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(71) Applicant: **YETI Coolers, LLC**
Austin TX 78735 (US)

(72) Inventors:
- **JINKINS, Cody**
  Austin, Texas, 78735 (US)
- **BONDHUS, Andy**
  Austin, Texas, 78735 (US)
- **RANE, Mark**
  Austin, Texas, 78735 (US)
- **BULLOCK, Dustin R**
  Austin, Texas, 78735 (US)
- **FRITZ, John**
  Austin, Texas, 78735 (US)
- **DRINKWATER, William**
  Austin, Texas, 78735 (US)
- **BRYSON, Matt**
  Austin, Texas, 78735 (US)
- **RUCHTE, Elizabeth**
  Austin, Texas, 78735 (US)

(74) Representative: **Haseltine Lake Kempner LLP**
One Portwall Square
Portwall Lane
Bristol BS1 6BH (GB)

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(54) CLOSURE AND LID AND METHOD OF FORMING CLOSURE AND LID

(57) An example lid assembly can include a lid and a slider. The lid can include a wall defining a recess. The slider can be configured to slide in the recess and can be configured to move between a closed position where the slider covers the opening to aid in preventing spilling of contents of the container, and an opened position where the slider uncovers the opening such that the contents may be poured from the container. The slider can be configured to be removable from the lid and can be replaced back on the lid. Additionally, the slider can be formed from upper and lower sled elements that are magnetically coupled to one another. In some examples, the lower sled of the slider may include an air vent with rounded entry portions, and the lid assembly may include engaging members with ramped surfaces.

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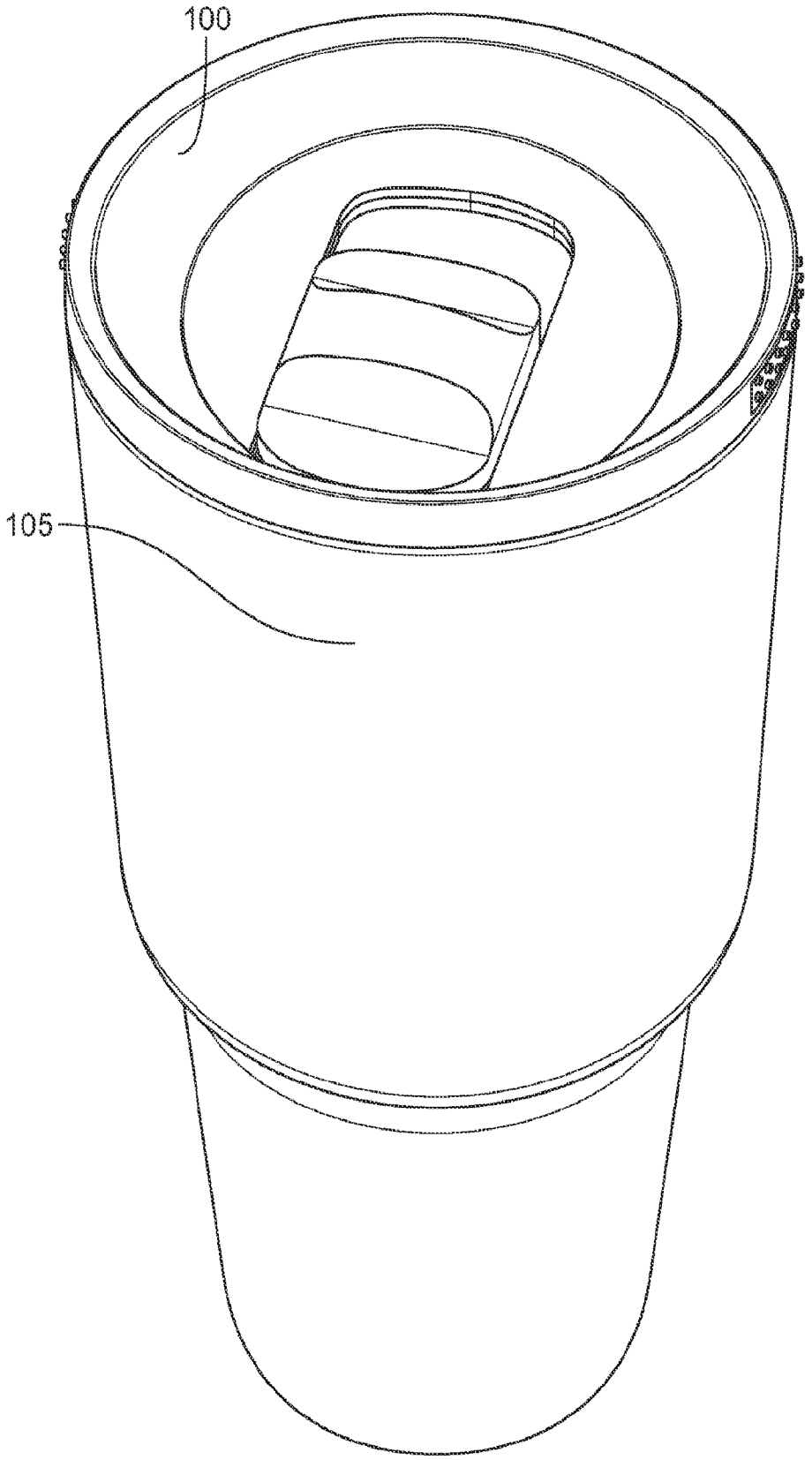

FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 63/125,835, filed December 15, 2020 and to co-pending U.S. Patent Application No. 16/988,301 filed on August 7, 2020, which claims priority to International Application No. PCT/US2019/057420 entitled "CLOSURE AND LID AND METHOD OF FORMING CLOSURE AND LID," filed October 22, 2019, which claims priority to U.S. Provisional Patent Application No. 62/749,443 filed October 23, 2018. All of these applications are incorporated herein by reference in their entirety for any and all nonlimiting purposes.

FIELD

[0002] The present disclosure herein relates broadly to lids for drinkware, and more specifically to closeable lids for drinkware containers used for drinkable beverages or foods.

BACKGROUND

[0003] Beverage containers can be filled with hot or cold drinkable liquids, such as water, coffee, tea, soft drink, or alcoholic beverage, such as beer. These beverage containers can be made of a variety of materials such as stainless steel, glass, plastic, cardboard, or paper material. Lids may be provided on beverage containers to provide an opening for pouring out the contents of the beverage container. In certain instances, it can be desired to selectively close and store the container such that the contents of the container do not spill.

SUMMARY

[0004] This Summary provides an introduction to some general concepts relating to this invention in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the invention.

[0005] Aspects of the disclosure herein may relate to a closable lid assembly for drinkware. In one example, the lid assembly can include a manually movable slider, which may include a tab or handle. In certain examples, the slider can be configured to perform one or more of the following: slide between a closed position and an open position where the slider covers an opening to aid in preventing spilling of contents of the container and an opened position where the slider uncovers the opening such that the contents of the container can be consumed, remain secured to the lid during movement between the closed position and the opened position, and to be removable from the lid so that the lid and slider can be cleaned.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The foregoing Summary, as well as the following Detailed Description, will be better understood when considered in conjunction with the accompanying drawings in which like reference numerals refer to the same or similar elements in all of the various views in which that reference number appears.

FIG. 1 depicts an isometric view of a lid assembly that is removably coupled to a container, according to one or more aspects described herein.

FIGS. 2A and 2B depict isometric views of a lid assembly in a closed and an open configuration, respectively, according to one or more aspects described herein.

FIG. 3 schematically depicts an exploded isometric view of a lid assembly, according to one or more aspects described herein.

FIG. 4 schematically depicts a cross-sectional view through a lid assembly 100, according to one or more aspects described herein.

FIGS. 5A and 5B depict isometric views of a lid assembly without a slider mechanism come according to one or more aspects described herein.

FIGS. 6A and 6B depict isometric views of a lower sled, according to one or more aspects described herein.

FIGS. 7A and 7B depict isometric views of an upper sled, according to one or more aspects described herein.

FIGS. 8A and 8B depict an isometric and a partial cross-sectional view of the lower gasket, according to one or more aspects described herein.

FIGS. 9A and 9B schematically depict cross-sectional views of a lid assembly in a closed configuration, according to one or more aspects described herein.

FIGS. 10A and 10B schematically depict cross-sectional views of a lid assembly in an open configuration, according to one or more aspects described herein.

FIGS. 11A and 11B schematically depict cross-sectional views of a lid assembly in a partially-open configuration, according to one or more aspects described herein.

FIGS. 12A-12D depict various steps for disassembly of a slider mechanism and removal from a lid assem-

bly, according to one or more aspects described herein.

FIG. 13 schematically depicts a cross-sectional view of a portion of a lid assembly coupled to a container, according to one or more aspects described herein.

FIGS. 14A-14E depict an alternative implementation of a slider mechanism that has an alternative disassembly mechanism come according to one or more aspects described herein.

FIG. 15 depicts another implementation of a lid assembly that is configured to be removably coupled to a container, according to one or more aspects described here.

FIG. 16 schematically depicts an exploded view of multiple elements of the lid assembly of FIG. 15, according to one or more aspects described herein.

FIG. 17 depicts a bottom view of a portion of the lid assembly of FIG. 15, according to one or more aspects described herein.

FIGS. 18A and 18B depict isometric views of a lower sled elements of a slider mechanism, according to one or more aspects described herein.

FIG. 19 depicts a configuration whereby a lower sled is prevented from being from being incorrectly positioned on the lid of the lid assembly, according to one or more aspects described here.

FIG. 20 depicts a view of a lower portion of an upper sled, according to one or more aspects described herein.

FIGS. 21A and 21B depict an isometric and an elevation view of a lower gasket, according to one or more aspects described herein.

FIG. 22 schematically depicts a cross sectional view of a lid assembly in an open configuration, according to one or more aspects described herein.

FIG. 23 depicts a top, front perspective view of another implementation of a lid assembly that is configured to be removably coupled to a container, according to one or more aspects described here.

FIG. 24 depicts a top, rear perspective view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 25 depicts a top view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 26 depicts a rear view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 27 depicts a front view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 28 depicts a rear view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 29 depicts a left side view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 30 depicts a left side view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 31 depicts an exploded top, rear perspective view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIG. 32 depicts a cross-sectional top, rear perspective view of the lid assembly of FIG. 23, according to one or more aspects described here.

FIGS. 33A-33F depict a cross-sectional view of the slider mechanism of the lid assembly of FIG. 23 moving from a closed position to an open position, according to one or more aspects described herein.

FIG 34 depicts a cross-sectional view of the slider mechanism of the lid assembly of FIG. 23 moving from an open position to a closed position, according to one or more aspects described herein.

FIG. 35 depicts a top perspective view of a portion of the lid assembly of FIG. 23, according to one or more aspects described herein.

FIG. 36 depicts a bottom perspective view of the portion of the lid assembly shown in FIG. 35, according to one or more aspects described herein.

FIG. 37 depicts a perspective view of a lower portion of an upper sled of the lid assembly of FIG. 23, according to one or more aspects described herein.

FIG. 38 depicts a top, front perspective view of a lower sled of the lid assembly of FIG. 23, according to one or more aspects described herein.

FIG. 39 depicts a bottom, rear perspective view of the lower sled shown in FIG. 38 of the lid assembly of FIG. 23, according to one or more aspects described herein.

FIG. 40 depicts a partial cross-sectional view of the lower sled shown in FIG. 38 of the lid assembly of FIG. 23, according to one or more aspects described herein.

DETAILED DESCRIPTION

[0007] In the following description of the various examples and components of this disclosure, reference is made to the accompanying drawings, which form a part hereof, and in which are shown by way of illustration various example structures and environments in which aspects of the disclosure may be practiced. It is to be understood that other structures and environments may be utilized and that structural and functional modifications may be made from the specifically described structures and methods without departing from the scope of the present disclosure.

[0008] Also, while the terms "frontside," "backside," "top," "base," "bottom," "side," "forward," and "rearward" and the like may be used in this specification to describe various example features and elements, these terms are used herein as a matter of convenience, e.g., based on the example orientations shown in the figures and/or the orientations in typical use. Nothing in this specification should be construed as requiring a specific three dimensional or spatial orientation of structures in order to fall within the scope of the claims.

[0009] FIG. 1 depicts an isometric view of a lid assembly 100 that is removably coupled to a container 105, according to one or more aspects described herein. Container 105 is one example container to which the lid assembly 100 may be configured to be removably coupled. Accordingly, the container 105 may be configured to store a volume of liquid and the lid assembly 100 may be configured to seal an opening of the container 105.

[0010] FIGS. 2A and 2B depict isometric views of the lid assembly 100 in a closed and an open configuration, respectively. The lid assembly 100 generally includes a slider mechanism 102 that is configured to move between a closed position (depicted in FIG. 2A) and an open position (depicted in FIG. 2B) to selectively close or open a first opening 104 through which a liquid, stored in the container 105, is configured to flow. Further details of the slider mechanism 102 are discussed in relation to the proceeding figures. The lid assembly 100 may additionally include a sidewall 106, which can define a groove 108 for placement of a gasket 110. Accordingly, the gasket 110 may provide a seal between the lid assembly 100 and the container 105. However, other scaling methods for scaling the lid assembly 100 to the container 105 are also contemplated. The lid assembly 100 may also include a rim 112 for engaging an opening of the container 105. The rim 112 may also include a top wall 114 and grip elements 116 and/or an optional lid tab (not depicted) extending from the top wall 114 to assist the user in removing the lid assembly 100 from the container 105.

[0011] The lid assembly 100 may also include a middle wall 118 extending below the rim 112. A top surface 120 of the middle wall 118 can define a recess 122 for receiving the slider mechanism 102. In one example, the recess 122 can define a guide channel as the slider mechanism 102 moves between the closed position depicted in FIG. 2A and the open position depicted in FIG. 2B. As shown in FIG. 2B, the first opening 104 for drinking or pouring liquid out of the container can also be formed in the recess 122. The recess 122 can also include a second opening 124, which is described in further detail in relation to FIG. 5A. A detent 126 may extend into from the top surface 120 of the middle wall 118 into the recess 122. This detent 126 may be configured to abut the slider mechanism 102 when in the open position depicted in FIG. 2B to prevent liquid from being compressed between the slider mechanism 102 and an end wall 128 of the recess 122, which may otherwise result in splashing of a liquid that may pool in the recess 122 as a result of a user drinking or pouring from the first opening 104.

[0012] FIG. 3 schematically depicts an exploded isometric view of the lid assembly 100, according to one or more aspects described herein. In particular, FIG. 3 schematically depicts multiple elements that make up the slider mechanism 102, as discussed in relation to FIGS. 2A and 2B. Accordingly, the slider mechanism 102 may include an upper sled 130, which is configured to be positioned within the recess 122 on the top surface 120 of the middle wall 118. The upper sled 130 may include an upper magnet 132 that is encapsulated therein. In one example, the upper magnet 132 may be encapsulated within a cavity in the upper sled 130, and may be overmolded with a polymeric overmold plug element 134. Additional or alternative encapsulation methods may be used to secure the upper magnet 132 within the upper sled 130, without departing from the scope of these disclosures. Additionally, the upper sled magnet 132 may be formed of any suitable ferromagnetic or otherwise magnetic material. The upper sled 130 is discussed in further detail in relation to FIGS. 7A and 7B.

[0013] The slider mechanism 102 may additionally include a lower sled 136 that is configured to be positioned adjacent to a bottom surface 138 of the middle wall 118 (depicted in FIG. 5B). The lower sled 136 may include a lower sled magnet 140 that is encapsulated therein. In one example, the lower sled magnet 140 may be encapsulated within a cavity in the lower sled 136, and may be overmolded with a polymeric overmold plug element 142. Additionally, the slider mechanism 102 may include a lower gasket 144 that is configured to extend around a perimeter of the lower sled 136. The lower sled 136 is described in further detail in relation to FIGS. 6A and 6B.

[0014] In one example, magnetic attraction between the upper sled magnet 132 and the lower sled magnet 140 magnetically couples the upper sled 130 to the lower sled 136 across the middle wall 118. Accordingly, manual actuation of the upper sled 130 on the top surface 6 of the middle wall 118 results in sliding motion of both the upper sled 130 and the lower sled 136.

[0015] FIG. 4 schematically depicts a cross-sectional view through the lid assembly 100, according to one or more aspects described herein. As depicted, the slider mechanism 102 is in a closed configuration such that the first opening 104 is sealed by the slider mechanism 102. In one example, the lower sled magnet 140 may have a cylindrical geometry with a hollow center. As such, the lower sled magnet 140 may otherwise be described as a ring magnet that extends around a central tube 146 through the overmolded plug element 142 and the lower sled 136. In another example, the lower sled magnet 140 may have a solid cylindrical geometry.

[0016] FIGS. 5A and 5B depict isometric views of the lid assembly 100 without the slider mechanism 102. In particular, FIG. 5A depicts a view of the top surface 120 of the middle wall 118, and FIG. 5B depicts a view of the bottom surface 138 of the middle wall 118. As depicted, the lid mechanism 100 includes a first opening 104 and a second opening 124. In one example, a portion of the slider mechanism 102 is configured to extend through the second opening 124 when the upper sled 130 is magnetically coupled to the lower sled 136.

[0017] The second opening 124 may include detents 148 that extend from the middle wall 118 into the second opening 124. These detents 148 are configured to be received into channels 150 (see FIG. 6A) extending along a portion of the central tube 146 of the lower sled 136 when the slider mechanism 102 is in the closed position depicted in FIG. 2A. Accordingly, the detents 148 are configured to provide an interference fitting to prevent the slider mechanism 102 from being inadvertently moved and thereby inadvertently unseal the first opening 104. In one example, the slider mechanism 102 may be configured to lock in the open and/or closed configuration depicted in FIGS. 2A and 2B. It is further contemplated that a locking mechanism in addition to the detents 148 may be used to further prevent the slider mechanism 102 from being inadvertently moved.

[0018] FIG. 5B depicts the bottom surface 138 of the middle wall 118. Accordingly, as depicted, the bottom surface 138 defines a first ramped feature 152 on a first side of the second opening 124. The first ramped feature 152 having a crest surface 154 spaced between two trough depressions 156. Similarly, a second ramped feature 158 is positioned on a second side of the second opening 124. The second ramped feature 158 includes a crest surface 160 spaced between two trough depressions 162.

[0019] The lid assembly 100 additionally includes a recess pocket 161 extending into an inner surface 163 of the sidewall that extends below the bottom surface 138 of the middle wall 118. Accordingly, the recess pocket 161 receives a portion of the lower sled 136 when the slider mechanism 102 is in the closed position depicted in FIG. 2A. The lid assembly 100 also includes a recessed vent pocket 165, such that the geometry of the recessed vent pocket 165 allows air to flow into the container 105 as a liquid is being poured out of the first opening 104.

[0020] FIGS. 6A and 6B depict isometric views of the lower sled 136, according to one or more aspects described herein. Accordingly, the lower sled 136 includes an inner surface 164 that is configured to be positioned adjacent to the bottom surface 138 of the middle wall 118. The inner surface 164 includes a lower sled ramp 166. The lower sled ramp 166 is configured to be received into one of the trough depressions of each of the first ramped feature 152 and the second ramped feature 158. As such, the lower sled ramp 166 is configured to slide across the first ramped feature 152 and the second ramped feature 158 as the slider mechanism 102 slides between the open and close configurations. As the slider mechanism 102 transitions between the open and the closed configuration, the lower sled ramp 166 will abut the crest surfaces 154 and 160. Further, because the crest surfaces 154 and 160 are raised relative to the trough depressions on either side of the crest surfaces 154 and 160, this will urge the upper sled 130 and the lower sled 136 to space further apart from one another. As such, because the magnetic force between the upper sled magnet 132 and the lower sled magnet 140 is inversely proportional to the square of the distance between them, the magnetic attractive force will be reduced when the lower sled ramp 166 abuts the crest surfaces 154 and 160. In one example, this reduction in magnetic force will provide for smooth movement of the slider mechanism 102 between the open and closed positions. Further, when the lower sled ramp 166 is positioned within the trough depressions of the first ramped feature 152 and the second ramped feature 158, the comparatively shorter distance between the upper sled magnet 132 and the lower sled magnet 140 will result in a comparatively stronger magnetic attractive force that serves to secure the slider mechanism 102 in the open or closed configuration.

[0021] It is noted that the lower sled 136 and the upper sled 130 are symmetrical about to perpendicular axes in order to allow the slider mechanism to be installed in the lid assembly 100 in any of four different ways. The lower sled 136 additionally includes a central tube 146 that extends from the inner surface 164. Further, the central tube 146 includes tab ears 168 that are configured to extend through the second opening 124. The lower sled 136 further includes a channel 170 that is configured to receive a portion of the lower gasket 144. Additionally, the lower sled 136 includes lower vent channels 171a and 171b. Accordingly, when the slider mechanism 102 is in the open configuration, a portion of the lower sled 136 extends over a portion of the recessed vent pocket 165. Further, one of the lower vent channels 171a or 171b is positioned over the recessed vent pocket 165, and thereby sets up a channel by which air can pass from the slider mechanism 102 into an internal cavity of the container 105.

[0022] FIG. 6B depicts an isometric view of an outer surface 172 of the lower sled 136. In one example, a knob 174, otherwise referred to as finger tabs 174 extend

from the outer surface 172. This knob 174 is configured to be gripped by a user in order to install the slider mechanism 102 in the lid assembly 100. This installation process is described in further detail in relation to FIG. 12.

[0023] FIGS. 7A and 7B depict isometric views of the upper sled 130. The upper sled 130 can include two symmetrical flanges 176a and 176b, which are both configured to selectively cover and seal the first opening 104 for pouring liquid out of the container and the second opening 124 in the recess 122, otherwise referred to as a guide channel 122. The tab or the handle 178 is configured for the user to grasp to selectively move the upper sled 130, and thereby the slider mechanism 102, into an opened position to uncover the first opening 104 on the lid assembly 100 or closed position to cover the first opening 104 on the lid assembly 100. The tab or handle 178 may include two inwardly tapered portions 180a and 180b for grasping purposes.

[0024] FIG. 7B depicts a view of an inner side 182 of the upper sled 130. Accordingly, the upper sled 130 includes upper vent channels 184a and 184b. Accordingly, when the slider mechanism 102 is in the open configuration, a vent path is partially formed by a portion of the lower sled 136 extending over a portion of the recessed vent pocket 165. Additionally, one of the lower vent channels 171a or 171b is positioned over the recessed vent pocket 165, and thereby sets up a channel through which air can pass from the slider mechanism 102 into an internal cavity of the container 105. This vent path between an external environment and the internal cavity of the container 105 is completed as the upper vent channels 184a and 184b allow air to pass from the external environment into the slider mechanism 102. The upper sled recesses 186a and 186b are configured to receive a portion of the tab cars 168 of the lower sled 136.

