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[Continued on next page]

(54) Title: PAPERBOARD CUP LIDS AND METHODS FOR MAKING THE SAME

(57) Abstract: A paperboard cup or container lid includes a sidewall and a top wall, the top wall including a tab or pull tab extending from the top wall and connected to a closure defined by one or more perforated areas wherein a user may create an opening in the top wall by pulling on the tab and breaking the perforations.

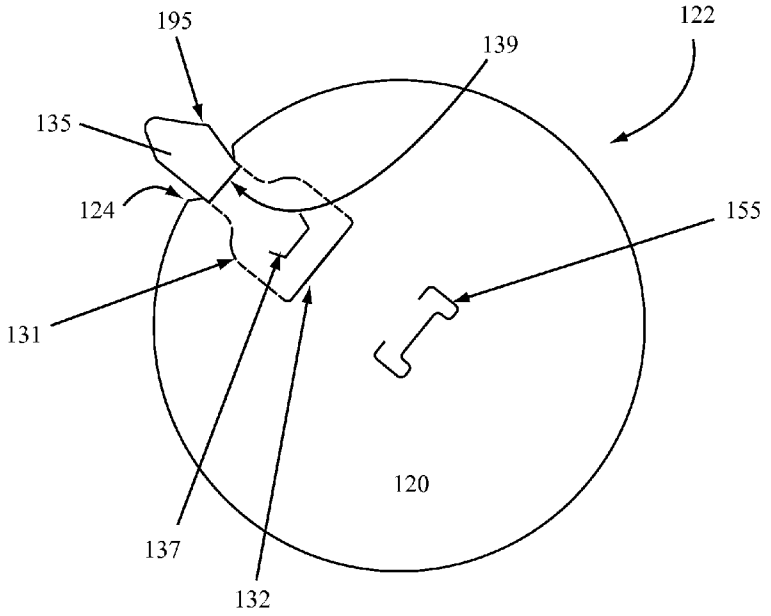

FIG. 15

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TITLE OF THE INVENTION

PAPERBOARD CUP LIDS AND METHODS FOR MAKING THE SAME

BACKGROUND OF THE INVENTION

[0001] Field of the Invention: Embodiments of the present invention relate to cup lids and more particularly to cup lids made of a paperboard or fibrous material and having an openable drinking hole therein.

[0002] State of the Art: Hot beverages, such as coffee, tea or the like, and cold beverages, are frequently sold as a takeout item and supplied in disposable cups with thin plastic lids fasten over the rim of drinking cups. Such lids prevent spillage and evaporation of the beverage within the cup, and help insulating the contents of the cup from the ambient temperature by closing the opening in the top of the cup.

[0003] While numerous cup lids have been developed and commercialized, problems associated with such cup lids exist. For example, most - if not all - of the cup lids used in commerce today are made of plastic, for example, thermoformed plastic cup lids. While economical, such plastic cup lids are typically not environmentally friendly. They are not generally recyclable in the same stream as that of the paperboard-based cups they are used with and most of the cup lids are not compostable unless made of more expense biodegradable plastics. In addition, depending upon the robustness of the design of such plastic cup lids and the amount of material used to add rigidity, commercial plastic cup lids may exhibit leakage problems and may not effectively retain heat within a cup when used with hot beverages.

[0004] In an attempt to resolve some of the issues of thermoformed cup lids, paperboard and paper-based cup lids have been proposed. However, performance issues and environmental issues also exist with some of these cup lids due to the design and the materials used to make such lids.

[0005] Examples of various paperboard cup lids - as well as particular embodiments of novel paperboard cup lids - are disclosed in International Application PCT/US2013/056239, published as WO 2014/031880 A1, which is incorporated herein in its entirety.

[0006] While such paperboard cup lids are disclosed, it has been found that the existence of the fixed opening in the top wall of the lid may be disadvantageous. For instance, the opening in the lid allows heat to escape or enter the cup, cooling or heating up the contents therein. In addition, the permanently open condition of the opening in the lid

may lead to spillage of a fluid or beverage contained in the cup, which may also be undesirable. And while plugs - such as those used with plastic cup lid openings - could be developed for paperboard cup lids, such components would be in addition to the cup lid, requiring further costs, additional steps and time to fill and seal a cup, additional waste, and additional parts that a user must contend with. Therefore, it is desirable to improve on the features of the opening in such cup lids.

BRIEF SUMMARY OF THE INVENTION

[0007] Various embodiments of the present invention relate to paperboard or paper-based cup lids. According to various embodiments, a paper-based cup lid may include a top wall having a perforated pattern wherein removal of the perforated pattern defines a hole in the top wall of the lid.

[0008] According to some embodiments of the invention, the perforated pattern may define a closure that may be separated completely from the top wall of the lid to define an opening therein. According to other embodiments of the invention, the perforated pattern may define a fixed closure that may be retained by a portion of the top wall of the lid but that may be separated along the perforations to define an opening in the top wall of the lid.

[0009] According to some embodiments of the invention, a tab may extend from a closure or fixed closure. In some embodiments, a tab may extend above the top wall of the lid, allowing a user to grasp the tab and pull such that pulling the tab detaches the closure or fixed closure from the lid along the perforations. According to other embodiments of the invention, a tab may be flush with the top wall of the lid. A hole in the lid adjacent a tab flush with the top wall of the lid may allow a user to grasp or pry the tab upwards such that the tab may be pulled to detach the closure or fixed closure from the top wall of the lid along the perforations. According to some embodiments of the invention, a tab may include at least one pry feature to allow a user to more easily pry or remove a tab from engagement with the top wall of the lid.

[0010] In some embodiments of the invention, a top wall of a lid may include one or more vent holes. In certain embodiments, a vent hole may be configured to accept a portion of a tab such that the tab and closure or fixed closure may be retained on the lid. For example, a vent hole may include a hole in the top wall of the lid. In other embodiments, a vent hole may include a perforated form that may be pushed in to form a hole in the lid. When pushed in, the perforations may break creating a venting tab connected to the top wall

of the lid and a hole through the top wall of the lid. In some embodiments, an end or portion of a tab may be inserted into the vent hole and may assist in pushing the venting tab into an interior cup space so that the vent hole remains open to allow venting during consumption of a beverage or fluid in the cup.

[0011] According to some embodiments of the invention, a top wall blank for a paperboard cup lid includes a tab extending beyond an edge of the top wall blank such that the tab may be used to remove a portion of the top wall from a cup lid manufactured using the top wall blank.

[0012] According to other embodiments of the invention, a top wall blank for a paperboard cup lid may include a tab connected to a perforated closure. The tab may extend away from an outer circumference of the top wall blank. A tab hole may be included in an area defined by the perforated closure. The tab may be folded back and inserted into the tab hole during formation of the top wall blank such that the top wall blank may be processed on cup lid forming equipment without many modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] While the specification concludes with claims particularly pointing out and distinctly claiming particular embodiments of the present invention, various embodiments of the invention can be more readily understood and appreciated by one of ordinary skill in the art from the following descriptions of various embodiments of the invention when read in conjunction with the accompanying drawings in which:

[0014] FIG. 1 illustrates a paperboard cup lid according to various embodiments of the invention;

[0015] FIG. 2 illustrates a paperboard cup lid attached to a container according to various embodiments of the invention;

[0016] FIG. 3 illustrates a top wall blank for a paperboard cup lid according to various embodiments of the invention;

[0017] FIG. 4A illustrates a step in a process for making a top wall blank for a paperboard cup according to various embodiments of the invention;

[0018] FIG. 4B illustrates a step in a process for making a top wall blank for a paperboard cup according to various embodiments of the invention;

[0019] FIG. 5A illustrates a step in a process of making a paperboard cup lid according to various embodiments of the invention;

[0020] FIG. 5B illustrates a step in a process of making a paperboard cup lid according to various embodiments of the invention;

[0021] FIG. 5C illustrates a step in a process of making a paperboard cup lid according to various embodiments of the invention;

[0022] FIG. 5D illustrates a step in a process of making a paperboard cup lid according to various embodiments of the invention;

[0023] FIG. 6 illustrates an alternate process, sidewall blank and top wall blank for making a paperboard cup lid according to various embodiments of the invention;

[0024] FIG. 7 illustrates an alternative top wall blank according to various embodiments of the invention;

[0025] FIG. 8 illustrates an alternative top wall blank according to various embodiments of the invention;

[0026] FIG. 9 illustrates an alternative top wall blank according to various embodiments of the invention;

[0027] FIG. 10 illustrates an alternative top wall blank according to various embodiments of the invention;

[0028] FIG. 11 illustrates an alternative top wall blank according to various embodiments of the invention;

[0029] FIG. 12 illustrates an alternative top wall blank according to various embodiments of the invention;

[0030] FIG. 13 illustrates an alternative top wall blank according to various embodiments of the invention;

[0031] FIG. 14 illustrates the top wall blank of FIG. 13 with a tab according to various embodiments of the invention inserted in a tab hole;

[0032] FIG. 15 illustrates an alternative top wall blank according to various embodiments of the invention;

[0033] FIG. 16 illustrates an alternative top wall blank according to various embodiments of the invention; and

[0034] FIG. 17 illustrates a process for making a paperboard cup lid according to various embodiments of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0035] A paper-based or paperboard cup lid 100 according to various embodiments of the invention is illustrated in FIG. 1. According to various embodiments of the invention, a paper-based or paperboard cup lid 100 may include a sidewall 110, a top wall 120, and an opening 190 defined by a closure 130 removed, or partially removed, from the top wall 120 of the cup lid 100. The cup lid 100 may further include a vent hole 150. The cup lid 100 may be formed from the assembly of a top wall blank 122 with a sidewall blank 112 according to various embodiments of the invention. The cup lid 100 may be connected to - or used with - a cup or container as desired.

[0036] According to some embodiments of the invention, a cup lid 100 may include a closure 130 defined in a top wall 120 of the cup lid 100. For example, as illustrated in FIG. 1, a cup lid 100 includes a closure 130 defined by perforations 131 in the top wall 120 of the cup lid 100. The perforations 131 may define the shape of an opening 190 in the cup lid 100 when the closure 130 is removed from the cup lid 100 or moved to a position such that the opening 190 is revealed.

[0037] As shown in FIG. 1, the top wall 120 of the cup lid 100 includes perforations 131 in a bell or gourd shape, the perforations 131 originating adjacent an outer circumference of the top wall 120 and extending towards the middle of the top wall 120 with a protruding or bulbous pattern towards the sides of the cup lid 100. Two perforation patterns are formed in the top wall 120 of the cup lid 100, each one mirroring the other as illustrated. The perforations 131 may terminate at or adjacent to a crease 132 in the top wall 120. A tab 135 extends generally vertically from the top wall 120 of the cup lid 100, the tab 135 being a portion of the top wall 120. The tab 135 may be connected to that portion of the top wall 120 defined within - or between - the perforations 131 in the top wall 120. The tab 135 may extend away from the top wall 120 an any angle between the top wall 120 surface and the surface of the sidewall 110 adjacent the tab 135. The tab 135 may also extend above or below an upper rim of the sidewall 110 as desired.

