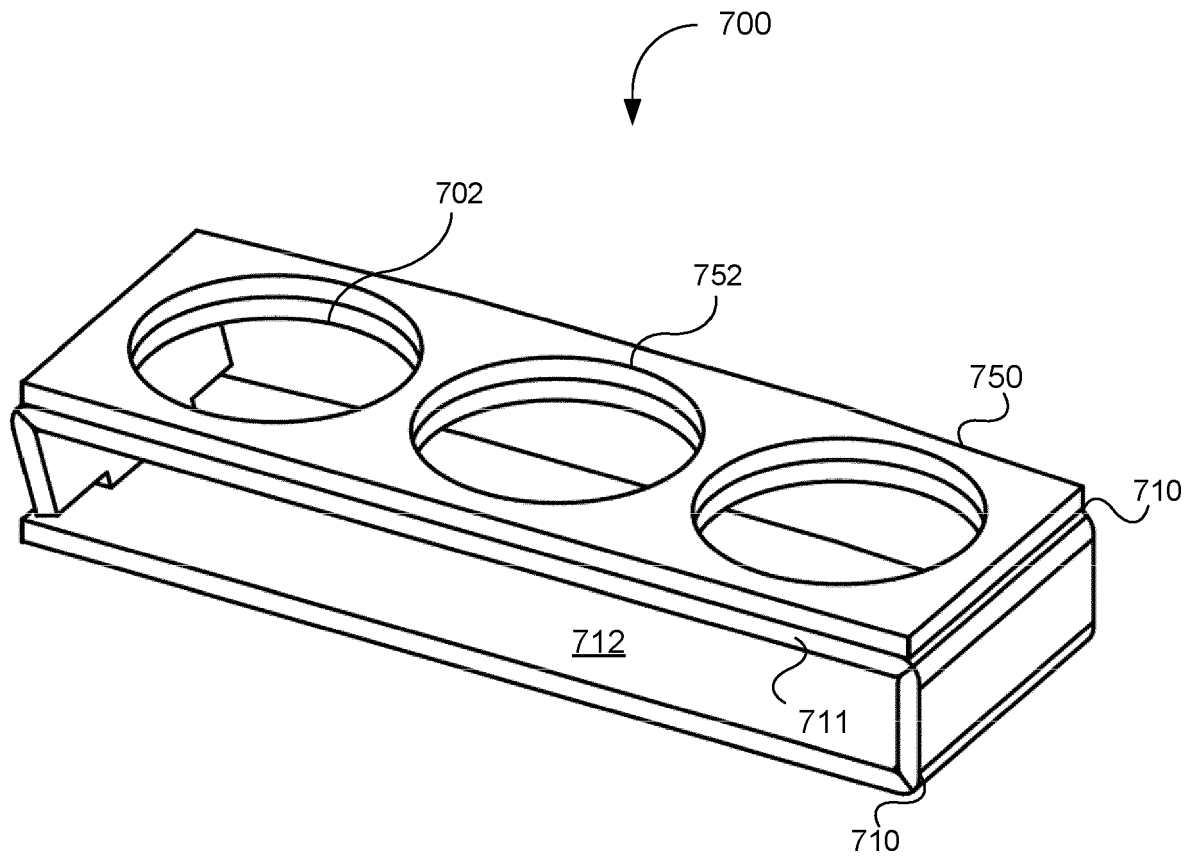


FIG. 7J

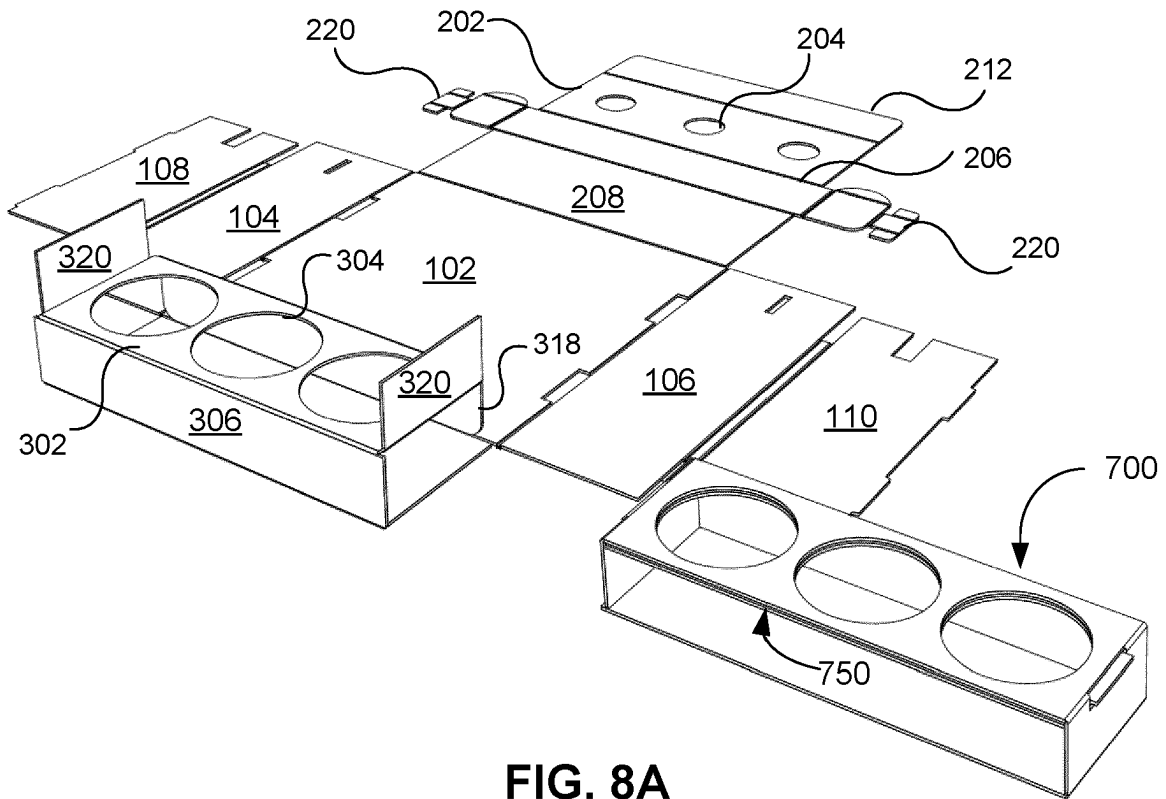


FIG. 8A

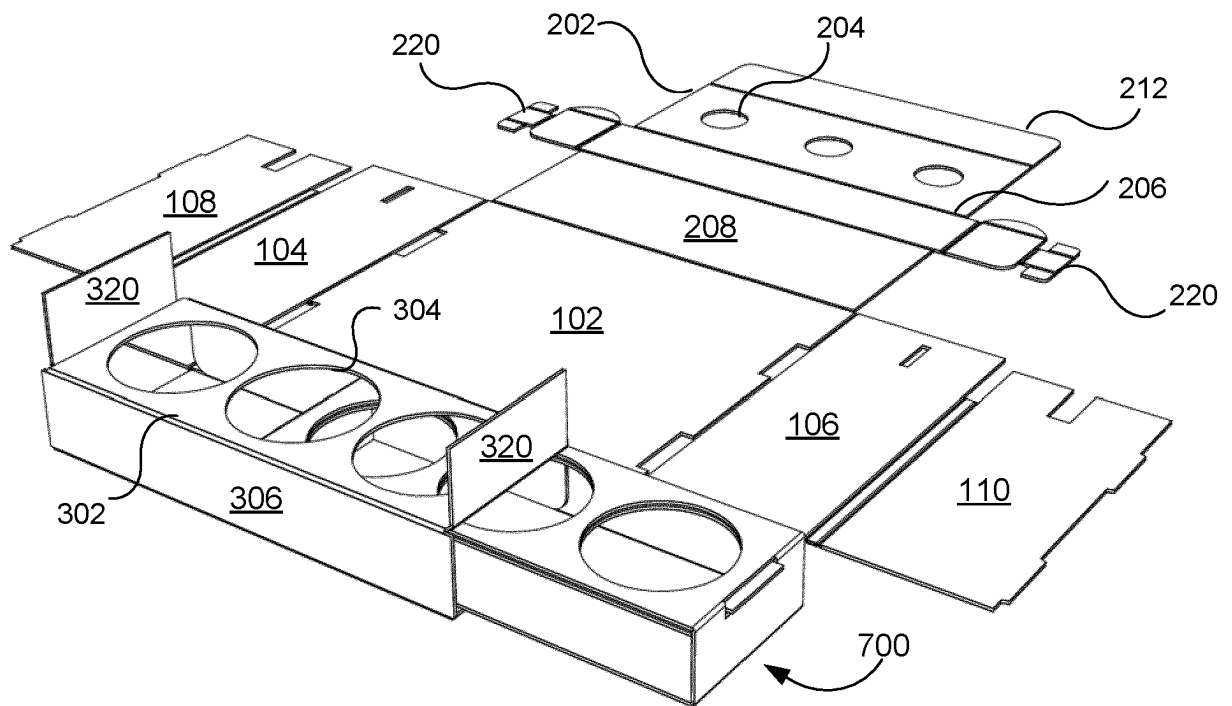


FIG. 8B

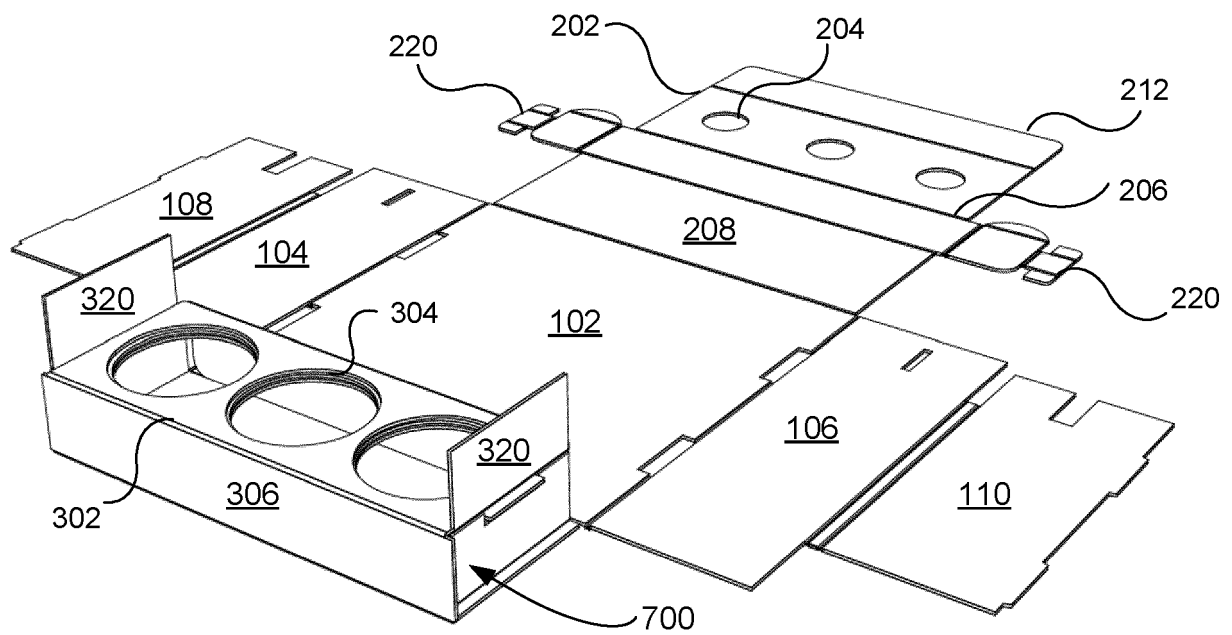


FIG. 8C

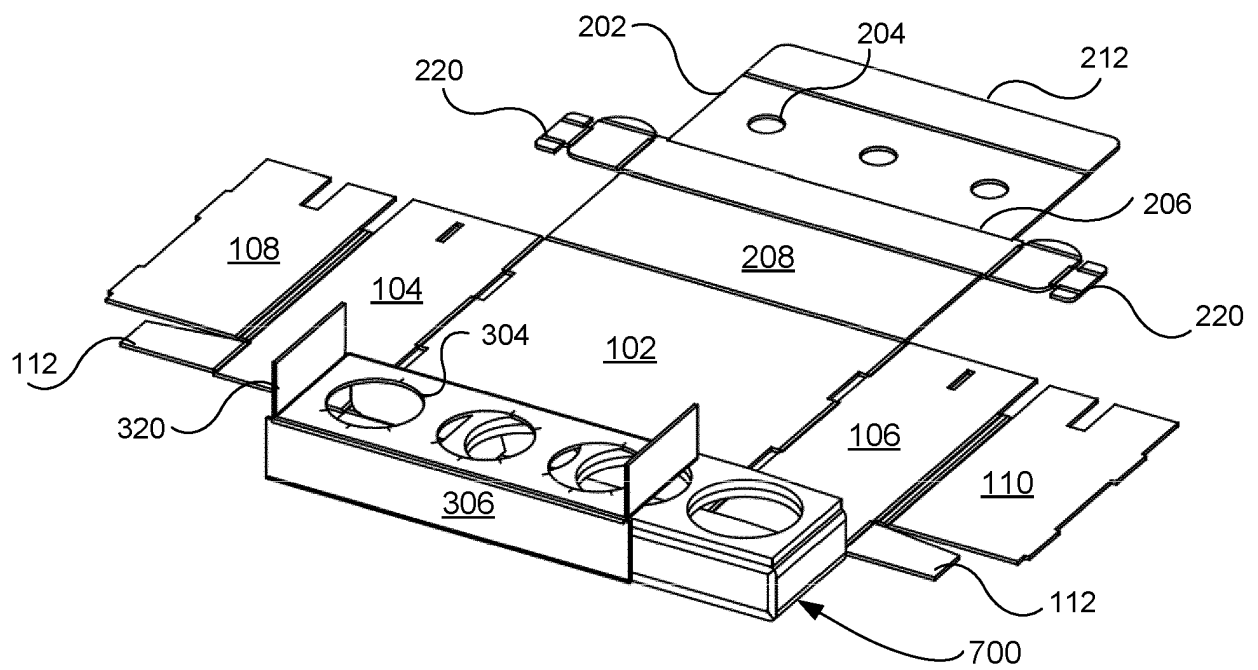


