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(54) Title: TRAY ASSEMBLY FOR ONE OR MORE ARTICLES

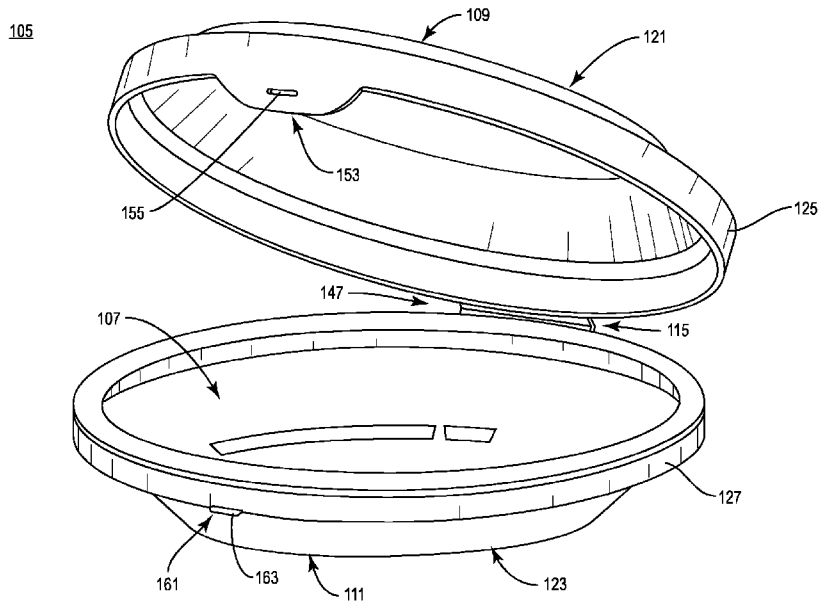

FIG. 3

(57) Abstract: A tray assembly for holding one or more articles, the tray assembly including a lid having a lid portion coupled to an upper hinge portion, a base having a base portion coupled to a lower hinge portion, the base portion extending at least partially around an interior of the tray assembly, and a hinge between the lid and the base and including the upper hinge portion and the lower hinge portion, the hinge for repositioning the tray assembly between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base, the upper hinge portion hingably coupled to the lower hinge portion, at least one of the lid portion, the base portion, the upper hinge portion, and the lower hinge portion includes paperboard.

[Continued on next page]

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TRAY ASSEMBLY FOR ONE OR MORE ARTICLES

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit of U.S. Provisional Patent Application No. 63/462,000, filed on April 26, 2023.

INCORPORATION BY REFERENCE

[0002] The disclosure of U.S. Provisional Patent Application No. 63/462,000, filed on April 26, 2023, is hereby incorporated for all purposes as if set forth in its entirety.

BACKGROUND

[0003] The present disclosure generally relates to containers for holding one or more articles. More specifically, the present disclosure relates to tray assemblies for holding one or more articles and that include opening features.

SUMMARY

[0004] According to one aspect, the disclosure is generally directed to a tray assembly for holding one or more articles, the tray assembly comprising a lid comprising a lid portion coupled to an upper hinge portion, a base comprising a base portion coupled to a lower hinge portion, the base portion extending at least partially around an interior of the tray assembly, a hinge between the lid and the base and comprising the upper hinge portion and the lower hinge portion, the hinge for repositioning the tray assembly between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base, the upper hinge portion hingably coupled to the lower hinge portion, at least one of the lid portion, the base portion, the upper hinge portion, and the lower hinge portion comprises paperboard.

[0005] According to another aspect, the disclosure is generally directed to a combination of components for forming a tray assembly for holding one or more articles, the combination of components comprising a lid portion, an upper hinge portion for being coupled to the lid portion to form a lid when the tray assembly is formed from the combination of components, a base portion for extending at least partially around an interior of the tray assembly, a lower hinge portion for being coupled to the base portion to form a base when the tray assembly is formed from the combination of components, at least one of the lid portion, the base portion, the upper hinge portion, and the lower hinge portion comprises paperboard, the upper hinge portion for being hingably coupled to the lower hinge portions to form a hinge for repositioning the tray assembly formed from

the combination of components between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base.

[0006] According to another aspect, the disclosure is generally directed to a method of forming a tray assembly for holding one or more articles, the method comprising obtaining a lid portion, obtaining an upper hinge portion, obtaining a base portion extending at least partially around an interior of the tray assembly, obtaining an upper hinge portion, obtaining a lower hinge portion, coupling the lid portion to the upper hinge portion to form a lid when the tray assembly is formed from the combination of components, coupling the base portion to the lower hinge portion to form a base, and hingably coupling the upper hinge portion to the lower hinge portion to form a hinge for repositioning the tray assembly between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base.

[0007] Those skilled in the art will appreciate the above stated advantages and other advantages and benefits of various additional embodiments reading the following detailed description of the embodiments with reference to the below-listed drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

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

[0009] Fig. 1 is an exploded perspective view of a tray assembly according to a first exemplary embodiment of the disclosure.

[0010] Fig. 1A is a perspective view of a lid portion of the tray assembly of Fig. 1 according to the first exemplary embodiment of the disclosure.

[0011] Fig. 1B is a perspective view of the base portion of the tray assembly of Fig. 1 according to the first exemplary embodiment of the disclosure.

[0012] Fig. 1C is a perspective view of an upper hinge portion of the tray assembly of Fig. 1 according to the first exemplary embodiment of the disclosure.

[0013] Fig. 1D is a perspective view of a lower hinge portion of the tray assembly of Fig. 1 according to the first exemplary embodiment of the disclosure.

[0014] Fig. 2 is a perspective view of the tray assembly of Fig. 1 in a closed configuration according to the first exemplary embodiment of the disclosure.

[0015] Fig. 3 is a perspective view of the tray assembly of Fig. 1 in an open configuration according to the first exemplary embodiment of the disclosure.

[0016] Fig. 4 is a perspective view of a tray assembly in an open configuration according to a second exemplary embodiment of the disclosure.

[0017] Fig. 5 is a perspective view of the tray assembly of Fig. 4 according to the second exemplary embodiment of the disclosure.

[0018] Corresponding parts are designated by corresponding reference numbers throughout the drawings.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0019] The present disclosure generally relates to containers such as trays/tray assemblies, cartons, cartons, carriers, clips, or the like, and packages that hold one or more articles such as personal care items (e.g., cosmetics such as makeup, etc., soaps, lotions, gels, suspensions, balms, masks, medicinal products, rinses such as mouthwash, etc.), household products (e.g., detergents, soap, hand or surface sanitizer, etc.), food products, or other articles.

[0020] Tray assemblies according to the present disclosure can accommodate articles of any shape. For the purpose of illustration and not for the purpose of limiting the scope of the disclosure, the following detailed description describes product holding tray assemblies (e.g., paperboard trays and sleeves). In this specification, the terms "inner," "interior," "outer," "exterior," "lower," "bottom," "upper," and "top" indicate orientations determined in relation to fully erected and upright tray assemblies.

[0021] As described herein, tray assemblies may be formed by multiple overlapping panels, end flaps, and/or other portions of blanks. Such panels, end flaps, and/or other portions of the blanks can be designated in relative terms to one another, e.g., "first", "second", "third", etc., in sequential or non-sequential reference, without departing from the disclosure.

[0022] Fig. 1 is an exploded view of a tray assembly 105 according to a first exemplary embodiment of the present disclosure. As shown, the tray assembly 105 can be formed from a combination of components that can include a lid portion 121, a base portion 123, an upper hinge portion 125, and a lower hinge portion 127.

[0023] As described further herein, the lid portion 121 of the tray assembly 105 can cooperate with an upper hinge portion 125 to form a lid 109 of the tray assembly 105. In addition, the base portion 123 of the tray assembly 105 can cooperate with the lower hinge portion 127 to form a base 111 of the tray assembly 105. Still further, the upper hinge portion 125 can cooperate with the lower hinge

portion 127 to form a hinge 115 (Fig. 2A) of the tray 105 for providing a hingable connection between the lid 109 and the base 111 of the tray assembly 105 to provide selective access to an interior 107 (Fig. 1B) of the tray assembly 105.

[0024] As shown in Fig. 1A, the lid portion 121 of the tray assembly 105 can have a generally inverted bowl-shaped configuration, with a generally circular top 129, a sloped sidewall 131 extending downwardly from the top 129, and a flange 133 extending outwardly from the sidewall 131.