[0038] According to various embodiments of the invention, a user may pull on the tab 135. Applying a pull-force to the tab 135 may break the perforations, allowing the user to raise the tab 135 and create an opening 190 in the top wall 120 of the cup lid 100 wherein the shape of the opening is generally defined by the location of the perforations. In some embodiments, a crease 132 at the termination of the perforations 131 within the top wall 120 may allow the tab 135 to more easily detached the closure 130 and fold the tab 135 and

closure 130 away from the opening 190. For example, when the tab 135 is pulled, perforations 131 are broken and the tab 135 pulls the closure 130 portion of the top wall 120 defined within the perforations 131 to be removed from the top wall 120, defining opening 190 as illustrated in FIG. 2. The tab 135 and closure 130 may bend or fold about a crease 132 formed in the top wall 120. A user pulling the tab 135 to create the opening 190 may then utilize the opening to consume or access the product in a cup utilizing the cup lid 100. A portion of the tab 135 may be inserted into a vent opening 153 formed by a vent tab 155 as illustrated in FIG. 2.

[0039] According to various embodiments of the invention, a base of the tab 135 adjacent the position where the top wall 120 is connected to the sidewall 110 may be snuggly fit or aligned such that a seal is formed between the base of the tab 135 and the sidewall 110 or top wall 120. The seal may be such that fluid or product within a container or cup utilizing the cup lid 100 will not pass by or leak past the base of the tab 135 adjacent the sidewall 110 and top wall 120 until the tab 135 have been pulled away from or disengaged from the top wall 120 and sidewall 110.

[0040] In some embodiments of the invention, a cup lid 100 may include a vent hole 150. A vent hole 150 may be nothing more than a hole in the top wall 120 of the cup lid 100. The vent hole 150 may be cut during cutting of the top wall 120 blank and may always be open.

[0041] In other embodiments of the invention, a vent opening 153 may be made or formed in the top wall 120 of a cup lid 100 when a user pushes on a vent tab 155 formed in the top wall 120 of the cup lid 100. A vent tab 155 may include a perforated area of the top wall 120 of the cup lid 100 that may be partially or completely separated from the top wall 120 to form a vent opening 153 in the top wall 120. For example, a vent tab 155 is illustrated in FIGs. 1 and 3. The illustrated vent tab 155 includes three perforated sides 157a, 157b, and 157c forming a "U" shape. The vent tab 155 may be pressed within an interior space of the "U" shape such that the force acting on that portion of the top wall 120 bounded by the perforations collapses or breaks about the perforations, allowing the vent tab 155 to be pushed into an interior portion of the cup lid 100 and creating a vent opening 153 through the top wall 120. The vent tab 155 may be retained by the top wall 120 of the cup lid 100.

[0042] In some embodiments of the invention, the vent tab 155 may be configured to retain a portion of a tab 135 after the tab 135 has been pulled by a user to remove the closure 130 and expose opening 190. For example, as illustrated in FIG. 2, a tab 135 may be pulled by a user to dislodge the closure 130 from the top wall 120 of a cup lid 100 and to expose the

opening 190 that may be used to access the contents of a container to which the cup lid 100 is attached. An end of the tab 135 may be inserted into the vent opening 153 formed by the vent tab 155. Insertion of the tab 135 into the vent opening 153 may retain the tab 135 therein such that the retention of the tab 135 in the vent opening 153 keeps the opening 190 open and prevents closure 130 from closing the opening 190. If desired, the tab 135 may be removed from the vent opening 153 and the closure 130 moved back into place over the opening 190 to close the opening 190. A portion of the tab 135 may be pushed or snuggly fit against the sidewall 110 of the cup lid 100 to retain the tab 135 and closure 130 back in a closed position where the closure 130 covers the opening 190.

[0043] Although the integrity of a seal between the closure 130 and the top wall 120 may be compromised when tab 135 is used to break the perforations 131 defining closure 130, placement of the closure 130 back over the opening 190 may help prevent excessive spilling of contents from the container on which the cup lid 100 is attached. Thus, the tab 135 may be used to open and close opening 190 as desired by a user of a cup lid 100 according to various embodiments of the invention.

[0044] A cup lid 100 having a tab 135 according to various embodiments of the invention may be made in different ways. According to some embodiments, a top wall blank 122 and a sidewall blank 112 may be assembled or constructed together to form the cup lid 100. In such embodiments, a top wall blank 122 may include a blank cut from a paperboard or fibrous material sheet. For example, a top wall blank 122 according to various embodiments of the invention is illustrated in FIG. 3. As shown, in some embodiments the top wall blank 122 includes a generally circular shape. Other shapes having an outer edge may also be used. A tab 135 extends beyond the circumference or outer edge of the generally circular shape of the top wall blank 122. Two notches 124 in the top wall blank 122 - a first notch and second notch - may be located adjacent the tab 135. The notches 124 may extend from an outer circumference or edge of the top wall blank 122 towards an interior of the top wall blank 122 where they intersect the tab 135 or juncture between the tab 135 and closure 130. The notches 124 are positioned adjacent the tab 135. Perforations 131 may also be cut in the top wall blank 122 adjacent the tab 135, the perforations 131 shaped to create an opening 190 of a desired shape when the tab 135 is removed or used to break the perforations 131. The perforations 131 may define the shape of the closure 130. The perforations 131 may include a first perforation pattern and a second perforation pattern that originate at the intersection of the notch 124 and the tab 135 or in the general vicinity of the intersection of

the notch 124 and tab 135. The top wall blank 122 may also include one or more vent holes 150, vent tabs 155, embosses, debosses, decorations, or other features as desired.

[0045] A top wall blank 122 according to various embodiments of the invention may be made by numerous processes. In some embodiments, for example, a top wall blank 122 may be stamped or cut from a paperboard substrate or sheet. One method for forming a top wall blank 122 according to various embodiments of the invention is illustrated by the steps shown in FIGs. 4A and 4B. As illustrated in FIG. 4A, a paperboard substrate may first be cut, perforated, creased or otherwise manipulated to form a tab 135, notch 124 edges, perforations 131, crease 132, vent hole 150, and vent tab 155. In a second step illustrated in FIG. 4B, the outer edge pattern of the top wall 120 may be cut, thereby forming the top wall blank 122. A completed top wall blank 122 is illustrated in FIG. 3.

[0046] Paperboard substrates or sheets used with various embodiments of the invention to make the top wall blank 122 and sidewall blank 112 may include any paperboard substrates commonly used with or in the formation of cups or paperboard containers. The paperboard substrate may be just paperboard or may be a coated or laminated paperboard. The paperboard substrate may also include additives, fillers, or other materials as desired for decoration or other functional purposes.

[0047] During assembly of a cup lid 100 according to various embodiments of the invention, a top wall blank 122 may be assembled to a sidewall blank 112 to form the cup lid 100. General assembly processes may be used. For example, a cup lid 100 according to various embodiments of the invention may be made or formed in accordance with known processes after the top wall blanks 122 and side wall blanks 112 are formed. In some embodiments, a cup lid 100 may be formed utilizing the methods described in International Application PCT/US2013/056239, published as WO 2014/031880 A1, which is incorporated herein in its entirety, utilizing the novel top wall blanks 122 and side wall blanks 112 according to embodiments of the invention.

[0048] In general, the formation of a cup lid 100 according to various embodiments may be accomplished using any feasible process. As a non-limiting example, the formation steps used in one process are illustrated in FIGs. 5A through 5D, wherein the sidewall blank 112 is prepared, the top wall blank 122 is prepared, the sidewall blank 112 and the top wall blank 122 are fitted together, and the cup lid 100 is formed.

[0049] A sidewall blank 112 may have a first end 114, a second end 115, a top edge 116 and a bottom edge 117 as illustrated in FIG. 5A. The first end 114 and second end 115 may be brought together, forming a band as illustrated in FIG. 5B. A portion of one of the

first end 114 or second end 115 may overlap a portion of the other end and the ends may be adhered together using an adhesive, heat, or other method to connect and seal the first end 114 and second end 115 to form a band or loop.

[0050] A top wall blank 122 - such as that illustrated in FIG. 4 - may be manipulated such that a portion of the outer perimeter of the top wall blank 122 is turned upward along with the tab 135 as illustrated in FIG. 5C

[0051] The top wall blank 122 may be moved into position within the space formed by the band of the sidewall blank 112 such that the turned-up outer perimeter and tab 135 of the top wall blank 122 extend from the top wall 120 of the top wall blank 122 towards the upper edge 116 of the sidewall blank 112 as illustrated in FIG. 5D.

[0052] The top edge 116 of the sidewall blank 112 may be turned or folded downward and inward over the turned-up outer perimeter of the top wall blank 122. The folded-over portion of the sidewall blank 112 may be pressed into sealing contact with the turned-up outer perimeter of the top wall blank 122 and sealed therewith. For example, adhesive, heat sealing, or other sealing process or method may be used. An assembled cup lid 100 according to embodiments of the invention is illustrated in FIG. 1.

[0053] According to various embodiments of the invention, during the folding over of the top edge 116 of the sidewall blank 112 onto the turned-up outer perimeter of the top wall blank 122, the tab 135 is positioned out of the way such that the tab is not folded over and the tab 135 is not sealed to the sidewall blank 112. While this may be accomplished in any desired manner, in some instances the tab 135 may be grabbed or moved by the assembly machinery and held out of position during the folding and sealing steps such that the tab 135 is not folded or sealed to the sidewall blank 112. In other instances, the assembly equipment may include a process - such as by blowing a compressed air stream against tab 135 - whereby the tab 135 may be moved out of the way of a hot nozzle performing the sealing. In still other embodiments, cutouts, millouts, or other features in a sealing nozzle may be provided to ensure that the tab 135 is not sealed to the sidewall blank 112 or to the top of the top wall blank 122.

[0054] Additional features may be applied to the cup lid 100. For example, indentations may be made in the sidewall 110 of the cup lid 100 to assist with securing the cup lid 100 to a container. In other instances, a sealing channel may be formed in the sidewall 110 of the cup lid 100 to facilitate securing the cup lid 100 to a container.

[0055] In other embodiments of the invention, a sidewall blank 112 and top wall blank 122 may include other features and may be made and assembled in an alternate

manner. For example, a top wall blank 122 may include a top wall 120 shape having an outer edge without any notches 124 as illustrated in FIG. 6. A tab 135 may extend beyond the outer edge of the top wall blank 122. The outer perimeter of the top wall blank 122 may be turned-up as with other embodiments of the invention. The sidewall blank 112 may include a cutout 113 in the top edge 116 thereof as illustrated. When the sidewall blank 112 is assembled into a band or loop and the top wall blank 122 is moved into position with the sidewall blank 112 and the top edge 116 is folded over the turned-up outer perimeter of the top wall blank 122, the cutout 113 may be aligned with the tab 135 position. Alignment of the cutout 113 with the tab 135 position prevents sealing of the tab 135 with the sidewall 110 when the folded-over edge of the sidewall blank 112 is sealed to the turned-up outer perimeter of the top wall blank 122.