FIG. 8D

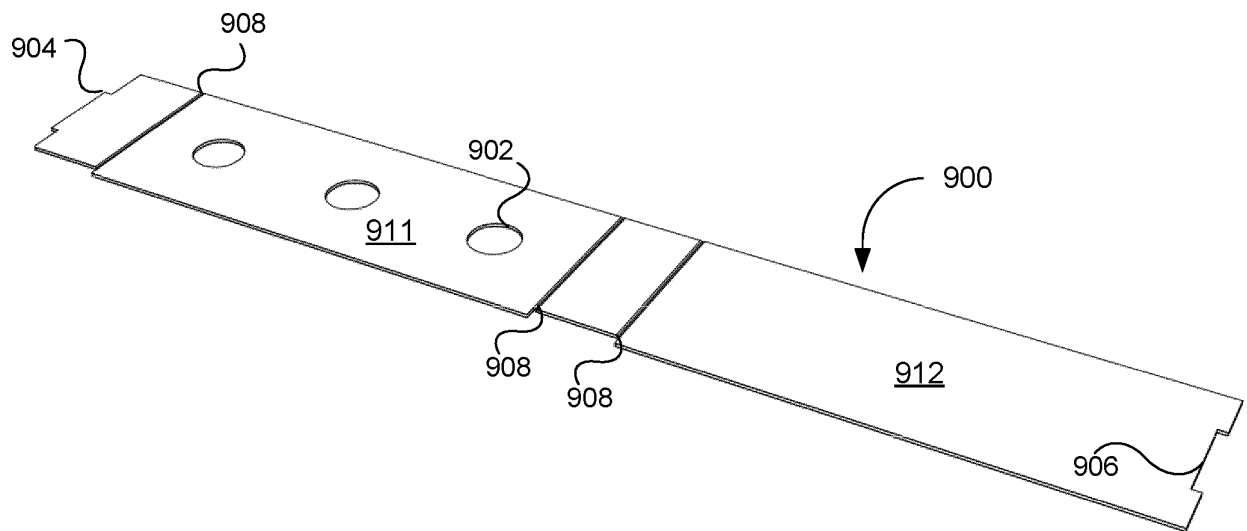


FIG. 9A

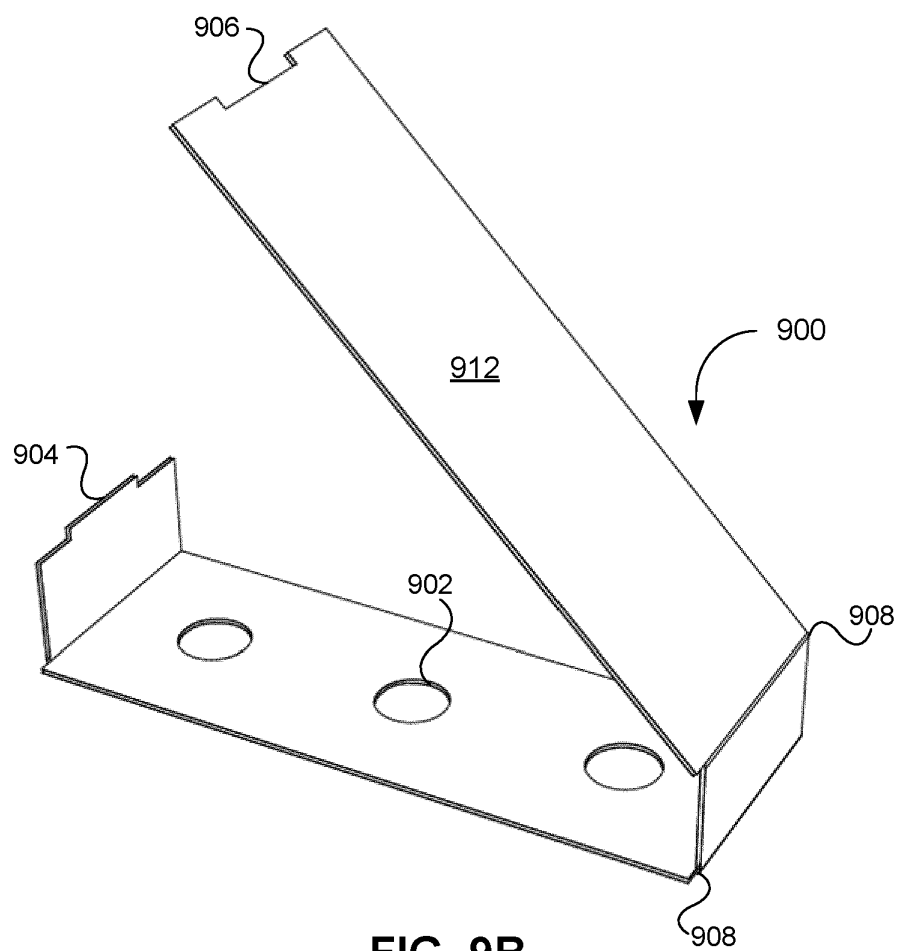


FIG. 9B

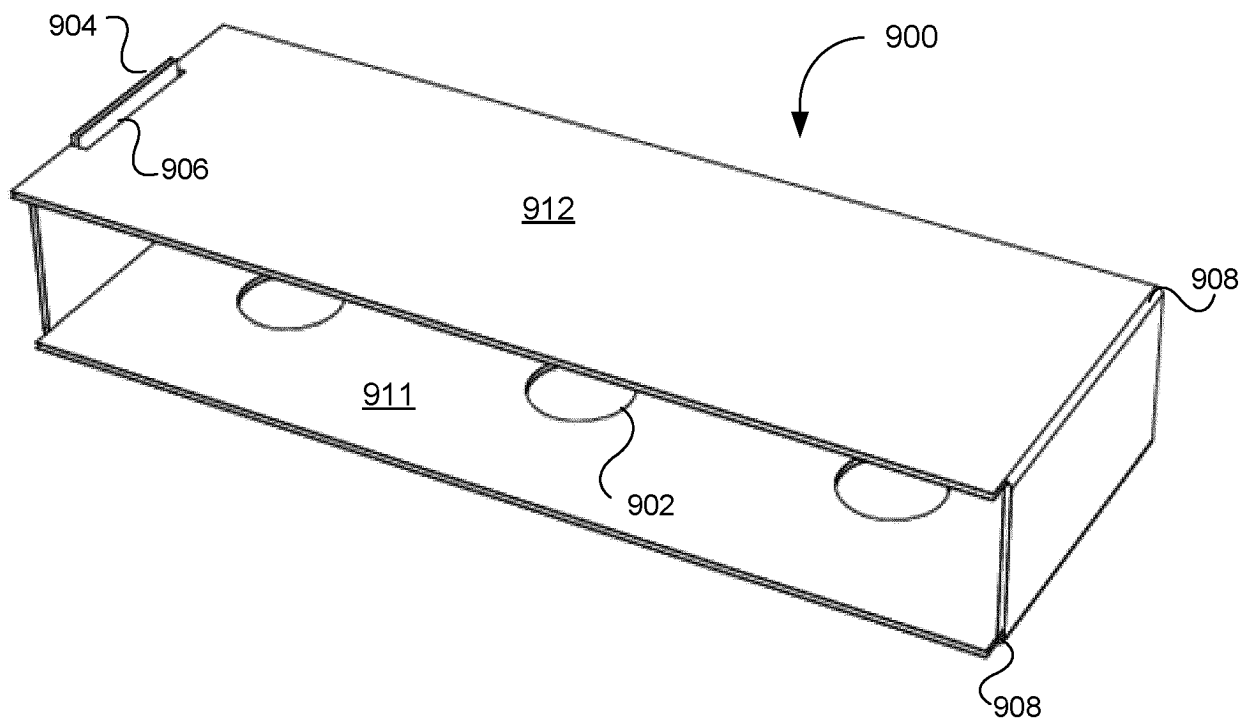


FIG. 9C

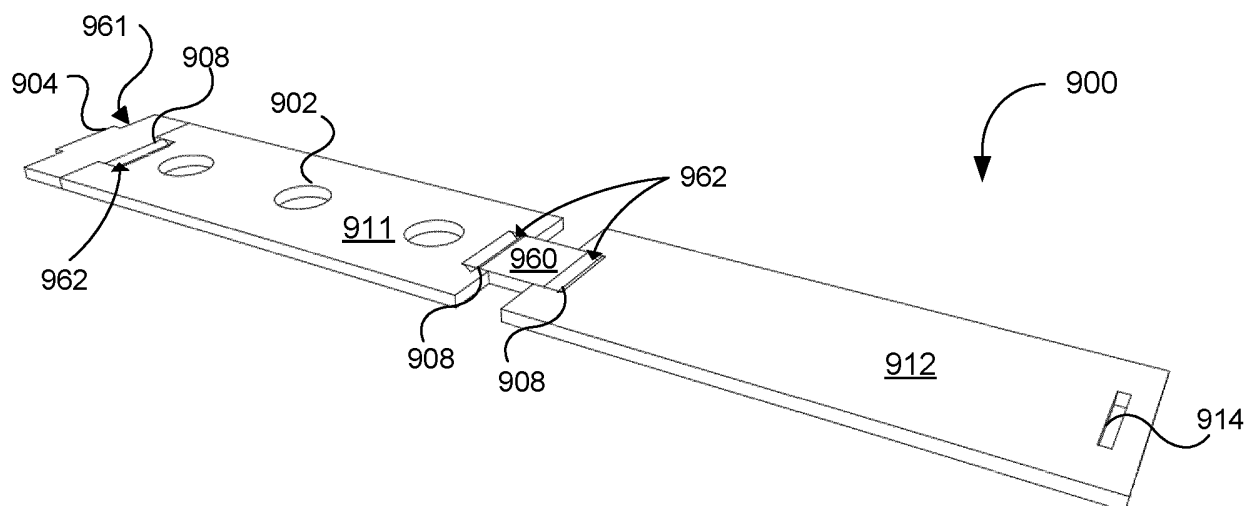


FIG. 9D