[0025] In some embodiments, the lid portion 121 of the tray assembly 105 can be formed from a paperboard blank that can be processed in a forming apparatus that includes a first tool part that cooperates with a second tool part. The first tool part can be a male forming apparatus part including a forming head or other shaping structure, the second tool part can be a female forming apparatus part including a cavity or other recess for at least partially receiving the forming head, and the second tool part can be is actuated to move toward the first tool part (e.g., by a motor, a hydraulic or pneumatic actuator, or other suitable actuator) after a blank is located onto the first tool part to cause one or more fibers or other components of the paperboard blank to deform, e.g., stretch, reorient, etc., into a desired configuration. Such a press-forming or molding apparatus could be otherwise configured without departing from the disclosure. For example, the male forming part could be disposed above the female forming part and/or either or both of the tool parts could be configured to move toward the other. A forming apparatus of the type suitable for use with the lid portion 121, e.g., to form the lid portion 121 from an associated blank, is disclosed in U.S. Patent No. 10,173,386, entitled *Blank and Forming Tool for Forming a Container*, issued on January 8, 2019.

[0026] Similarly, with additional reference to Fig. 1B, the base portion 123 can have a similar, but inverted, configuration relative to the lid portion 121 of the tray assembly 105. In this regard, the base portion 123 can have a generally bowl-shaped configuration that includes a generally circular bottom 135, a sloped sidewall 137 extending upwardly from the bottom 135, and a flange 139 extending outwardly from the sidewall 137. The base portion 123 can be formed from a blank in a manner similar to that described above with regard to the lid portion 121, e.g., via cooperation with a forming apparatus. A forming apparatus of the type suitable for use with the base portion 123, e.g., to form the base portion 123 from an associated blank, is disclosed in U.S. Patent No. 10,173,386, entitled *Blank and Forming Tool for Forming a Container*, issued on January 8, 2019.

[0027] As described further herein, the base portion 123 can at least partially define the interior 107 of the tray assembly 105, for example, an article receiving portion of the tray assembly 105. In this regard, the interior 107 can be at least partially formed between the bottom 135 and the sidewall 137 of the base portion 123. In some embodiments, the interior of the tray assembly 105 can be at least partially defined by the lid portion 121.

[0028] As described herein, one or both of the lid portion 121 and the base portion 123 of the tray 105 can be formed from a paperboard material, e.g., a paperboard material press-formed or molded in the manner described above. In some embodiments, such paperboard material can be provided with one or more coatings or films. For example, a paperboard can be provided with one or more fluid-resistant coatings or films so as to minimize absorption of one or more fluids or fluid components of articles held in the interior 107 of the tray 105. In some embodiments, one or both of the lid portion 121 and the base portion 123 of the tray 105 can be at least partially covered with a laminate, e.g., a foil laminate or other covering that can be provided with one or more surface features such as embossing, debossing, etc.

[0029] Turning to Fig. 1C, the upper hinge portion 125 can include a generally annular sidewall 141 and a generally annular rim 143 extending interiorly from an upper edge of the sidewall 141 in generally perpendicular relation thereto. The sidewall 141 and the rim 143 can at least partially define an opening 145 for at least partially receiving a portion of the lid portion 121, as described further herein.

[0030] As also shown, the upper hinge portion 125 can include a hinge component 147 extending downwardly from the sidewall 141. In the illustrated embodiment, the hinge component 147 can include a first portion 149 proximate the sidewall 141 and a second portion 151 at least partially hingably/rotatably coupled to the first portion 149 and extending away therefrom. In some embodiments, the first portion 149 of the hinge component 147 can include one or more generally tubular members through which a generally rod-like or pin-like portion of the second portion 151 can be rotatably received therein.

[0031] The tray assembly 105 can also include locking features for at least partially maintaining the tray assembly 105 in a closed configuration, as described further herein. In some embodiments, the upper hinge portion 125 can include an upper locking feature 153 at least partially defined adjacent the sidewall 141, and which can include a locking opening 155 (broadly, "locking recess") defined in a portion of the upper hinge portion 125. In some embodiments, the upper locking feature 153 can protrude at least partially downwardly from the sidewall 141. In other embodiments, the upper locking feature 153 can be formed along the profile of the sidewall 141.

[0032] With reference to Fig. 1D, the lower hinge portion 127 can include a generally annular sidewall 154 and a generally annular rim 157 extending interiorly from an upper edge of the sidewall 154 in generally perpendicular relation thereto. The sidewall 154 and the rim 157 can at least partially define an opening 159 for at least partially receiving a portion of the base portion 123, as described further herein.

[0033] The lower hinge portion 127 can also include a lower locking feature 161 for at least partially being received in the locking opening 155 of the upper locking feature 153. In the illustrated embodiment, the lower locking feature 161 can include a locking protrusion 163 extending/protruding outwardly from the sidewall 154. In some embodiments, the locking protrusion 163 can have a pronged or otherwise shaped profile so as to include at least one discontinuity along an outer free edge thereof.

[0034] In some embodiments, one or both of the upper hinge portion 125 and the lower hinge portion 127 can be formed of a polymeric material. In some embodiments, such polymeric material can be provided with a coating or plating, e.g., a chrome or other plating. In some embodiments, one or both of the upper hinge portion 125 and the lower hinge portion 127 can be formed of a metallic material.

[0035] With additional reference to Fig. 2, the fully assembled tray assembly 105 is illustrated in a closed configuration, e.g., such that the lid 109 at least partially overlies the base 111. In some embodiments, the closed configuration of the tray assembly 105 can include an abutting relationship between the lid 109 and the base 111. In the illustrated embodiment, in the closed configuration of the tray assembly 105, the downwardly-extending portion of the sidewall 141 that includes the upper locking feature 153 of the upper hinge portion 125 can overlap to extend in front can overlap and extend in front of at least a portion of the sidewall 154 of the lower hinge portion 127.

[0036] In some embodiments, in order to form the tray assembly 105, the lid portion 121 can be at least partially received through the opening 145 in the upper hinge portion 125 to form the lid 109 of the tray assembly 105. In some embodiments, the sidewall 131 and top 129 of the lid portion 121 can protrude upwardly through the opening 145 such that the flange 133 of the lid portion 121 is at least partially recessed within the upper hinge portion 125 between the sidewall 141 and the rim 143 and contacting the rim 143. In some embodiments, the lid portion 121 can be at least partially coupled to the upper hinge portion 125, for example, with an adhesive such as glue, by crimping a portion of the upper hinge portion 125, etc.

[0037] Similarly, the base portion 123 can be at least partially received through the opening 159 in the lower hinge portion 127 to form the base 111 of the tray assembly 105. In some embodiments, the sidewall 137 and bottom 135 of the base portion 123 can protrude downwardly through the opening 159 such that the flange 139 of the base portion 123 is at least partially recessed within the lower hinge portion 127 between the sidewall 154 and the rim 157 and contacting the rim 157. In some embodiments, the lid portion 121 can be at least partially coupled to the lower hinge portion 127, for example, with an adhesive such as glue, by crimping a portion of the lower hinge portion 127, etc.

[0038] The second portion 151 of the hinge component 147 of the upper hinge portion 125 can be at least partially attached to the sidewall 154 of the lower hinge portion 127. In some embodiments, the second portion 151 of the hinge component 147 can be coupled to the sidewall 154 of the lower hinge portion 127, for example, with a mechanical fastener such as a screw or rivet, can be adhered to the sidewall 154 of the lower hinge portion 127 with an adhesive such as glue, and/or can be welded to the sidewall 155 of the lower hinge portion 127.

[0039] In some embodiments, the sidewall 154 of the lower hinge portion 127 can have a configuration complementary to that of the second portion 151 of the hinge component 147, for example, a recessed portion along the sidewall 154, one or more openings for receiving a mechanical fastener and/or a portion of the second portion 151 of the hinge component 147, etc. In some embodiments, the upper hinge portion 125 and the lower hinge portion 151 can be at least partially unitarily or monolithically formed.

[0040] In this regard, and with additional reference to Fig. 3, the lid 109 and the base 111 of the tray assembly 105 are hingably arranged via the hinge component 147 of the hinge 115. For example, the first portion 149 of the hinge component 147 can be at least partially rotated/pivoted relative to the second portion 151 thereof such that the second component 151 of the hinge component 147 extends obliquely away from the first component 149. The lid 109 attached to the first portion 149 of the hinge component 147 via the upper hinge portion 125 can thus be pivotably arranged relative to the base 111.

[0041] Accordingly, the lid 109 can be selectively at least partially raised away from the base 111 in a first or open configuration of the tray assembly 105, and can be positioned at least partially overlying the base 111 in a second or closed configuration of the tray assembly 105.