[0056] Other manufacturing methods and configurations of a top wall blank 122 and sidewall blank 112 may be used to form a cup lid 100 having a tab 135 and closure 130 according to embodiments of the invention.

[0057] While various embodiments of the invention may include vent tabs 155 having different shapes, it has been found that certain shapes may provide better venting than other shapes, the better venting improving a user's drinking experience when drinking from a cup lid 100 according to various embodiments of the invention. For example, the vent tab 155 illustrated in FIG. 1 includes a "U" shape perforated region with the non-perforated side closest to the closure 130 and this configuration provides good ventilation even when tab 135 is inserted in the vent opening 153 formed by the vent tab 155. Such vent tab 155 configuration provides an intuitive shape and position for a user to push the tab 135 through during use of the cup lid 100.

[0058] In other embodiments, a "U" shaped vent tab 155 may be used with the non-perforated side facing a side of the cup lid 100 such that the non-perforated side is facing generally towards a side of the top wall 120 ninety-degrees from the tab 135 position as illustrated in FIG. 7. In such configuration, it has been found that the placement of tab 135 into the vent opening 153 formed by vent tab 155 provides improved venting of the container on which the cup lid 100 is attached. However, such configuration may not be as intuitive for the user during operation.

[0059] Other shapes and configurations of a vent tab 155 may be used with various configuration of the invention. In addition, while the vent opening 153 formed by a vent tab 155 may provide sufficient venting of a container used with a cup lid 100, it may be desirable

to include a vent hole 150 in the top wall 120 of a cup lid 100 along with a vent tab 155 which may provide a vent opening 153.

[0060] In other embodiments, a vent tab 155 - such as that illustrated in FIG. 8 - may include an opening on the side of the vent tab 155 adjacent the perforated side 157b. The opening may allow a user to pull the vent tab 155 upwards, tearing the perforations and creating a vent opening 157 with the vent tab 155 extended upwards. In still other embodiments, the vent tab 155 may be completely removed by a user dislodging the vent tab 155 from the top wall 120 of the cup lid 100 and creating a vent opening 153.

[0061] According to other embodiments of the invention, a cup lid 200 may include a pull-tab 235 integrated in a top wall 220 of the cup lid 200 as illustrated in FIGs. 9 through 11.

[0062] The pull tab 235 illustrated in FIG. 9 is integrated into the top wall 220 of the cup lid 200. Perforations 231 define an area of the top wall 220 that may be removed when an end 236 of the pull tab 235 is pulled. Pulling on the end 236 of the pull tab 235 allows a user to break the perforations 231 and tear off the pull tab 235, detaching it from the cup lid 200 to reveal opening 290 from which a user may drink.

[0063] Similar to the embodiment illustrated in FIG. 9, the embodiment illustrated in FIG. 10 includes a pull tab 235 that may be removed from the top wall 220 of the cup lid 200 along the perforations 231. In this embodiment, however, an additional opening 233 adjacent the end 236 of the pull tab 235 may allow a user to more easily access the end 236 of the pull tab 235 in order to facilitate a user's ability to grasp and pull the pull tab 235.

[0064] In another embodiment, a pull tab 235 may have a different shape as illustrated in FIG. 11. A user may grasp an end 236 of the pull tab 235 and pull on it, separating the pull tab 235 from the top wall 220 of the cup lid 200 to reveal an opening 290 into the interior of a container attached to the cup lid 200.

[0065] In still other embodiments of the invention, a pull tab 335 may be integrated with the sidewall 310 of the cup lid 300. For example, as illustrated in FIG. 12, a top wall 320 may include an opening (not shown) in the top wall 320 where a use may drink or access the contents of a container attached to the cup lid 300. A pull tab 335 extending off of a portion of the sidewall 310 may overlap a portion of the top wall 320, covering the opening. The pull tab 335 may be sealed around the opening such that a fluid tight seal exists to prevent spillage through the opening until the pull tab 335 is removed. A user may grasp the pull tab 335 and pull the pull tab 335 away from engagement with the top wall 320 to reveal

the opening underneath. The pull tab 335 may be separated from the cup lid 300 or folded over the sidewall 310 so that it can be reused to close the opening.

[0066] Another embodiment of a top wall blank 122 according to various embodiments of the invention is illustrated in FIGs. 13 and 14. As illustrated in FIG. 13, a top wall blank 122 may be formed in a generally circular shape. Other shapes having an outer edge may also be used. A tab 135 extends beyond the circumference or outer edge of the generally circular shape of the top wall blank 122. In some embodiments, two notches 124 in the top wall blank 122 - a first notch and a second notch - may be located adjacent the tab 135. The notches 124 may extend from an outer circumference or edge of the top wall blank 122 towards an interior of the top wall blank 122 where they intersect the tab 135 or juncture between the tab 135 and closure 130. The notches 124 may be positioned adjacent the tab 135. Perforations 131 may also be cut in the top wall blank 122 adjacent the tab 135, the perforations 131 shaped to create an opening 190 of a desired shape when the tab 135 is removed or used to break the perforations 131. The perforations 131 may define the shape of the closure 130. The perforations 131 may include a first perforation pattern and a second perforation pattern that originate at the intersection of the notch 124 and the tab 135 or in the general vicinity of the intersection of the notch 124 and tab 135. The top wall blank 122 may also include one or more vent holes 150, vent tabs 155, embosses, debosses, decorations, or other features as desired. In addition, the top wall blank 122 may include a tab hole 137 punched or formed within the area or region at least partially bound by the perforations 131 and crease 132. As illustrated in FIG. 13, the top wall blank 122 may also include a tab fold line 139 or crease allowing tab 135 to be folded over.

[0067] FIG. 14 illustrates another embodiment of the top wall blank 122 of FIG. 13 wherein the tab 135 is folded over and a tip portion thereof is inserted into the tab hole 137. Insertion of a portion of the tab 135 into the tab hole 137 may retain the tab 135 in the tab hole 137 while the top wall blank 122 is assembled into a cup lid 100. In some embodiments of the invention, tab 135 may be folded along a tab fold line 139 and inserted into the tab hole 137.

[0068] Still other embodiments of a top wall blank 122 according to various embodiments of the invention are illustrated in FIGs. 15 and 16. As illustrated in FIGs. 15 and 16, a top wall blank 122 may be formed in a generally circular shape. Other shapes having an outer edge may also be used. A tab 135 extends beyond the circumference or outer edge of the generally circular shape of the top wall blank 122. In some embodiments, two notches 124 in the top wall blank 122 may be located adjacent to the tab 135. The notches

124 may extend from an outer circumference or edge of the top wall blank 122 towards an interior of the top wall blank 122 where they intersect the tab 135 or juncture between the tab 135 and closure 130. The notches 124 may be positioned adjacent the tab 135. Perforations 131 may also be cut in the top wall blank 122 adjacent the tab 135, the perforations 131 shaped to create an opening 190 of a desired shape when the tab 135 is removed or used to break the perforations 131. The perforations 131 may define the shape of the closure 130. The perforations 131 may include varying patterns originating at the intersection of a notch 124 and the tab 135 or in the general vicinity of the intersection of a notch 124 and the tab 135. The top wall blank 122 may also include one or more vent holes 150, vent tabs 155, embosses, debosses, decorations, or other features as desired. In addition, the top wall blank 122 may include a tab hole 137 punched or formed within the area or region at least partially bound by the perforations 131 and crease 132.

[0069] As illustrated in FIG. 15, the perforations 131 may include a preferred pattern to facilitate easier opening and separation of the closure 130 from a portion of the top wall blank 122. In some embodiments of the invention, a perforation pattern as illustrated in FIG. 15 having multiple smaller perforations 131 and two larger perforations 131 may be used. The larger perforations 131 may be located where the perforations transform from a narrower portion (opposite perforations 131 being closer together) to a wider portion (opposite perforations 131 being further apart).

[0070] As illustrated in FIG. 16, the perforations 131 may include larger or longer perforations 131 with minimal connections holding the portion of the top wall blank 122 covering what is the opening 190 when the tab 135 is pulled to detach a portion from the top wall blank 122. As illustrated, two narrow connections on either side of the perforation pattern may retain that portion of the top wall blank 122 bounded by the perforations 131 to the top wall blank 122. Force applied to the tab 135 may tear those narrow connections, allowing the opening 190 to be formed.

[0071] As illustrated in FIGs. 15 and 16, a tab 135 may include one or more pry features 195. As illustrated, a pry feature 195 may extend off of the general shape of the tab 135 such that the pry feature 195 or portion of the tab 135 will stick out when the tab 135 is folded over and inserted in the tab hole 137. For example, when a tab 135 as illustrated in FIGs. 15 or 16 is folded over and an end thereof is inserted in the tab hole 137, the pry feature 195 provides a semi-pointed extension off of the tab 135 under which a user may easily insert a finger nail or part of a finger to begin to pry the tab 135 out of the tab hole 137. While tabs 135 such as those illustrated in FIGs. 13 and 14 can be removed in a similar manner, it has

been found that the inclusion of a semi-pointed region or pry feature 195 extending off of the general tab 135 shape provides a visual cue to a user as to how to remove a tab 135 from a tab hole 137 as well as facilitating an easier removal of such tab 135 from the tab hole 137.

[0072] In various embodiments of the invention, a top wall blank 122 as illustrated in FIGs. 13, 14, 15 and 16 may be prepared for formation or assembly into a cup lid 100 in the same manner as explained with reference to FIGs. 4A and 4B. In the process, the tab hole 137 may also be stamped. In addition, a tab fold line 139 may be created in the process if desired.

[0073] FIG. 17 illustrates a process of forming a cup lid 100 according to various embodiments of the invention. For example, using a top wall blank 122 as illustrated in FIG. 13, the process may be described as follows: a material web may be provided for making a top wall blank 122; a top wall blank 122 may be formed from the web; a tab 135 of the top wall blank 122 may be folded upwards, the fold may be assisted with a tab fold line 139 on the top wall blank 122; the folded tab 135 may be inserted into the tab hole 137 (such as by mechanical insertion for example); the top wall blank 122 may be formed with a side wall to form a cup lid 100. In some embodiments of the invention, the tab 135 may be removed from the tab hole 137 following completion of the formation of the cup lid 100 such that the tab 135 is more easily grasped by a user.

[0074] A paper-based or paperboard cup lid 100 according to various embodiments of the invention may be used with or connected to a cup or other container. For example, a cup lid 100 according to various embodiments of the invention may be assembled to or put on a cup to provide a lid for the cup. The cup lid 100 may be used with either hot or cold beverages as desired.

[0075] While various embodiments of the invention have been described with respect to a cup and a cup lid 100, it is understood that the embodiments of the invention are not limited to lids for cups. A lid according to various embodiments of the invention may be used with other containers. For example, lids for snack containers may include a closure or fixed closure according to embodiments of the invention. In some of those embodiments, the closure or fixed closure may be configured so that the closure or fixed closure may be opened and then reclosed to cover the opening in the lid.