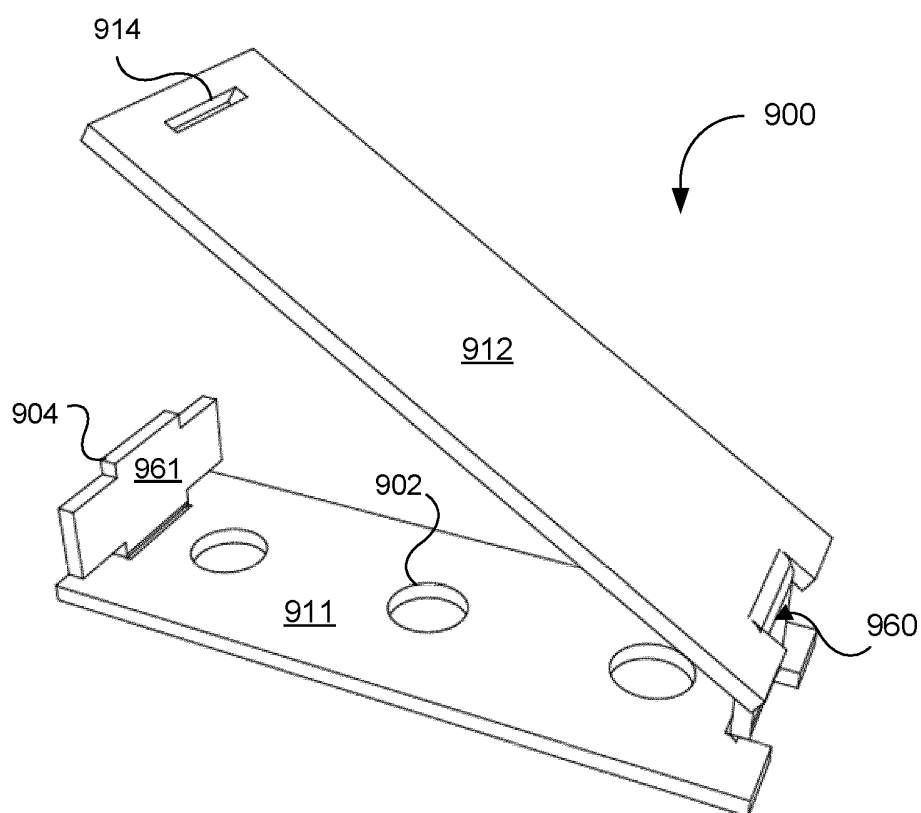


FIG. 9E

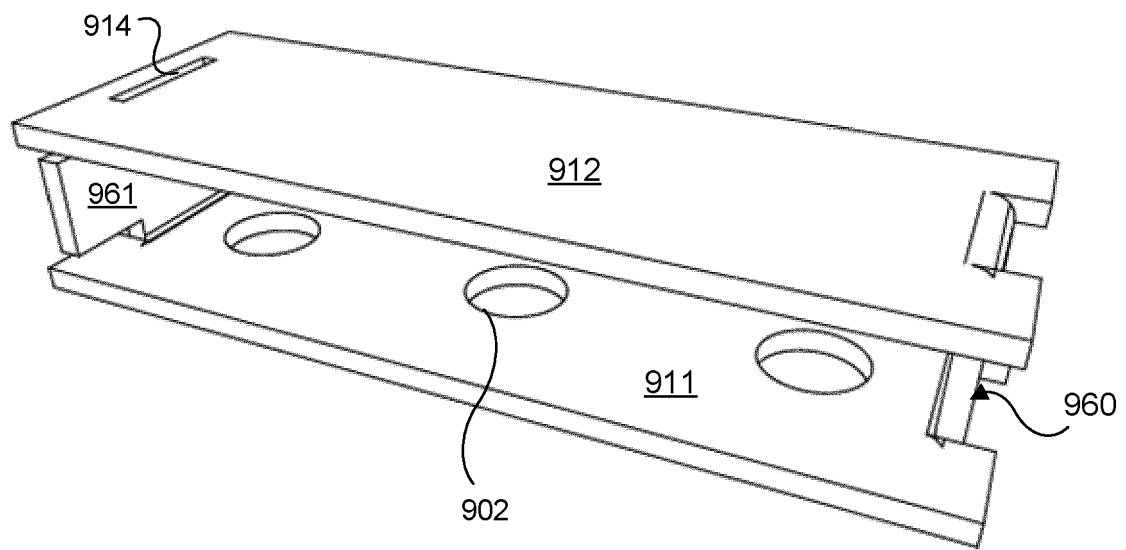


FIG. 9F

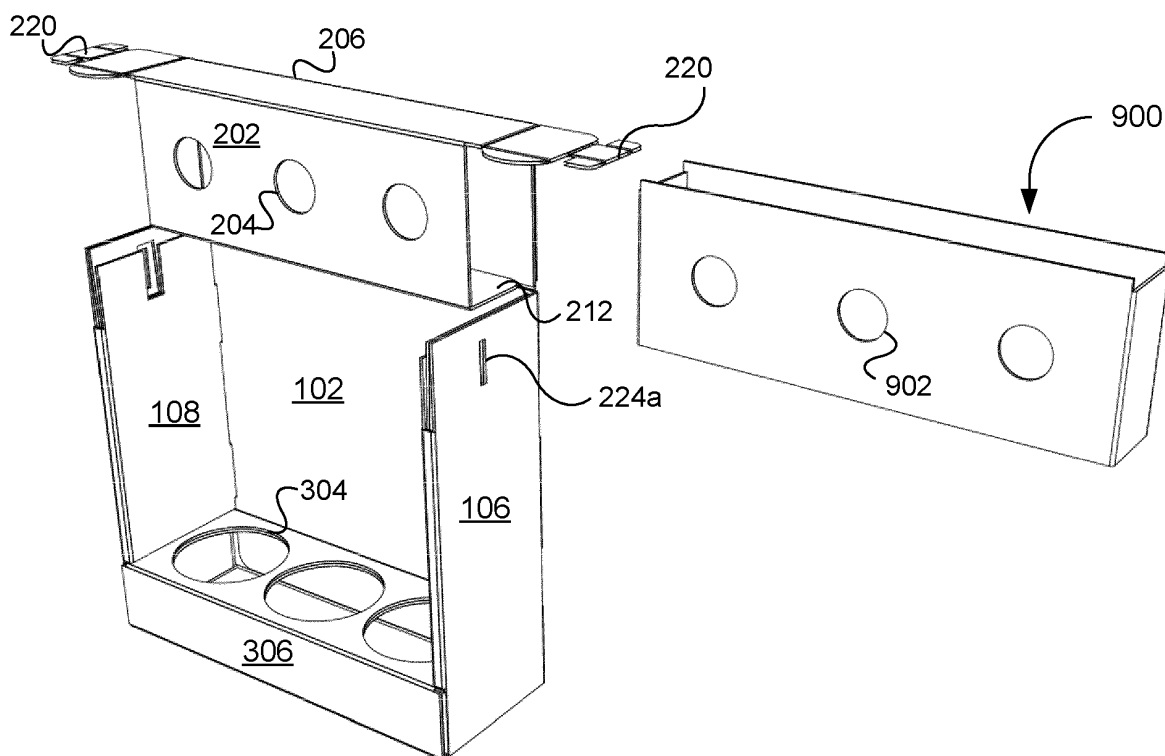


FIG. 10A

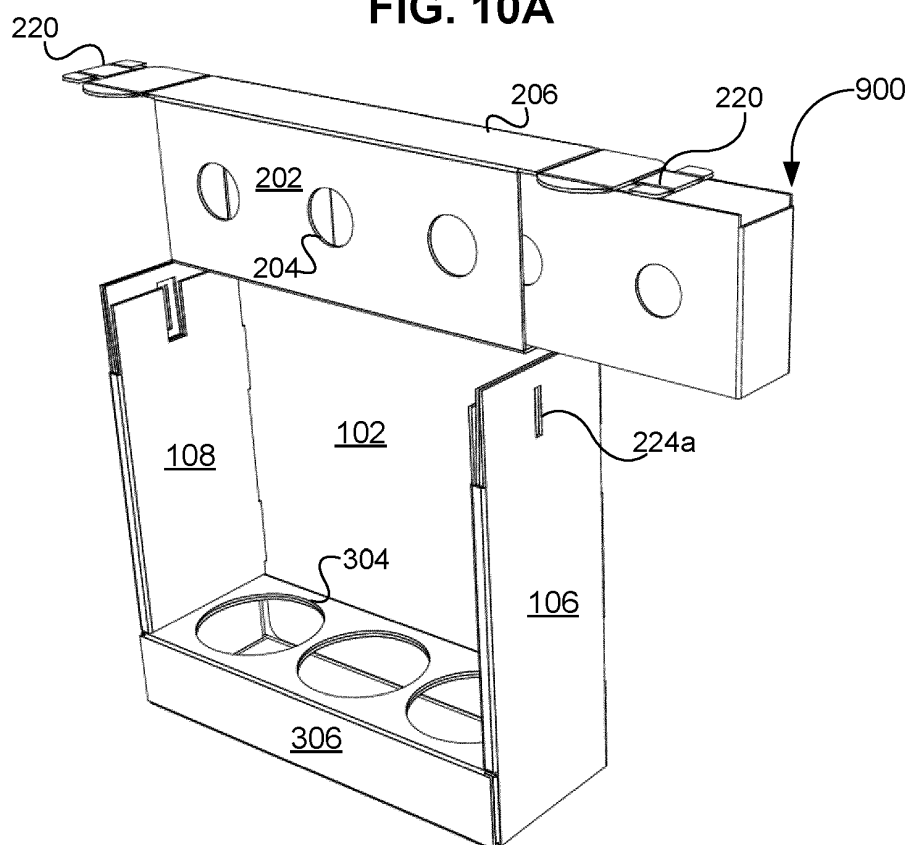


FIG. 10B

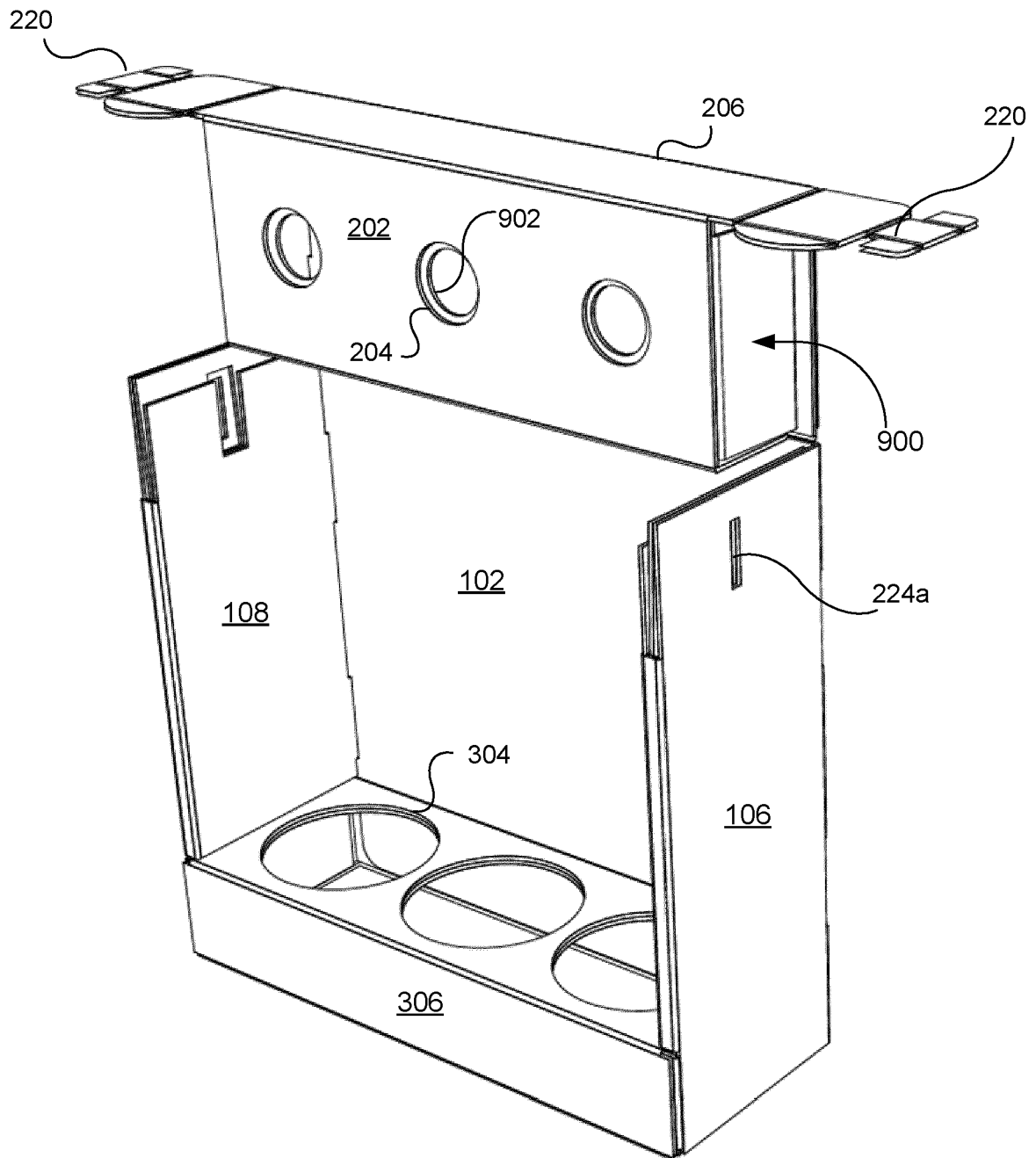