[0025] FIGS. 8A and 8B depict an isometric and a partial cross-sectional view of the lower gasket 144, according to one or more aspects described herein. Accordingly, the lower gasket 144 is configured to seal the first opening 104 when the slider mechanism 102 is in the closed configuration depicted in FIG. 2A. Additionally, the lower gasket 144 is configured to seal the second opening 124. In one example, an inner surface 188 of the lower gasket 144 is configured to be positioned over the outer surface 172 of the lower sled 136. The opening 190 in the lower gasket 144 is configured to allow the knob 174 of the lower sled 136 to extend through. In one example, the lower gasket 144 may be constructed from silicone. However, additional or alternative polymeric materials may be used, without departing from the scope of these disclosures.

[0026] The cross-sectional view of FIG. 8B indicates the spring feature 192 of the lower gasket 144. Accordingly, the spring feature 192 allows the seal formed by the gasket 144 to move and stay in contact with the bottom surface 138 of the middle wall 118. Accordingly, when in the open or closed configurations, the comparatively high magnetic force urging the lower sled 136 toward the bottom surface 138 of the middle wall 118 compresses the spring feature 192 of the lower gasket 144. Further, when the lower sled ramp 166 is positioned on the crest surfaces 154 and 160, and the magnetic force is comparatively lower and the lower sled 136 is moved away from the bottom surface 138, the spring feature 192 extends out toward and maintains contact with the bottom surface 138 to maintain the seal of the lower gasket 144 on the bottom surface 138.

[0027] FIGS. 9A and 9B schematically depict cross-sectional views of the lid assembly 100 in a closed configuration. As depicted, the slider mechanism 102 that includes the upper sled 130 and the lower sled 136 is sealing the first opening 104. FIG. 9B depicts a more detailed view of a portion of the cross-section of FIG. 9A. Accordingly, FIG. 9B depicts a portion of the lower sled 136 and the lower gasket 144 received into the recess pocket 161 of the lid assembly 100.

[0028] FIGS. 10A and 10B schematically depict cross-sectional views of the lid assembly 100 in an open configuration. As depicted, the first opening 104 is completely uncovered by the slider mechanism 102 that includes the upper sled 130 and the lower side 136. FIG. 10B schematically depicts a more detailed view of a portion of the cross-section of FIG. 10A. In particular, FIG. 10B depicts a portion of the lower gasket 144 that has been slid over a portion of the recessed vent pocket 165. The overlap of the portion of the lower gasket 144 on the portion of the recessed vent pocket 165 results in a gap 192 through which the air can enter into the container 105 as liquid is being poured from the first opening 104.

[0029] FIGS. 11A and 11B schematically depict cross-sectional views of the lid assembly 100 in a partially-open configuration. As depicted, the first opening 104 is partially uncovered by the slider mechanism 102 that includes the upper sled 130 and the lower sled 136. FIG. 11B schematically depicts a more detailed view of a portion of the cross-section of FIG. 11A. In particular, FIG. 11B depicts a separation 196, or gap 196 between the upper sled 130 and the lower sled 136. This separation 196 results from the lower sled ramp 166 abutting the crest surfaces 154 and 160, as previously described.

[0030] FIGS. 12A-12D depict various steps for disassembly of the slider mechanism 102 and removal from the lid assembly 100. As previously described, the slider mechanism 102 includes the upper sled 130 and the lower sled 136. Further, the upper sled includes the upper sled magnet 132, and the lower sled 136 includes the lower sled magnet 140 and lower gasket 144. FIG. 12A depicts the lid assembly 100 with the slider mechanism 102 fully installed and in an open configuration. In order to remove the slider mechanism, for example to facilitate cleaning of the lid assembly 100, the upper sled 130 may be manually lifted from the top surface 120. FIG. 12B depicts the upper sled 130 after having being removed from the top surface 120. Once the upper sled 130 is removed, the lower sled 136 is no longer held against the bottom surface 138 by the magnetic attractive force

between the upper sled magnet 132 and the lower sled magnet 140. However, tab ears 168 prevent the lower sled 136 from falling into the container 105 as the tab ears 168 extend through the second opening 124 and grip onto a portion of the top surface 120.

[0031] In order to remove the lower sled 136 from the lid assembly 100, the lower sled 136 is rotated through 90° such that the tab ears 168 can be passed through the second opening 124. FIG. 12D depicts the upper sled 130 and lower sled 136 fully removed from the lid assembly 100.

[0032] FIG. 13 schematically depicts a cross-sectional view of a portion of the lid assembly 100 coupled to a container 105. In one example, the lid assembly 100 may be resealably coupled to the container 105 by threaded elements on both the sidewall 106 of the lid assembly 100, and a sidewall 202 of the container 105. Elements 204 and 206 are threads on the sidewalls 106 and 202, respectively. Further, it is contemplated that any thread geometries may be used to secure the lid assembly 100 to the container 105, without departing from the scope of these disclosures. Alternatively, the various lid assembly 100 structures described throughout this disclosure may be implemented without a threaded coupling between the lid assembly 100 and the container 105. In one example, the lid assembly 100 may be secured to the container 105 by an interference fit, among others.

[0033] FIGS. 14A-14E depict an alternative implementation of a slider mechanism that has an alternative disassembly mechanism. Accordingly, FIG. 14A depicts an isometric view of a lid assembly 300 that includes a slider mechanism 301. The lid assembly 300 may be similar to lid assembly 100, and the slider mechanism 301 may be similar to slider mechanism 102. The slider mechanism 301 may include an upper sled 302 similar to upper sled 130, and a lower sled 306 similar to lower sled 136. In order to disassemble the slider mechanism, the upper sled 302 may be manually removed from the lid assembly 300. Similar to the lower sled 136, the lower sled 306 may include tab ears 308 to prevent the lower sled 306 from falling into the container when the upper sled 302 is removed. However, in order to remove the lower sled 306 from the lid assembly 300, the lower sled 306 is slid to the position depicted in FIG. 14C, such that the geometry of the tab ears 308 aligns with the geometry of an opening 309 in the middle wall 310 of the lid assembly 300. When positioned in the configuration depicted in FIG. 14C, the lower sled 306 can pass through the opening 309, as depicted in FIG. 14D. FIG. 14E depicts the upper sled 302 and lower sled 306 fully removed from the lid assembly 300.

[0034] FIG. 15 depicts another implementation of a lid assembly 1500 that is configured to be removably coupled to a container 1505, according to one or more aspects described here. The lid assembly 1500 and container 1505 may be interchangeable with lid assembly 100 and container 105, such that lid assembly 1500 may be removably coupled to container 105 and lid assembly 100 may be removably coupled to container 1505. The lid assembly 1500 may include multiple elements similar to lid assembly 100, such that reference numerals used to described features of lid assembly 1500 may include elements of similar features described in relation to lid assembly 100, if those features are labelled with the first two digits being "15" and the final two digits being the same as those described in relation to lid assembly 100. For example, slider mechanism 102 described in relation to lid assembly 100 may be similar to slider mechanism 1502, since both elements are denoted with labels ending in "02." Additional, alternative or distinguishing features of the elements of lid assembly 1500 over those of lid assembly 100 may be noted in the proceeding descriptions.

[0035] FIG. 16 schematically depicts an exploded view of multiple elements of the lid assembly 1500, according to one or more aspects described herein. The lid assembly 1500 generally includes a slider mechanism 1502 that is configured to move between a closed position (depicted in FIG. 15) and an open position to selectively close or open a first opening 1504 through which a liquid, stored in the container 1505, is configured to flow. The lid assembly 1500 may additionally include a sidewall 1506, which can define a groove 1508 for placement of a gasket 1510. Accordingly, the gasket 1510 may provide a seal between the lid assembly 1500 and the container 1505. However, other sealing methods for sealing the lid assembly 1500 to the container 1505 are also contemplated. The lid assembly 1500 may also include a rim 1512 for engaging an opening of the container 1505. The rim 1512 may include a top wall 1514 and grip elements 1616 extending from the top wall 1514 to assist the user in removing the lid assembly 1500 from the container 1505. As depicted, the grip elements 1616 include multiple groove elements extending along a vertical wall 1602 of the rim 1512. It is contemplated that these grip elements 1616 may have any groove geometries (depth, spacing, among others) and may be made from a same material or a different material to the rim 1512 element. Additionally or alternatively, the grip elements may include different grip surface geometries to the depicted grooves, such as dimples, protrusions, or a relatively smooth grip surface.

[0036] The lid assembly 1500 may include a lid 1501 with a middle wall 1518 extending below a rim 1512. A top surface 1520 of the middle wall 1518 may define a recess 1522 for receiving the slider mechanism 1502. In one example, the recess 1522 can define a guide channel as the slider mechanism 1502 moves between the closed position depicted in FIG. 15 and an open position. The first opening 1504 for drinking or pouring liquid out of the container can also be formed in the recess 1522. The recess 1522 can also include a second opening 1524. A detent 1526 may extend from the top surface 1520 of the middle wall 1518 into the recess 1522. This detent 1526 may be configured to abut the slider mechanism 1502 when in the open position to prevent liquid from being

compressed between the slider mechanism 1502 and an end wall 1528 of the recess 1522, which may otherwise result in splashing of a liquid that may pool in the recess 1522 as a result of a user drinking or pouring from the first opening 1504.

[0037] The slider mechanism 1502 may include an upper sled 1530, which is configured to be positioned within the recess 1522 on the top surface 1520 of the middle wall 118. The upper sled 1530 may include an upper magnet that is encapsulated therein. In one example, the upper magnet may be encapsulated within a cavity within the upper sled 1530, and may be overmolded with a polymeric overmold plug element. Additional or alternative encapsulation methods may be used to secure the upper magnet within the upper sled 1530, without departing from the scope of these disclosures.

[0038] The slider mechanism 1502 may additionally include a lower sled 1536 that is configured to be positioned adjacent to a bottom surface 1538 of the middle wall 1518 (depicted in FIG. 17). Accordingly, FIG. 17 depicts the bottom surface 1538 of the middle wall 1518. The lower sled 1536 may include a lower sled magnet that is encapsulated therein. In one example, the lower sled magnet may be encapsulated within a cavity in the lower sled, and may be overmolded with a polymeric overmold plug element. Additionally, the slider mechanism 1502 may include a lower gasket 1544 that is configured to extend around a perimeter of the lower sled 1536. The lower sled 1536 is described in further detail in relation to FIGS. 18A and 18B.In one example, magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled 1530 to the lower sled 1536 across the middle wall 1518. Accordingly, manual actuation of the upper sled 1530 on the top surface 1520 of the middle wall 1518 results in sliding motion of both the upper sled 1530 and the lower sled 1536.

[0039] FIG. 17 depicts a bottom view of the lid assembly 1500, according to one or more aspects described herein. FIG. 17 depicts the bottom surface 1538 of the middle wall 1518. Accordingly, as depicted, the bottom surface 1538 defines a first ramped feature 1552 on a first side of the second opening 1524. The first ramped feature 1552 has a crest surface or point 1554 spaced between two trough depressions 1556a and 1556b. Similarly, a second ramped feature 1558 is positioned on a second side of the second opening 1524. The second ramped feature 1558 includes a crest surface or point 1560 spaced between two trough depressions 1562a and 1562b.

[0040] The lid assembly 1500 additionally includes a recess pocket 1561 extending into an inner surface 1563 of the sidewall that extends below the bottom surface 1538 of the middle wall 1518. Accordingly, the recess pocket 1561 receives a portion of the lower sled 1536 when the slider mechanism 1502 is in the closed position depicted in FIG. 15.

[0041] The second opening 1524 may include detents 1548 that extend from the middle wall 1518 into the second opening 1524. These detents 1548 are configured to be received into channels 1550 (see FIG. 18B) extending along a portion of the curved walls 1646a and 1646b of the lower sled 1536 when the slider mechanism 1502 is in the closed position depicted in FIG. 15. Accordingly, the detents 1548 are configured to provide an interference fitting to prevent the slider mechanism 1502 from being inadvertently moved and thereby inadvertently unseal the first opening 1504. In one example, the slider mechanism 1502 may be configured to lock in the open and/or closed configuration. It is further contemplated that a locking mechanism in addition to the detents 1548 may be used to further prevent the slider mechanism 1502 from being inadvertently moved.

[0042] FIGS. 18A and 18B depict isometric views of the lower sled 1536, according to one or more aspects described herein. The lower sled 1536 includes an inner surface 1564 that is configured to be positioned adjacent to the bottom surface 1538 of the middle wall 1518. The inner surface 1564 includes a lower sled ramp 1566. The lower sled ramp 1566 is configured to be received into one of the trough depressions of each of the first ramped feature 1552 and the second ramped feature 1558. As such, the lower sled ramp 1566 is configured to slide across the first ramped feature 1552 and the second ramped feature 1558 as the slider mechanism 1502 slides between the open and closed configurations. As the slider mechanism 1502 transitions between the open and the closed configuration, the lower sled ramp 1566 will abut the crest surfaces 1554 and 1560. Further, because the crest surfaces 1554 and 1560 are raised relative to the trough depressions on either side of the crest surfaces 1554 and 1560, this will urge the upper sled 1530 and the lower sled 1536 to space further apart from one another. As such, because the magnetic force between the upper sled magnet and the lower sled magnet is inversely proportional to the square of the distance between them, the magnetic attractive force will be reduced when the lower sled ramp 1566 abuts the crest surfaces 1554 and 1560. In one example, this reduction in magnetic force will provide for smooth movement of the slider mechanism 1502 between the open and closed positions. Further, when the lower sled ramp 1566 is positioned within the trough depressions of the first ramped feature 1552 and the second ramped feature 1558, the comparatively shorter distance between the upper sled magnet and the lower sled magnet will result in a comparatively stronger magnetic attractive force that serves to secure the slider mechanism 1502 in the open or closed configuration.

[0043] The lower sled 1536 includes a curved walls 1646a and 1646b that extend from the inner surface 1564 to tabs/ tab cars 1568a and 1568b. The tab cars 1568a and 1568b are configured to extend through the second opening 1524. The lower sled 1536 further includes a channel 1570 that is configured to receive a portion of the lower gasket 1544. Additionally, the lower sled 1536 includes lower vent channels 1571a and 1571b. Accord-

ingly, when the slider mechanism 1502 is in the open configuration, one or more of the lower vent channels 1571a or 1571b may provide a channel for air to pass from the external environment, through the slider mechanism 1502 and into an internal cavity of the container 1505. This air flow path may reduce or prevent glugging as liquid is poured from the first opening 1504. Further, the air flow path may be configured to relieve a pressure differential between an internal cavity of the container 1505 and an external environment. As such, an increased pressure within an internal cavity of the container 1505 may be partially or wholly relieved as a gas/ air is allowed to escape to an external environment surrounding the container 1505 through the slider mechanism 1502.

[0044] Additionally, the lower sled 1536 includes a knob air vent 1802 that extends from the seal surface 1650 through to a lower surface 1804 of the knob 1574. The knob air vent may be configured to allow air to pass between an internal cavity of the container 1505 and an external environment surrounding the container 1505. In one example, air may pass through the knob air vent 1802, through the second opening 1524 and out to the external environment. In one example, when the lower sled 1536 and the upper sled 1530 are positioned moved from the closed position depicted in FIG. 15 to the open position schematically depicted in FIG. 22, the lower sled 1536 is spaced apart from the upper sled 1530. This spacing unseals the radial ridges 1664 from the seal surface 1640 and allows air to flow through the knob air vent 1802 between the internal cavity of the container 1505 and the external environment. This knob air vent 1802 may reduce or prevent glugging due to a relative pressure difference between the internal cavity of the container and the external environment as a liquid is being poured from the first opening 1504.

[0045] In one example, the curved walls 1646a and 1656b may be separated by gaps 1648a and 1648b. These gaps 1648a and 1648b may allow air to escape when a portion of the upper sled 1530 is brought into contact with a seal surface 1650 of the lower sled 1536. In one example, the seal surface 1650 may have a smooth surface texture to enhance a seal between the upper sled 1530 and lower sled 1536. In one example, the seal surface 1650 may include a polished surface finish, and may be an SPI-A2 finish.

[0046] In one example, a separation distance between a lower surface 1652a or 1652b of the tab ears 1568a and 1568b and the inner surface 1564 may be such that the lower sled 1536 cannot be inserted on the incorrect side of the slider mechanism 1502. Specifically, the separation distance between a lower surface 1652a or 1652b of the tab ears 1568a and 1568b and the inner surface 1564 may be less than the wall thickness between top surface 1520 and bottom surface 1538. This geometry prevents the lower sled 1536 from being inserted into the second opening 1524 such that the inner surface 1564 would be in contract with the recess 1522. FIG. 19 depicts a configuration whereby the lower sled 1536 is on the incorrect top surface 1520 but cannot be fully inserted into the recess 1522.

[0047] FIG. 18B depicts an isometric view of an outer surface 1572 of the lower sled 1536. In one example, a knob 1574 extends from the outer surface 1572. This knob 1574 is configured to be gripped by a user in order to install the slider mechanism 1502 in the lid assembly 1500. The knob 1574 may comprise a grip surface finish. In one example, the knob 1574, or a portion thereof, may be formed from a first material and the remainder of the lower sled 1536 may be formed from a second, different material. In one example, the knob 1574 may have a rubberized outer surface. The lower sled 1536 encapsulates a lower sled magnet, similar to lower magnet 142. In one example, this lower sled magnet of lower sled 1536 is encapsulated within the knob 1574.

[0048] FIG. 20 depicts a view of an inner side 1582 of the upper sled 1530. The upper sled 1530 includes upper vent channels 1584a and 1584b. An air vent path between an external environment and an internal cavity of the container 1505 may be completed as the upper vent channels 1584a and 1584b allow air to pass from the external environment into the slider mechanism 1502. The upper sled recesses 1586a and 1586b are configured to receive a portion of the tab ears 1568a and 1568b of the lower sled 1536. A cylindrical spacer 1660 extends from the upper sled 1530 and is configured to be received between the curved walls 1646a and 1646b of the lower sled 1536. The cylindrical spacer 1660 includes a lower surface 1662 with radial ridges 1664. This lower surface 1662 and radial ridges 1664 are configured to abut seal surface 1650. In one example, the radial ridges 1664 form a seal with seal surface 1640 when the upper sled 1530 is magnetically coupled to the lower sled 1536 when the slider mechanism 1502 is in a closed configuration and/or open configuration. The radial ridges 1664 may be formed from a rubber material. In one example, the radial ridges 1664 may be formed from a thermoplastic vulcanizate (TPV) material. The upper sled 1530 encapsulates an upper sled magnet. In one example, this upper sled magnet may be similar to upper magnet 132. In one example, the upper sled magnet is encapsulated within the cylindrical spacer 1660.

[0049] In one implementation, the slider mechanism may include the upper sled 1530 and lower sled 1536 such that movement of the upper sled 1530 urges the lower sled 1536 to move in a same direction. This synchronous movement may result from the cylindrical spacer 1660 of the upper sled 1530 abutting one or more surfaces of the curved walls 1646a and 1646b of the lower sled 1536. In one example, the synchronous movement of the upper sled 1530 and the lower sled 1536 may not utilize magnets to urge the upper sled 1530 toward the lower sled 1536. In this example the upper sled 1530 and/or lower sled 1536 may be implemented without magnet elements such that there is no magnetic attractive force between the upper sled 1530 and lower sled

1536.

[0050] FIGS. 21A and 21B depict an isometric and an elevation view of the lower gasket 1544, according to one or more aspects described herein. Accordingly, the lower gasket 1544 is configured to seal the first opening 1504 when the slider mechanism 1502 is in the closed configuration depicted in FIG. 15. Additionally, the lower gasket 1544 is configured to seal the second opening 1524. In one example, an inner surface 1588 of the lower gasket 1544 is configured to be positioned over the outer surface 1572 of the lower sled 1536. The opening 1590 in the lower gasket 1544 is configured to allow the knob 1574 of the lower sled 1536 to extend through. In one example, the lower gasket 1544 may be constructed from silicone. However, additional or alternative polymeric materials may be used, without departing from the scope of these disclosures. In one example, the lower gasket 1544 may be integrally molded with the bottom slider 1536. Accordingly, lower gasket 1544 may be molded from a same or a different material to the bottom slider 1536 using a single- or multi-stage (single-shot or multi-shot) molding process.

[0051] In one example, and as depicted in the elevation view of 21B, the lower gasket 1544 may have a lip 1692 that extends farther out from the inner surface 1588 than the comparable spring feature 192 of lower gasket 144. Accordingly, the lip 1692 may provide enhanced sealing when the lower gasket 1544 is positioned on the bottom surface 1538 of the lid 1501.

[0052] FIG. 22 schematically depicts the lid assembly 1500 in an open configuration. In one example, a back wall 1690 of the recess 1522 is configured to abut the upper sled 1530 when positioned in the open configuration of FIG. 22. Accordingly, when in the depicted open configuration, the lower sled ramp 1566 may be held on the crest surface 1554 (and 1560). In this configuration, the lower gasket 1544 may be spaced apart from the bottom surface 1538 such that air can flow between an internal cavity of the container 1505, through the lid assembly 1500 and out to an external environment, thereby preventing or limiting glugging during pouring.

[0053] FIGS. 23-40 depict another implementation of a lid assembly 2000 that is configured to be removably coupled to a container 1505, according to one or more aspects described here. The lid assembly 2000 may be interchangeable with lid assembly 1500 or lid assembly 100 such that lid assembly 2000 may be removably coupled to container 105, container 1505, or other similar container. The lid assembly 2000 may include multiple elements similar to lid assembly 100 and lid assembly 1500, such that reference numerals used to described features of lid assembly 2000 may include elements of similar features described in relation to lid assemblies 100 and 1500, if those features are labeled with the first two digits being "20" and the final two digits being the same as those described in relation to lid assemblies 100 and 1500. For example, slider mechanism 1502 described in relation to lid assembly 1500 may be similar to slider mechanism 2002, since both elements are denoted with labels ending in "02." In addition, the features of lid assembly 2000 may include features labeled with the first two digits being "21" or "22" and the final two digits being the same as those described in relation to lid assembly 1500 that have the first two digits of "16" or "18" respectively. Because the features are similar, these features may be described in lesser detail or not described at all with respect to lid assembly 2000. Additional, alternative or distinguishing features of the elements of lid assembly 2000 over those of lid assemblies 100 and 1500 may be noted in the subsequent descriptions.

[0054] FIGS. 23-34 depict the lid assembly 2000. The lid assembly 2000 generally includes a slider mechanism 2002 that is configured to move between a closed position (depicted in FIG. 23) and an open position to selectively close or open a first opening 2004 through which a liquid, stored in the container, is configured to flow. The lid assembly 2000 may additionally include a sidewall 2006, which can define a groove 2008 for placement of a gasket 2010. Accordingly, the gasket 2010 may provide a seal between the lid assembly 2000 and the container. However, other sealing methods for sealing the lid assembly 2000 to the container are also contemplated. The lid assembly 2000 may also include a rim 2012 for engaging an opening of the container. The rim 2012 may include a top wall 2014 and grip elements 2116 extending from the top wall 2014 to assist the user in removing the lid assembly 2000 from the container.