[0076] Furthermore, while various opening 190 configurations have been illustrated and described with reference to the various embodiments of the invention, it is understood that the shape of an opening 190 may be configured as desired. For example, some openings 190 may be wider than others. Some openings 190 may be narrow. Other openings 190 may

be configured for the use of the cup lid 100, for example, if particulates or chunks are to be consumed or poured through the opening 190, the size and shape of the opening 190 may be adjusted accordingly.

[0077] Similarly, the size, shape, and design of a tab 135 and closure 130 may be configured as desired to create the desired opening 190 shape and user interaction or experience. In some embodiments of the invention, the tab 135 may be configured such that the tab 135 extends above the upper wall or edge of a sidewall 110 when assembled as a cup lid 100. In other embodiments, the tab 135 on a top wall blank may be configured such that the tab 135 will not extend above a top edge of a sidewall 110 when assembled as a cup lid 100.

[0078] Having thus described certain embodiments of the invention, it is understood that the invention defined by the appended claims is not to be limited by particular details set forth in the above description, as many apparent variations thereof are contemplated. Rather, the invention is limited only by the appended claims, which include within their scope all equivalent devices or methods which operate according to the principles of the invention as described.

CLAIMS

What is claimed is:

1. A top wall blank for a cup lid, comprising:

a top wall bounded by an outer edge;

a tab extending from the top wall beyond the outer edge and having a first tab edge and a second tab edge;

a first notch in the top wall adjacent the first edge of the tab;

a second notch in the top wall adjacent the second edge of the tab;

a first perforated pattern in the top wall extending from a position adjacent an intersection of the first notch and the tab towards a center of the top wall; and

a second perforated pattern in the top wall extending from a position adjacent the intersection of the second notch and the tab towards a center of the top wall.

2. The top wall blank of claim 1,further comprising a vent hole in the top wall.

3. The top wall blank of claim 1, further comprising a perforated vent tab in the top wall.

4. The top wall blank of claim 3, wherein the perforated vent tab comprises a "U" shaped perforation pattern.

5. The top wall blank of claim 1, wherein the top wall is paperboard.

6. The top wall blank of claim 5, wherein the paperboard is coated with a plastic material on at least one side.

7. The top wall blank of claim 1, wherein the top wall further comprises a top wall having a circular shape and the outer edge comprises an outer circumference.

8. The top wall blank of claim 1, wherein the first perforated pattern and second perforated pattern define a closure connected to the tab.

9. The top wall blank of claim 1, wherein the first perforated pattern and second perforated pattern define a closure separable from the top wall by application of force on the tab.

10. A top wall blank for a cup lid, comprising:

a top wall bounded by an outer edge;

a tab extending from the top wall beyond the outer edge and having a first tab edge and a second tab edge;

a first notch in the top wall adjacent the first edge of the tab;

a second notch in the top wall adjacent the second edge of the tab;

a first perforated pattern in the top wall extending from a position adjacent an intersection of the first notch and the tab towards a center of the top wall;

a second perforated pattern in the top wall extending from a position adjacent the intersection of the second notch and the tab towards a center of the top wall;

a tab hole in a region defined by the first perforated pattern and the second perforated pattern.

11. The top wall blank of claim 10, wherein a portion of the tab is inserted in the tab hole.

12. The top wall blank of claim 10, further comprising a tab fold line adjacent the first notch and second notch, a base of the tab folded along the tab fold line and a tip of the tab inserted in the tab hole.

13. The top wall blank of claim 10, wherein the tab further comprises at least one pry feature.

14. The top wall blank of claim 10, wherein the first perforated pattern and second perforated pattern are mirror images of each other.

15. The top wall blank of claim 14, wherein the first perforated pattern and second perforated pattern comprise a perforation defining the transition from a narrow portion to a wider portion of the top wall to be removed to form an opening therein.

16. A cup lid for a container, comprising:

a paperboard sidewall; and

a paperboard top wall, comprising:

a circular-shaped top wall having an outer edge;

a tab extending beyond the outer edge;

at least one perforation in the top wall adjacent the tab; and

a vent tab in the top wall.

17. The cup lid of claim 16, further comprising a tab hole in the paperboard top wall, wherein a portion of the tab is inserted in the tab hole.

18. The cup lid of claim 16, further comprising a pry feature extending off of the tab.

19. The cup lid of claim 16, wherein the at least one perforation in the top wall adjacent the tab comprises at least one set of perforations defining a narrow and a wide portion of the top wall which may be removed to form an opening therein.

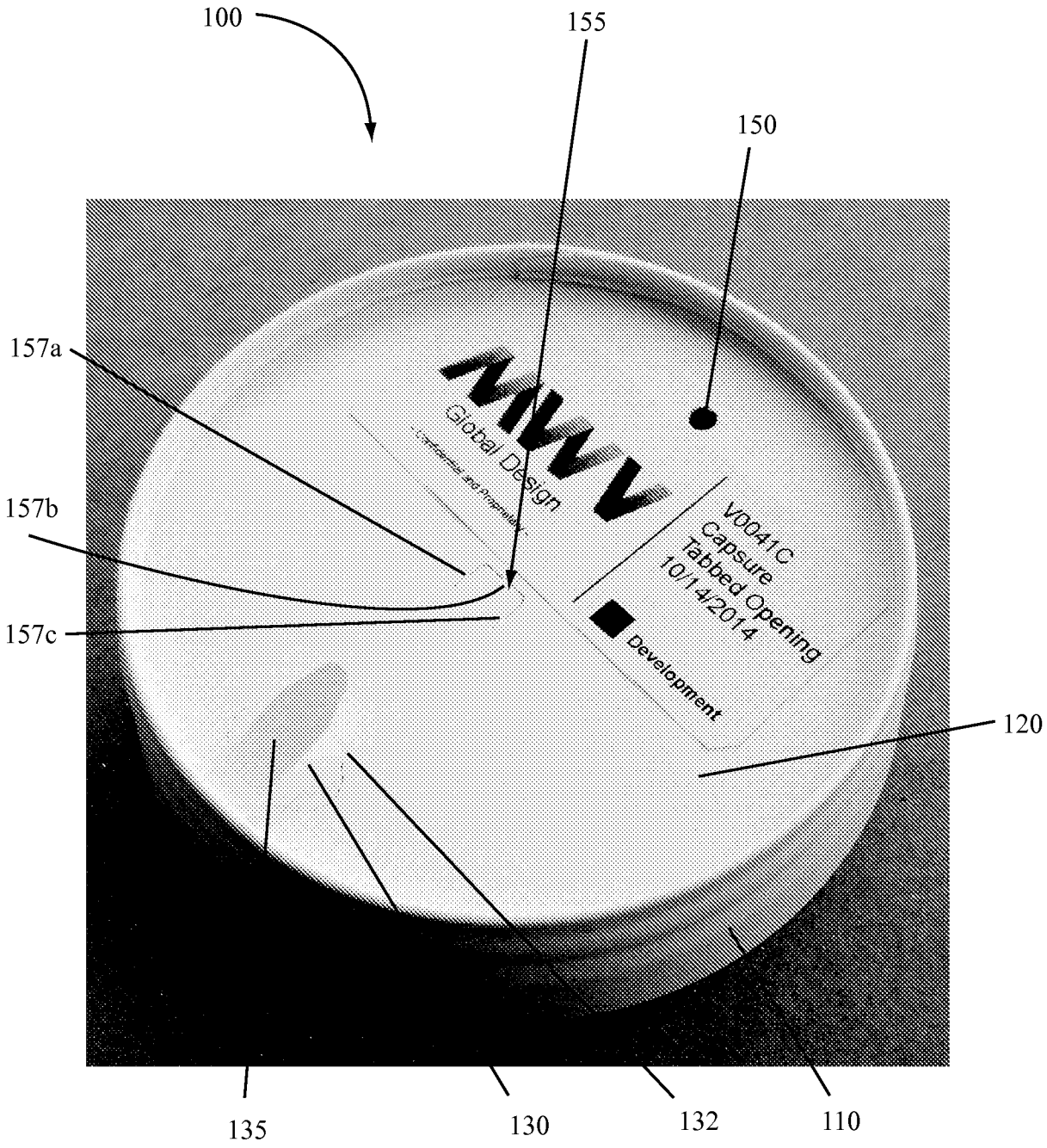
100
155
150
157a
157b
157c
120
135
130
132
110
Global Design
V0041C
Capsure
Tabbed Opening
10/14/2014
Development

FIG. 1

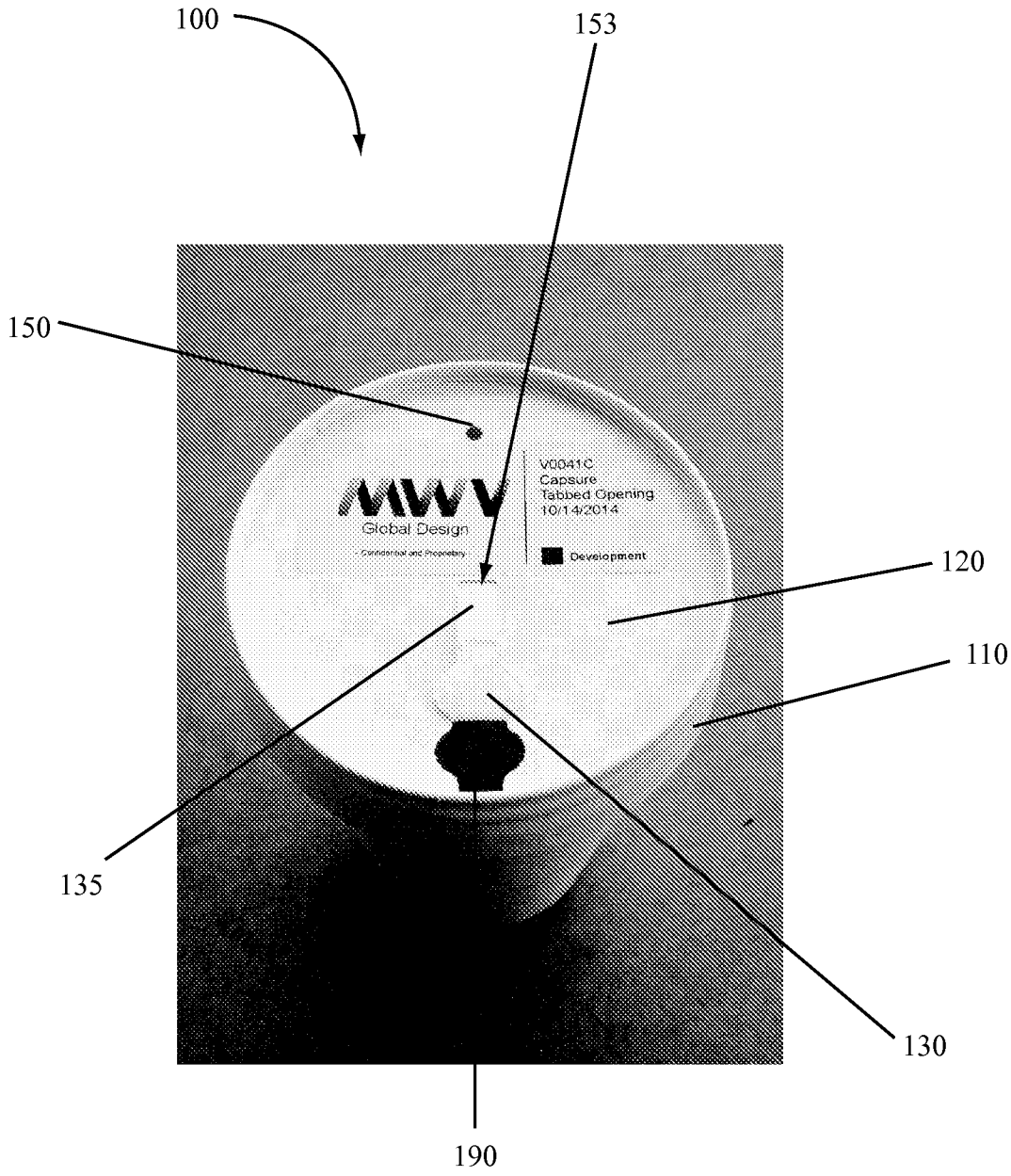
100
153
150
V0041C
Capsure
Tabbed Opening
10/14/2014
Global Design
Development
120
110
135
130
190