FIG. 10C

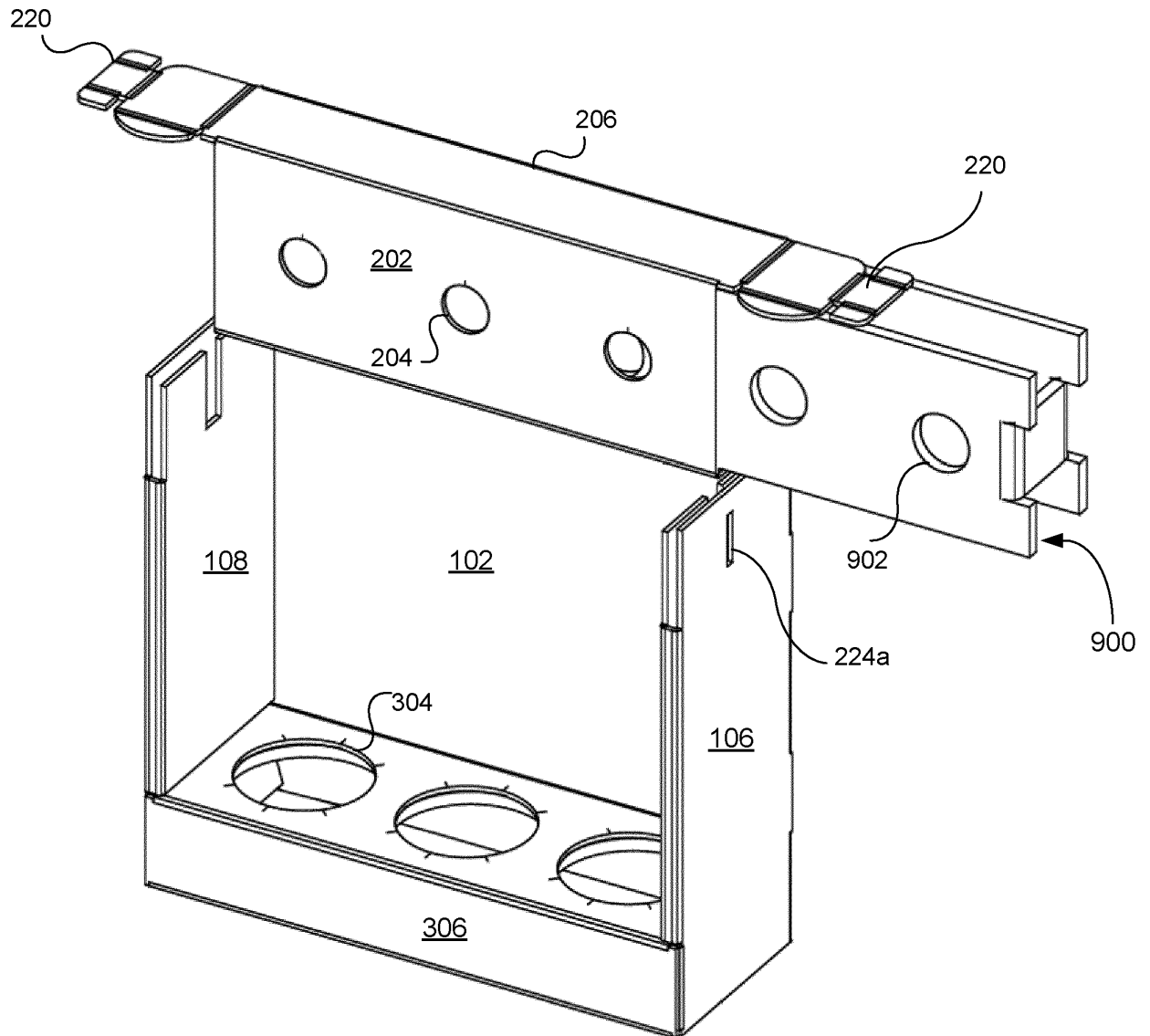


FIG. 10D

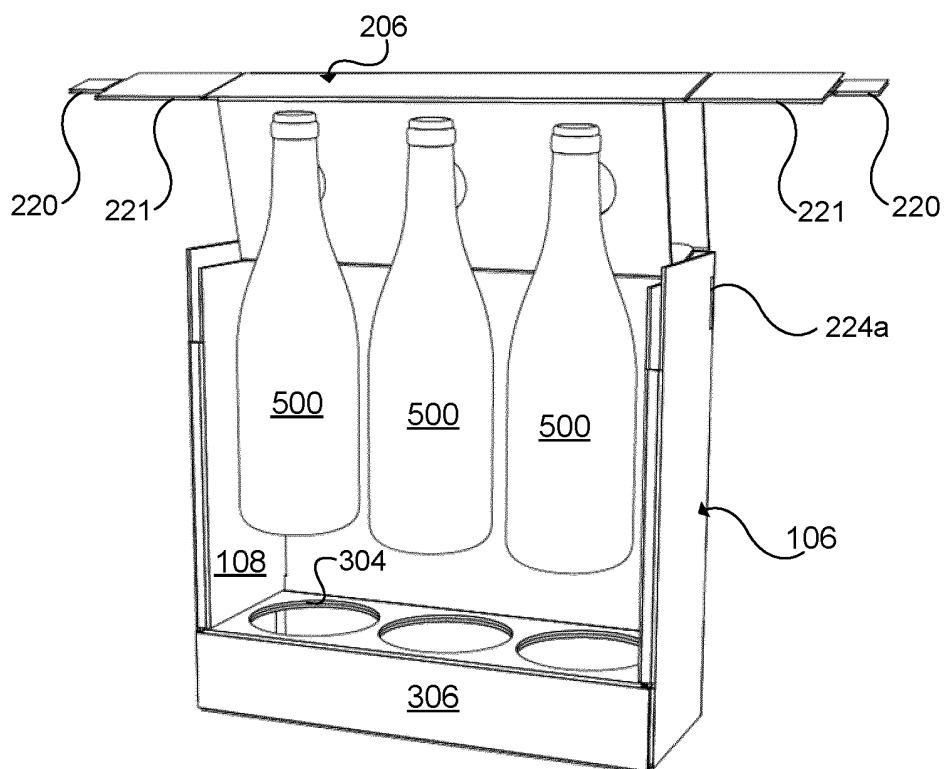


FIG. 11A

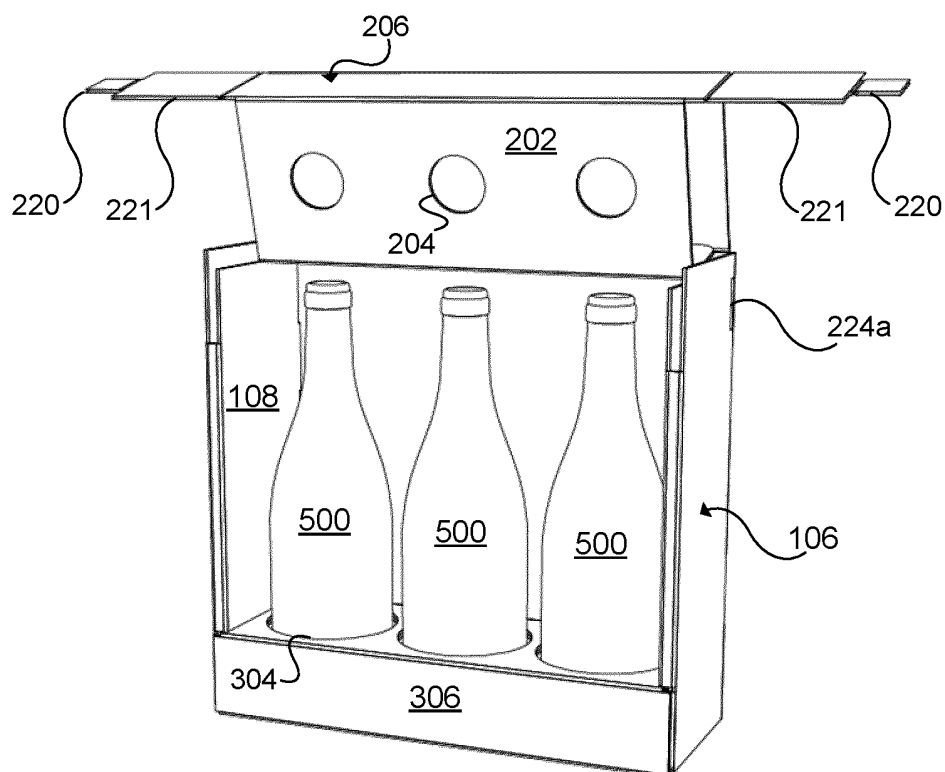


FIG. 11B

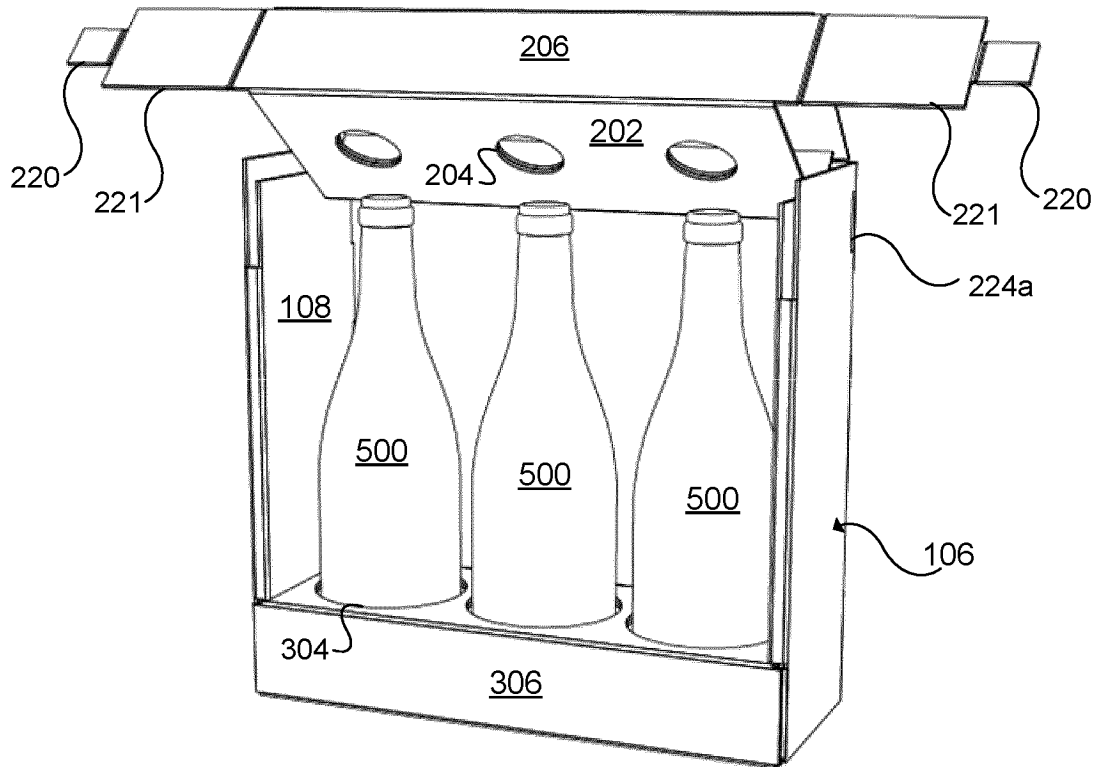


FIG. 11C