[0055] The lid assembly 2000 may include a lid 2001 with a middle wall 2018 extending below a rim 2012. A top surface 2020 of the middle wall 2018 may define a recess 2022 for receiving the slider mechanism 2002. In one example, the recess 2022 can define a guide channel as the slider mechanism 2002 moves between the closed position depicted in FIG. 23 and an open position. The first opening 2004 for drinking or pouring liquid out of the container can also be formed in the recess 2022. The recess 2022 may also include a second opening 2024.

[0056] The slider mechanism 2002 may include an upper sled 2030, which is configured to be positioned within the recess 2022 on the top surface 2020 of the middle wall 2018. The upper sled 2030 may include an upper magnet that is encapsulated therein. In one example, the upper magnet may be encapsulated within a cavity within the upper sled 2030, and may be overmolded with a polymeric overmold plug element. Additional or alternative encapsulation methods may be used to secure the upper magnet within the upper sled 2030, without departing from the scope of these disclosures.

[0057] The slider mechanism 2002 may additionally include a lower sled 2036 that is configured to be positioned adjacent to a bottom surface 2038 of the middle wall 2018 (depicted in FIG. 32). Accordingly, FIG. 36 depicts the bottom surface 2038 of the middle wall 2018. The lower sled 2036 may include a lower sled magnet that is encapsulated therein. In one example, the lower sled magnet may be encapsulated within a cavity in the lower sled

2036, and may be overmolded with a polymeric overmold plug element. Additionally, the slider mechanism 2002 may include a lower gasket 2044 that is configured to extend around a perimeter of the lower sled 2036. The lower sled 2036 is described in further detail in relation to FIGS. 38-40. In one example, magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled 2030 to the lower sled 2036 across the middle wall 2018. Accordingly, manual actuation of the upper sled 2030 on the top surface 2020 of the middle wall 2018 results in sliding motion of both the upper sled 2030 and the lower sled 2036.

[0058] As best shown in FIG. 35, the recess 2022 may include a tapered surface 2025 between the first opening 2004 and the second opening 2024. This tapered surface 2025 may provide that a first depth of the recess 2022 near and/or adjacent to the first opening 2004 may be greater than a second depth adjacent the second opening 2024. The tapered surface 2025 may extend to be on either or both sides of the first opening 2004. In addition, the tapered surface 2025 may extend on either side or both sides of a portion of the second opening 2024. The tapered surface 2025 may allow for a forward portion 2031 of the upper sled 2030 to tilt downward into the region above the tapered surface 2025 to start the actuation of the slider mechanism 2002 from a closed position to an open position as will be discussed in more detail below.

[0059] An upper surface 2023 of recess 2022 may further include a pair of engaging members 2170. Each engaging member 2170 may include a first ramped surface 2172 and a second ramped surface 2174 arranged adjacent to each other. The pair of engaging members 2170 may be spaced apart from each other and also arranged substantially parallel to each other. In addition, a majority of each engaging member 2170 may be positioned rearward of the second opening 2024. In some examples, the entirety of each engaging member 2170 may be positioned rearward of the second opening 2024. Each engaging member 2170 may be individually received within respective channels 2180 that may be arranged along a lower surface of the upper sled 2030. Each channel 2180 of the lower sled may include a rear channel engaging member 2182. When the slider mechanism 2002 is in the closed position, each rear channel engaging member 2182 may be forward of the engaging members 2170 in the recess 2022, and when the slider mechanism 2002 is in the open position, each rear channel engaging member 2182 may be rearward of the engaging members 2170. The interaction between the engaging members 2170 and their respective receiving channels 2180 may help to guide the slider mechanism 2002 in its forward and rearward movement. In addition, the engaging members 2170 and the rear channel engaging members 2182 may contact each other and act as stops to limit or restrict movement of the slider mechanism 2002 to prevent accidental opening of the lid assembly 2000. While the illustrated lid assembly 2000 depicts two engaging members 2170, the lid 2001 may comprise a single engaging member 2170 that is substantially centered longitudinally within the recess 2022 and positioned rearward of the second opening 2024. This single engaging member 2170 may be received in a centrally located channel 2180 extending along the lower surface of the upper sled 2030.

[0060] Additionally, for each engaging member 2170, the first ramped surface 2172 may be arranged where a first angle between the upper surface 2023 and the first ramped surface 2172 (the first angle may be defined as the angle between the upper surface 2023 and the first ramped surface 2172 in a counterclockwise direction) may be greater than a second angle of the upper surface 2023 and the second ramped surface 2174 (the second angle may be defined as the angle between the upper surface 2023 and the second ramped surface 2174 in a clockwise direction). Similarly, each rear channel engaging member 2182 may have a first ramped surface 2184 and a second ramped surface 2186 arranged adjacent to each other. The first ramped surfaces 2184 may be arranged where a first angle between a bottom channel surface 2185 and the first ramped surface 2184 (the first angle may be defined as the angle between the bottom channel surface 2185 and the first ramped surface 2184 in a counterclockwise direction, when upper sled 2030 has bottom channel surface 2185 facing upward) may be smaller than a second angle of the bottom channel surface 2185 to the second ramped surface 2186 (the second angle may be defined as the angle between the bottom channel surface 2185 and the second ramped surface 2186 in a clockwise direction, when upper sled 2030 has bottom channel surface 2185 facing upward). When the slider mechanism 2002 is in the closed position, each second ramped surface 2174 of the each engaging member 2170 may face the first ramped surface 2184 of each rear channel engaging member 2182. When the slider mechanism 2002 is in the open position, each first ramped surface 2172 of each engaging member 2170 may face the second ramped surface 2186 of the rear channel engaging member 2182.

[0061] Each channel 2180 may extend through a front surface 2190 of the upper sled 2030 and may also extend through a rear surface 2192 of the upper sled 2030. Each channel 2180 may be intermittent; such that is does not extend continuously from the front surface 2190 to the rear surface 2192. Each channel 2180 may be arranged on either side of the cylindrical spacer 2160 or may be interrupted by the cylindrical spacer 2160. In alternate examples, each channel 2180 may be continuous from the front surface 2190 to the rear surface 2192. Each channel 2180 may be spaced apart from and substantially parallel to each other. In addition, each channel 2180 may include a forward channel engaging member 2196. Each forward channel engaging member 2196 may have the same geometry and shape as each rear channel engaging member 2182. Each forward channel engaging member 2196 may be a mirror image of the rear channel engaging members 2182 with respect to a

plane that extends perpendicular to the channels 2180 and through a center of the upper sled 2030. Because the channel engaging members 2182, 2196 are located as a mirror image, the upper sled 2030 may be assembled in multiple orientations.

[0062] In addition to the interaction of the channels 2180 and engaging members 2170, slider mechanism 2002 may also interact in a similar manner with lid 2001 as slider mechanism 1502 and lid 1501. For instance, as shown in FIG. 36, lid 2001 may have a bottom surface 2038 of the middle wall 2018 that includes a first ramped feature 2052 on a first side of the second opening 2024 and a second ramped feature 2058 arranged on an opposite side of the second opening 2024. The first ramped feature 2052 has a crest surface or point 2054 spaced between two trough depressions 2056a and 2056b. Similarly, the second ramped feature 2058 may include a crest surface or point 2060 spaced between two trough depressions 2062a and 2062b.

[0063] FIGS. 33A-33F depict a process for a user to move the slider mechanism 2002 from a closed position shown in FIG. 33A to a fully open position shown in FIG. 33F. The first step in the process, shown in FIG. 33B, depicts the slider mechanism 2002 being moved slightly rearward from the closed position when a user begins to exert a rearward force, but further travel is prevented by engaging member 2170. Next, in FIG. 33C, a user may press downward on the forward portion 2031 of the upper sled 2030, which causes the rear portion 2033 to move upward. As the rear portion 2033 moves upward, any gases or fluids that may be under pressure between the upper sled 2030, the lower sled 2036 and the container are vented outward from the rear of the upper sled 2030 away from where a user may place to his or her mouth to drink from the lid 2001. For instance, as the upper sled 2030 tilts, the sealing surface 2150 of the lower sled may release from the radial ridges 2164 of the lower surface 2162 of the upper sled 2030 causing the release of any pressurized gas or liquid within the container. Next, as shown in FIG. 33D and 33E, as the user exerts a rearward force on the slider mechanism 2002, the first ramped surface 2184 of the rear channel engaging member 2182 may slide along the second ramped surface 2174 of engaging member 2170 allowing the rear channel engaging member 2182 to slide over and then move beyond engaging member 2170. At the same time, the lower ramp sled 2066 of the lower sled 2036 begins moving from the first trough depression 2056a towards the second trough depression 2056b. The last step in the opening process shown in FIG. 33F, the user may continue exerting a rearward force until the lower ramp sled 2066 engages the second trough depression 2056b and/or the rear surface 2192 of the upper sled 2030 contacts a stop surface of the recess 2022. The lid assembly 2000 is now in an open position and ready to allow fluid to flow through opening 2004. To move the slider mechanism 2002 back to the closed position, a user may exert a forward force on the upper sled 2030. The second ramped surface 2184 slides up and over the first ramped surface 2172 as shown in FIG. 34. The upper sled 2030 is then moved to cover the first opening 2004 to move the slider mechanism 2002 into the closed position as shown in FIG. 33A.

[0064] FIG. 37 depicts a view the upper sled 2030. The upper sled 2030 may include upper vent channels 2084a and 2084b. An air vent path between an external environment and an internal cavity of the container may be completed as the upper vent channels 2084a and 2084b allow air to pass from the external environment into the slider mechanism 2002. The upper sled recesses 2086a and 2086b are configured to receive a portion of the tab ears 2068a and 2068b of the lower sled 2036. A cylindrical spacer 2160 extends from the upper sled 2030 and is configured to be received between the curved walls 2046a and 2046b of the lower sled 2036. The cylindrical spacer 2160 includes a lower surface 2162 with radial ridges 2164. This lower surface 2162 and radial ridges 2164 are configured to abut seal surface 2150 of the lower sled 2036. In one example, the radial ridges 2164 form a seal with seal surface 2150 when the upper sled 2030 is magnetically coupled to the lower sled 2036 when the slider mechanism 2002 is in a closed configuration and/or open configuration. The radial ridges 2164 may be formed from a compliant material such as a rubber based material. In one example, the radial ridges 2164 may be formed from a thermoplastic vulcanizate (TPV) material. The upper sled 2030 may encapsulate an upper sled magnet. In one example, this upper sled magnet may be similar to upper magnet 132. In one example, the upper sled magnet is encapsulated within the cylindrical spacer 2160.

[0065] FIGS. 38-40 depict the lower sled 2036. The lower sled 2036 may include an inner surface 2064 that is configured to be positioned adjacent to the bottom surface 2038 of the middle wall 2018. The lower sled 2036 may have features similar to lower sled 1536 such as a lower ramp sled 2066 that interacts is configured to be received into one of the trough depressions of each of the first ramped feature 2052 and the second ramped feature 2058. As such, the lower ramp sled 2066 is configured to slide across the first ramped feature 2052 and the second ramped feature 2058 as the slider mechanism 2002 slides between the open and closed configurations. In addition, the lower sled 2036 may also include curved walls 2146a and 2146b that extend from the inner surface 2064 to tabs/ tab ears 2068a and 2068b. The tab ears 2068a and 2068b are configured to extend through the second opening 2024. The lower sled 2036 further includes a channel 2070 that is configured to receive a portion of the lower gasket 2044. Additionally, the lower sled 2036 may include lower vent channels 2071a and 2071b to provide a channel for air to pass from the external environment, through the slider mechanism 2002 and into an internal cavity of the container. This air flow path may reduce or prevent glugging as liquid is poured from the first opening 2004. Further, the air flow path may be configured to relieve a pressure differential between

an internal cavity of the container and an external environment. As such, an increased pressure within an internal cavity of the container may be partially or wholly relieved as a gas/ air is allowed to escape to an external environment surrounding the container through the slider mechanism 2002. This venting may also be occur as discussed above when the slider mechanism 2002 is tilted when being moved from the closed position to the open position.

[0066] Additionally, the lower sled 2036 includes a knob air vent 2202 that extends from the seal surface 2150 through to a lower surface 2204 of the knob 2074. The knob air vent 2202 may be configured to allow air to pass between an internal cavity of the container and an external environment surrounding the container. In one example, air may pass through the knob air vent 2202, through the second opening 2024 and out to the external environment. In one example, when the lower sled 2036 and the upper sled 2030 are moved from the closed position depicted in FIG. 33A to the open position schematically depicted in FIG. 33F, the lower sled 2036 may be unsealed from the radial ridges 2164 from the seal surface 2150 and allows air to flow through the knob air vent 2202 between the internal cavity of the container and the external environment. This knob air vent 2202 may reduce or prevent glugging due to a relative pressure difference between the internal cavity of the container and the external environment as a liquid is being poured from the first opening 2004.

[0067] As shown in FIG. 40, the knob air vent 2202 may have a knob air vent 2202 that extends from the seal surface 2150 to the lower surface 2204. The knob air vent 2202 may include a first vent opening 2206 at the lower surface 2204, a second vent opening 2208 at the seal surface 2150, and a vent inner surface 2210 between the first vent opening 2206 and the second vent opening 2208. Knob air vent 2202 may have a first rounded entry portion 2212 (i.e. fillet radius) that transitions from the lower surface 2204 to the vent inner surface 2210. Similarly, knob air vent 2202 may have a second rounded entry portion 2214 (i.e. fillet radius) that transitions from the seal surface 2150 to the vent inner surface 2210 at the second vent opening 2208. By adding the rounded entry portions 2212, 2214, the pressure buildup between the upper sled 2030 and the lower sled 2036 may be reduced. In some examples, the first vent opening 2206 may have a first diameter, and the second vent opening 2208 may have a second diameter, where the first diameter may be smaller than the second diameter. Further, a ratio of the first diameter to the second diameter may be approximately 0.8:1.0 or within a range of 0.7:1.0 and 0.9:1.0. In addition, the vent inner surface 2210 may include a tapered or conical shaped surface that expands as it moves from the first rounded entry portion 2212 to the second rounded entry portion 2214, or the vent inner surface 2210 may have a substantially cylindrical shape. A third diameter measured at the smallest region along the vent inner surface 2210 (i.e. between the first diameter and the second diameter) may be smaller than the first diameter. The third diameter may be within a range of 1.0 to 1.25 mm. The first diameter may be within a range of 4 mm and 5 mm, or within a range of 3 mm and 6 mm. Another way of expressing size of the third diameter may be as a ratio of the third diameter to the first diameter. For example, a ratio of the third diameter to the first diameter may be approximately 0.27:1.0, may be within a range of 0.2:1.0 and 0.3:1.0, or may be within a range of 0.2:1 and 0.5:1.0. In some examples, the first rounded portion may have a radius of approximately 2.9 mm or within a range of 2.5 and 3.5 mm while the second rounded portion may have a radius of approximately 3.8 mm or within a range of 3.5 and 4.5 mm. The radius of the first rounded entry portion 2212 may be smaller than the radius of the second rounded entry portion 2214. As another way of expressing the size of the rounded entry portions 2212, 2214 as a ratio of the radius of the first rounded entry portion 2212 and the radius of the second rounded entry portion 2214. For instance, the ratio of the radius of the first rounded entry portion 2212 to the radius of the second rounded entry portion 2214 may be approximately 0.76:1, or may be within a range of 0.7:1 and 0.8:1. The geometry of the air vent 2202 may allow air to be released from the container at a rate to prevent any adverse pressure buildup between the contents of the container and the slider mechanism 2002.

[0068] In one implementation, a lid assembly may include a rim for engaging an opening of a container, with the rim defining a top wall, the lid assembly may additionally include a sidewall defining a groove for placement of an upper gasket. A middle wall may extend below the rim, with a top surface of the middle wall defining a recess. The recess may have a first opening, a second opening, and an air vent. A bottom surface of the middle wall may define a first ramped feature having a crest surface spaced between two trough depressions. The first ramped feature may be positioned on a first side of the second opening, and a second ramped feature may have a crest surface spaced between two trough depressions, with the second ramped feature positioned on a second side of the second opening. The lid assembly may additionally include a slider mechanism configured to be manually slid to selectively provide a closed position, by covering both the first opening and the second opening, and an open position, by only covering the second opening. The slider mechanism may include an upper sled configured to be positioned within the recess on the top surface of the middle wall. Further, the upper sled may have an encapsulated upper sled magnet. The slider mechanism may additionally include a lower sled configured to be positioned beside the bottom surface of the middle wall. The lower sled may additionally include an inner surface that has a lower sled ramp protruding therefrom, with the lower sled ramp configured to be selectively received into a first trough depression of the two trough depressions on the first side of the second opening, and a first trough depression of the two trough depressions

on the second side of the second opening, when the slider mechanism is in the open position. The lower sled ramp is additionally configured to be received into a second trough depression of the two trough depressions on the first side of the second opening and a second trough depression of the two trough depressions on the second side of the second opening when the slider mechanism is in the closed position. The lower sled may also include a lower sled magnet that is encapsulated within the lower sled. The lower sled may also have a central tube that extends from the inner surface of the lower sled and has tab ears at a distal end configured to extend through the second opening. The slider mechanism may also include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. Further, magnetic attraction between the upper sled magnet and the lower sled magnet is configured to magnetically couple the upper sled to the lower sled.

[0069] In another example, the lower sled ramp of the lid assembly is configured to slide over the crest surfaces of the first and second ramped features as the slider mechanism slides between the open and closed positions.

[0070] In one example, the lower sled moves away from the upper sled as the lower sled ramp slides from a selected pair of the trough depressions to the crest surfaces.

[0071] In another example, the lower gasket further includes a gasket spring portion that stays in contact with the bottom surface of the middle wall of the lower sled moves away from the upper sled.

[0072] The second opening of the lid assembly further includes detents extending from the middle wall into the second opening, such that the detents are configured to be received into channels extending along a portion of the central tube, when the slider mechanism is in the closed position.

[0073] The lid assembly further includes a detent extending into the recess on the top surface of the middle wall, which is configured to abut the upper sled when in the open position to prevent liquid from being compressed between the upper sled and an end wall of the recess on the top surface of the middle wall.

[0074] The upper sled of the lid assembly may be manually removable from the lid assembly by exerting a manual force of overcome the magnetic force between the upper sled magnet and the lower sled magnet.

[0075] The tab ears of the lid assembly may be configured to catch on the sides of the second opening to prevent the lower sled from separating from the lid assembly when the upper sled is removed from the lid assembly.

[0076] The lower sled may further include finger tabs extending from an outer surface.

[0077] The lower sled of the lid assembly may be manually removable from the lid assembly by manually actuating the finger tabs to rotate the lower sled through 90° relative to the second opening in the middle wall.

[0078] The lid assembly may also have a recess pocket extending into an inner surface of the sidewall that extends below the middle wall. The recess pocket may receive a portion of the lower sled when the slider mechanism is in the closed position.

[0079] The lid assembly may also include a vent pocket on the bottom surface of the middle wall, such that when the lid assembly is attached to a container and in the open position, the lower gasket slides over the vent pocket to allow air to pass between an outside atmosphere and an internal cavity of the container.

[0080] The lower sled magnet may be a ring magnet that extends around the central tube.

[0081] In another aspect, a container assembly may include a container that has an inner wall having a first end with a container opening extending into an internal reservoir, and an outer wall forming an outer shell of the container, with the outer wall having a second end configured to support the container on a surface. The container assembly may additionally include a lid adapted to seal the container opening. The lid may further include a rim for engaging the container opening, the rim defining a top wall. The lid may also have a sidewall defining a groove for placement of an upper gasket, and a middle wall extending below the rim, a top surface of the middle wall defining a recess, and the recess having a first opening, a second opening, and an air vent. A bottom surface of the middle wall may define a first ramped feature that has a crest surface spaced between two trough depressions. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have a crest surface spaced between two trough depressions, with the second ramped feature positioned on a second side of the second opening. The lid may additionally include a slider mechanism configured to manually slide to selectively provide a closed position, by covering both the first opening and the second opening, and an open position, by only covering the second opening. The slider mechanism may additionally include an upper sled configured to be positioned within the recess on the top surface of the middle wall. The upper sled may encapsulate an upper sled magnet. The slider mechanism may also include a lower sled configured to be against the bottom surface of the middle wall. The lower sled may further include an inner surface that has a protruding lower sled ramp, with the lower sled ramp configured to be selectively received into a first trough depression of the two trough depressions on the first side of the second opening and a first trough depression of the two trough depressions on the second side of the second opening when the slider mechanism is in the open position. The lower sled ramp may be configured to be received into a second trough depression of the two trough depressions on the first side of the second opening, and a second trough depression of the two trough depressions on the second side of the second opening

when the slider mechanism is in the closed position. The lower sled may encapsulate a lower sled magnet. The lower sled may additionally include a central tube extending from the inner surface of the lower sled, with the central tube having tab ears connected to a distal end configured to extend through the second opening. The slider mechanism may additionally include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. The magnetic attraction between the upper sled magnet and the lower sled magnet may magnetically couple the upper sled to the lower sled.

[0082] In one example, the inner wall of the container includes a threaded sidewall configured to receive a thread structure on the sidewall of the lid.

[0083] The container may also include a sealed vacuum cavity between the inner wall and the outer wall.

[0084] In another example, the lower sled ramp may slide over the crest surfaces of the first and second ramped features as the slider mechanism slides between the open and closed positions.

[0085] In one example, the lower sled may move away from the upper sled as the lower sled ramp slides from the selected pair of the trough depressions to the crest surfaces.

[0086] The lower gasket of the container assembly may further include a gasket spring portion that stays in contact with the bottom surface of the middle wall as the lower sled moves away from the upper sled.

[0087] The second opening of the container assembly may further include detents that extend from the middle wall into the second opening, such that the detents are configured to be received into channels extending along a portion of the central tube when the slider mechanism is in the closed position.

[0088] The container assembly may additionally include a detent that extends into the recess on the top surface of the middle wall, and configured to abut the upper sled when in the open position to prevent liquid from being compressed between the upper sled and the end wall of the recess on the top surface of the middle wall.

[0089] The upper sled may be manually removable from the lid assembly by exerting a manual force of overcome the magnetic force between the upper sled magnet and the lower sled magnet.

[0090] The upper sled of the lid assembly may be manually removable from the lid assembly by exerting a manual force of overcome the magnetic force between the upper sled magnet and the lower sled magnet.

[0091] The tab ears of the lid assembly may be configured to catch on the sides of the second opening to prevent the lower sled from separating from the lid assembly when the upper sled is removed from the lid assembly.

[0092] The lower sled may further include finger tabs extending from an outer surface.

[0093] The lower sled of the lid assembly may be manually removable from the lid assembly by manually actuating the finger tabs to rotate the lower sled through 90° relative to the second opening in the middle wall.