FIG. 2

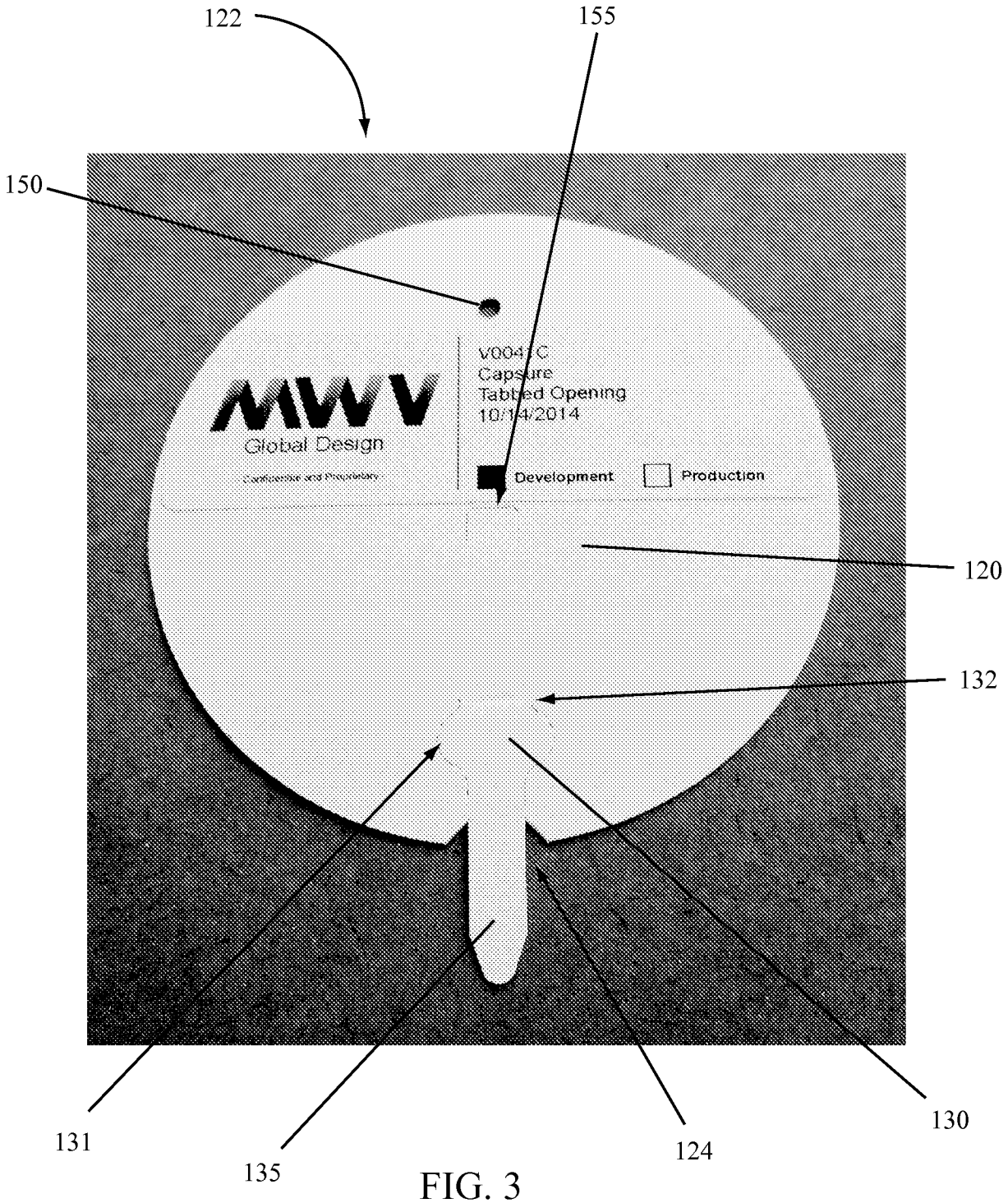
122
155
150
MWV
Global Design
V004 C
Capsure
Tabbed Opening
10/14/2014
Development
Production
120
132
130
131
135
124