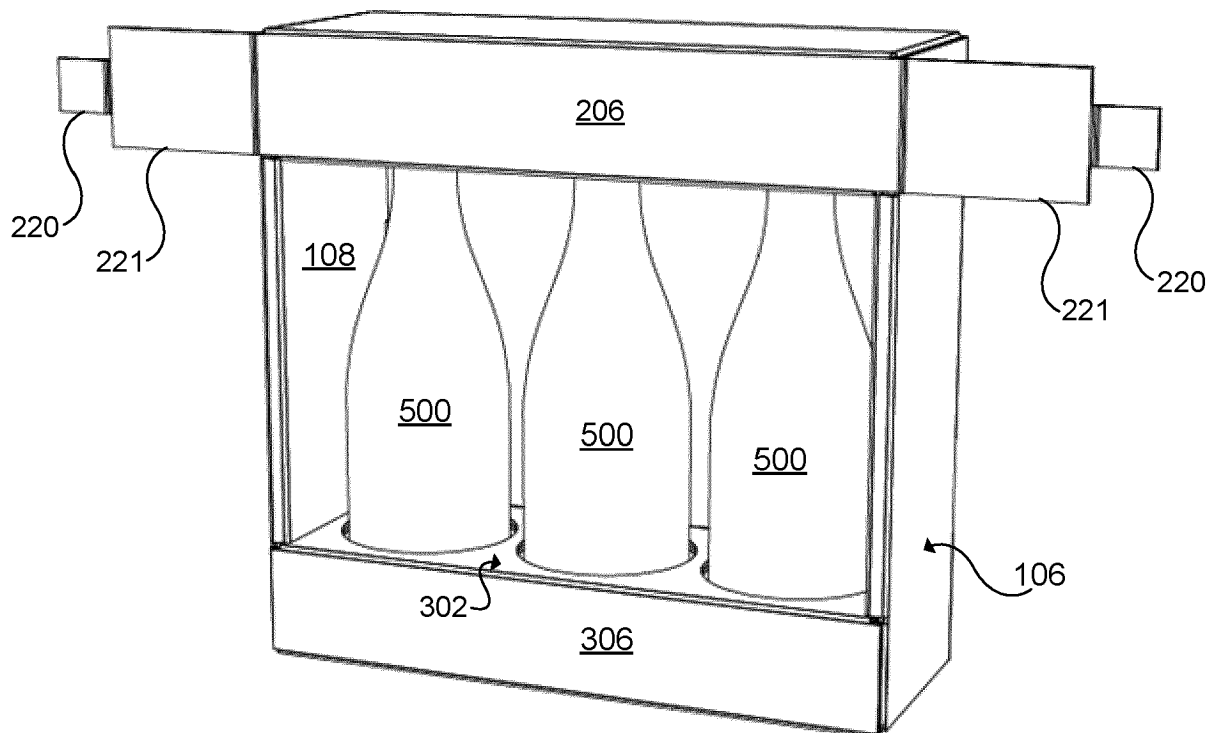


FIG. 11D

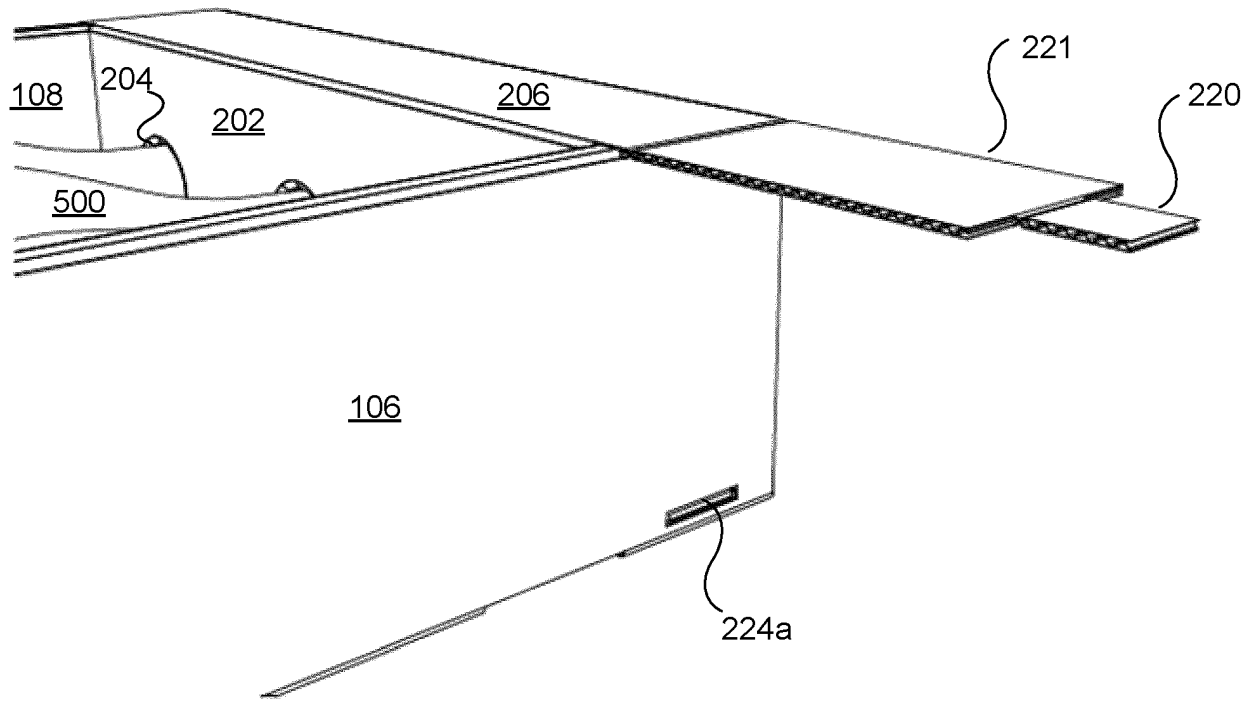


FIG. 11E

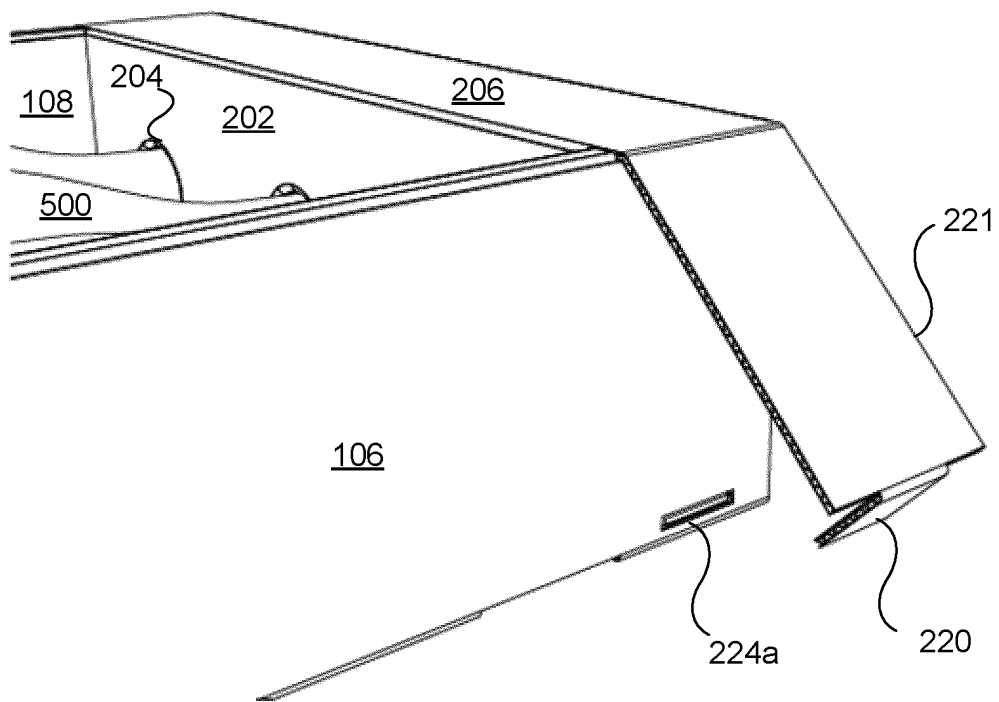


FIG. 11F

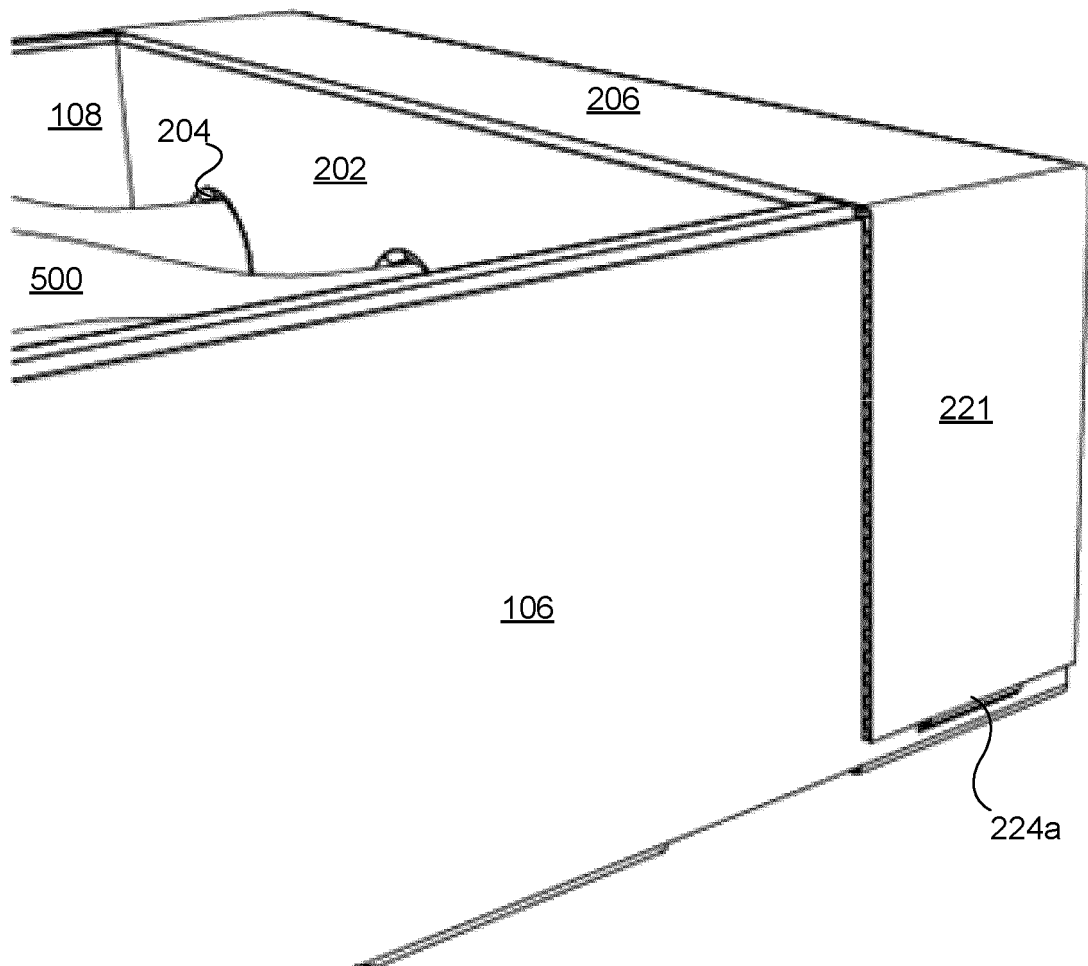


FIG. 11G

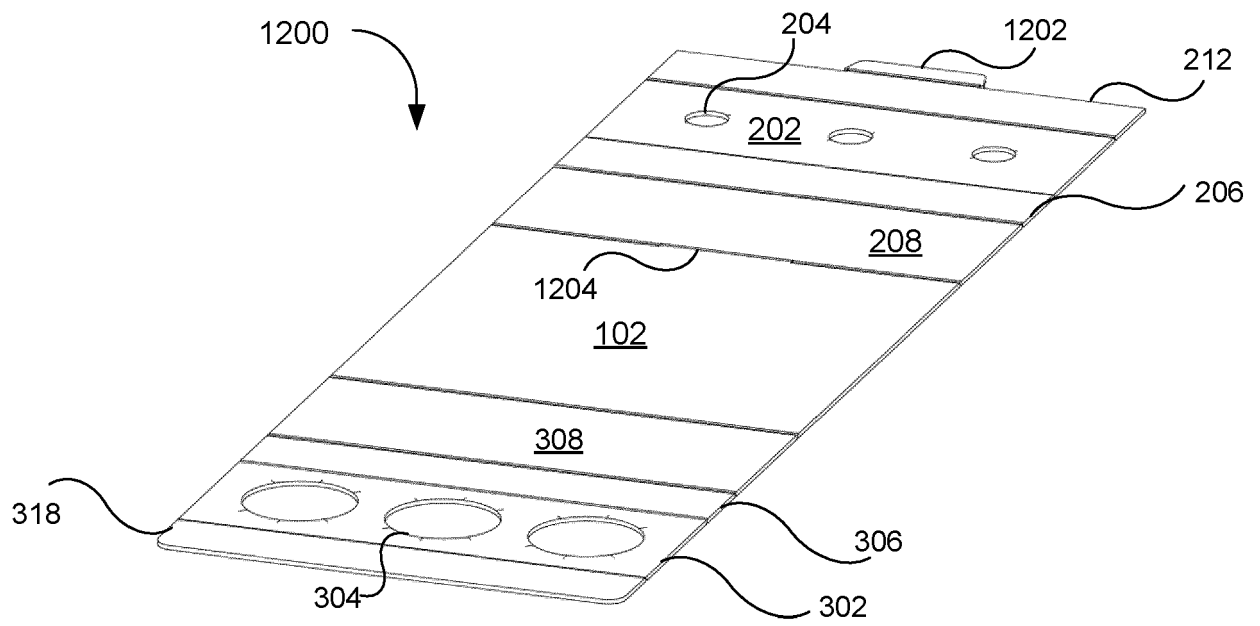