[0042] In some embodiments, the tray assembly 105 can be at least partially maintained in the second or closed configuration via engagement of the locking features 153, 161. In particular, the locking opening 155 can be at least partially aligned with the locking protrusion 163 such that the locking protrusion 163 is at least partially received therethrough. Such engagement of the locking features 153, 161 in some embodiments, can include an at least partial camming action of the locking feature 153 over the locking protrusion 161 until the locking tab 161 is at least partially received in the locking opening 155, which can be accompanied by an audible and/or tactile pop or click.

[0043] It will be understood that the tray assembly 105 can be provided with a different configuration of locking features without departing from the disclosure. For example, in some embodiments, the locking features can comprise one or more magnetic elements coupled to the lid 109 configured to magnetically attract one or more magnetic elements coupled to the base 111 so as to at least partially maintain the tray assembly 105 in the second or closed configuration and/or to

provide a preselected degree of resistance from transitioning the tray assembly 105 from the second or closed configuration to the first or open configuration.

[0044] Accordingly, one or more articles can be positioned in the interior 107 of the tray assembly 105 in the first or open configuration prior to reconfiguration of the tray assembly 105 to the second or closed configuration. In order to transition the tray assembly 105 from the closed configuration to the open configuration, a user can at least partially disengage the locking tab 161 from the locking opening 155 and at least partially raise the lid 109 away from the base 111. In some embodiments, such unlocking of the locking features can include at least partially pulling on or tilting the locking feature.

[0045] Turning to Figs. 4 and 5, a tray assembly according to a second exemplary embodiment of the disclosure is generally designated 205. The tray assembly 205 can have one or more features that are the same or similar to those described above with respect to the tray assembly 105, and like or similar features are designated with like or similar reference numerals.

[0046] In the illustrated embodiment, the tray assembly 205 can include the lid portion 121, the base portion 123, an upper hinge portion 225, and a lower hinge portion 227. As described further herein, the lid portion 121 of the tray assembly 205 can cooperate with the upper hinge portion 225 to form a lid 209 of the tray assembly 205, and the base portion 123 of the tray assembly 205 can cooperate with the lower hinge portion 127 to form a base 211 of the tray assembly 205.

[0047] As shown, the upper hinge portion 225 and the lower hinge portion 227 can be hingably connected to one another such that a hinge 215 is integrally formed with both the upper hinge portion 225 and the lower hinge portion 227. In some embodiments, the hinge 215 can be otherwise coupled to one or both of the upper hinge portion 225 and the lower hinge portion 227.

[0048] The upper hinge portion 225, as shown, can have a generally rounded rectangular-disc configuration, with an upper surface 229, a lower surface 231, and a sidewall 233 extending from the upper surface 229 to the lower surface 231. The upper surface 229, the lower surface 231, and the sidewall 233 can at least partially define and/or circumscribe an opening 245 within which the lid portion 121 is at least partially received.

[0049] Similarly, the lower hinge portion 227 can have a generally rounded rectangular-disc configuration generally complementary to that of the upper hinge portion 225, with an upper surface 235, a lower surface 237, and a sidewall 239 extending from the upper surface 235 to the lower surface 237. The upper surface 235, the lower surface 237, and the sidewall 239 can at least partially define and/or circumscribe an opening 259 within which the base portion 123 is at least partially received.

[0050] In some embodiments, one or both of the upper hinge portion 225 and the lower hinge portion 227 can be comprised of a laminate, e.g., multiple overlying layers of paperboard or another composite, paper-based material. In some embodiments, one or more portions of the laminate can be press-formed or molded in the manner described herein with regard to the lid portion 121 and the base portion 123.

[0051] As shown, the hinge 215 of the tray assembly 205 can be generally continuous with the upper surface 229 of the upper hinge portion 225 and the lower surface 237 of the lower hinge portion 227 so as to extend from the upper hinge portion 225 to the lower hinge portion 227. In some embodiments, the hinge 215 can be continuous with an upper layer of a laminate that forms the upper hinge portion 225 to at least partially define the upper surface 229 thereof, and/or a lower layer of a laminate that forms the lower hinge portion 227 to at least partially define a lower surface 237 thereof. In this regard, the hinge 215 can comprise a material the same or similar to that of the upper hinge portion 225 and the lower hinge portion 227. The hinge 215 can be comprised of a material that his at least partially flexible to provide a hingable connection between the lid 209 and the base 211 of the tray assembly 205.

[0052] The tray assembly 205 can also include locking features for at least partially maintaining the tray assembly 205 in a closed configuration, as described further herein. The upper hinge portion 225 can include an upper locking feature 255 comprising one or more locking protrusions 257 at least partially protruding from the lower surface 231 thereof, and for being at least partially received in a lower locking feature 261 comprising one or more respective locking recesses 263 (broadly, "locking openings") at least partially defined in the upper surface 235 thereof.

[0053] In order to form the tray assembly 205, the lid portion 121 can be at least partially received through the opening 245 in the upper hinge portion 225 to form the lid 209 of the tray assembly 211. In some embodiments, the sidewall 131 and top 129 of the lid portion 121 can protrude upwardly through the opening 245 such that the flange 133 of the lid portion 121 is at least partially recessed within the upper hinge portion 225 and contacting and/or abutting the lower surface 231 thereof.

[0054] In some embodiments, the lid portion 121 can be at least partially coupled to the upper hinge portion 225, for example, with an adhesive such as glue, by crimping a portion of the upper hinge portion 225, etc. In some embodiments, the flange 133 of the lid portion 121 can be positioned between adjacent layers of a laminate structure that forms the upper hinge portion 225.

[0055] Similarly, the base portion 123 can be at least partially received through the opening 259 in the lower hinge portion 227 to form the base 211 of the tray assembly 205. In some embodiments, the sidewall 137 and bottom 135 of the base portion 123 can protrude downwardly through the

opening 259 such that the flange 139 of the base portion 123 is at least partially recessed within the lower hinge portion 227 and contacting the lower surface 237 thereof.

[0056] In some embodiments, the lid portion 121 can be at least partially coupled to the lower hinge portion 227, for example, with an adhesive such as glue, by crimping a portion of the lower hinge portion 227, etc. In some embodiments, the flange 139 of the base portion 123 can be positioned between adjacent layers of a laminate structure that forms the lower hinge portion 227.

[0057] In this regard, the lid 209 and the base 211 of the tray assembly 105 are hingably arranged via the 215. Accordingly, the lid 209 can be selectively at least partially raised away from the base 211 in a first or open configuration of the tray assembly 205, and can be positioned at least partially overlying the base 211 in a second or closed configuration of the tray assembly 205.

[0058] In some embodiments, the tray assembly 205 can be at least partially maintained in the second or closed configuration via engagement of the locking features 255, 261. In particular, the locking recesses 263 can be at least partially aligned with the locking protrusions 257 such that the locking protrusions 257 are at least partially received in the respective locking recesses 263. Such engagement of the locking features 255, 261, in some embodiments, can be accompanied by an audible and/or tactile pop or click. It will be understood that the tray assembly 205 can be provided with a different configuration of locking features without departing from the disclosure. For example, in some embodiments, the locking features can comprise one or more magnetic elements coupled to the lid 209 configured to magnetically attract one or more magnetic elements coupled to the base 211 so as to at least partially maintain the tray assembly 205 in the second or closed configuration and/or to provide a preselected degree of resistance from transitioning the tray assembly 205 from the second or closed configuration to the first or open configuration.

[0059] Accordingly, one or more articles can be positioned in the interior 107 of the tray assembly 205 in the first or open configuration prior to reconfiguration of the tray assembly 205 to the second or closed configuration. In order to transition the tray assembly 205 from the closed configuration to the open configuration, a user can at least partially disengage the locking protrusions 257 from the respective locking recesses 263 and at least partially raise the lid 209 away from the base 211.

[0060] In general, the blanks of the present disclosure may be constructed from paperboard having a caliper so that it is heavier and more rigid than ordinary paper. The blank can also be constructed of other materials, such as cardboard, or any other material having properties suitable for enabling the carton to function at least generally as described above. The blank can be coated with, for example, a clay coating. The clay coating may then be printed over with product, advertising, and other information or images. The blanks may then be coated with a varnish to protect information printed on the blanks. The blanks may also be coated with, for example, a moisture barrier layer, on

either or both sides of the blanks. The blanks can also be laminated to or coated with one or more sheet-like materials at selected panels or panel sections.

[0061] As an example, a tear line can include: a slit that extends partially into the material along the desired line of weakness, and/or a series of spaced apart slits that extend partially into and/or completely through the material along the desired line of weakness, or various combinations of these features. As a more specific example, one type of tear line is in the form of a series of spaced apart slits that extend completely through the material, with adjacent slits being spaced apart slightly so that a nick (e.g., a small somewhat bridging-like piece of the material) is defined between the adjacent slits for typically temporarily connecting the material across the tear line. The nicks are broken during tearing along the tear line. The nicks typically are a relatively small percentage of the tear line, and alternatively the nicks can be omitted from or torn in a tear line such that the tear line is a continuous cut line. That is, it is within the scope of the present disclosure for each of the tear lines to be replaced with a continuous slit, or the like. For example, a cut line can be a continuous slit or could be wider than a slit without departing from the present disclosure.