[0094] The container assembly may also have a recess pocket extending into an inner surface of the sidewall that extends below the middle wall. The recess pocket may receive a portion of the lower sled when the slider mechanism is in the closed position.

[0095] The container assembly may also include a vent pocket on the bottom surface of the middle wall, such that when the lid assembly is attached to the container and in the open position, the lower gasket slides over the vent pocket to allow air to pass between an outside atmosphere and an internal cavity of the container.

[0096] The lower sled magnet may be a ring magnet that extends around the central tube.

[0097] In another implementation, a lid assembly may include a rim for engaging an opening of a container, and a middle wall extending below the rim, with a top surface of the middle wall having a first opening, a second opening, and an air vent. The bottom surface of the middle wall may define a first ramped feature having a crest surface spaced between two trough depressions. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have a crest surface spaced between two trough depressions, the second ramped feature positioned on a second side of the second opening. The lid assembly may additionally include a slider mechanism configured to be manually slid to selectively provide a closed position, by covering both the first opening and the second opening, and an open position, by only covering the second opening. The slider mechanism may further include an upper sled configured to be positioned within the recess on the top surface of the middle wall, the upper sled may encapsulate an upper sled magnet. The slider mechanism may additionally include a lower sled configured to be positioned beside the bottom surface of the middle wall. The lower sled may further include an inner surface having a protruding lower sled ramp. The lower sled ramp may be configured to be selectively received into a first trough depression of the two trough depressions on the first side of the second opening, and a first trough depression of the two trough depressions on the second side of the second opening when the slider mechanism is in the open position. The lower sled ramp may be configured to be selectively received into a second trough depression of the two trough depressions on the first side of the second opening, and a second trough depression of the two trough depressions on the second side of the second opening when the slider mechanism is in the closed position. A lower sled magnet may be encapsulated within the lower sled. The slider mechanism may additionally include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. Magnetic attraction

between the upper sled magnet and the lower sled magnet may magnetically couple the lower sled to the upper sled.

[0098] In another example, a method of forming a lid assembly can include one or more of: injection molding a lid body of a first shot of material, injection molding a first plate portion of a second shot of material onto the lid body, injection molding a second plate portion of a third shot of material onto the lid body, and injection molding a seal portion with a third shot of material to seal the first plate portion and the second plate portion to the lid body. The method may further include in-molding a magnet assembly into the second plate portion. A channel can be formed between the first plate portion and the second plate portion and the second shot of material can be combined with the third shot of material. The method may also include trapping a pocket of air between the lid body and both the first plate portion and the second plate portion.

[0099] In one implementation, a lid assembly may include a rim for engaging an opening of a container, with the rim defining a top wall. The lid assembly may additionally include a sidewall defining a groove for placement of an upper or first gasket. A middle wall may extend below the rim, with a top surface of the middle wall defining a recess. The recess may have a first opening and a second opening. A bottom surface of the middle wall may define a first ramped feature having a first crest surface and a first trough depression. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have second a crest surface and a second trough depression, with the second ramped feature positioned on a second side of the second opening. The lid assembly may additionally include a slider mechanism configured to be manually slid to selectively provide a closed position, by covering both the first opening and the second opening, and an open position. The slider mechanism may include an upper sled configured to be positioned within the recess on the top surface of the middle wall. Further, the upper sled may have an encapsulated upper sled magnet. The slider mechanism may additionally include a lower sled configured to be positioned beside the bottom surface of the middle wall. The lower sled may additionally include an inner surface that has a lower sled ramp protruding therefrom, with the lower sled ramp configured to be selectively received into the first trough depression and the second trough depression when the slider mechanism is in the closed position. The lower sled ramp is additionally configured to abut the first crest surface and the second crest surface when the slider mechanism is in the open position. The lower sled may also include a lower sled magnet that is encapsulated within the lower sled. The lower sled may also have a first and a second curved wall that extend from the inner surface of the lower sled and have first and second tab ears at distal ends of the first and second curved walls configured to extend through the second opening. The slider mechanism may also include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. Further, magnetic attraction between the upper sled magnet and the lower sled magnet is configured to magnetically couple the upper sled to the lower sled.

[0100] In another example, a spacing distance between the inner surface of the lower sled and the first and second tab ears prevents the first and second tab ears from being inserted into the second opening when the lower sled is incorrectly positioned on the top surface of the middle wall.

[0101] In one example, the lower sled moves away from the upper sled as the lower sled ramp slides from the first and second trough depressions to the first and second crest surfaces.

[0102] In one example, as the lower sled moves away from the upper sled, the second gasket is spaced apart from the bottom surface of the middle wall to unseal the lower sled from the bottom surface and allow air to flow through the slider assembly.

[0103] In one example, as the lower sled moves away from the upper sled, a seal surface of the lower gasket is unsealed from radial ridges of the upper sled to allow air to flow through a knob air vent of the lower sled and through the slider assembly.

[0104] The second opening of the lid assembly further includes detents extending from the middle wall into the second opening, such that the detents are configured to be received into channels extending along a portion of the first and second curved walls, when the slider mechanism is in the closed position.

[0105] The lid assembly further includes a detent extending into the recess on the top surface of the middle wall, which is configured to abut the upper sled when in the open position to prevent liquid from being compressed between the upper sled and an end wall of the recess on the top surface of the middle wall.

[0106] The upper sled of the lid assembly may be manually removable from the lid assembly by exerting a manual force of overcome the magnetic force between the upper sled magnet and the lower sled magnet.

[0107] The first and second tab ears of the lid assembly may be configured to catch on the sides of the second opening to prevent the lower sled from separating from the lid assembly when the upper sled is removed from the lid assembly.

[0108] The lower sled may further include a knob extending from an outer surface.

[0109] The lower sled of the lid assembly may be manually removable from the lid assembly by manually actuating the knob to rotate the lower sled relative to the second opening in the middle wall. The angle of rotation may have any value between 5 degrees and 145 degrees.

[0110] The lid assembly may also have a recess pocket extending into an inner surface of the sidewall that extends below the middle wall. The recess pocket may re-

ceive a portion of the lower sled when the slider mechanism is in the closed position.

[0111] In another aspect, a container assembly may include a container that has an inner wall having a first end with a container opening extending into an internal reservoir, and an outer wall forming an outer shell of the container, with the outer wall having a second end configured to support the container on a surface. The container assembly may additionally include a lid adapted to seal the container opening. The lid may further include a rim for engaging the container opening, the rim defining a top wall. The lid may also have a sidewall defining a groove for placement of an upper gasket, and a middle wall extending below the rim, a top surface of the middle wall defining a recess, and the recess having a first opening and a second opening. A bottom surface of the middle wall may define a first ramped feature that has a first crest surface and a first trough depression. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have a second crest surface and a second trough depression, with the second ramped feature positioned on a second side of the second opening. The lid may additionally include a slider mechanism configured to manually slide to selectively provide a closed position, by covering both the first opening and the second opening, and an open position, by only covering the second opening. The slider mechanism may additionally include an upper sled configured to be positioned within the recess on the top surface of the middle wall. The upper sled may encapsulate an upper sled magnet. The slider mechanism may also include a lower sled configured to be positioned against the bottom surface of the middle wall. The lower sled may further include an inner surface that has a protruding lower sled ramp, with the lower sled ramp configured to be selectively received into the first trough depression and the second trough depression when the slider mechanism is in the closed position. The lower sled ramp may be configured to abut the first crest surface and the second crest surface when the slider mechanism is in the open position. The lower sled may encapsulate a lower sled magnet. The lower sled may additionally include first and second curved walls extending from the inner surface of the lower sled, with the first and second curved walls having first and second tab ears connected to a distal end configured to extend through the second opening. The slider mechanism may additionally include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. The magnetic attraction between the upper sled magnet and the lower sled magnet may magnetically couple the upper sled to the lower sled.

[0112] In one example, the inner wall of the container includes a threaded sidewall configured to receive a thread structure on the sidewall of the lid.

[0113] The container may also include a scaled vacuum cavity between the inner wall and the outer wall.

[0114] In another example, a spacing distance between the inner surface of the lower sled and the first and second tab ears prevents the first and second tab ears from being inserted into the second opening when the lower sled is incorrectly positioned on the top surface of the middle wall.

[0115] In one example, the lower sled may move away from the upper sled as the lower sled ramp slides from the first and second trough depressions to the first and second crest surfaces.

[0116] In one example, as the lower sled moves away from the upper sled, the second gasket is spaced apart from the bottom surface of the middle wall to unseal the lower sled from the bottom surface and allow air to flow through the slider assembly

[0117] The second opening of the container assembly may further include detents that extend from the middle wall into the second opening, such that the detents are configured to be received into channels extending along a portion of the first and second curved walls when the slider mechanism is in the closed position.

[0118] The container assembly may additionally include a detent that extends into the recess on the top surface of the middle wall, and configured to abut the upper sled when in the open position to prevent liquid from being compressed between the upper sled and the end wall of the recess on the top surface of the middle wall.

[0119] The upper sled of the lid assembly may be manually removable from the lid assembly by exerting a manual force of overcome the magnetic force between the upper sled magnet and the lower sled magnet.

[0120] The first and second tab ears of the lid assembly may be configured to catch on the sides of the second opening to prevent the lower sled from separating from the lid assembly when the upper sled is removed from the lid assembly.

[0121] The lower sled may further include a knob extending from an outer surface.

[0122] The lower sled of the lid assembly may be manually removable from the lid assembly by manually actuating the knob to rotate the lower sled relative to the second opening in the middle wall.

[0123] The container assembly may also have a recess pocket extending into an inner surface of the sidewall that extends below the middle wall. The recess pocket may receive a portion of the lower sled when the slider mechanism is in the closed position.

[0124] In another implementation, a lid assembly may include a rim for engaging an opening of a container, and a middle wall extending below the rim, with a top surface of the middle wall having a first opening and a second opening. A bottom surface of the middle wall may define a first ramped feature having a first crest surface and a first trough depression. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have a second crest surface and a second trough depression. The second ramped feature

may be positioned on a second side of the second opening. The lid assembly may additionally include a slider mechanism configured to be manually slid to selectively provide a closed position, by covering both the first opening and the second opening, and an open position, by only covering the second opening. The slider mechanism may further include an upper sled configured to be positioned within the recess on the top surface of the middle wall, the upper sled may encapsulate an upper sled magnet. The slider mechanism may additionally include a lower sled configured to be positioned beside the bottom surface of the middle wall. The lower sled may further include an inner surface having a protruding lower sled ramp. The lower sled ramp may be configured to be selectively received into the first and second trough depressions when the slider mechanism is in the closed position. The lower sled ramp may be configured to abut the first and second crest surfaces when the slider mechanism is in the open position. A lower sled magnet may be encapsulated within the lower sled. The slider mechanism may additionally include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall. Magnetic attraction between the upper sled magnet and the lower sled magnet may magnetically couple the lower sled to the upper sled.

[0125] In another example, a method of forming a lid assembly can include one or more of: injection molding a lid body of a first shot of material, injection molding a first plate portion of a second shot of material onto the lid body, injection molding a second plate portion of a third shot of material onto the lid body, and injection molding a seal portion with a third shot of material to seal the first plate portion and the second plate portion to the lid body. The method may further include in-molding a magnet assembly into the second plate portion. A channel can be formed between the first plate portion and the second plate portion and the second shot of material can be combined with the third shot of material. The method may also include trapping a pocket of air between the lid body and both the first plate portion and the second plate portion.

[0126] In one implementation, a lid assembly may include a rim for engaging an opening of a container, with the rim defining a top wall. The lid assembly may additionally include a sidewall defining a groove for placement of an upper or first gasket. A middle wall may extend below the rim, with a top surface of the middle wall defining a recess. The recess may have a first opening and a second opening. A bottom surface of the middle wall may define a first ramped feature having a first crest surface and a first trough depression. The first ramped feature may be positioned on a first side of the second opening. A second ramped feature may have second a crest surface and a second trough depression, with the second ramped feature positioned on a second side of the second opening. The lid assembly may additionally include a slider mechanism configured to be manually slid to selectively provide a closed position, by covering both the first opening and the second opening, and an open position. The slider mechanism may include an upper sled configured to be positioned within the recess on the top surface of the middle wall. The slider mechanism may additionally include a lower sled configured to be positioned beside the bottom surface of the middle wall. The lower sled may additionally include an inner surface that has a lower sled ramp protruding therefrom, with the lower sled ramp configured to be selectively received into the first trough depression and the second trough depression when the slider mechanism is in the closed position. The lower sled ramp may be additionally configured to abut the first crest surface and the second crest surface when the slider mechanism is in the open position. The lower sled may also have a first and a second curved wall that extend from the inner surface of the lower sled and have first and second tab ears at distal ends of the first and second curved walls configured to extend through the second opening. The slider mechanism may also include a lower gasket that is configured to extend around a perimeter of the inner surface of the lower sled, and configured to be compressed between the lower sled and the lower surface of the middle wall.

[0127] The present disclosure is disclosed above and in the accompanying drawings with reference to a variety of examples. The purpose served by the disclosure, however, is to provide examples of the various features and concepts related to the invention, not to limit the scope of the invention. One skilled in the relevant art will recognize that numerous variations and modifications may be made to the examples described above without departing from the scope of the present invention.

[0128] For the avoidance of doubt, the present application includes the subject-matter described in the following numbered paragraphs (referred to as "Para" or "Paras"):

1. A lid assembly comprising:

    a rim for engaging an opening of a container, the rim defining a top wall;
    a sidewall defining a groove for placement of a gasket;
    a middle wall extending below the rim, a top surface of the middle wall defining a recess, the recess having a first opening and a second opening, and a bottom surface; and
    a slider mechanism configured to be manually slid to selectively provide a closed position by covering both the first opening and the second opening, and an open position, the slider mechanism comprising:

        an upper sled configured to be positioned within the recess on the top surface of the middle wall, and having an upper sled mag-

net encapsulated therein;
a lower sled configured to be positioned proximate the bottom surface of the middle wall, the lower sled further comprising:

a lower sled magnet encapsulated within the lower sled;
a knob extending from an outer surface, the knob having a lower surface;
a seal surface opposite the lower surface;
a knob air vent that extends from the seal surface to the lower surface, wherein the knob air vent includes a first vent opening at the lower surface, a second vent opening at the seal surface, a vent inner surface between the first vent opening and the second vent opening, a first rounded entry portion extending from the first vent opening to the vent inner surface, and a second rounded entry portion from the second vent opening to the vent inner surface;

the first vent opening having a first diameter;
the second vent opening having a second diameter;
wherein the first diameter is smaller than the second diameter;

and

wherein magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled to the lower sled.

2. The lid assembly of Para 1, wherein a ratio of the first diameter to the second diameter is within a range of 0.70: 1 and 0.90:1.

3. The lid assembly of Para 1, wherein a first radius of the first rounded entry portion is smaller than a second radius of the second rounded entry portion.

4. The lid assembly of Para 3, wherein a ratio of the first radius of the first rounded entry portion to the second radius of the second rounded entry portion is within a range of 0.7:1 and 0.8:1.

5. The lid assembly of Para 1, wherein the vent inner surface has a portion with a conical shape.

6. The lid assembly of Para 1, wherein the recess includes a tapered surface between the first opening and the second opening, wherein a first depth of the recess adjacent the first opening is greater than a second depth adjacent the second opening.

7. The lid assembly of Para 1, wherein an upper surface of the recess includes a first engaging member with a first ramped surface and a second ramped surface arranged adjacent each other.

8. The lid assembly of Para 7, wherein the first engaging member is received within a first channel arranged on a lower surface of the upper sled.

9. The lid assembly of Para 8, wherein the first channel includes a first channel engaging member with a first channel ramped surface, wherein when the slider mechanism is in the open position the first channel ramped surface faces the first ramped surface of the first engaging member.

10. A lid assembly comprising:

a rim for engaging an opening of a container, the rim defining a top wall;
a sidewall defining a groove for placement of a gasket;
a middle wall extending below the rim, a top surface of the middle wall defining a recess, the recess having a first opening and a second opening, and a bottom surface;
wherein an upper surface of the recess includes a first engaging member with a first ramped surface and a second ramped surface arranged adjacent each other; and
a slider mechanism configured to be manually slid to selectively provide a closed position by covering both the first opening and the second opening, and an open position, the slider mechanism comprising:
an upper sled configured to be positioned within the recess on the top surface of the middle wall, the upper sled comprising:

an upper sled magnet encapsulated therein,
a first channel extending along a lower surface of the upper sled,
a second channel extending along the lower surface of the upper sled, wherein the first channel is spaced from and substantially parallel to the first channel, and
a lower sled configured to be positioned proximate the bottom surface of the middle wall, the lower sled further comprising:

a lower sled magnet encapsulated within the lower sled;
wherein the first engaging member is received within a first channel of the upper sled; and

wherein magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled to the lower sled.

11. The lid assembly of Para 10, wherein the first channel and the second channel extend through a rear surface of the upper sled.

12. The lid assembly of Para 10, wherein the first channel includes a first channel engaging member with a first channel ramped surface; and
wherein when the slider mechanism is in the open position, the first channel ramped surface faces the first ramped surface of the first engaging member.

13. The lid assembly of Para 12, wherein the first channel engaging member further comprises a second channel ramped surface; and
wherein when the slider mechanism is in the closed position, the second channel ramped surface faces the second ramped surface of the first engaging member.

14. The lid assembly of Para 10, wherein the upper surface of the recess includes a second engaging member spaced from the first engaging member, and wherein the second engaging member is received within the second channel of the upper sled.

15. The lid assembly of Para 10, wherein a majority of the first engaging member is positioned rearward of the second opening.

16. The lid assembly of Para 10, wherein a first angle of the upper surface to the first ramped surface is greater than a second angle of the upper surface to the second ramped surface.

17. The lid assembly of Para 10, wherein the recess includes a tapered surface between the first opening and the second opening, and wherein a first depth of the recess near adjacent the first opening is greater than a second depth adjacent the second opening.

18. The lid assembly of Para 17, wherein when moving the sliding mechanism from an open to a closed position, a front portion of the upper sled is configured to tilt downward causing a rear portion of the upper sled to be moved away from the upper surface of the recess.

19. A lid assembly comprising:

a rim for engaging an opening of a container, the rim defining a top wall;
a sidewall defining a groove for placement of a gasket;
a middle wall extending below the rim, a top surface of the middle wall defining a recess, the recess having a first opening and a second opening, and a bottom surface, wherein the recess includes a tapered surface between the first opening and the second opening, wherein a first depth of the recess near adjacent the first opening is greater than a second depth adjacent the second opening; and

wherein an upper surface of the recess includes a first engaging member with a first ramped surface and a second ramped surface arranged adjacent each the first ramped surface, wherein a majority of the first engaging member is positioned rearward of the second opening; and
a slider mechanism configured to be manually slid to selectively provide a closed position by covering both the first opening and the second opening, and an open position, the slider mechanism comprising:
an upper sled configured to be positioned within the recess on the top surface of the middle wall, the upper sled comprising:

an upper sled magnet encapsulated therein;
a first channel extending along a lower surface of the upper sled, wherein the first channel includes a first channel engaging member with a first channel ramped surface; and
a lower sled configured to be positioned proximate the bottom surface of the middle wall, the lower sled further comprising:
a lower sled magnet encapsulated within the lower sled;
wherein magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled to the lower sled; and
wherein when the slider mechanism is in the closed position, the first channel engaging member is forward of the first engaging member, and when the slider mechanism is in the open position, the first channel engaging member is rearward of the first engaging member.

20. The lid assembly of Para 19, wherein the lower sled further comprises:

a knob extending from an outer surface, the knob having a lower surface;
a seal surface opposite the lower surface; and
a knob air vent that extends from the seal surface

to the lower surface, wherein the knob air vent includes a first vent opening at the lower surface, a second vent opening at the seal surface, a vent inner surface between the first vent opening and the second vent opening, a first rounded entry portion extending from the first vent opening to the vent inner surface, and a second rounded entry portion from the second vent opening to the vent inner surface;

the first vent opening having a first diameter; the second vent opening having a second diameter; and

wherein the first diameter is smaller than the second diameter.

Claims

1. A lid assembly comprising:

a rim for engaging an opening of a container, the rim defining a top wall;
a sidewall defining a groove for placement of a gasket;
a middle wall extending below the rim, a top surface of the middle wall defining a recess (2022), the recess (2022) having a first opening and a second opening, and a bottom surface;
wherein an upper surface of the recess includes a first engaging member (2170) with a first ramped surface (2172) and a second ramped surface (2174) arranged adjacent each other; and
a slider mechanism configured to be manually slid to selectively provide a closed position by covering both the first opening and the second opening, and an open position, the slider mechanism comprising:
an upper sled (2030) configured to be positioned within the recess on the top surface of the middle wall, the upper sled comprising:

an upper sled magnet encapsulated therein,
a first channel (2180) extending along a lower surface of the upper sled,
a second channel (2180) extending along the lower surface of the upper sled, wherein the second channel is spaced from and substantially parallel to the first channel, and
a lower sled configured to be positioned proximate the bottom surface of the middle wall, the lower sled further comprising:

a lower sled magnet encapsulated within the lower sled;

wherein the first engaging member (2170) is received within the first channel (2180) of the upper sled; and
wherein magnetic attraction between the upper sled magnet and the lower sled magnet magnetically couples the upper sled to the lower sled.

2. The lid assembly of claim 1, wherein the first channel (2180) and the second channel (2180) extend through a rear surface of the upper sled.

3. The lid assembly of claim 1 or 2, wherein the first channel (2180) includes a first channel engaging member (2182) with a first channel ramped surface (2186); and
wherein when the slider mechanism is in the open position, the first channel ramped surface (2186) faces the first ramped surface (2172) of the first engaging member (2170).

4. The lid assembly of claim 3, wherein the first channel engaging member (2182) further comprises a second channel ramped surface (2184); and
wherein when the slider mechanism is in the closed position, the second channel ramped surface (2184) faces the second ramped surface (2174) of the first engaging member (2170).

5. The lid assembly of claim 3 or 4, wherein the first engaging member (2170) and the first channel engaging member (2182) are configured to contact each other to restrict movement of the slider mechanism to prevent accidental opening.

6. The lid assembly of any preceding claim, wherein the upper surface of the recess includes a second engaging member spaced from the first engaging member, and wherein the second engaging member is received within the second channel of the upper sled.

7. The lid assembly of any preceding claim, wherein a majority of the first engaging member is positioned rearward of the second opening.

8. The lid assembly of any preceding claim, wherein a first angle of the upper surface to the first ramped surface is greater than a second angle of the upper surface to the second ramped surface.

9. The lid assembly of any preceding claim, wherein the recess includes a tapered surface between the first opening and the second opening, and wherein a first depth of the recess adjacent the first opening is greater than a second depth adjacent the second opening.