FIG. 12A

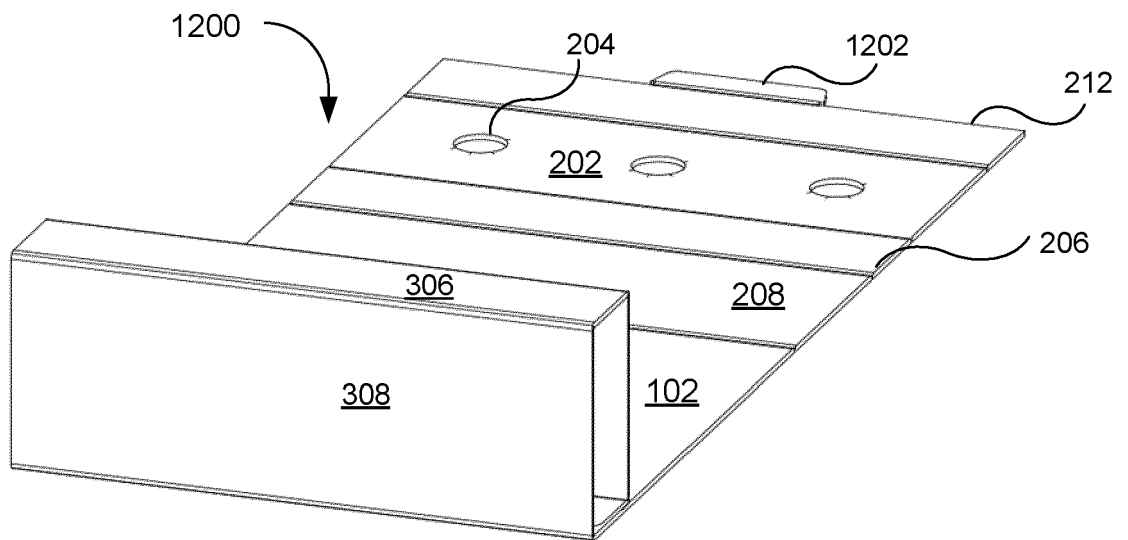


FIG. 12B

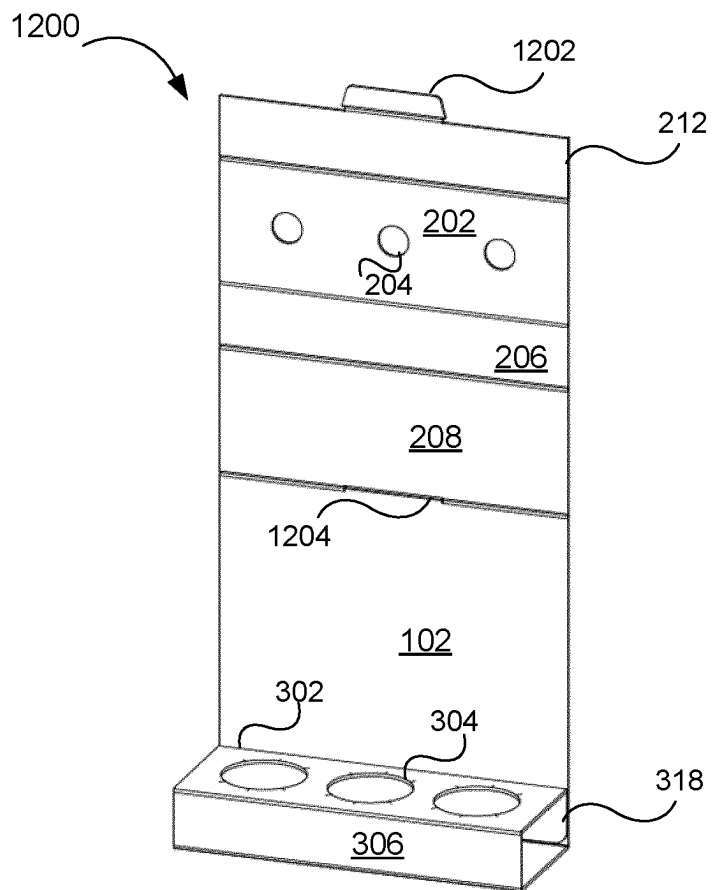


FIG. 12C

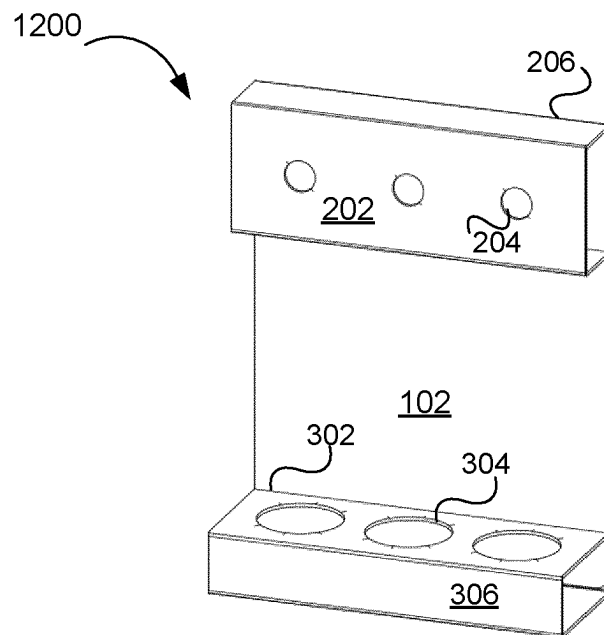
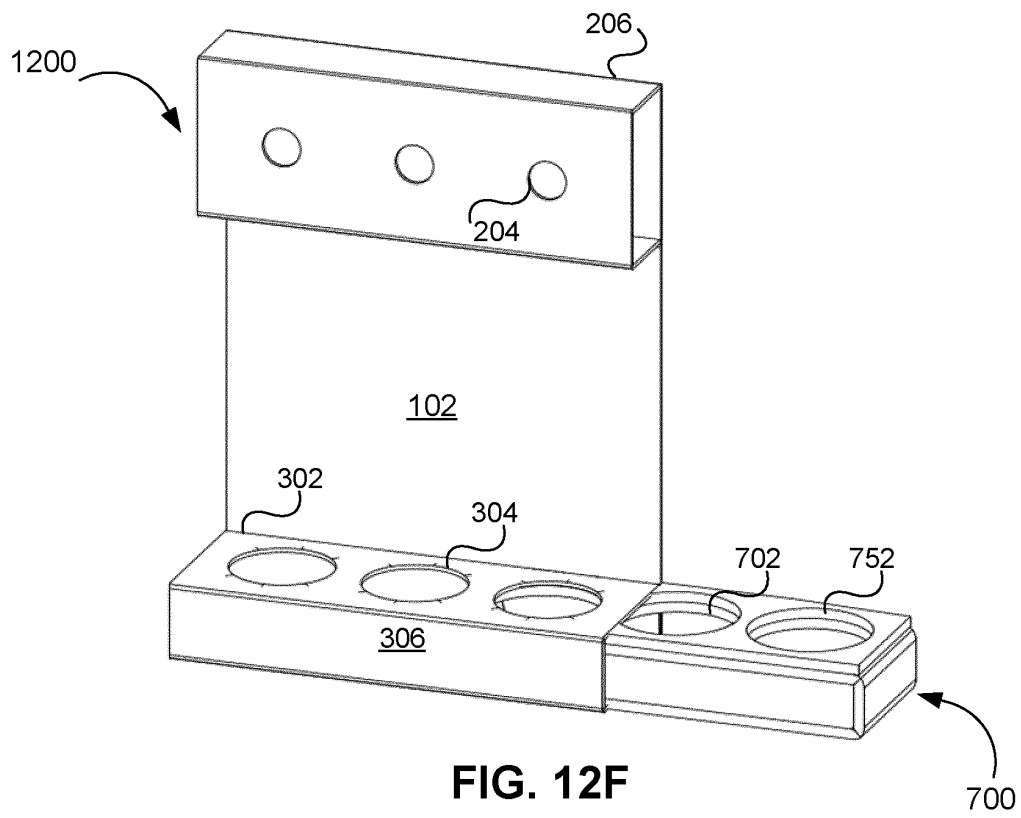
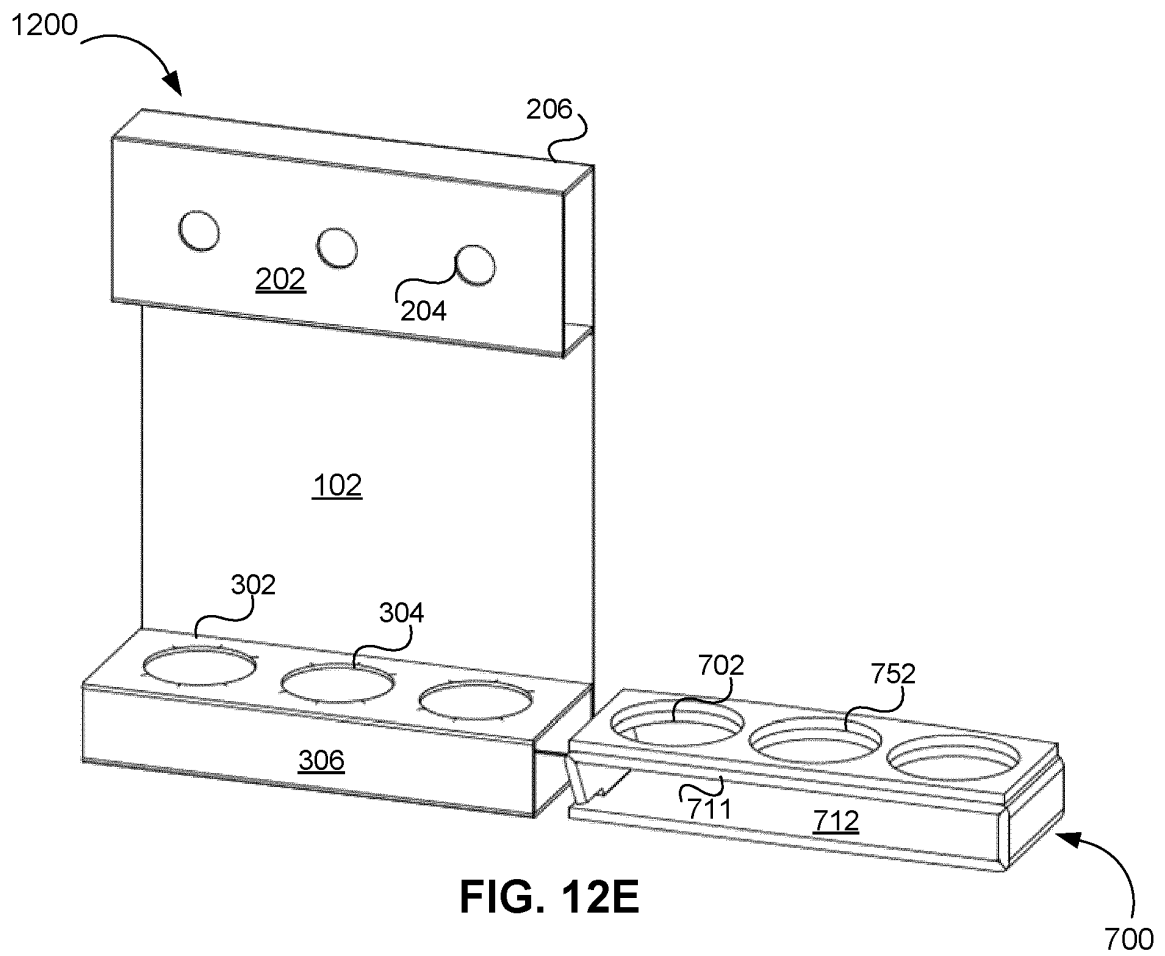