[0062] In accordance with the exemplary embodiments, a fold line can be any substantially linear, although not necessarily straight, form of weakening that facilitates folding there along. More specifically, but not for the purpose of narrowing the scope of the present disclosure, fold lines include: a score line, such as lines formed with a blunt scoring knife, or the like, which creates a crushed or depressed portion in the material along the desired line of weakness; a cut that extends partially into a material along the desired line of weakness, and/or a series of cuts that extend partially into and/or completely through the material along the desired line of weakness; and various combinations of these features. In situations where cutting is used to create a fold line, typically the cutting will not be overly extensive in a manner that might cause a reasonable user to incorrectly consider the fold line to be a tear line.

[0063] The above embodiments may be described as having one or more panels adhered together by glue during erection of the carton embodiments. The term "glue" is intended to encompass all manner of adhesives commonly used to secure carton panels in place.

[0064] The foregoing description of the disclosure illustrates and describes various embodiments. As various changes could be made in the above construction without departing from the scope of the disclosure, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. Furthermore, the scope of the present disclosure covers various modifications, combinations, alterations, etc., of the above-described embodiments. Additionally, the disclosure shows and describes only selected embodiments, but various other combinations, modifications, and environments are within the scope of the disclosure as expressed herein, commensurate with the above teachings, and/or within the

skill or knowledge of the relevant art. Furthermore, certain features and characteristics of each embodiment may be selectively interchanged and applied to other illustrated and non-illustrated embodiments of the disclosure.

What is claimed is:

1. A tray assembly for holding one or more articles, the tray assembly comprising:

a lid comprising a lid portion coupled to an upper hinge portion;

a base comprising a base portion coupled to a lower hinge portion, the base portion extending at least partially around an interior of the tray assembly;

a hinge between the lid and the base and comprising the upper hinge portion and the lower hinge portion, the hinge for repositioning the tray assembly between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base, the upper hinge portion hingably coupled to the lower hinge portion,

at least one of the lid portion, the base portion, the upper hinge portion, and the lower hinge portion comprises paperboard.

2. The tray assembly of claim 1, wherein each of the lid portion and the base portion comprises paperboard.

3. The tray assembly of claim 2, wherein each of the upper hinge portion and the lower hinge portion comprises paperboard.

4. The tray assembly of claim 2, wherein the hinge comprises a hinge component, the hinge component comprising a first portion extending from the upper hinge portion and a second portion hingably coupled to the first portion, the second portion of the hinge component coupled to the lower hinge portion.

5. The tray assembly of claim 2, wherein the hinge is integrally formed with each of the upper hinge portion and the lower hinge portion.

6. The tray assembly of claim 2, further comprising locking features for at least partially maintaining the tray assembly in the closed configuration.

7. The tray assembly of claim 6, wherein the locking features comprise at least one locking protrusion extending from one of the upper hinge portion and the lower hinge portion, and at least one locking opening at least partially defined in the other of the upper hinge portion and the lower hinge portion for at least partially receiving the at least one locking protrusion.

8. The tray assembly of claim 7, wherein each of the upper hinge portion and the lower hinge portion comprises a sidewall, the at least one locking protrusion extends away from the sidewall of the upper hinge portion and the at least one locking protrusion is at least partially defined in the sidewall of the lower hinge portion.

9. The tray assembly of claim 8, wherein at least a portion of the sidewall of the upper hinge portion overlaps and extends in front of at least a portion of the sidewall of the lower hinge portion when the tray assembly is in the closed configuration.

10. The tray assembly of claim 7, wherein each of the upper hinge portion and the lower hinge portion comprises an upper surface, a lower surface, and a sidewall extending from the upper surface to the lower surface, the at least one locking protrusion extends from the lower surface of the upper hinge portion, and the at least one locking opening is at least partially defined in the upper surface of the lower hinge portion.

11. The tray assembly of claim 2, wherein each of the upper hinge portion and the lower hinge portion comprises a respective sidewall at least partially defining a respective opening, wherein the lid portion comprises a top and a sidewall extending away from the top, wherein the base portion comprises a bottom and a sidewall extending away from the bottom, wherein the sidewall of the lid portion is at least partially received in the opening of the upper hinge portion, and wherein the sidewall of the base portion is at least partially received in the opening of the lower hinge portion.

12. The tray assembly of claim 11, wherein each of the upper hinge portion and the lower hinge portion comprises a respective rim extending inwardly from the respective sidewall thereof, wherein each of the lid portion of the base portion comprises a respective flange extending away from the respective sidewall thereof, wherein the flange of the lid portion is positioned between the sidewall of the upper hinge portion and the rim of the upper hinge portion, and wherein the flange of the base portion is positioned between the sidewall of the lower hinge portion and the rim of the lower hinge portion.

13. A combination of components for forming a tray assembly for holding one or more articles, the combination of components comprising:

a lid portion;

an upper hinge portion for being coupled to the lid portion to form a lid when the tray assembly is formed from the combination of components;

a base portion for extending at least partially around an interior of the tray assembly;

a lower hinge portion for being coupled to the base portion to form a base when the tray assembly is formed from the combination of components,

at least one of the lid portion, the base portion, the upper hinge portion, and the lower hinge portion comprises paperboard,

the upper hinge portion for being hingably coupled to the lower hinge portions to form a hinge for repositioning the tray assembly formed from the combination of components between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base.

14. The combination of claim 13, wherein each of the lid portion and the base portion comprises paperboard.

15. The combination of claim 14, wherein each of the upper hinge portion and the lower hinge portion comprises paperboard.

16. The combination of claim 14, wherein the hinge comprises a hinge component, the hinge component comprising a first portion extending from the upper hinge portion and a second portion hingably coupled to the first portion, the second portion of the hinge component for being coupled to the lower hinge portion when the tray assembly is formed from the combination of components.

17. The combination of claim 14, wherein the hinge is integrally formed with each of the upper hinge portion and the lower hinge portion.

18. The combination of claim 14, further comprising locking features for at least partially maintaining the tray assembly formed from the combination of components in the closed configuration.

19. The combination of claim 18, wherein the locking features comprise at least one locking protrusion extending from one of the upper hinge portion and the lower hinge portion, and at least one locking opening at least partially defined in the other of the upper hinge portion and the lower hinge portion for at least partially receiving the at least one locking protrusion.

20. The combination of claim 19, wherein each of the upper hinge portion and the lower hinge portion comprises a sidewall, the at least one locking protrusion extends away from the sidewall of the upper hinge portion and the at least one locking protrusion is at least partially defined in the sidewall of the lower hinge portion.

21. The combination of claim 20, wherein at least a portion of the sidewall of the upper hinge portion is for overlapping and extending in front of at least a portion of the sidewall of the lower hinge portion when the tray assembly formed from the combination of components is in the closed configuration.

22. The combination of claim 19, wherein each of the upper hinge portion and the lower hinge portion comprises an upper surface, a lower surface, and a sidewall extending from the upper surface to the lower surface, the at least one locking protrusion extends from the lower surface of the upper hinge portion, and the at least one locking opening is at least partially defined in the upper surface of the lower hinge portion.

23. The combination of claim 14, wherein each of the upper hinge portion and the lower hinge portion comprises a respective sidewall at least partially defining a respective opening, wherein the lid portion comprises a top and a sidewall extending away from the top, wherein the base portion comprises a bottom and a sidewall extending away from the bottom, wherein the sidewall of the lid portion is for being at least partially received in the opening of the upper hinge portion when the tray assembly is formed from the combination of components, and wherein the sidewall of the base portion is for being at least partially received in the opening of the lower hinge portion when the tray assembly is formed from the combination of components.

24. The combination of claim 23, wherein each of the upper hinge portion and the lower hinge portion comprises a respective rim extending inwardly from the respective sidewall thereof, wherein each of the lid portion of the base portion comprises a respective flange extending away from the respective sidewall thereof, wherein the flange of the lid portion is for being positioned between the sidewall of the upper hinge portion and the rim of the upper hinge portion when the tray assembly is formed from the combination of components, and wherein the flange of the base portion is for being positioned between the sidewall of the lower hinge portion and the rim of the lower hinge portion when the tray assembly is formed from the combination of components.