10. The lid assembly of claim 9, wherein when moving the sliding mechanism from the open position to the closed position, a front portion of the upper sled is configured to tilt downward causing a rear portion of the upper sled to be moved away from the upper surface of the recess.

11. The lid assembly of any preceding claim, wherein when the slider mechanism is in the closed position, the first channel engaging member is forward of the first engaging member, and when the slider mechanism is in the open position, the first channel engaging member is rearward of the first engaging member.

12. The lid assembly of any preceding claim, wherein the lower sled further comprises:

a knob extending from an outer surface, the knob having a lower surface;
a seal surface opposite the lower surface; and
a knob air vent (2022) that extends from the seal surface to the lower surface, wherein the knob air vent includes a first vent opening (2206) at the lower surface (2204), a second vent opening (2208) at the seal surface (2150),

the first vent opening (2206) having a first diameter;
the second vent opening (2208) having a second diameter; and
wherein the first diameter is smaller than the second diameter.

13. The lid assembly of claim 12, wherein the knob air vent further comprises a vent inner surface between the first vent opening and the second vent opening, wherein the vent inner surface has a portion with a conical shape.

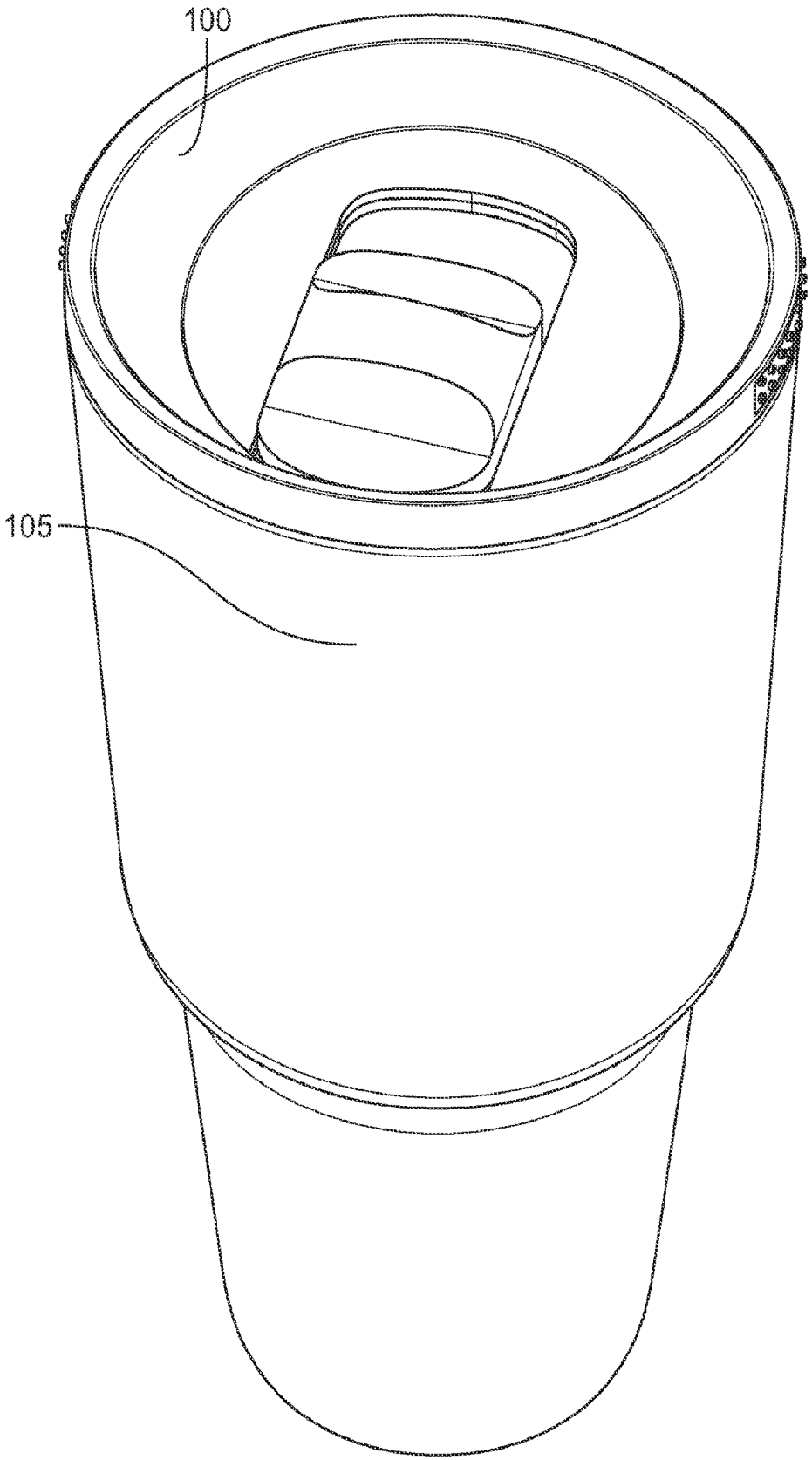

FIG. 1

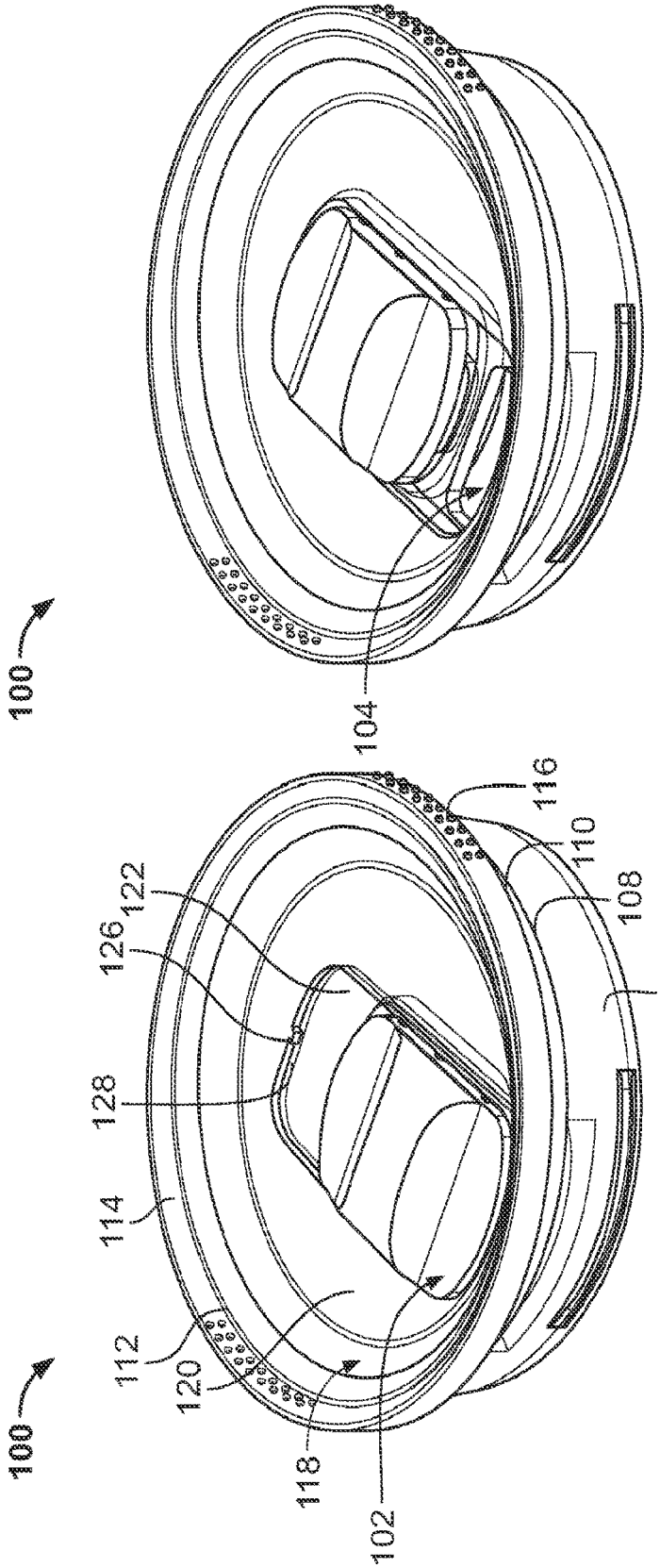

FIG. 2B

FIG. 2A

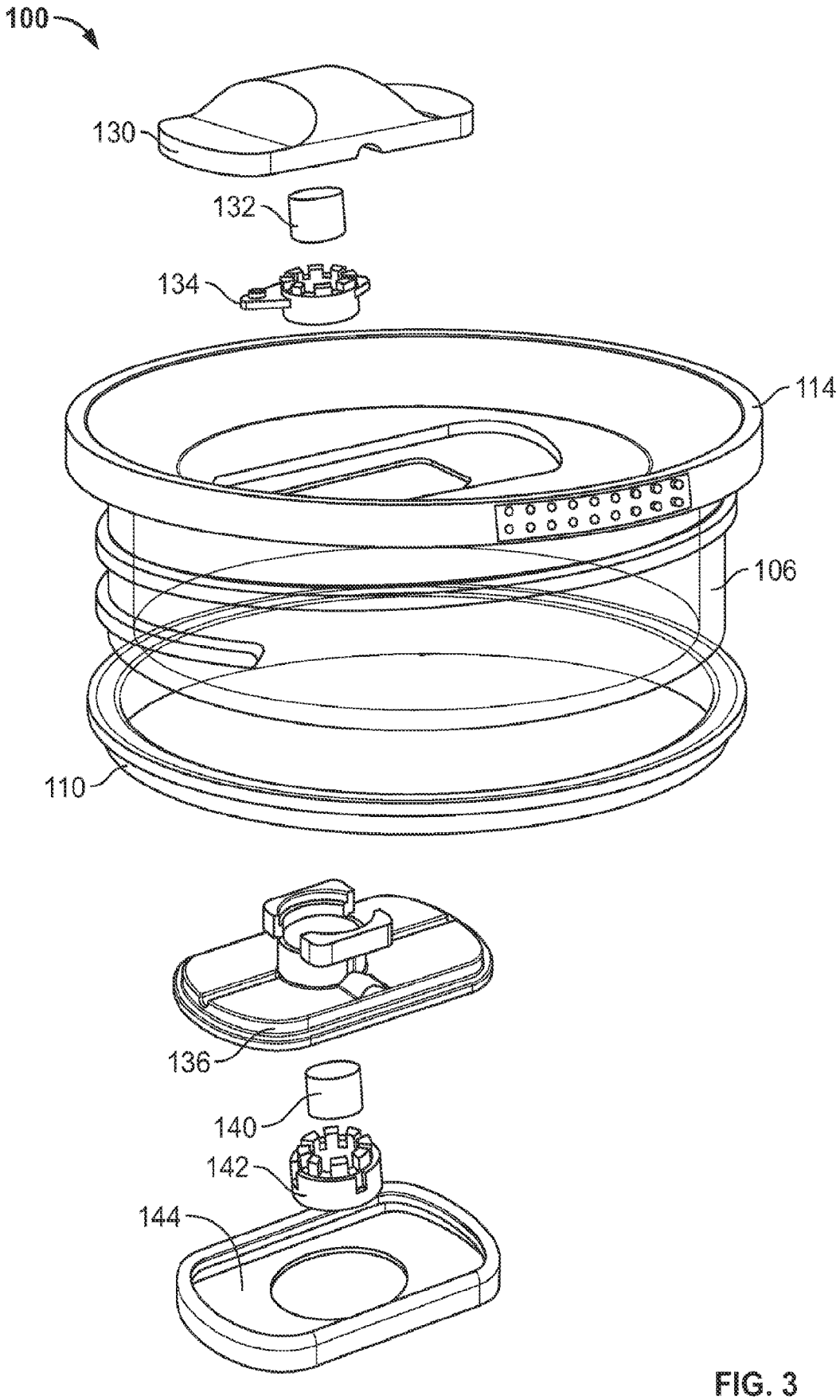

FIG. 3

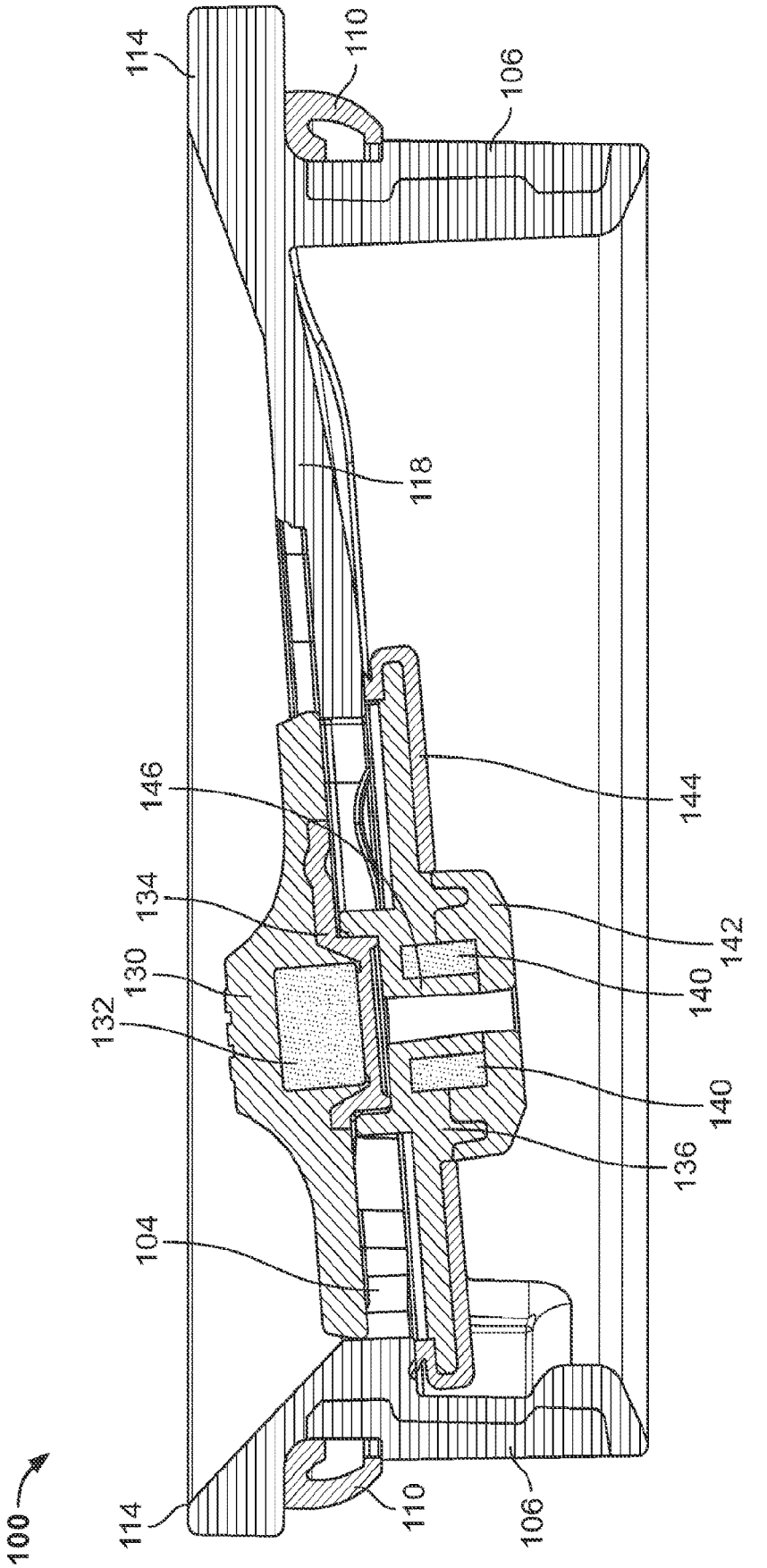
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FIG. 4

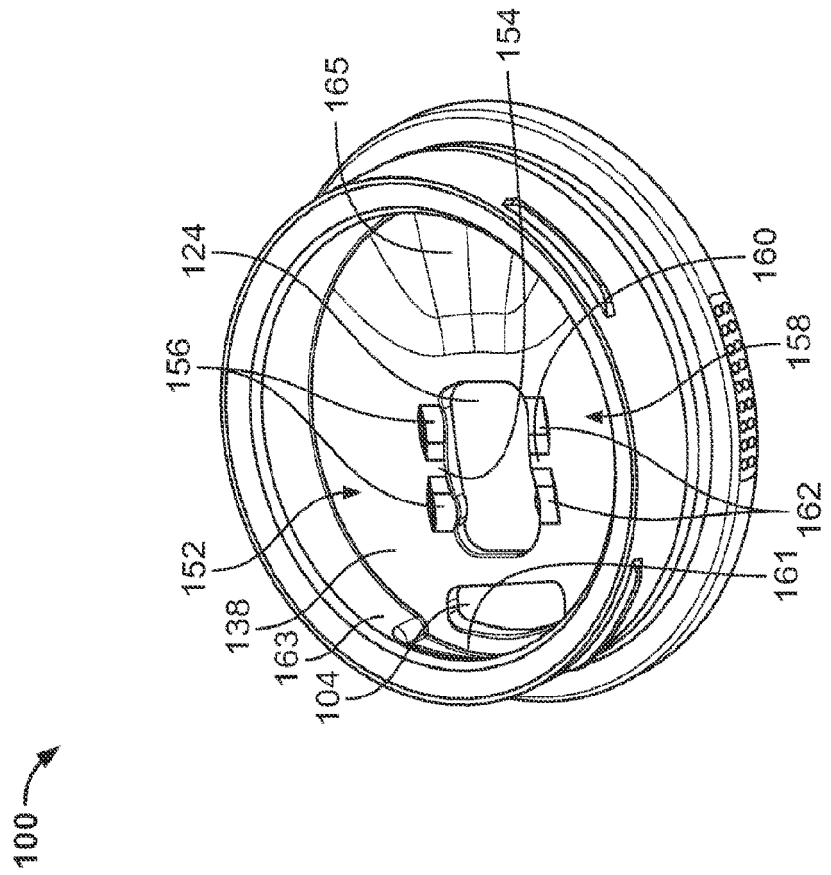
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FIG. 5B

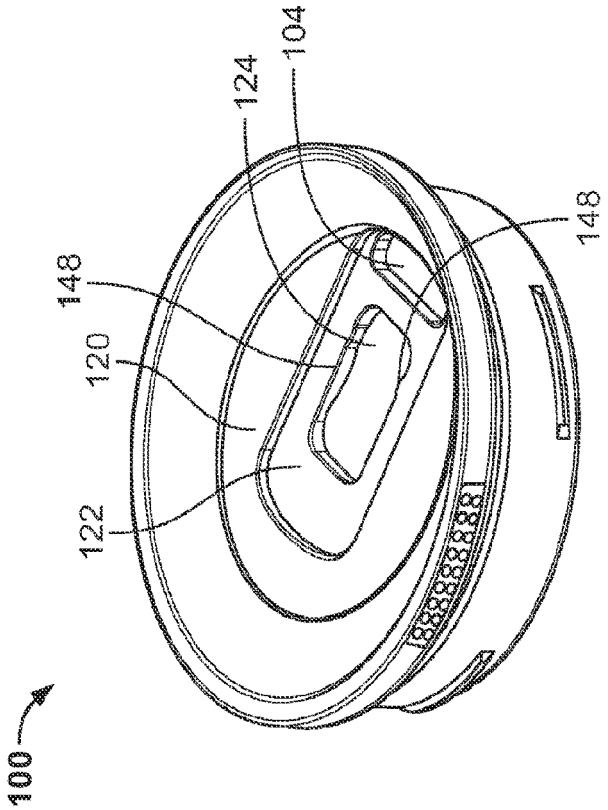
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FIG. 5A