FIG. 3

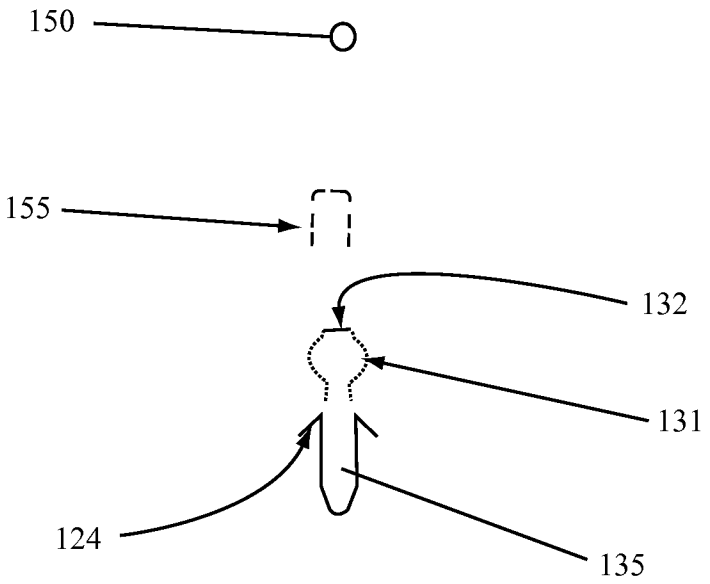

FIG. 4A

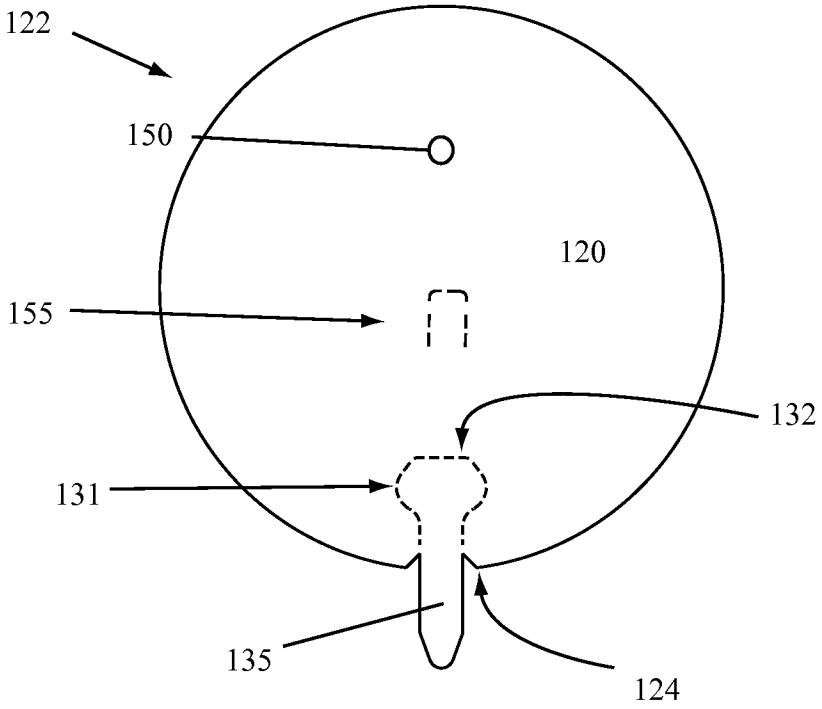

FIG. 4B

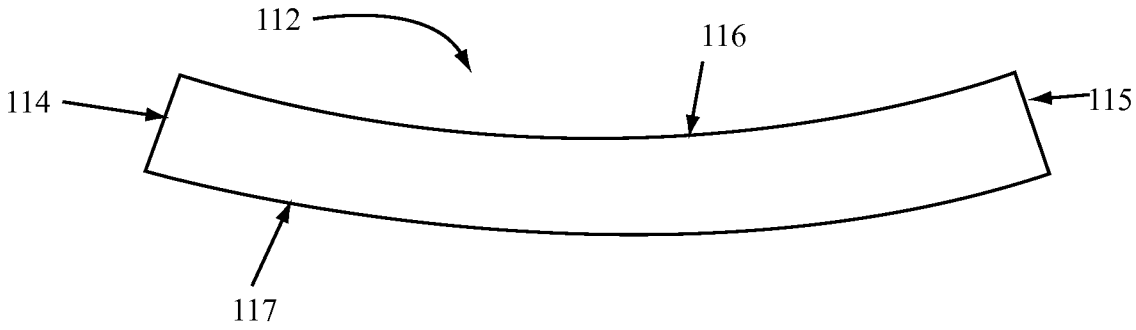

FIG. 5A

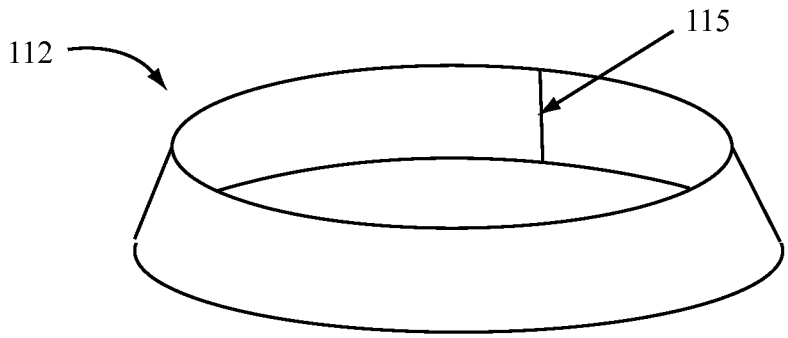

FIG. 5B

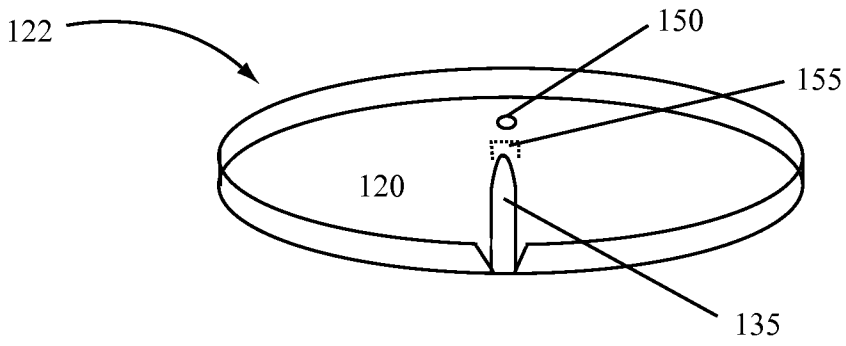

FIG. 5C

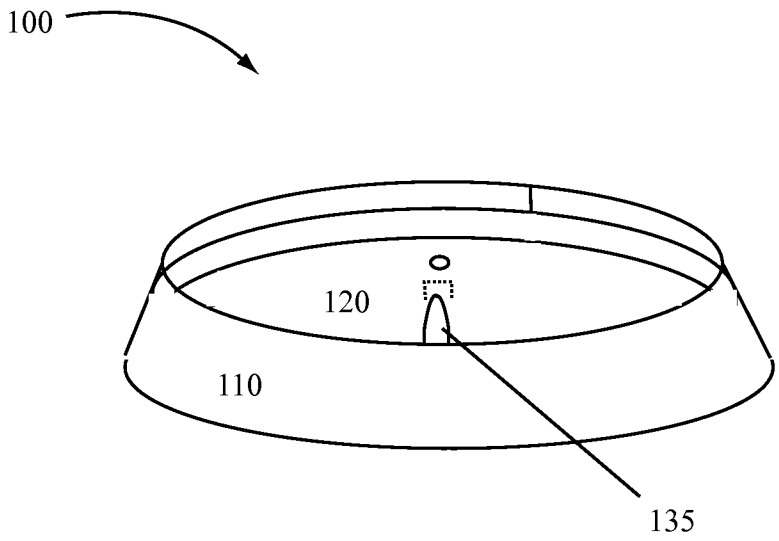

FIG. 5D

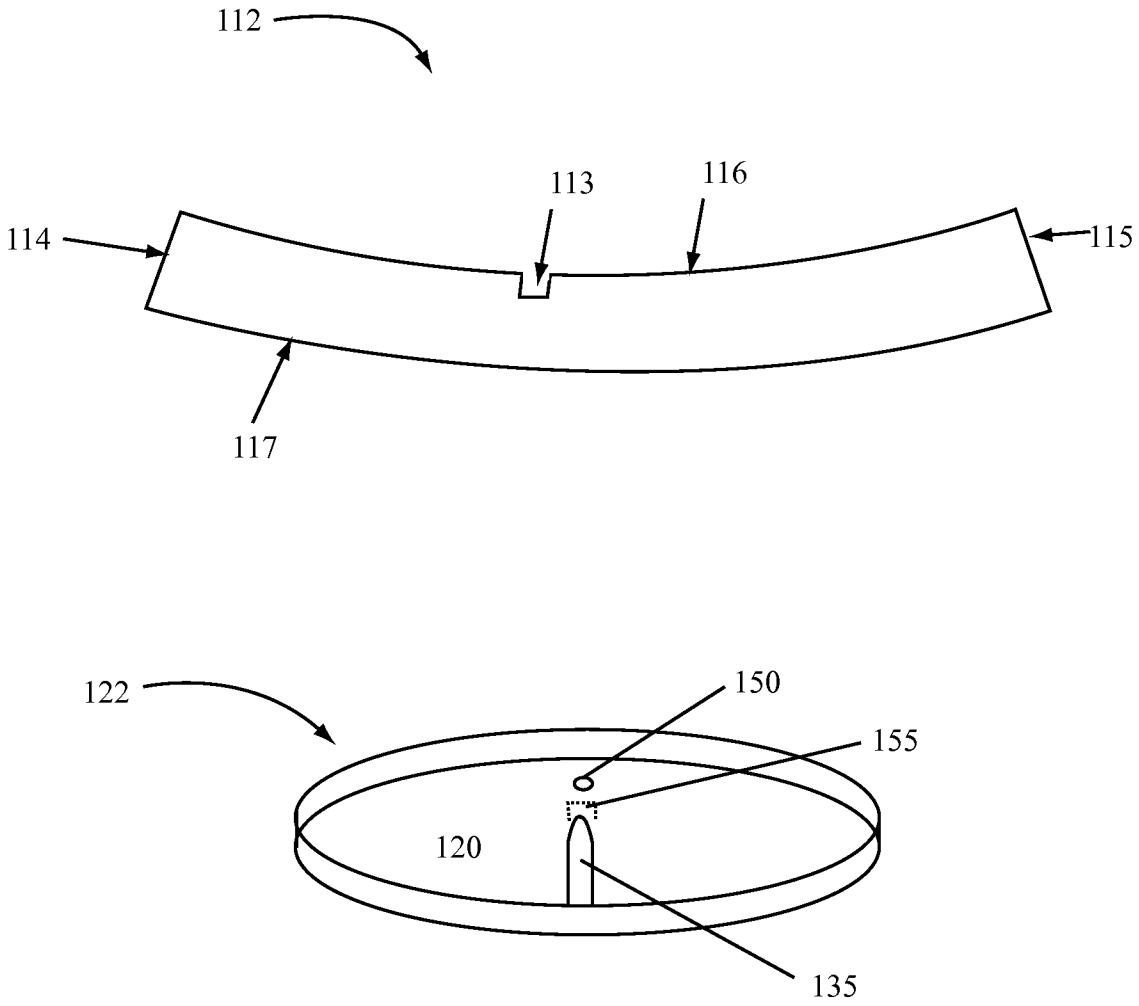

FIG. 6

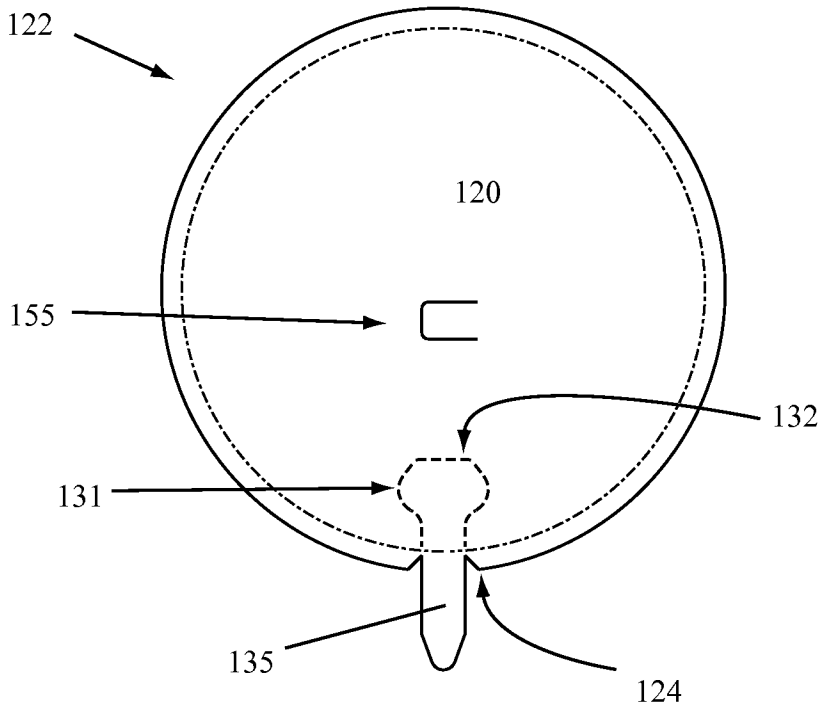

FIG. 7

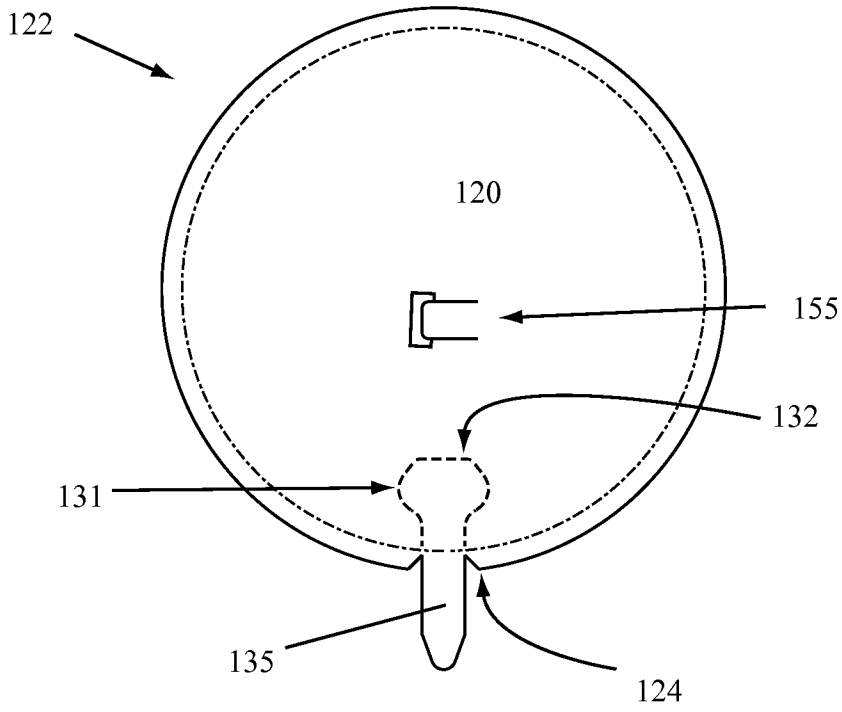

FIG. 8

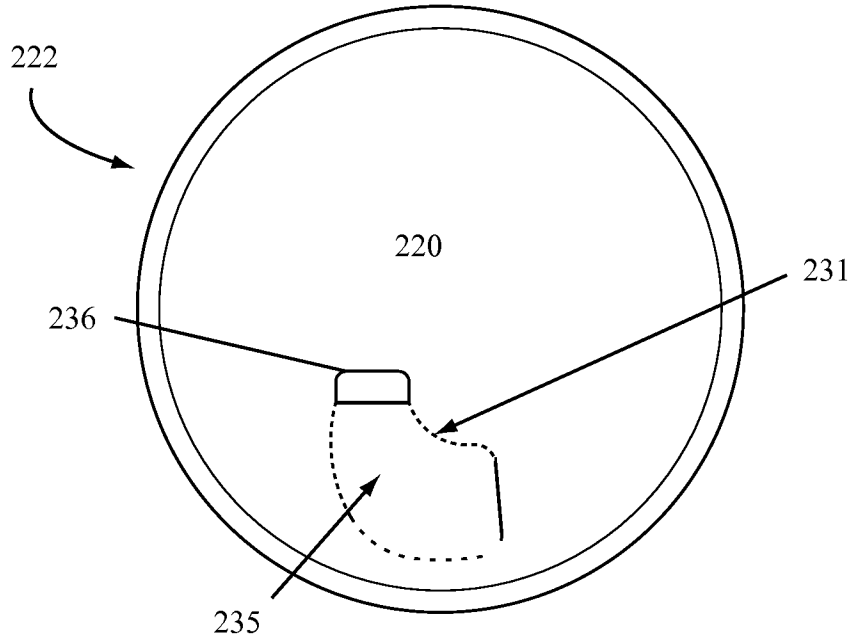

FIG. 9

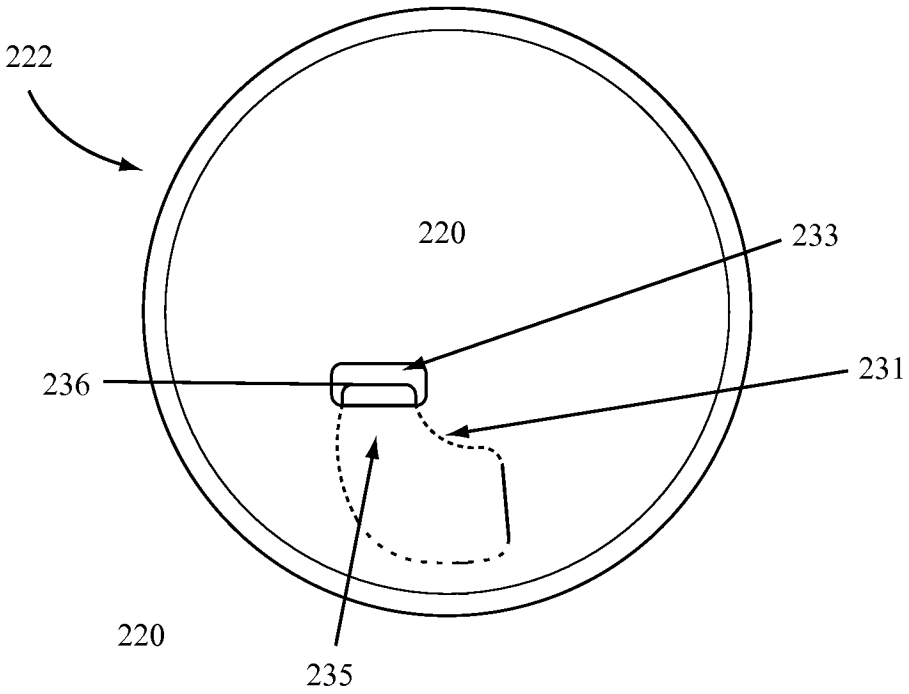

FIG. 10

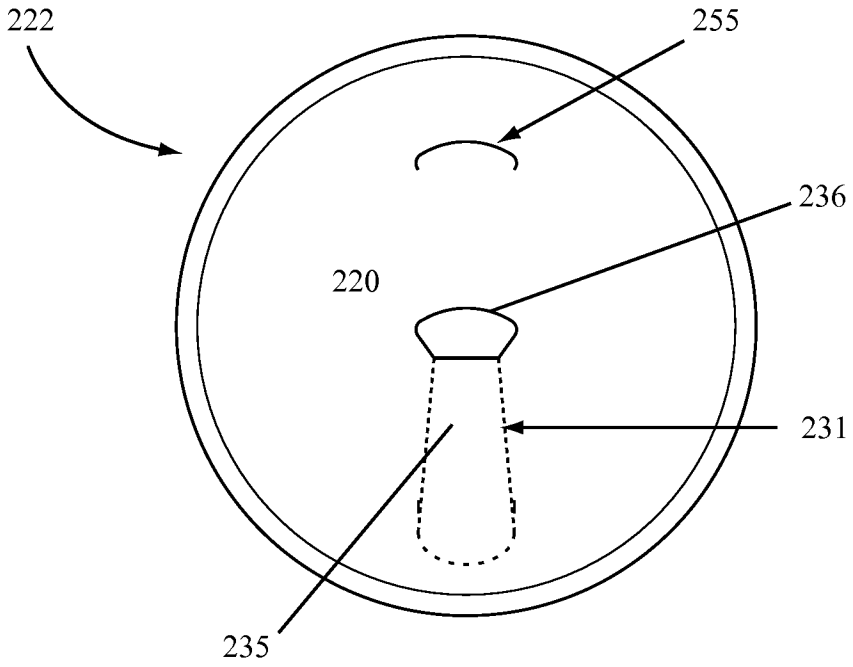

FIG. 11

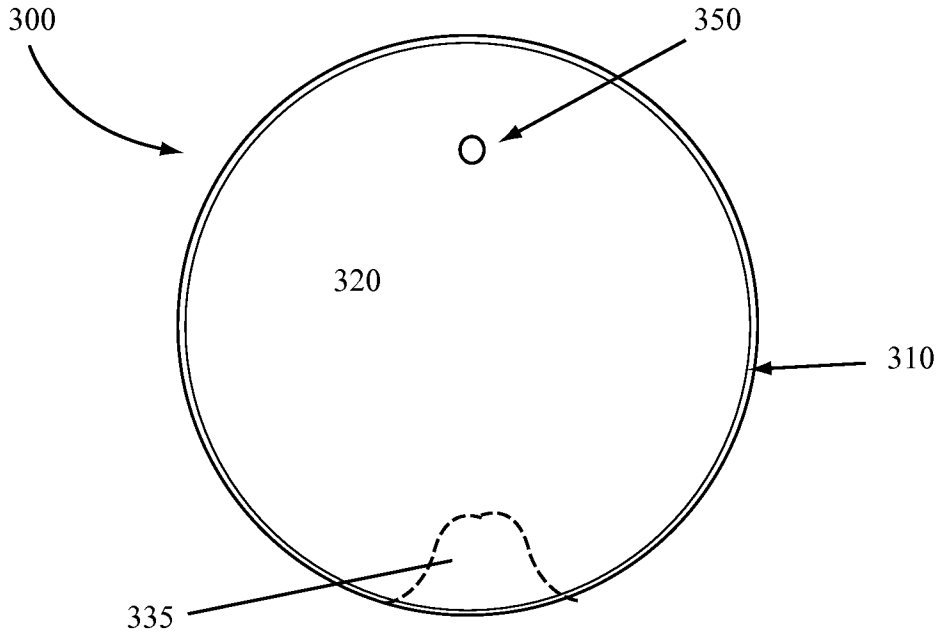

FIG. 12

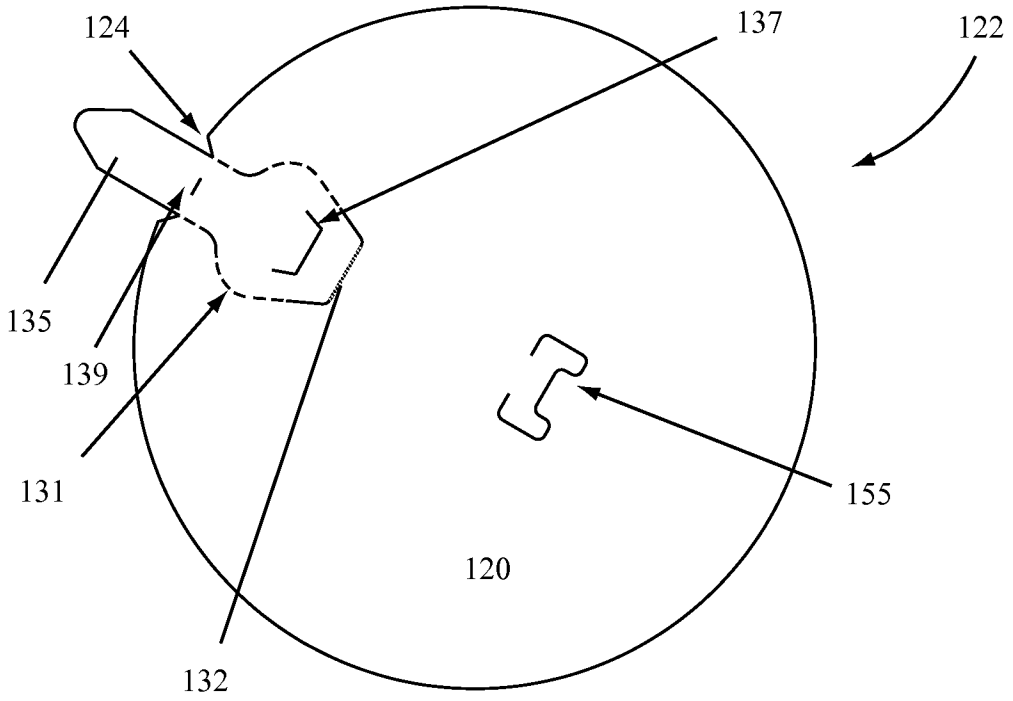

FIG. 13

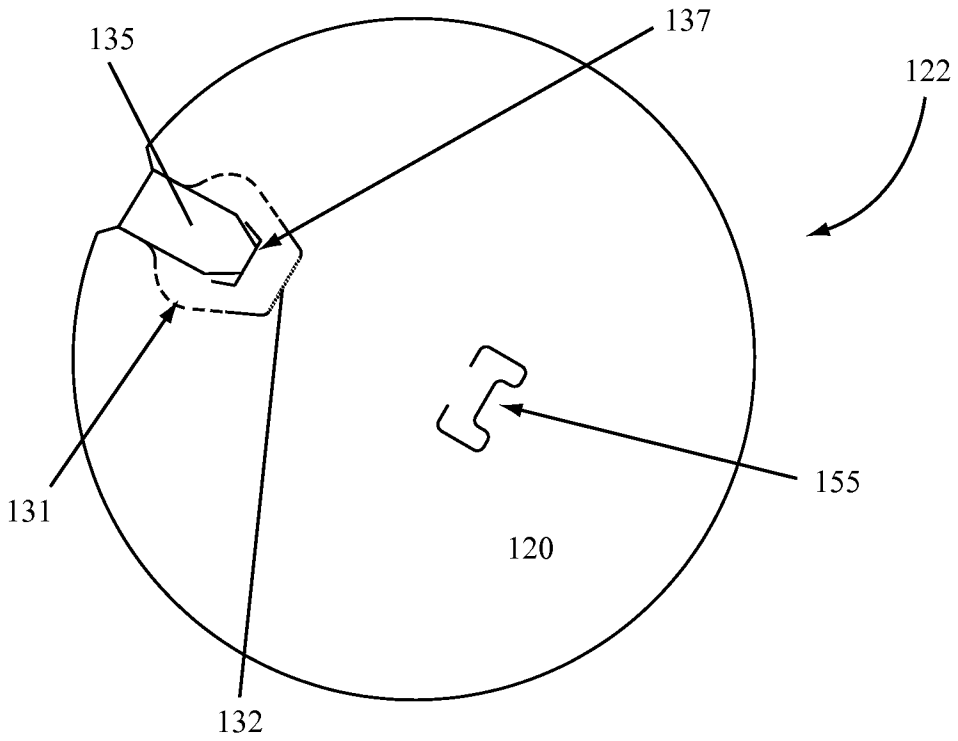

FIG. 14

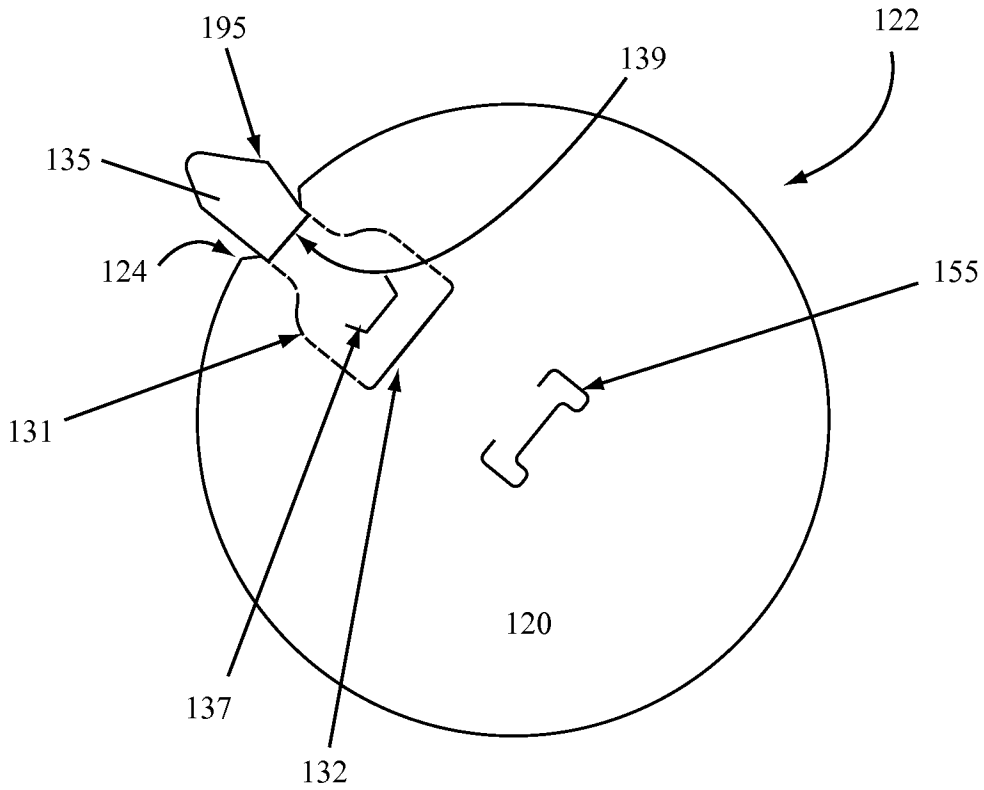
195
122
139
135
124
155
131
120
137
132

FIG. 15

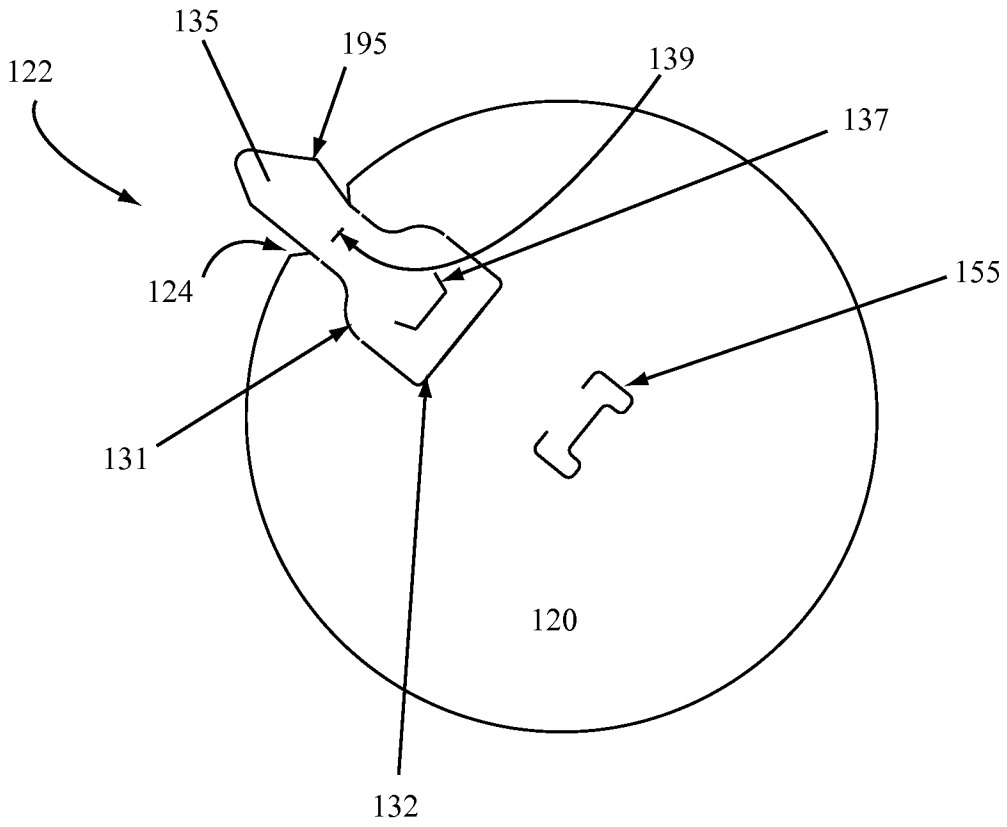
135
195