FIG. 12D



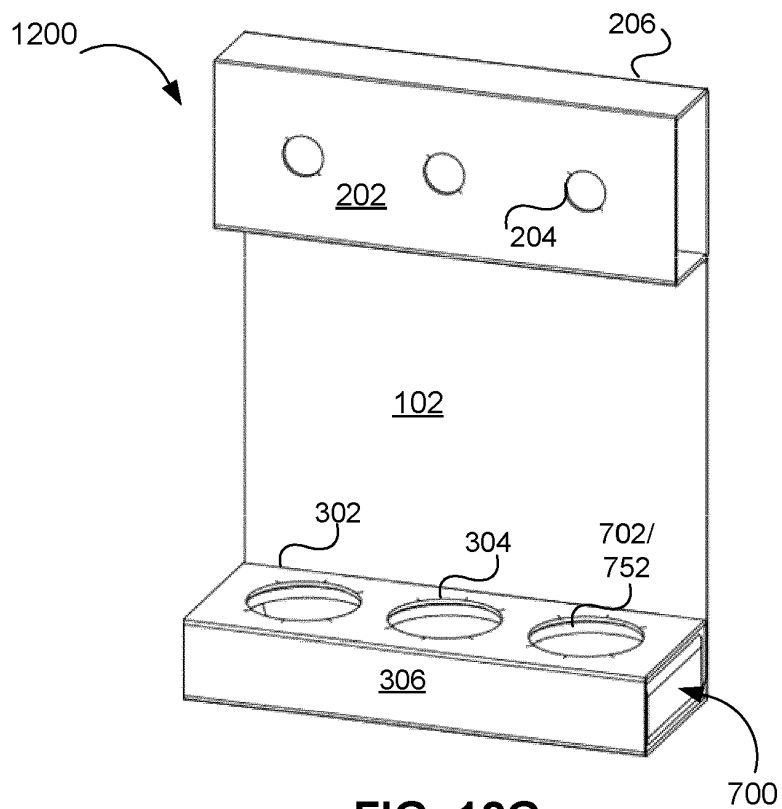


FIG. 12G

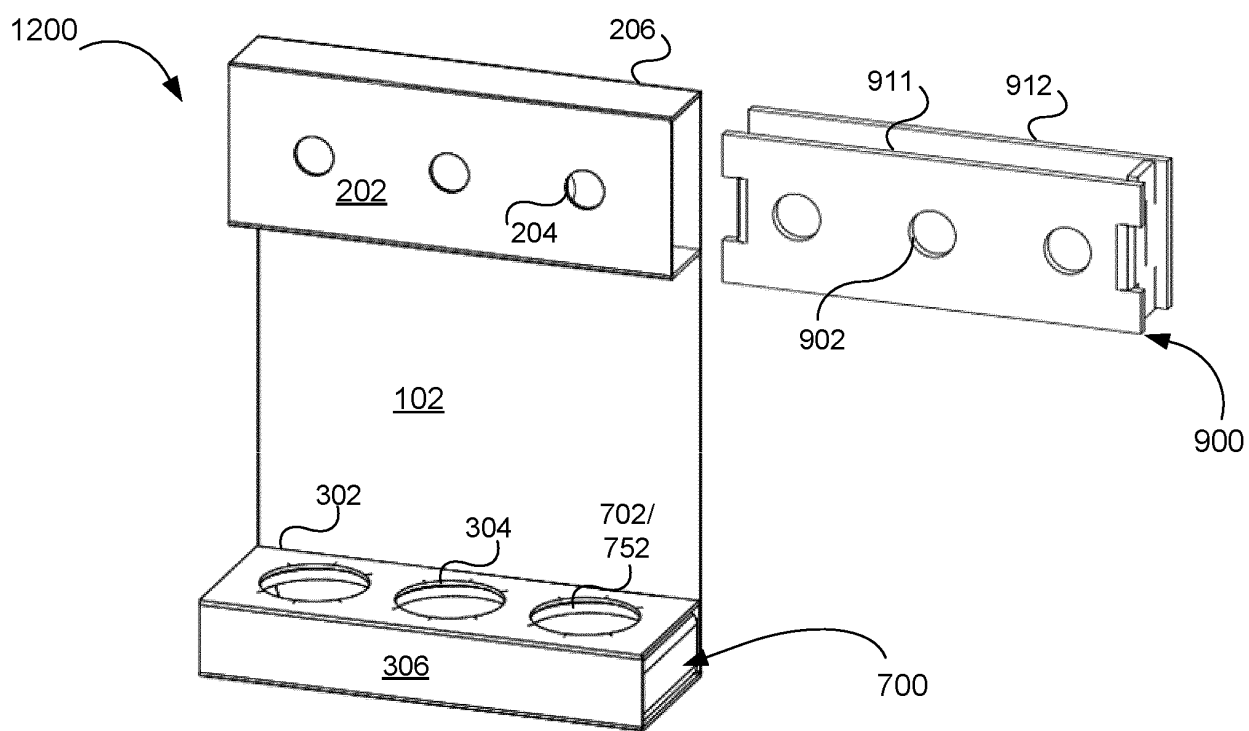


FIG. 12H

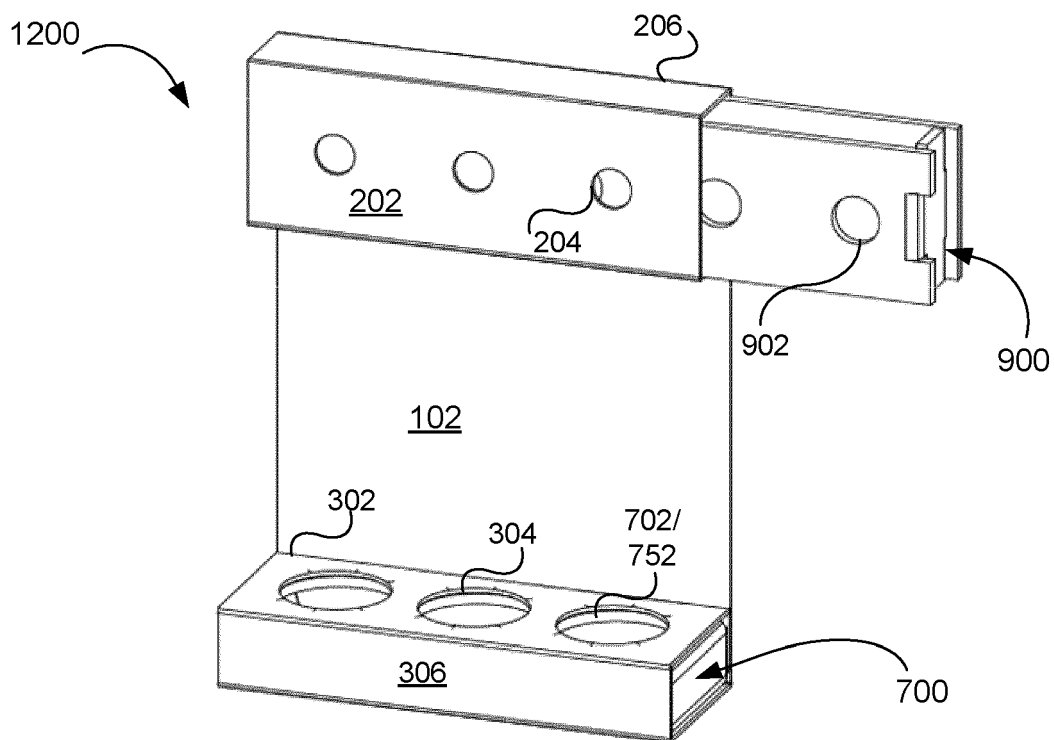


FIG. 12I

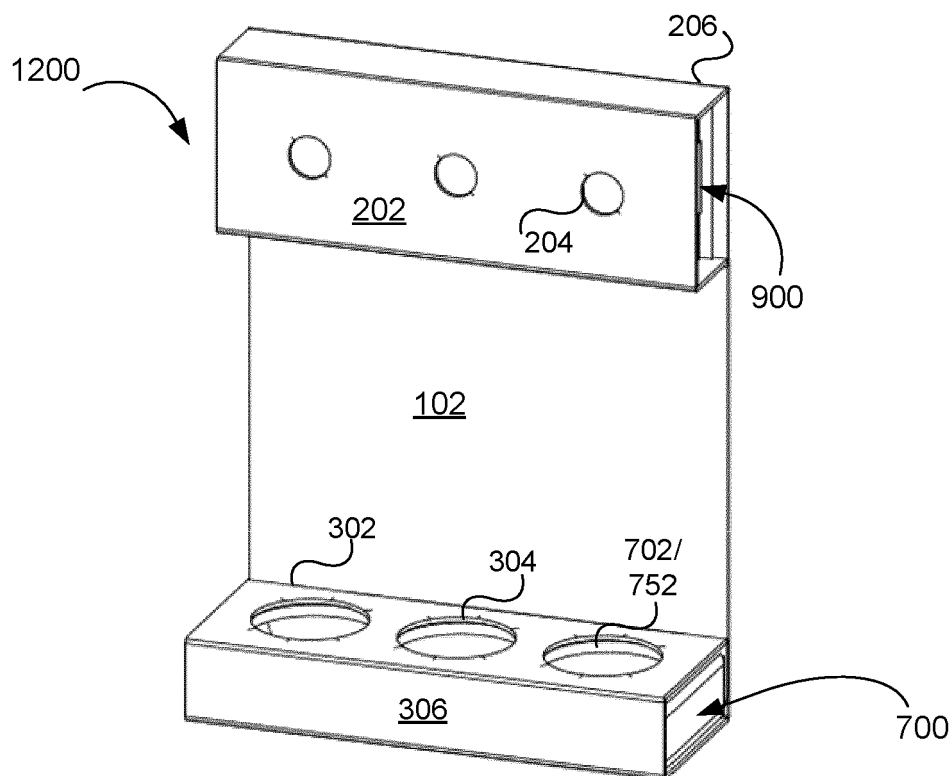


FIG. 12J

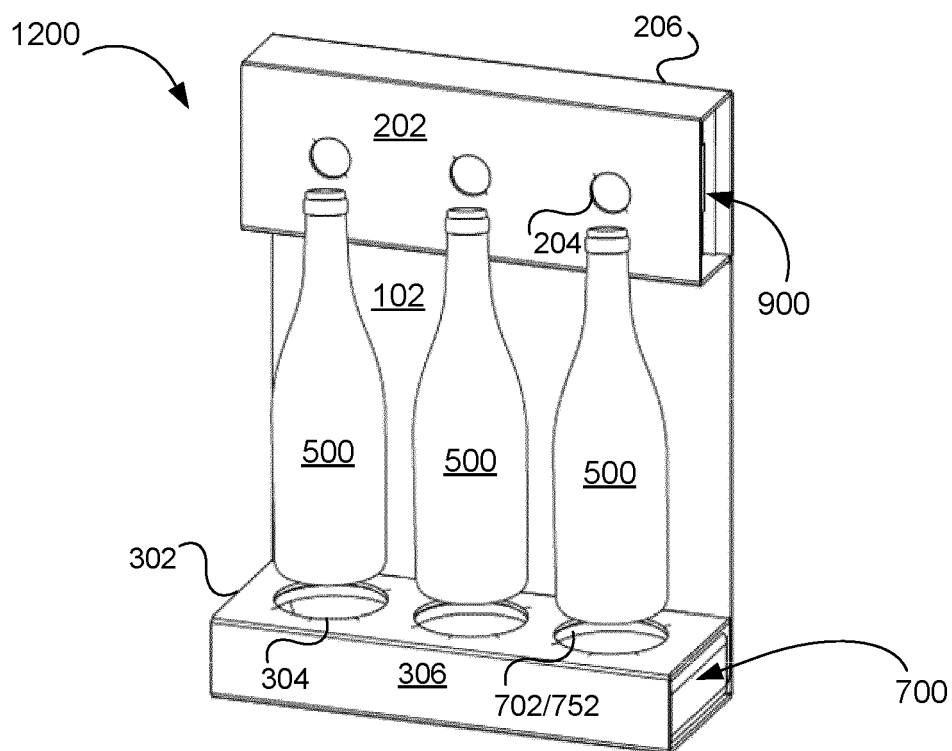