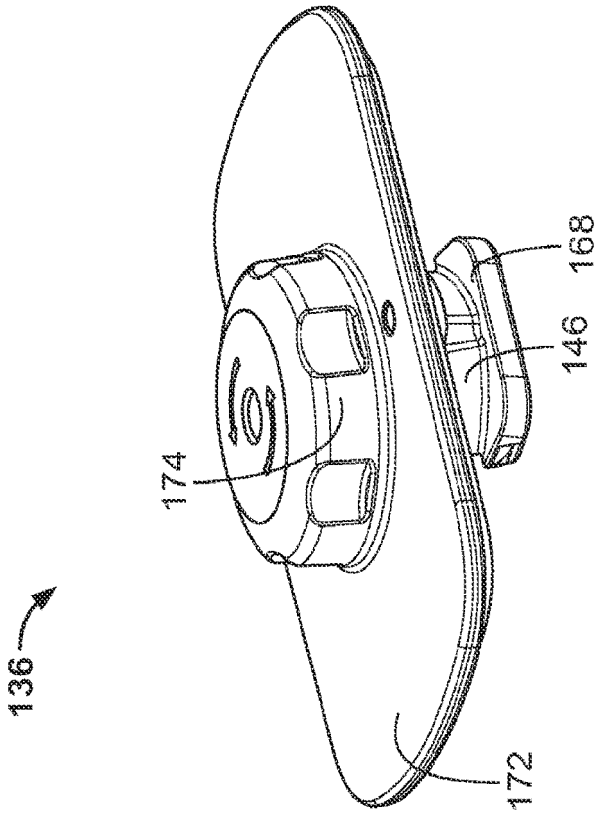

FIG. 6B

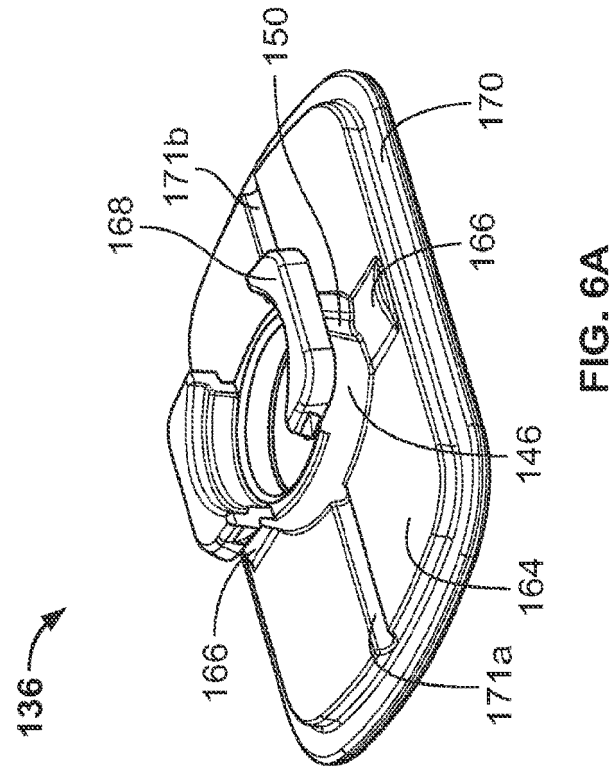

FIG. 6A

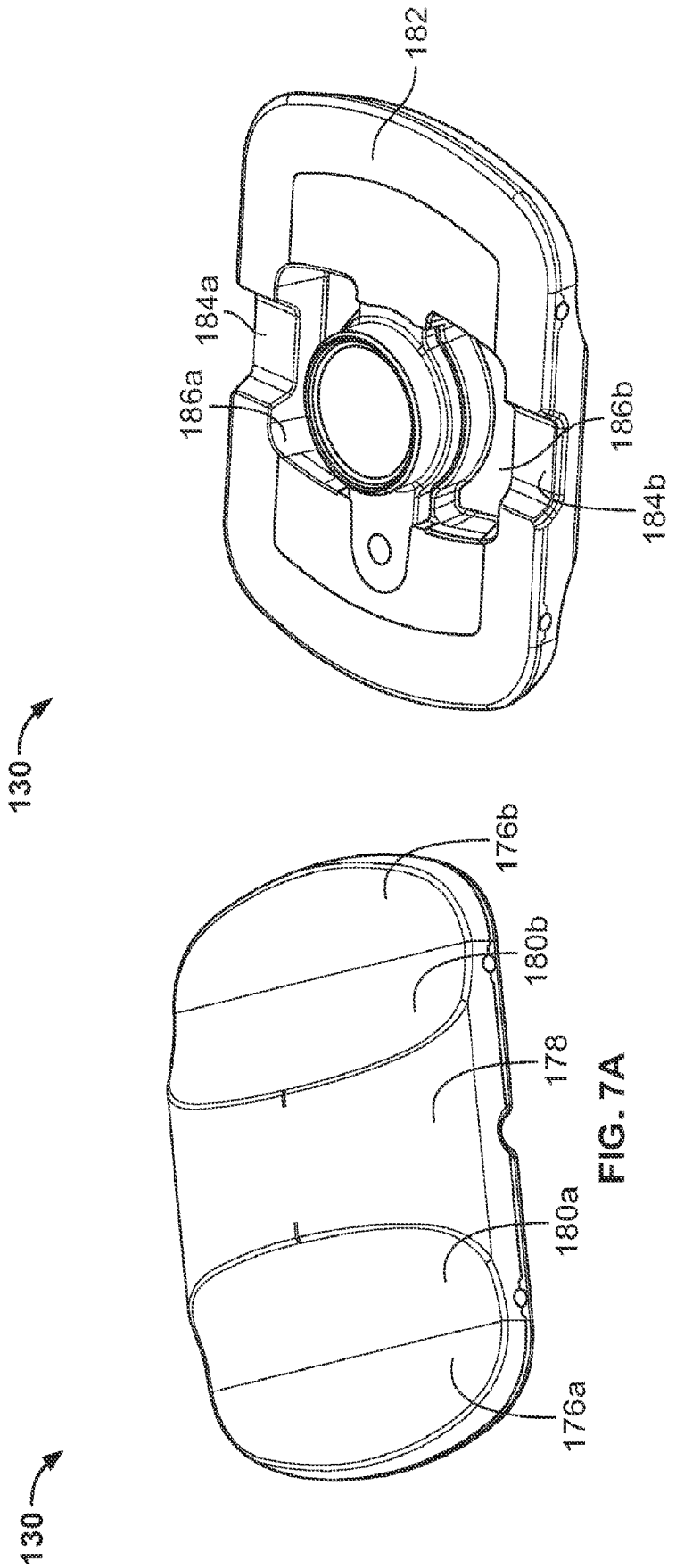

FIG. 7A

FIG. 7B

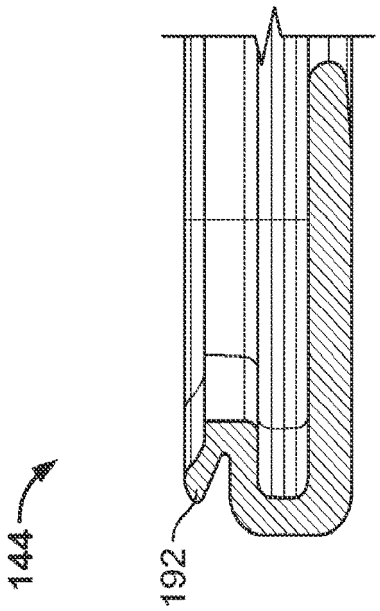

FIG. 8B

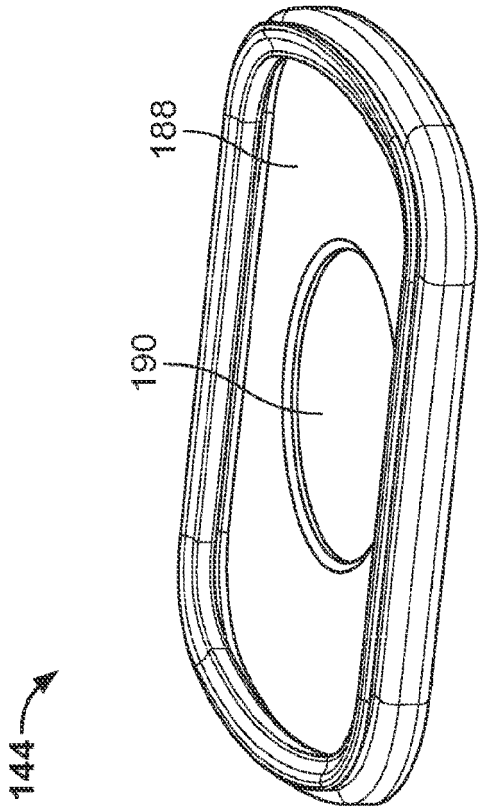

FIG. 8A

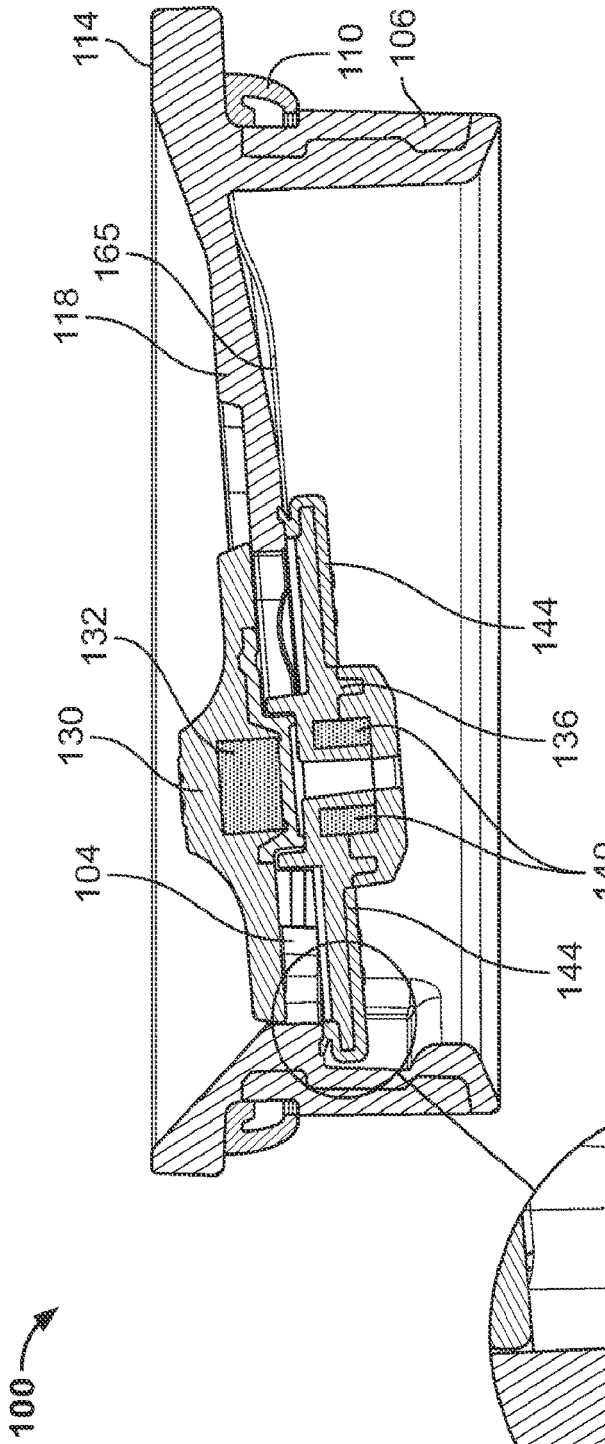

FIG. 9A

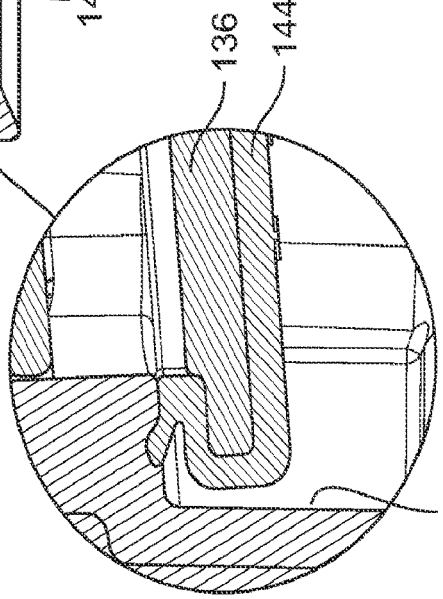

FIG. 9B

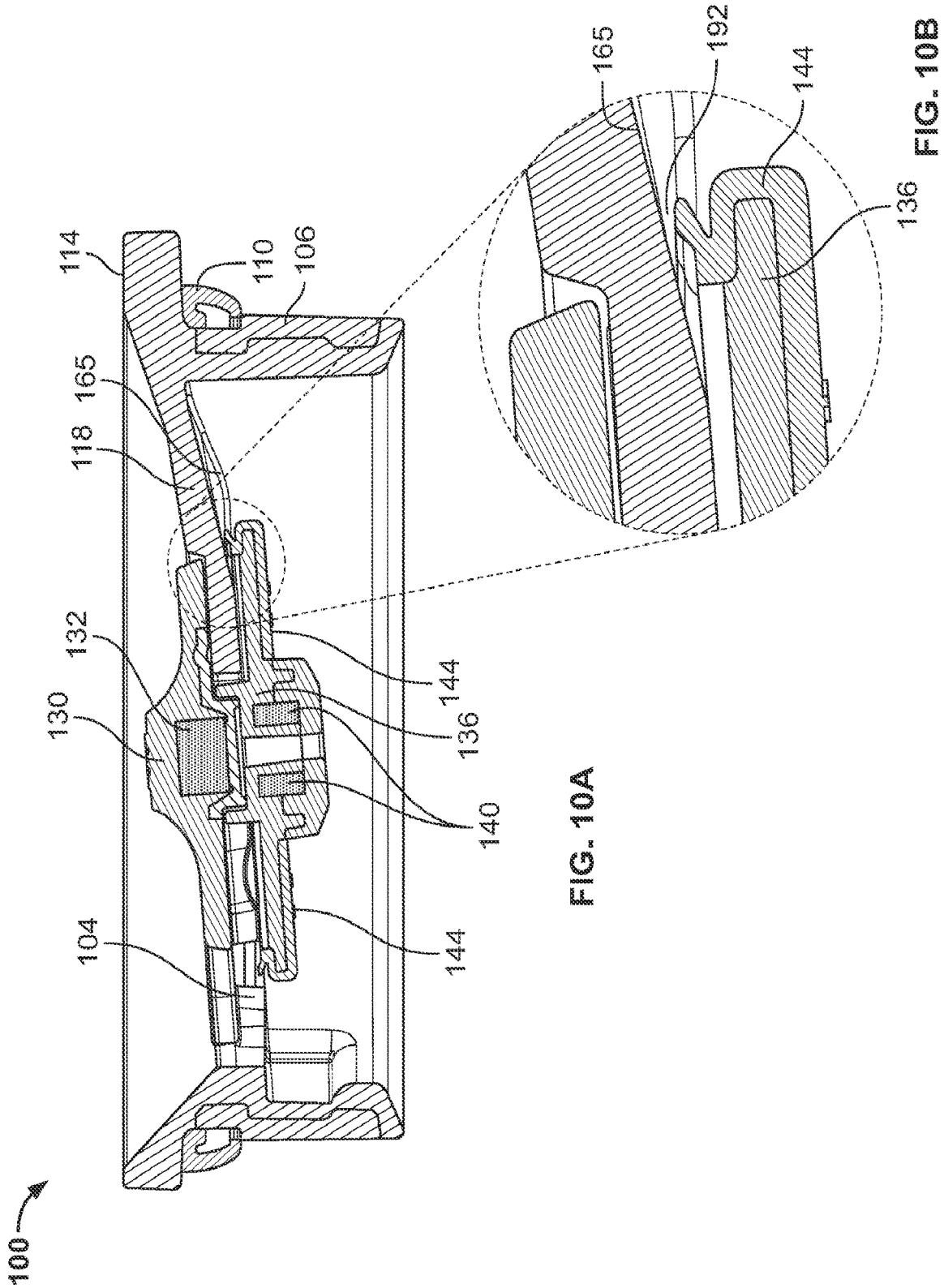

FIG. 10A

FIG. 10B

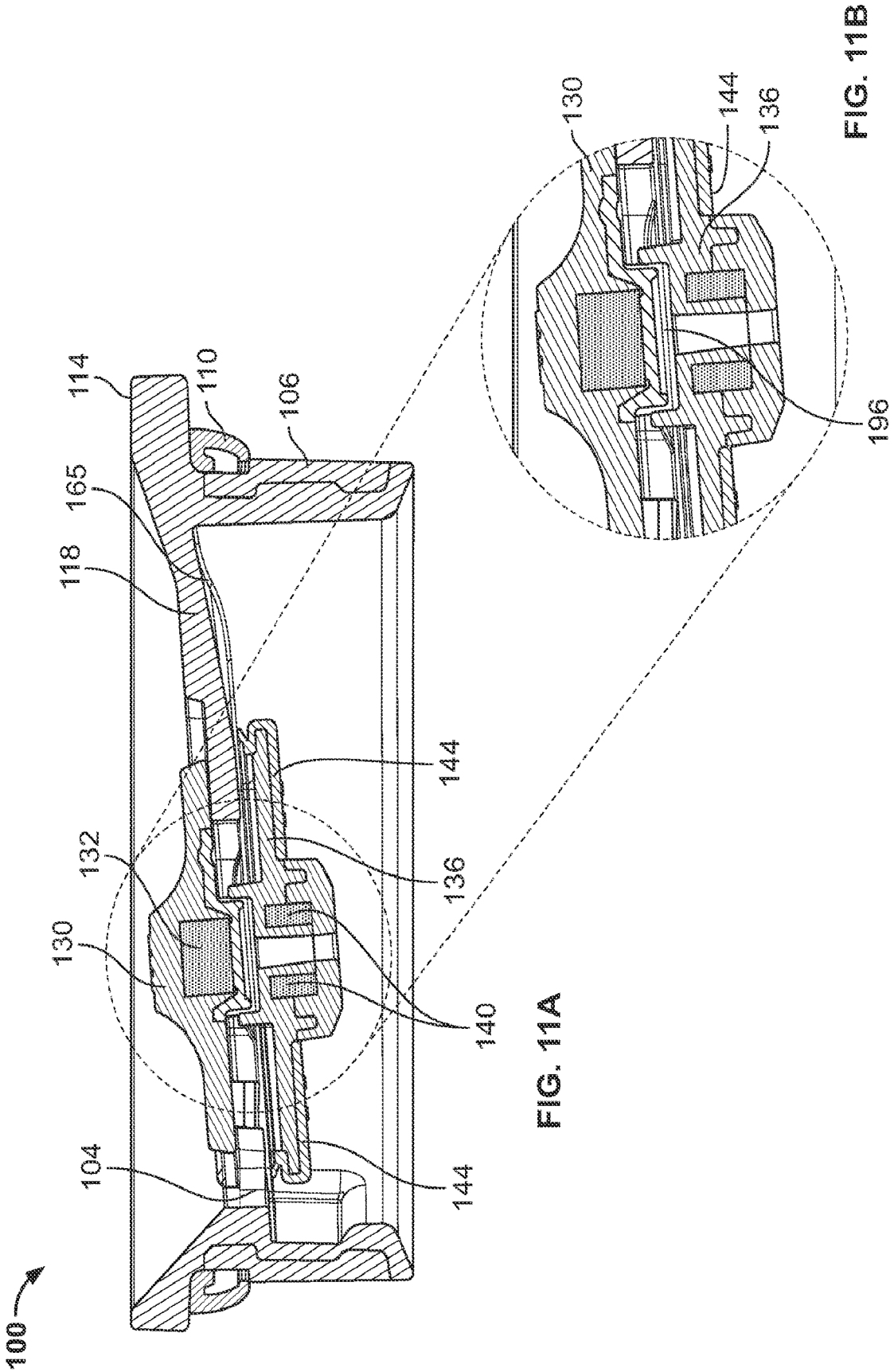

FIG. 11A

FIG. 11B

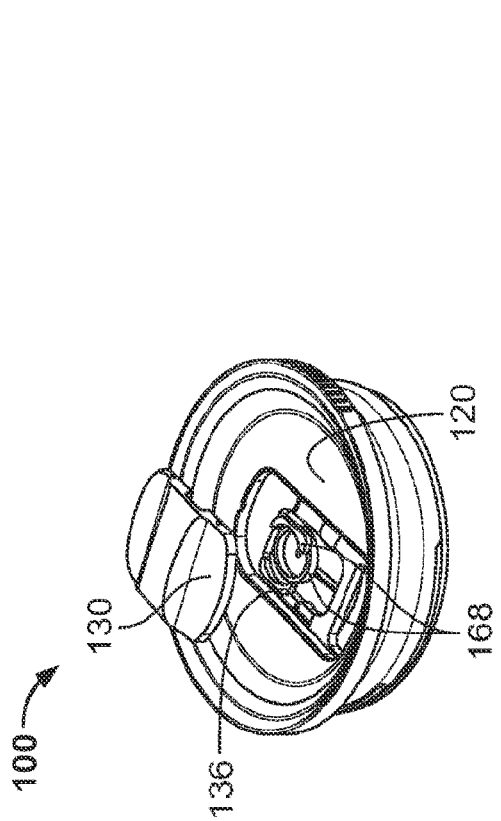