122
139
137
124
155
131
120
132

FIG. 16

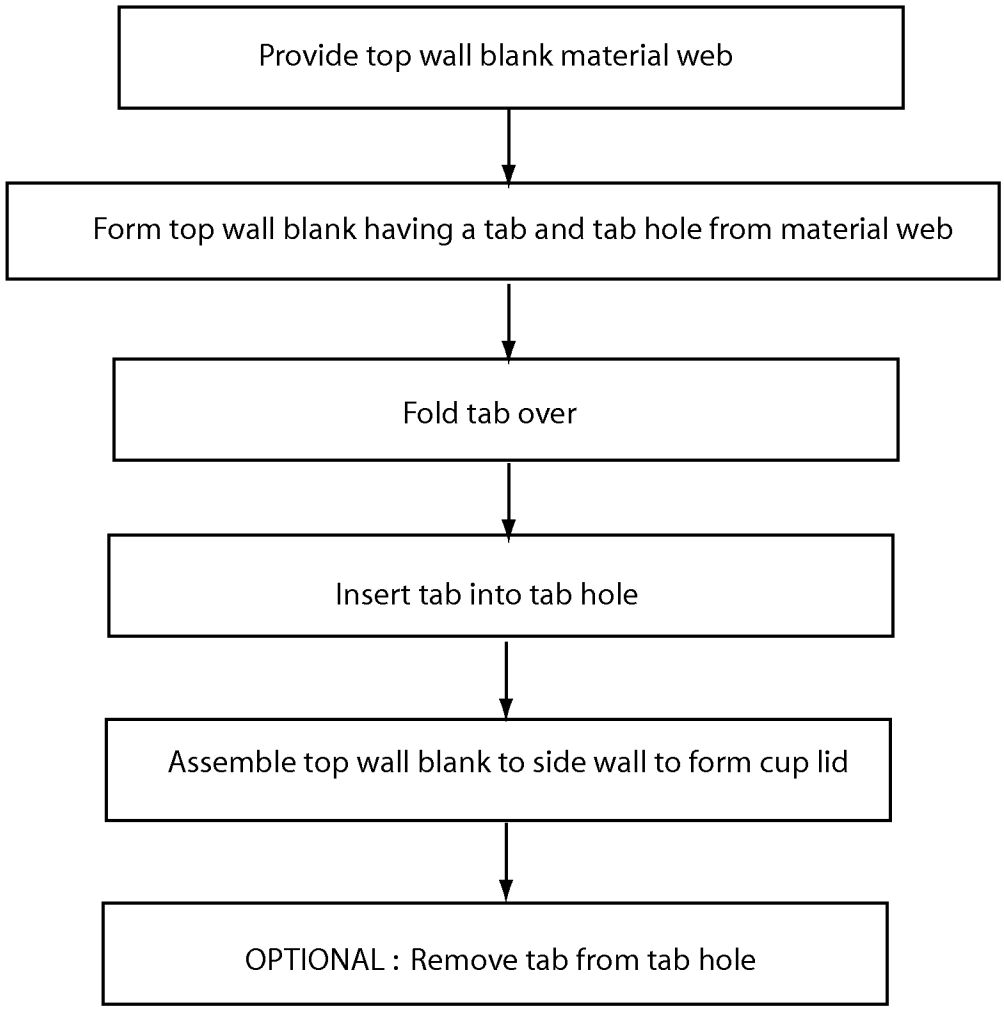
Provide top wall blank material web
Form top wall blank having a tab and tab hole from material web
Fold tab over
Insert tab into tab hole
Assemble top wall blank to side wall to form cup lid
OPTIONAL : Remove tab from tab hole

FIG. 17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/057835

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B65D 43/02 (2015.01)
CPC - B65D 43/02 (2015.12)
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)
IPC(8) - B65D 43/02, 43/04, 43/06, 43/08 (2015.01)
CPC - B65D 43/02, 43/0204, 43/0206, 43/0214, 43/04, 43/06, 43/08 (2015.12)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 220/200, 254.1, 254.3, 269, 711, 712, 793; 29/906.1 (Keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google, YouTube
Search terms used: cup, lid, wall, paper, wall, perforated, tab, cover, closure, blank, coffee, beverage, hot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,994,411 A (ELFELT et al) 30 November 1976 (30.11.1976) entire document	1-3, 5-9, 16-19
Y	US 2008/0217346 A1 (RUSH et al) 11 September 2008 (11.09.2008) entire document	1-3, 5-9
Y	US 2014/0054306 A1 (MEADWESTVACO CORPORATION) 27 February 2014 (27.02.2014) entire document	5, 6, 16-19
A	US 2003/0178426 A1 (FREEK et al) 25 September 2003 (25.09.2003) entire document	1-19
A	US 2009/0026219 A1 (BAL) 29 January 2009 (29.01.2009) entire document	1-19
A	US 4,502,608 A (MILLS) 05 March 1985 (05.03.1985) entire document	1-19

☐ 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
"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
17 December 2015	19 JAN 2016
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450 Facsimile No. 571-273-8300	Authorized officer Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774