25. A method of forming a tray assembly for holding one or more articles, the method comprising:

obtaining a lid portion;

obtaining an upper hinge portion;

obtaining a base portion extending at least partially around an interior of the tray assembly;

obtaining an upper hinge portion;

obtaining a lower hinge portion;

coupling the lid portion to the upper hinge portion to form a lid when the tray assembly is formed from the combination of components;

coupling the base portion to the lower hinge portion to form a base; and

hingably coupling the upper hinge portion to the lower hinge portion to form a hinge for repositioning the tray assembly between a closed configuration, in which the lid at least partially overlies the base, and an open configuration, in which the lid is raised away from the base.

26. The method of claim 25, wherein each of the lid portion and the base portion comprises paperboard.

27. The method of claim 26, wherein each of the upper hinge portion and the lower hinge portion comprises paperboard.

28. The method of claim 26, wherein the upper hinge portion comprises a hinge component, the hinge component comprising a first portion extending from the upper hinge portion and a second portion hingably coupled to the first portion, and the method further comprises coupling the second portion of the hinge component to the lower hinge portion.

29. The method of claim 26, wherein the hinge is integrally formed with each of the upper hinge portion and the lower hinge portion.

30. The method of claim 26, wherein the upper hinge portion and the lower hinge portion further comprise locking features for at least partially maintaining the tray assembly in the closed configuration.

31. The method of claim 30, wherein the locking features comprise at least one locking protrusion extending from one of the upper hinge portion and the lower hinge portion, and at least one locking opening at least partially defined in the other of the upper hinge portion and the lower hinge portion for at least partially receiving the at least one locking protrusion.

32. The method of claim 31, wherein each of the upper hinge portion and the lower hinge portion comprises a sidewall, the at least one locking protrusion extends away from the sidewall of the upper hinge portion and the at least one locking protrusion is at least partially defined in the sidewall of the lower hinge portion.

33. The method of claim 32, wherein the tray assembly is formed such that at least a portion of the sidewall of the upper hinge portion is for overlapping and extending in front of at least a portion of the sidewall of the lower hinge portion when the tray assembly is in the closed configuration.

34. The method of claim 31, wherein each of the upper hinge portion and the lower hinge portion comprises an upper surface, a lower surface, and a sidewall extending from the upper surface to the lower surface, the at least one locking protrusion extends from the lower surface of the upper hinge portion, and the at least one locking opening is at least partially defined in the upper surface of the lower hinge portion.

35. The method of claim 26, wherein each of the upper hinge portion and the lower hinge portion comprises a respective sidewall at least partially defining a respective opening, wherein the lid portion comprises a top and a sidewall extending away from the top, wherein the base portion comprises a bottom and a sidewall extending away from the bottom, wherein coupling the lid portion to the upper hinge portion comprises at least partially receiving the sidewall of the lid in the opening of the upper hinge portion, and wherein coupling the base portion to the lower hinge portion comprises at least partially receiving the sidewall of the base portion in the opening of the lower hinge portion.

36. The method of claim 35, wherein each of the upper hinge portion and the lower hinge portion comprises a respective rim extending inwardly from the respective sidewall thereof, wherein each of the lid portion of the base portion comprises a respective flange extending away from the respective sidewall thereof, wherein coupling the lid portion to the upper hinge portion comprises positioning the flange of the lid portion between the sidewall of the upper hinge portion and the rim of the upper hinge portion, and wherein coupling the base portion to the lower hinge portion comprises positioning the flange of the base portion between the sidewall of the lower hinge portion and the rim of the lower hinge portion.