FIG. 12A

FIG. 12B

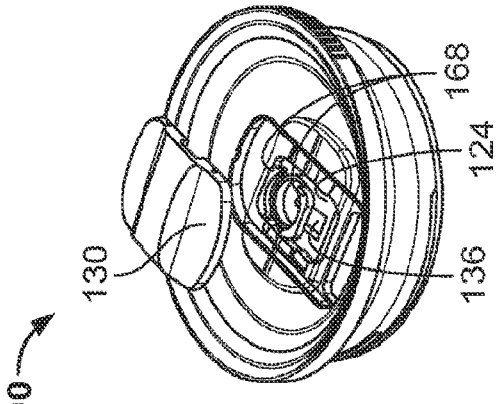

FIG. 12C

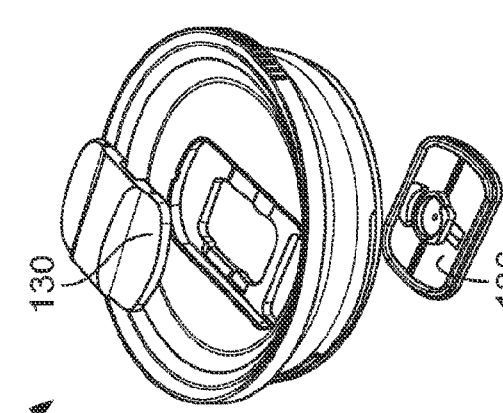

FIG. 12D

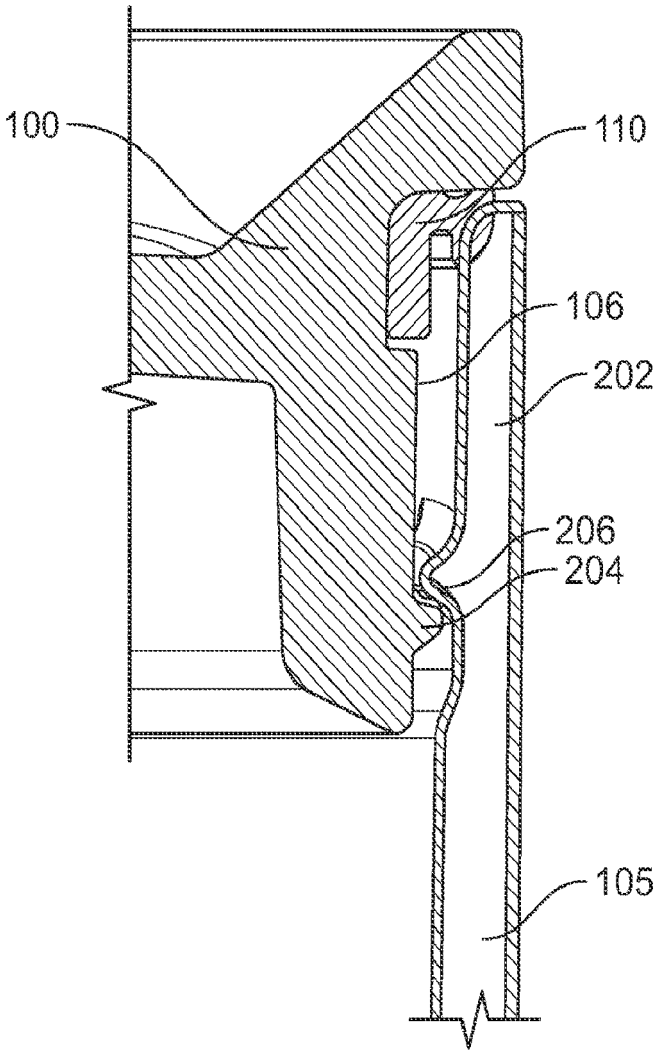

FIG. 13

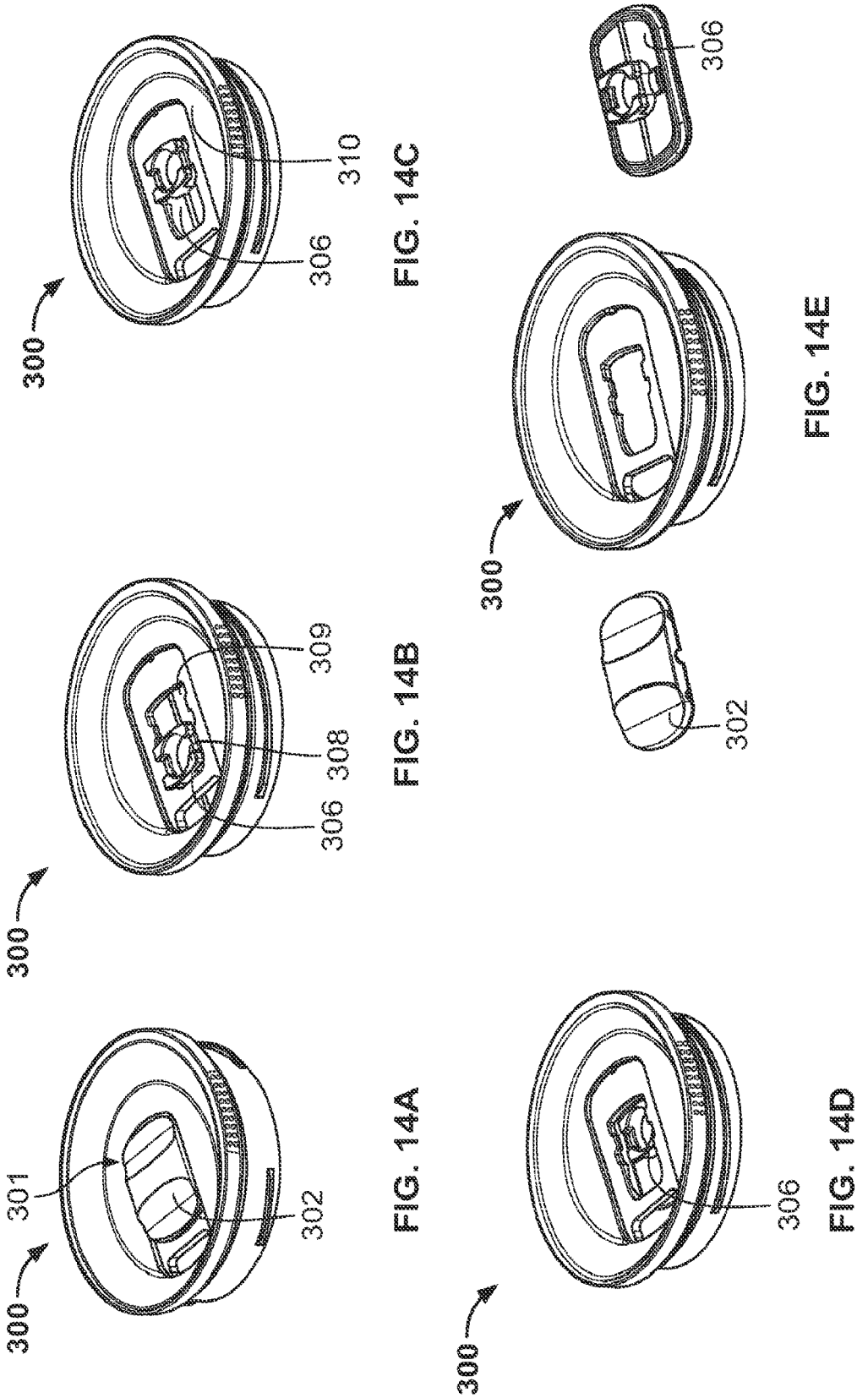

FIG. 14A FIG. 14B FIG. 14C FIG. 14D FIG. 14E

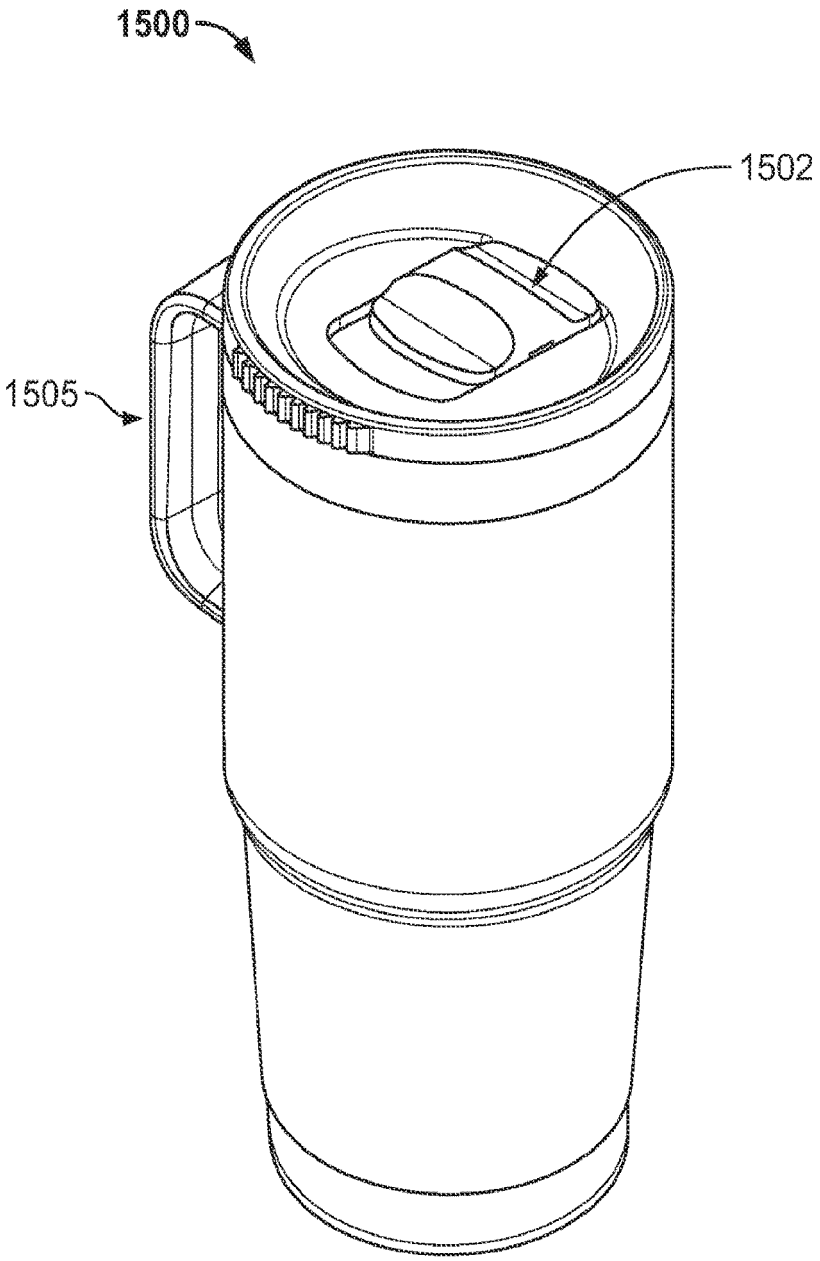

FIG. 15

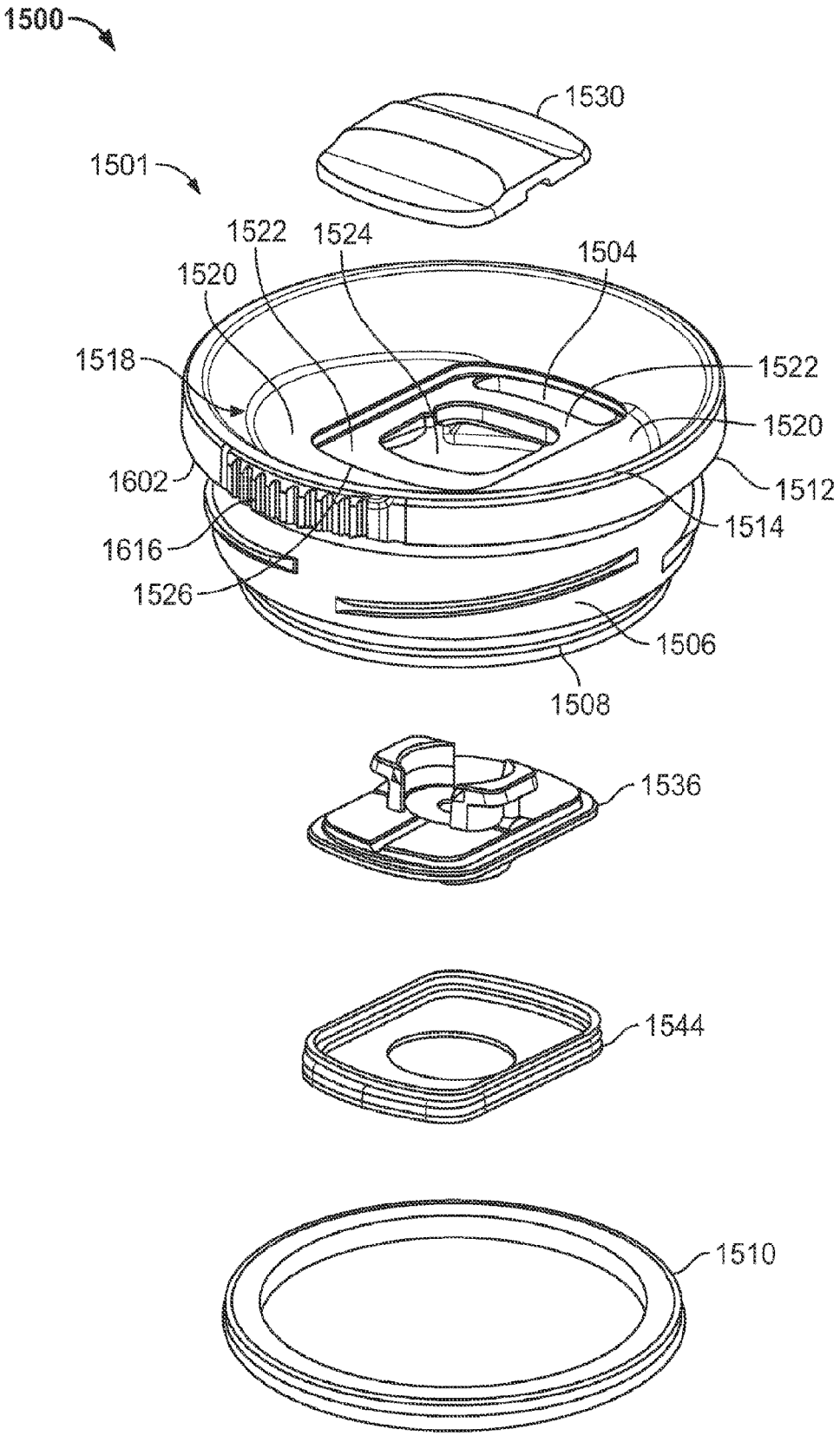
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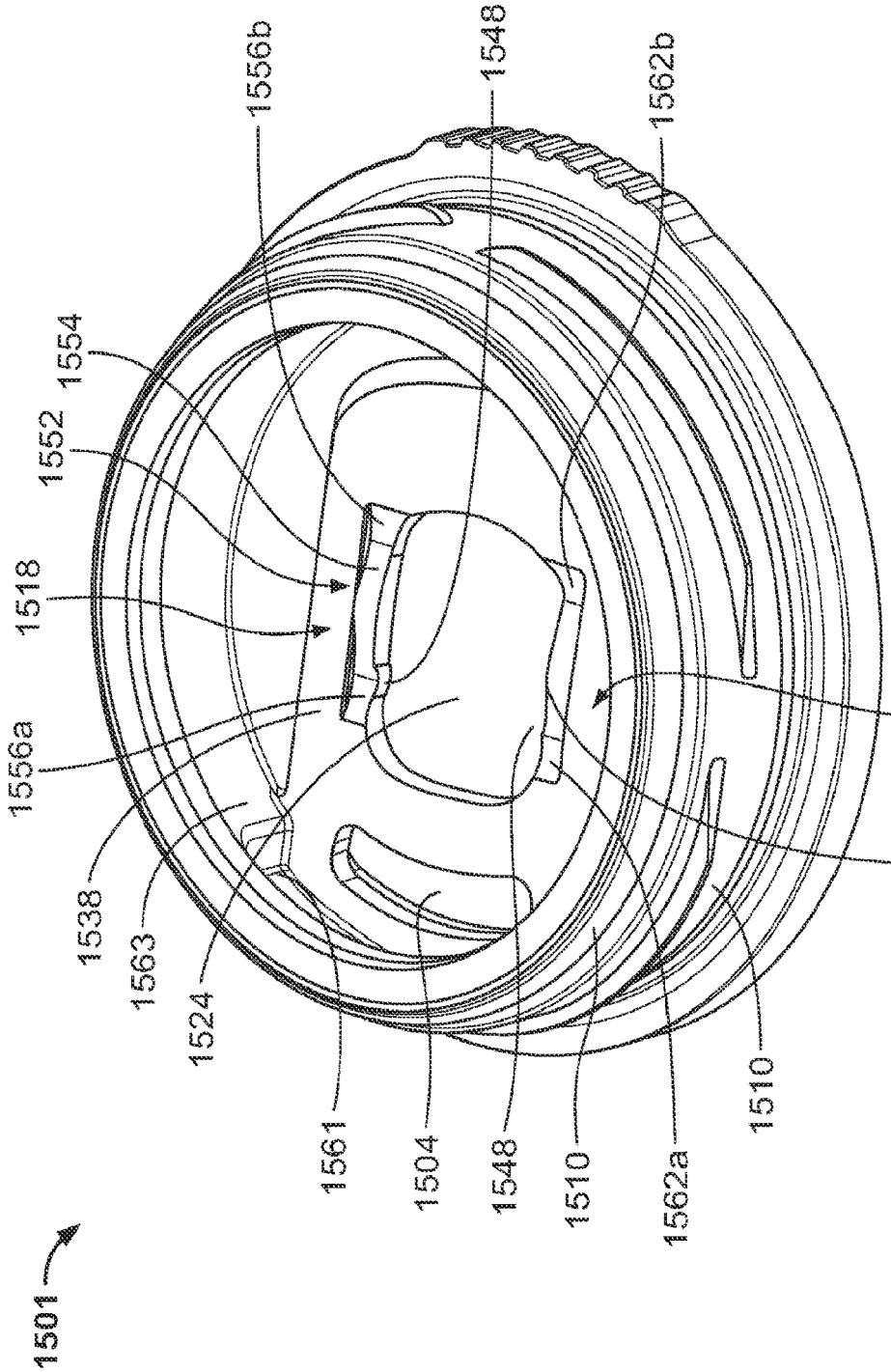
FIG. 16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1558