FIG. 12K

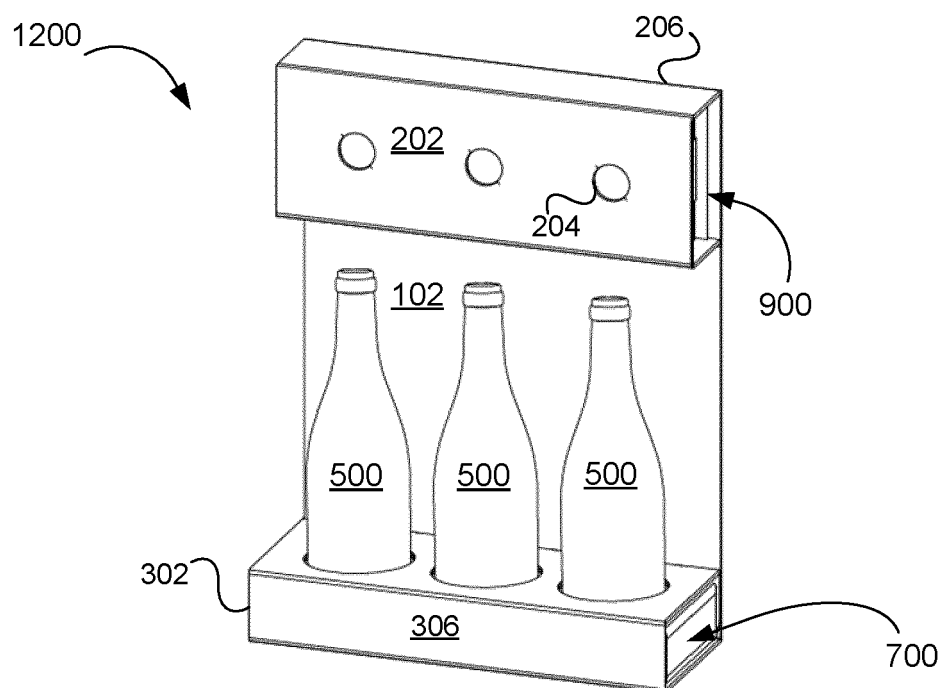


FIG. 12L

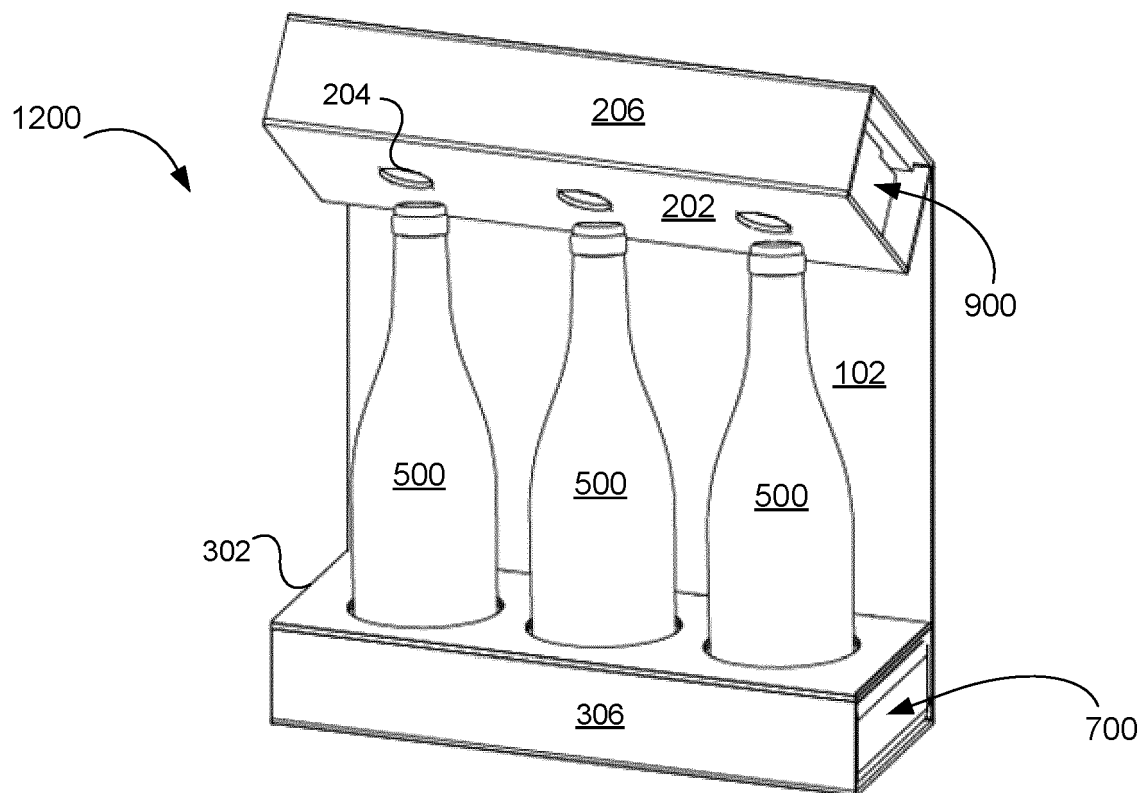


FIG. 12M

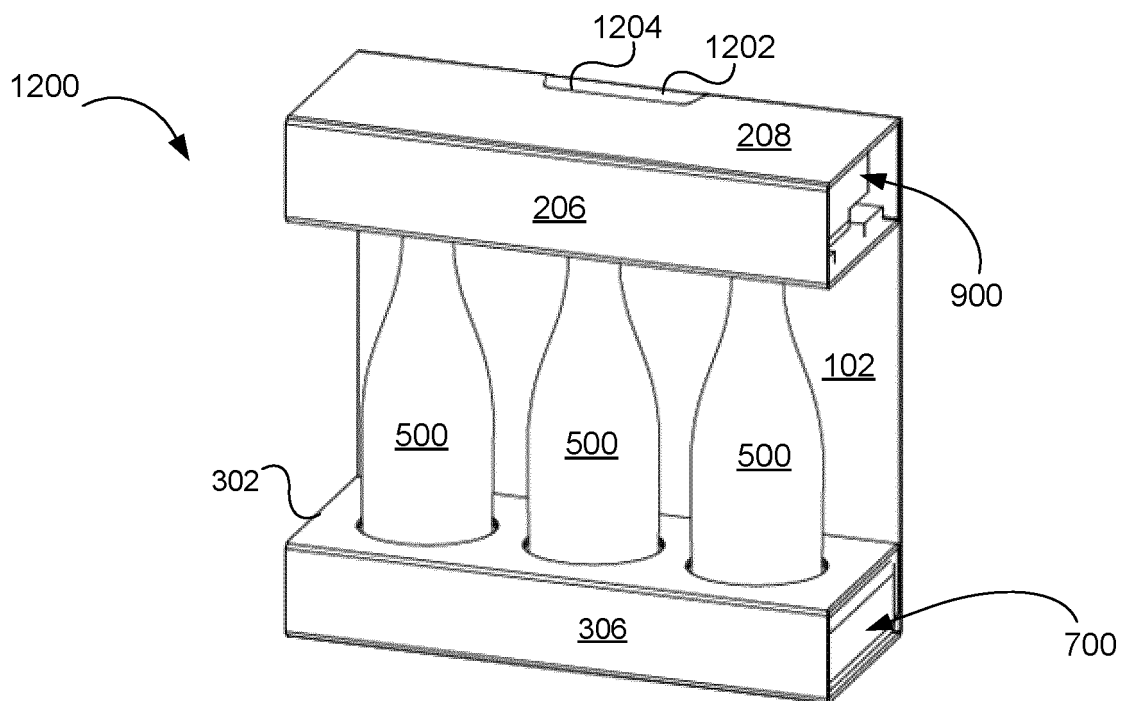


FIG. 12N

REFERENCES CITED IN THE DESCRIPTION

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