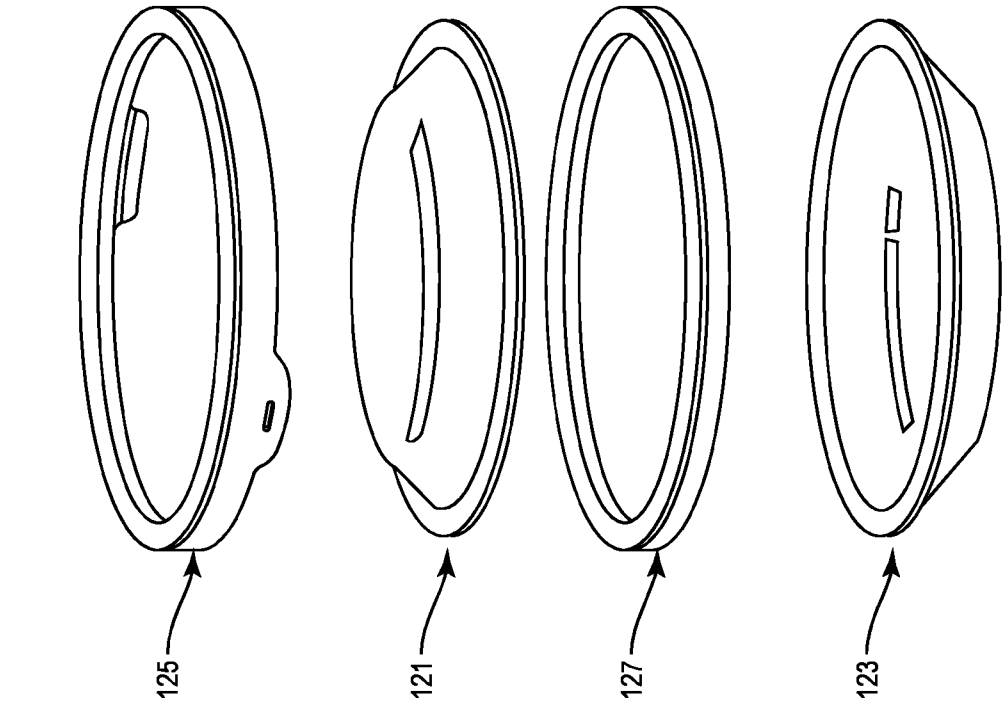

FIG. 1

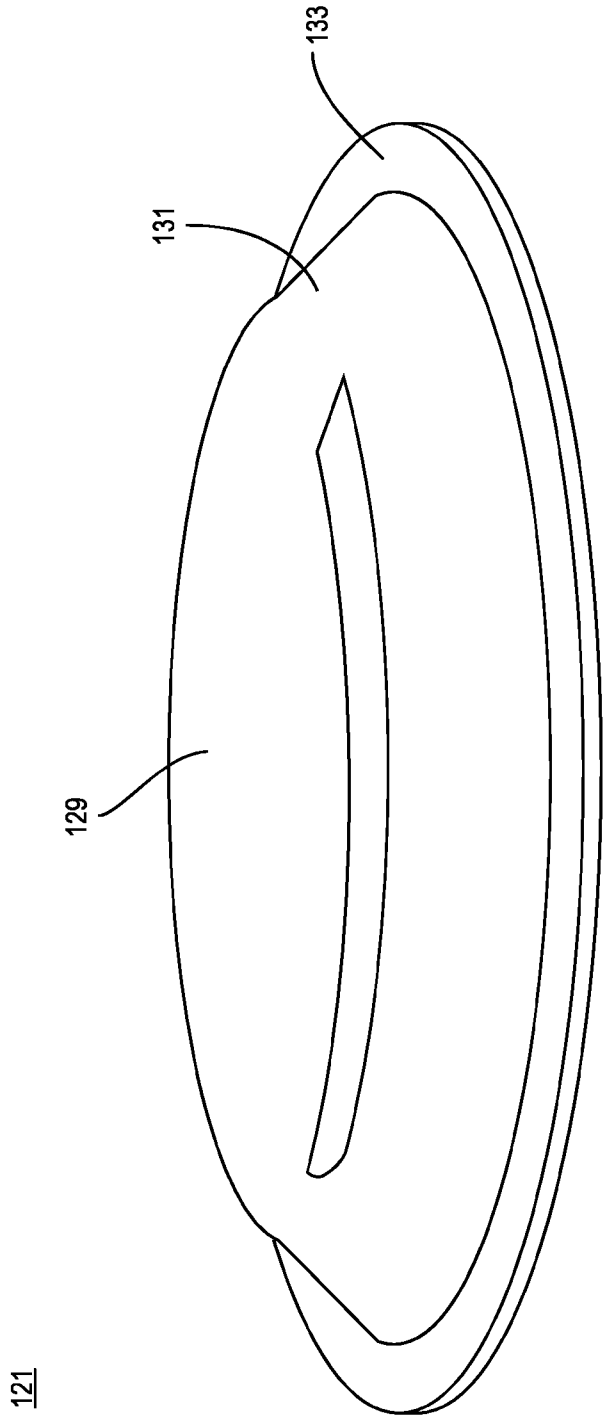

FIG. 1A

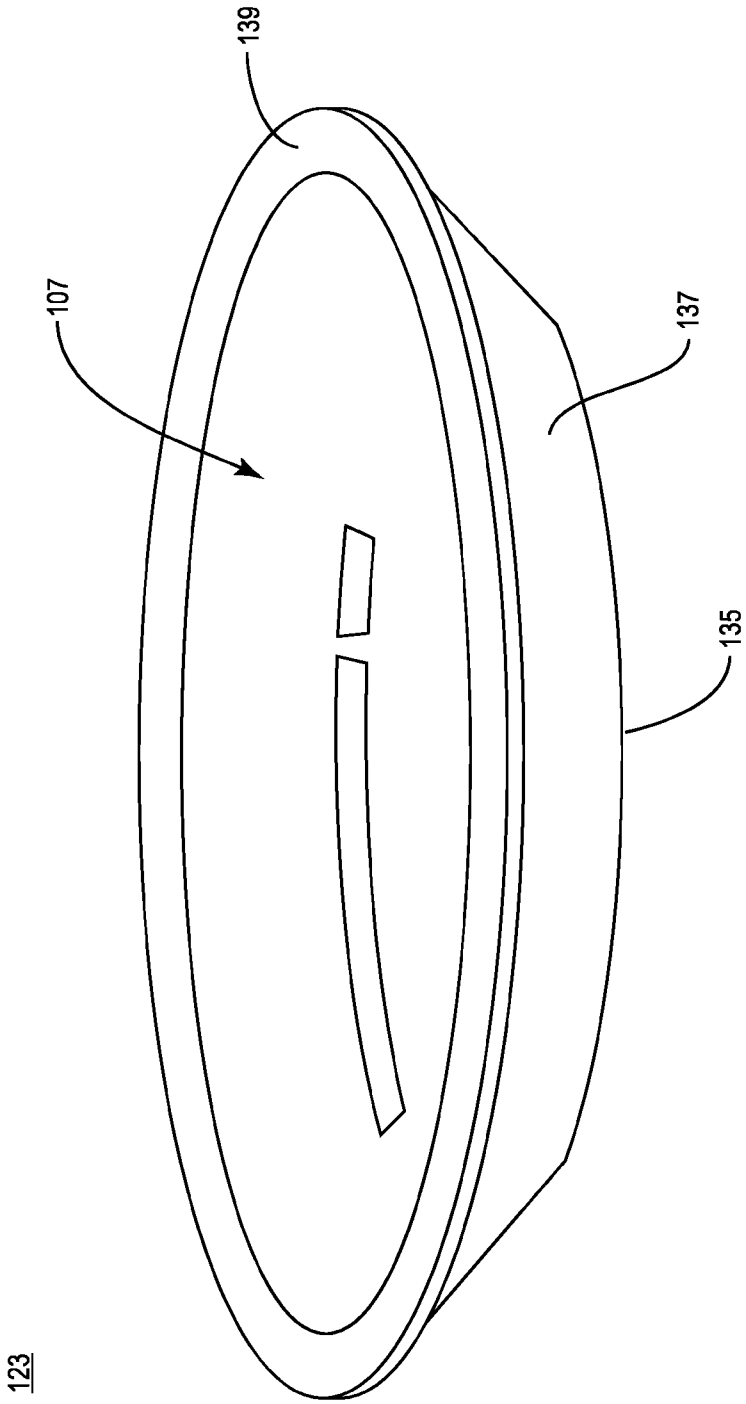

FIG. 1B

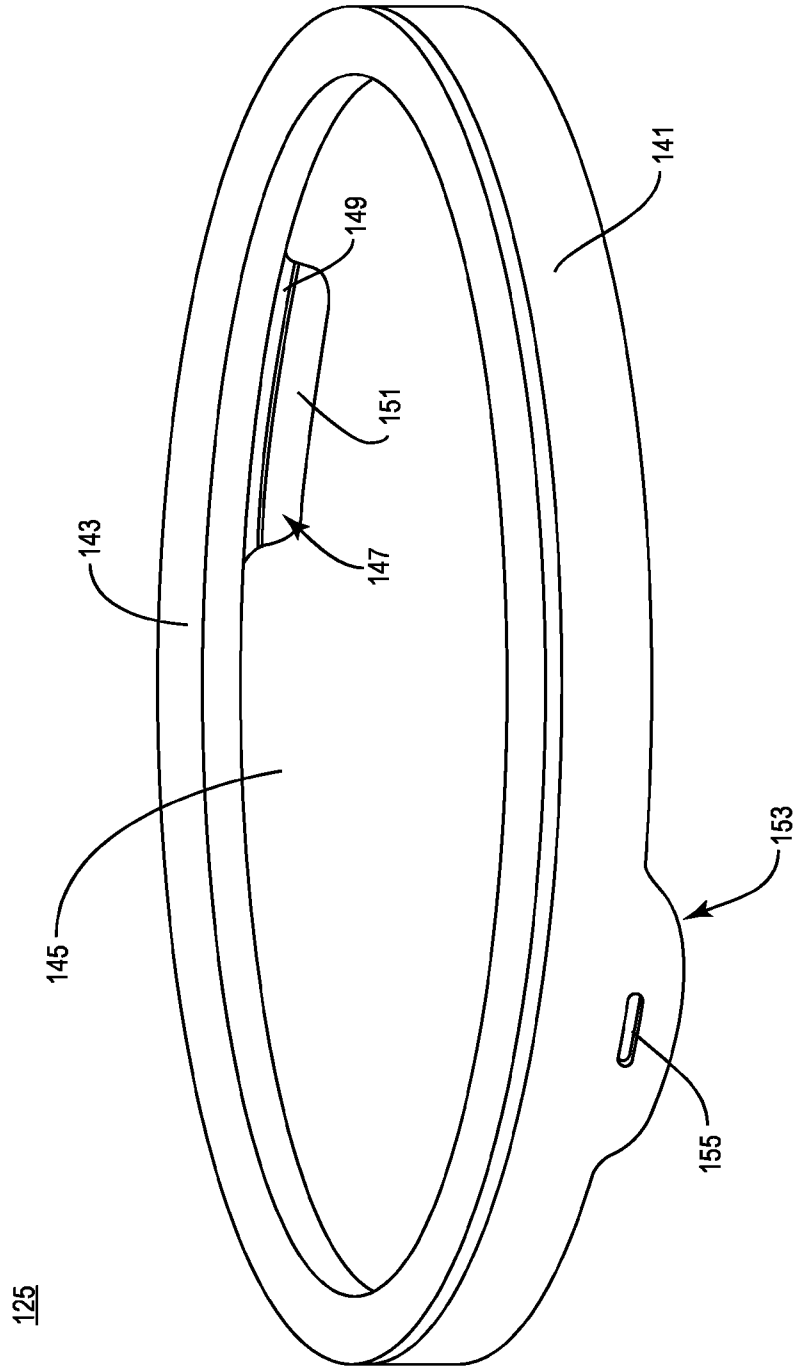

FIG. 1C

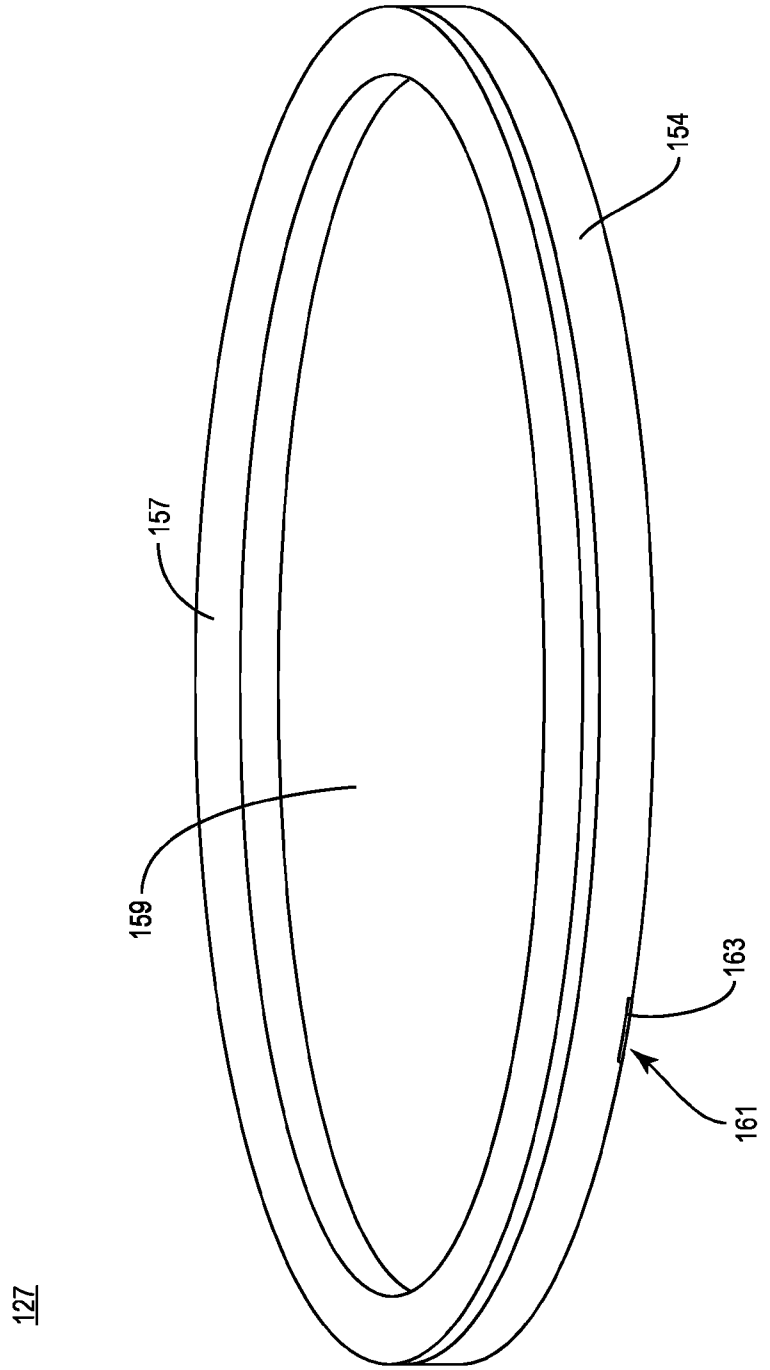

FIG. 1D

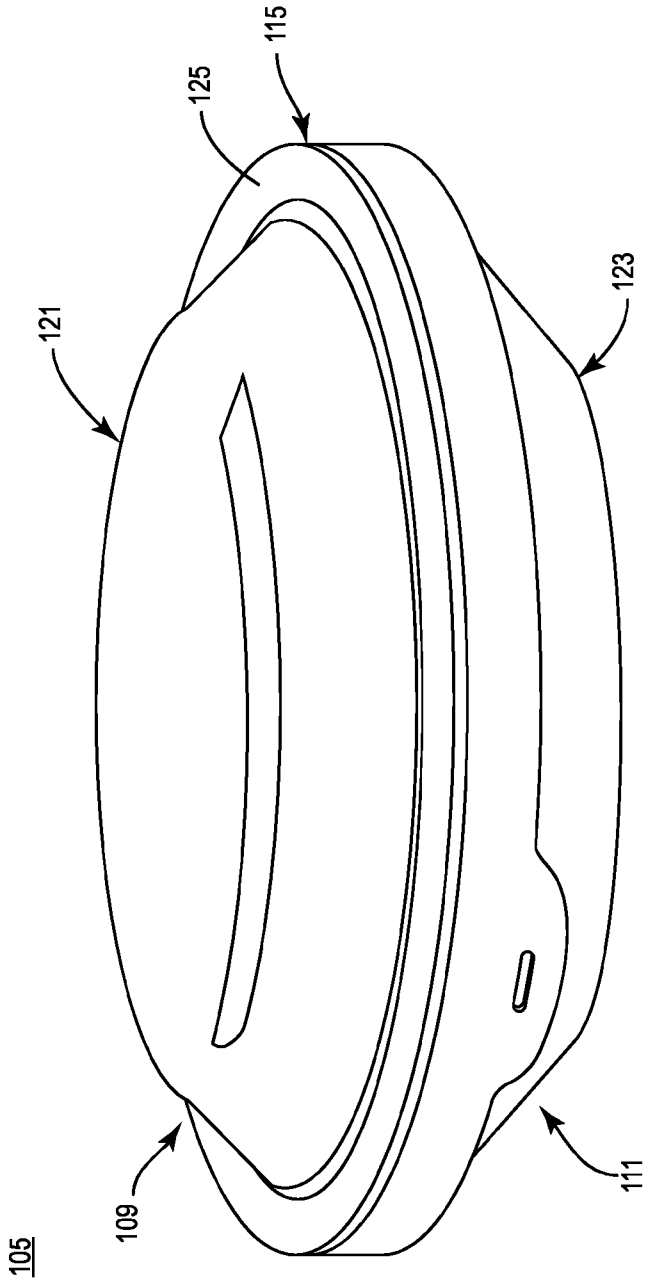

FIG. 2

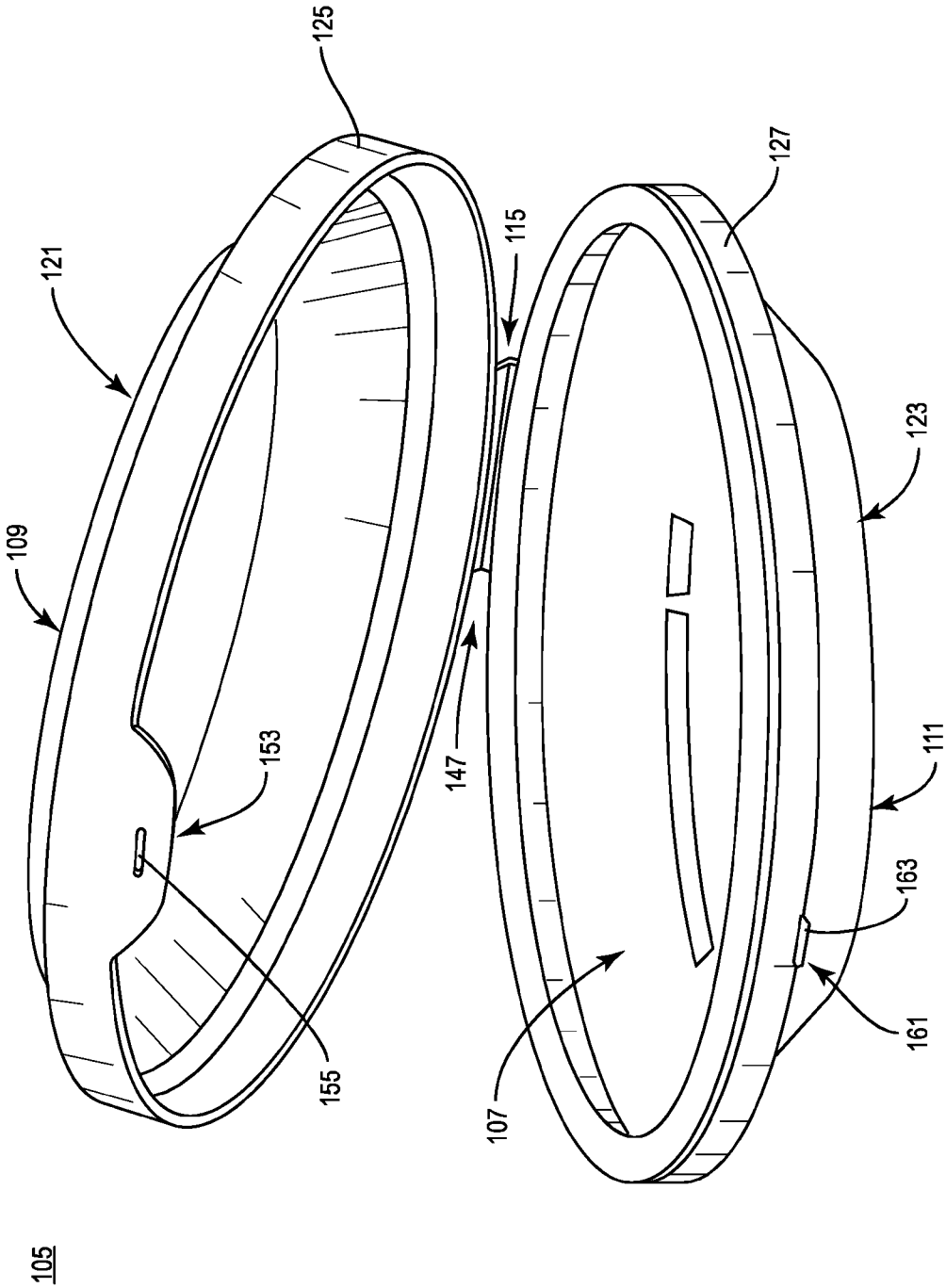

FIG. 3

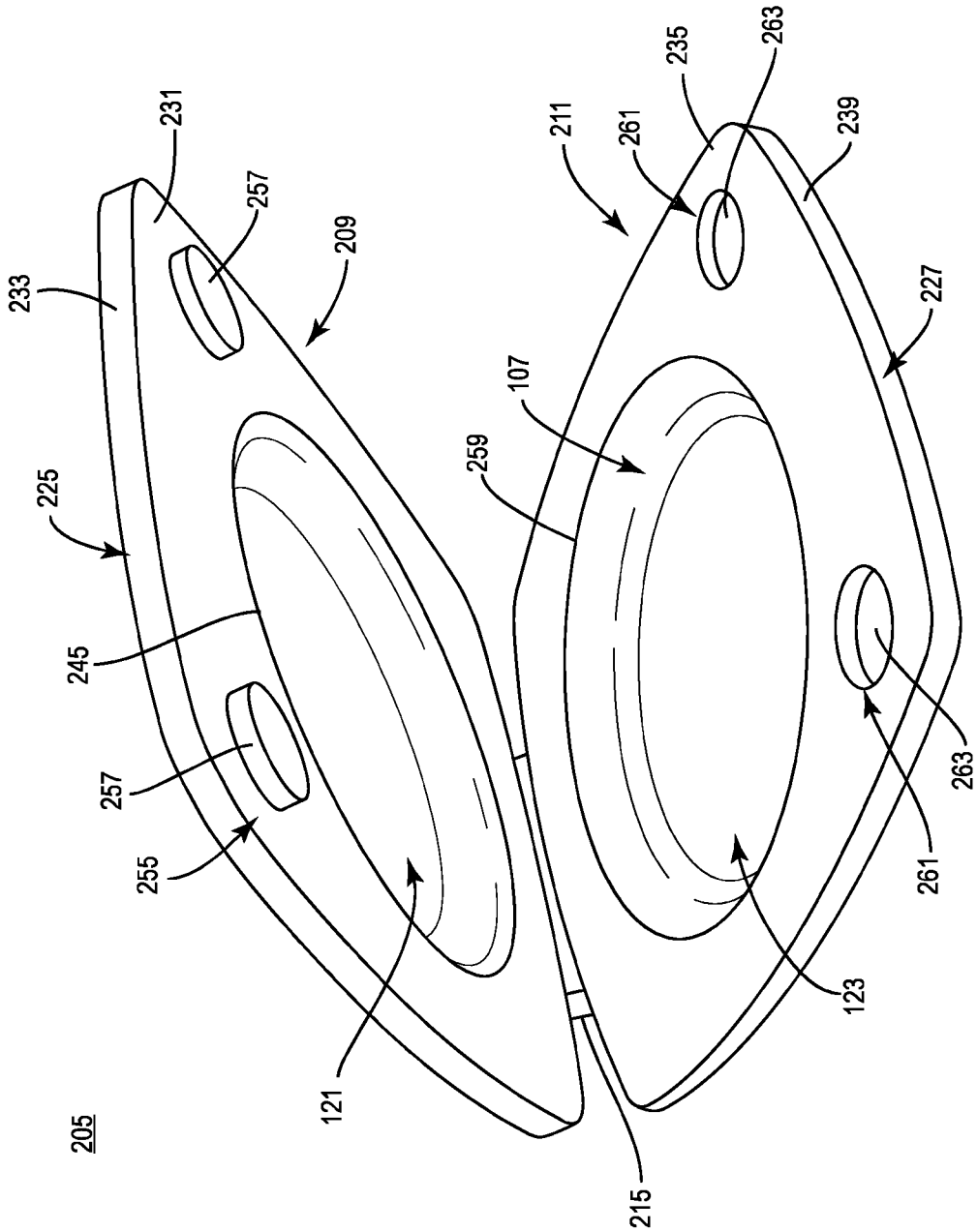
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FIG. 4

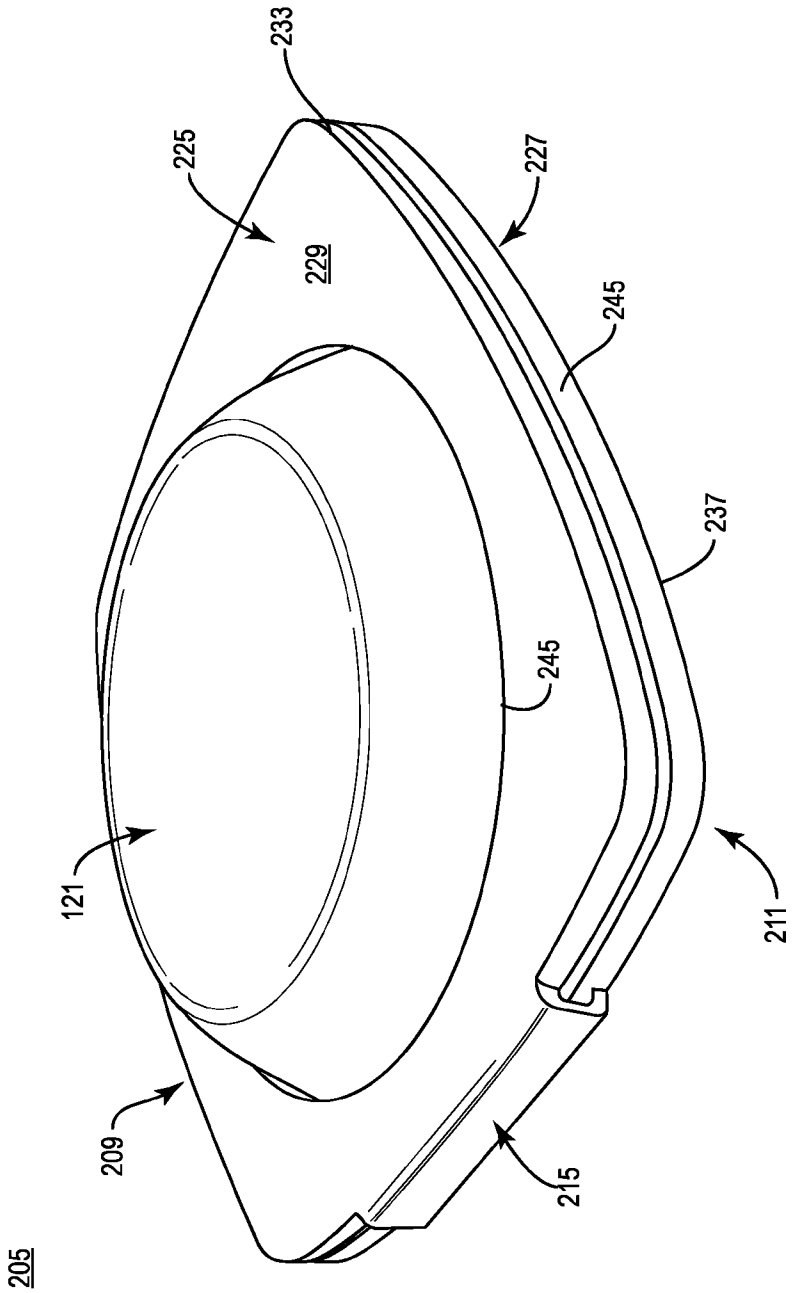

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2024/026205

A. CLASSIFICATION OF SUBJECT MATTER

B65D 43/16(2006.01)i; **B65D 1/34**(2006.01)i; **B65D 83/08**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D 43/16(2006.01); A45D 33/00(2006.01); A45D 33/18(2006.01); A45D 33/24(2006.01); B23P 19/02(2006.01); B65D 3/00(2006.01); B65D 5/08(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: tray assembly, hinge, paperboard, lid, locking features

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011-0108553 A1 (PANTELLERIA, JOSEPH A.) 12 May 2011 (2011-05-12) paragraphs [0017]-[0031] and figures 1-3	1-36
Y	JP 63-129514 U (YOSHIDA INDUSTRIES CO., LTD.) 24 August 1988 (1988-08-24) figures 1-3	1-36
Y	JP 2000-095229 A (SEKISUI PLASTICS CO., LTD.) 04 April 2000 (2000-04-04) paragraph [0024] and figure 1	3,15,27
A	CN 203424525 U (CIXI HONGTAI PLASTIC PRODUCTIS CO., LTD.) 12 February 2014 (2014-02-12) figures 1-3	1-36
A	KR 20-1999-0001573 U (KANG, SEONGIL) 15 January 1999 (1999-01-15) claim 1 and figure 1	1-36

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 September 2024	**05 September 2024**

Name and mailing address of the ISA/KR	Authorized officer
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2024/026205

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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		MX 2010012153 A	23 May 2011
		US 2013-0160265 A1	27 June 2013
JP 63-129514 U	24 August 1988	JP 05-010736 Y2	16 March 1993
JP 2000-095229 A	04 April 2000	None	
CN 203424525 U	12 February 2014	None	
KR 20-1999-0001573 U	15 January 1999	KR 20-0165353 Y1	15 January 2000