FIG. 17

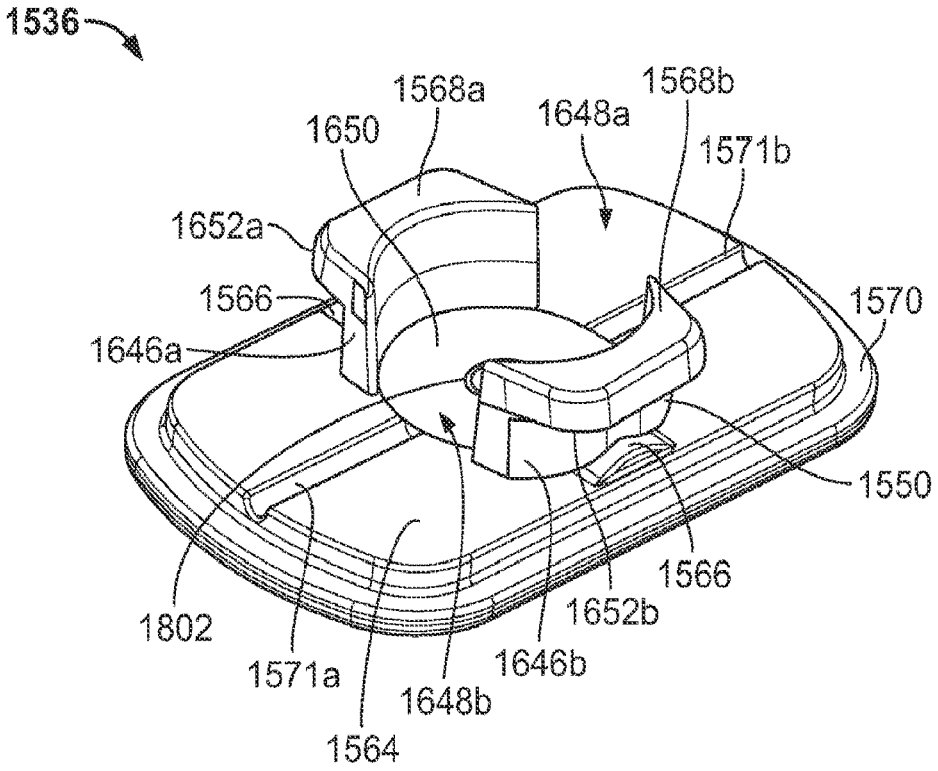

FIG. 18A

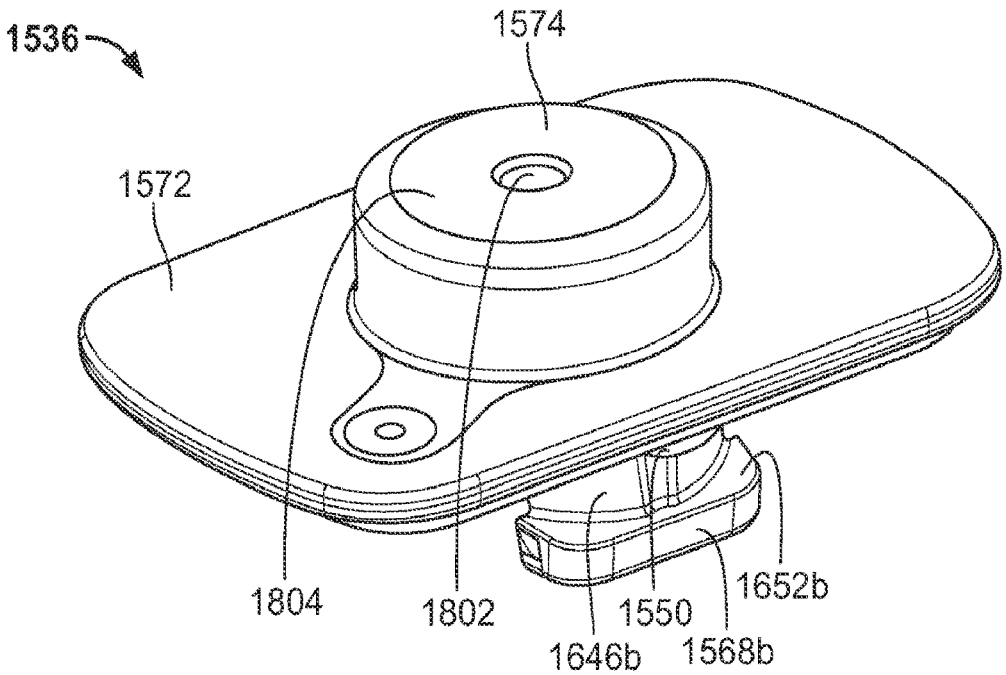

FIG. 18B

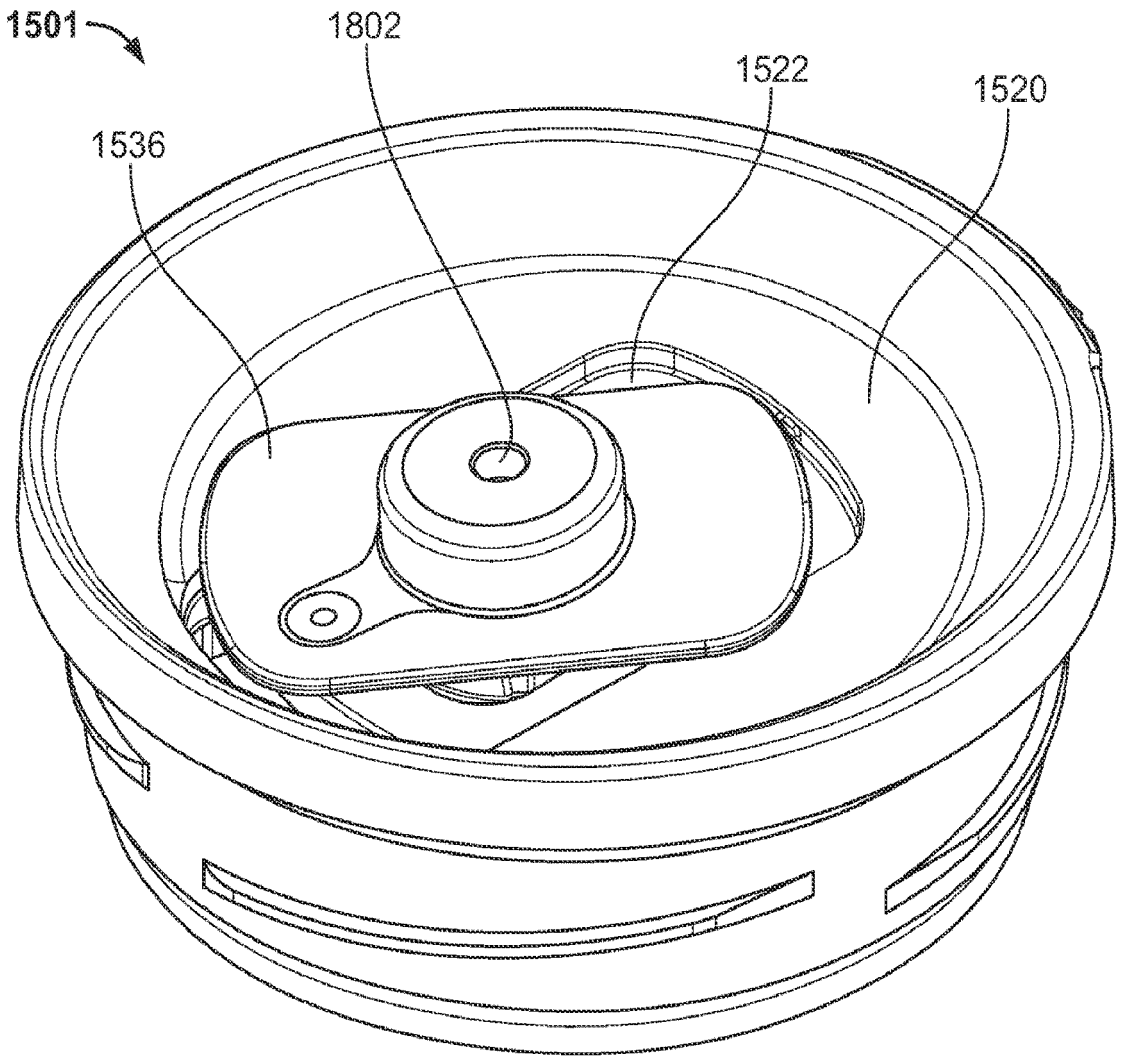

FIG. 19

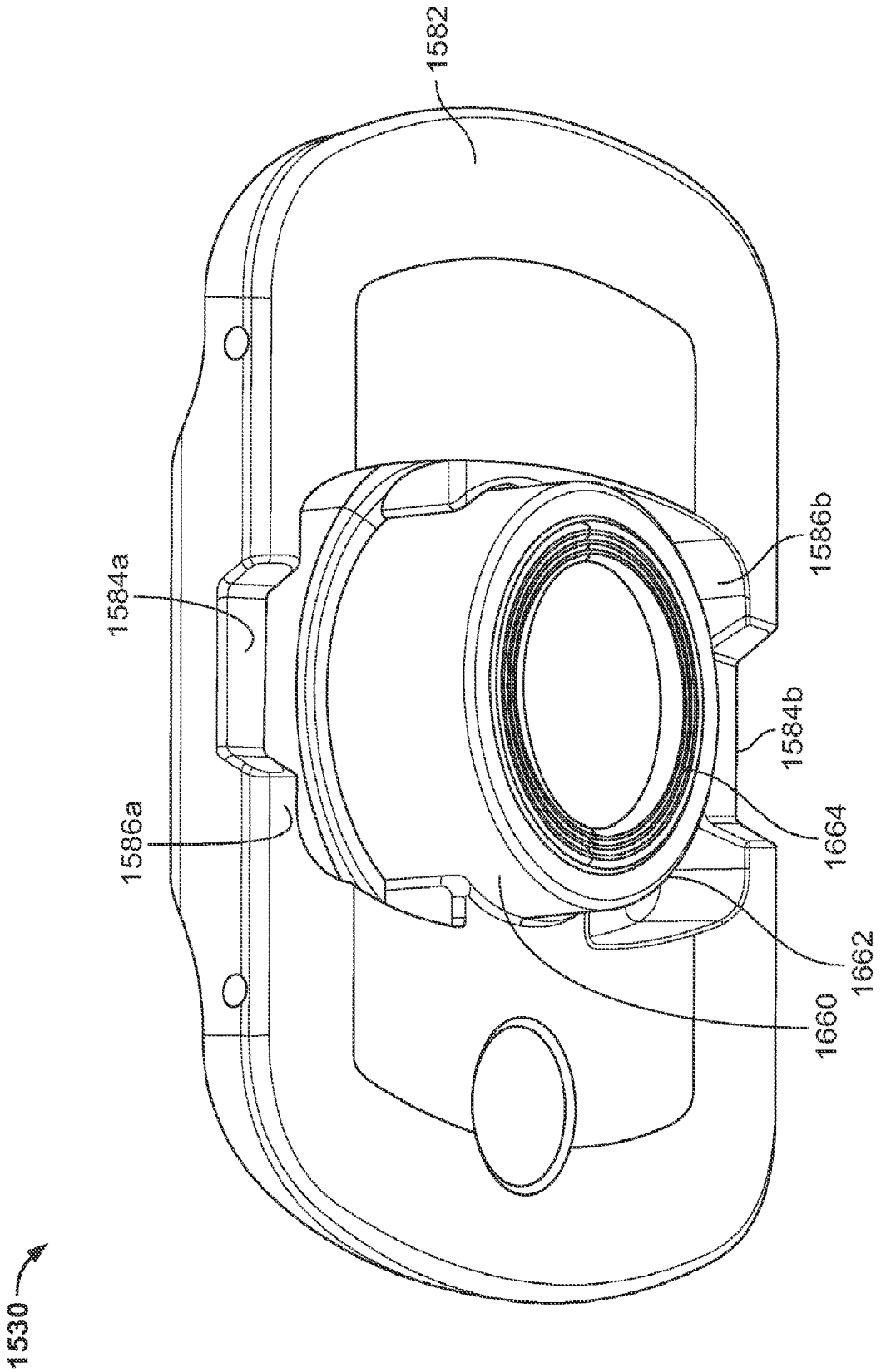

FIG. 20

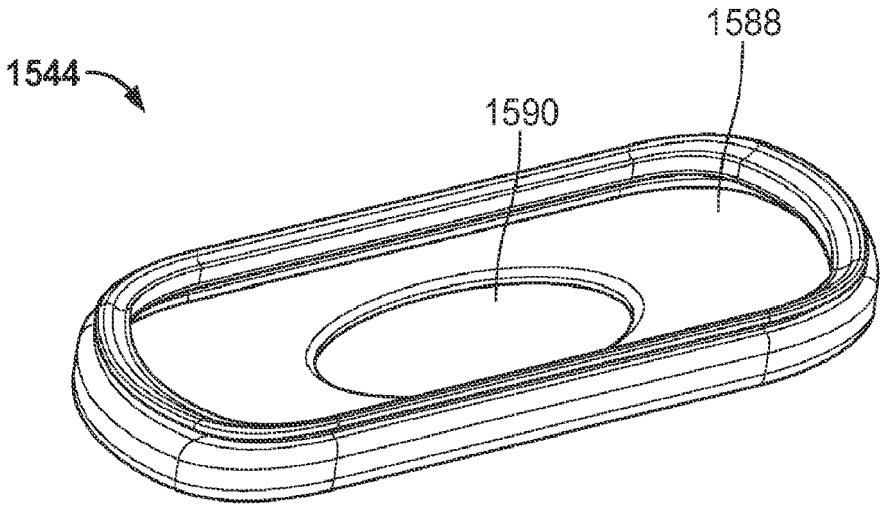

FIG. 21A

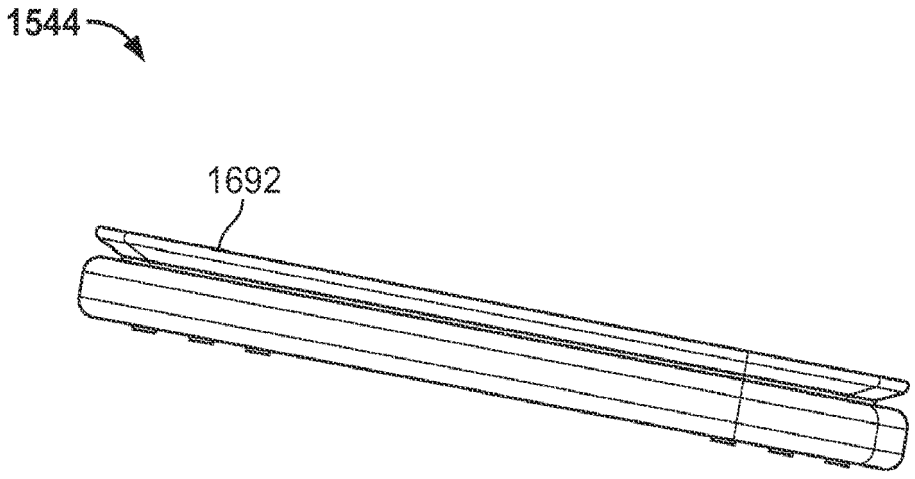

FIG. 21B

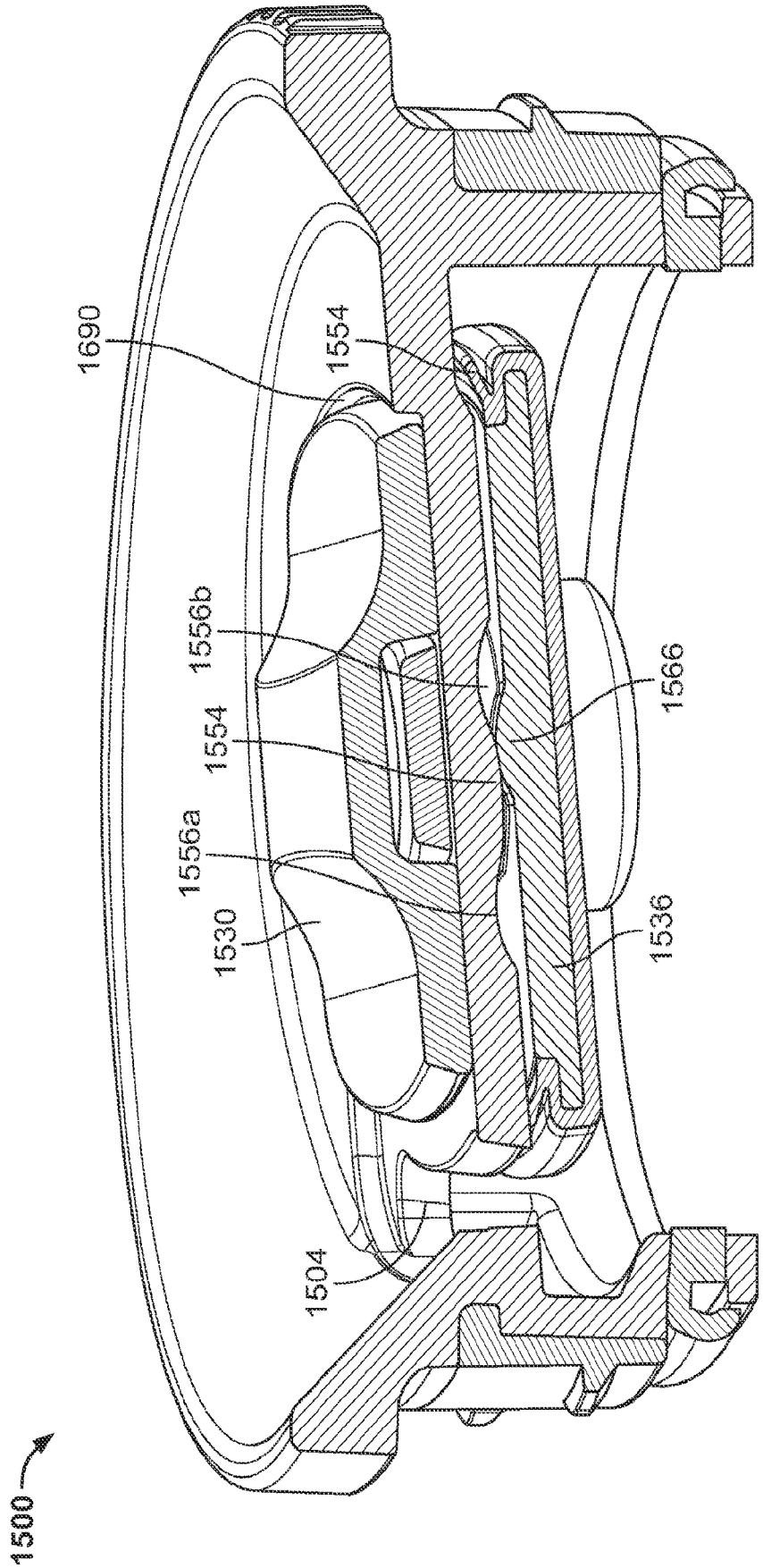

FIG. 22

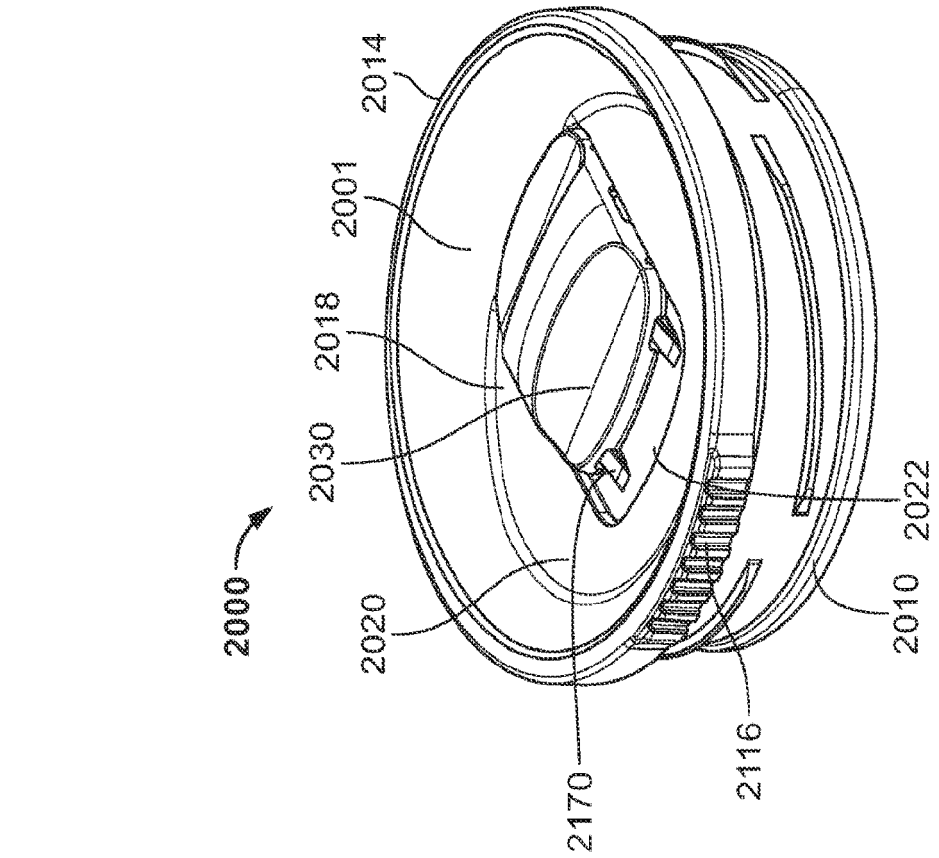
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FIG. 24

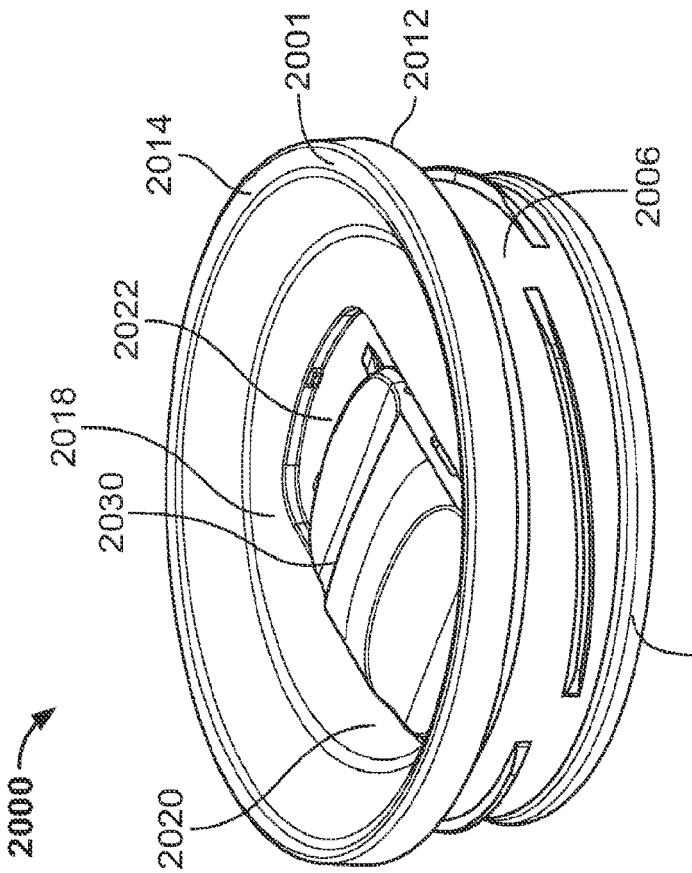
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FIG. 23

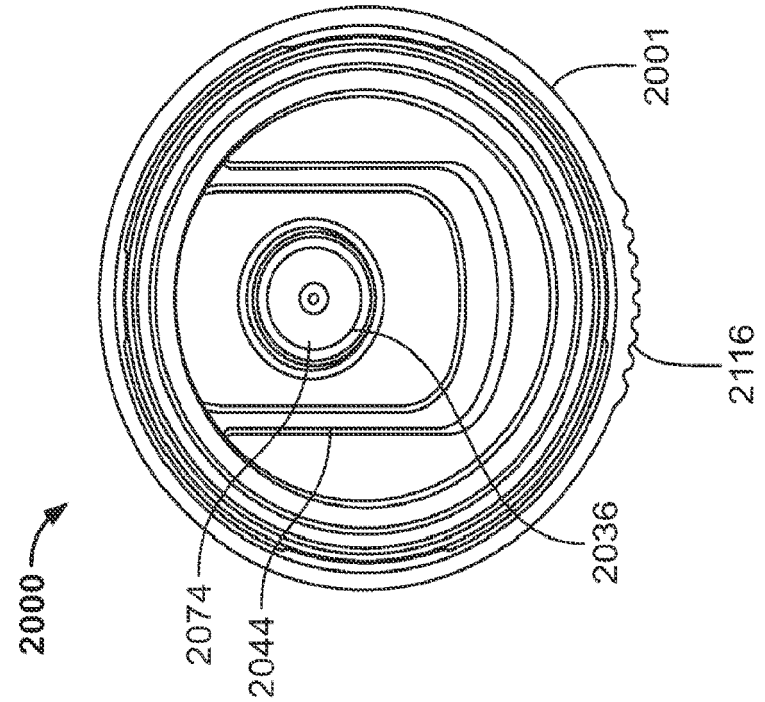

FIG. 26

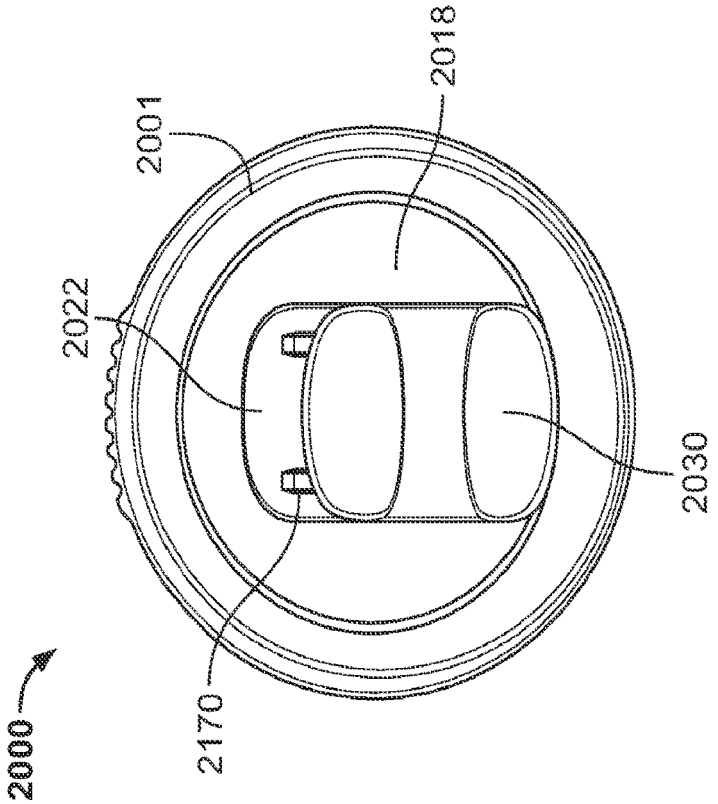

FIG. 25

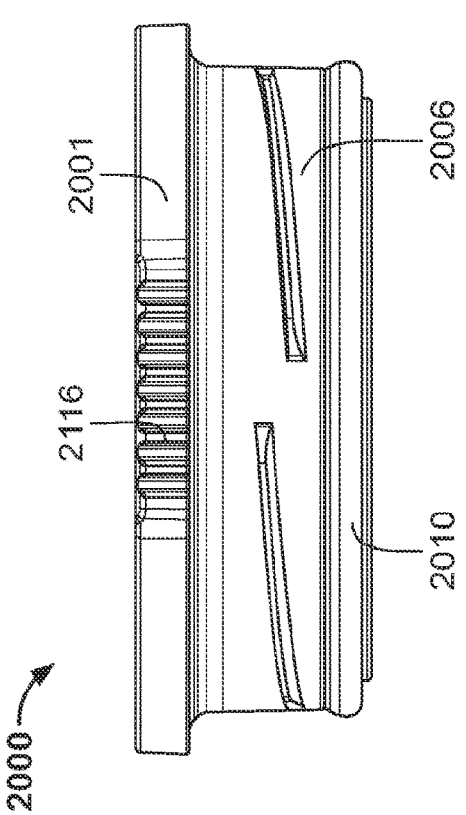

FIG. 28

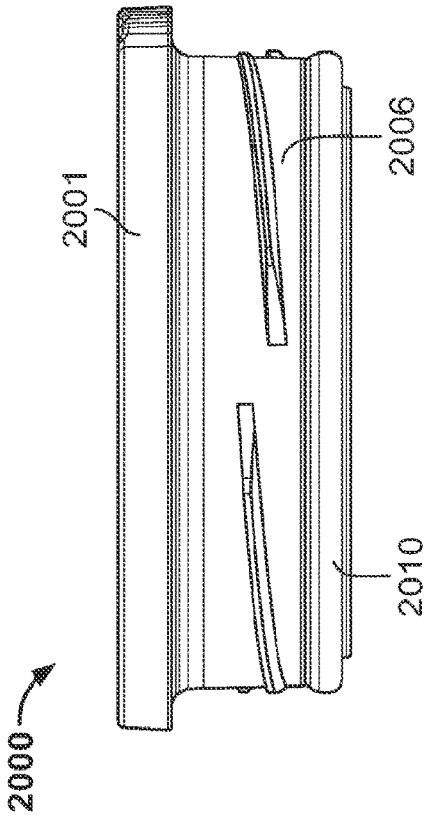

FIG. 30

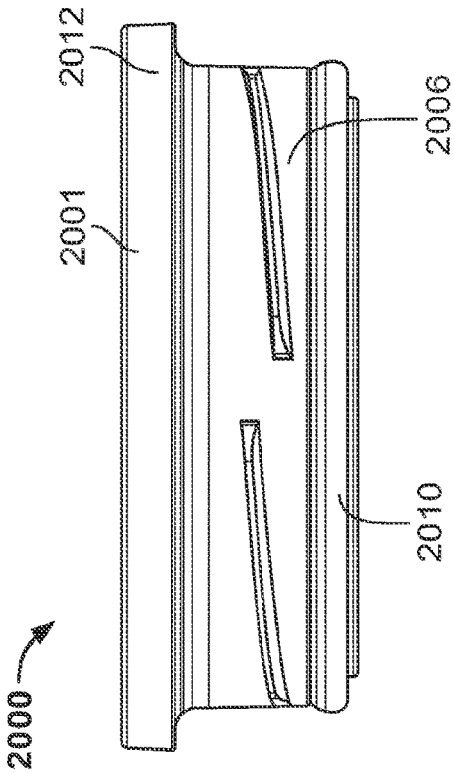

FIG. 27

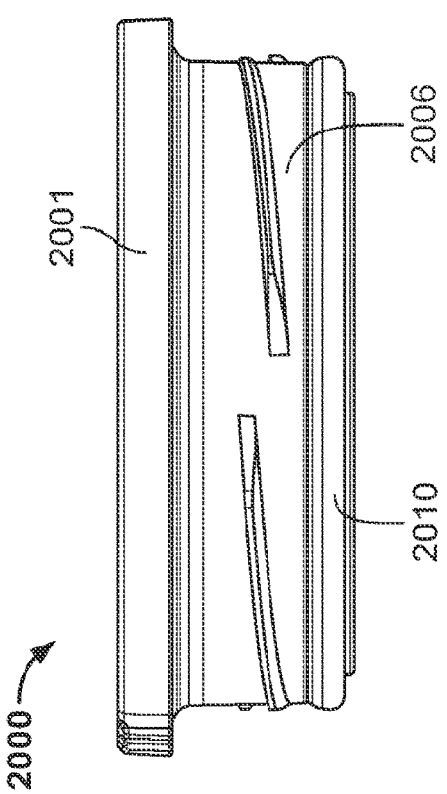

FIG. 29

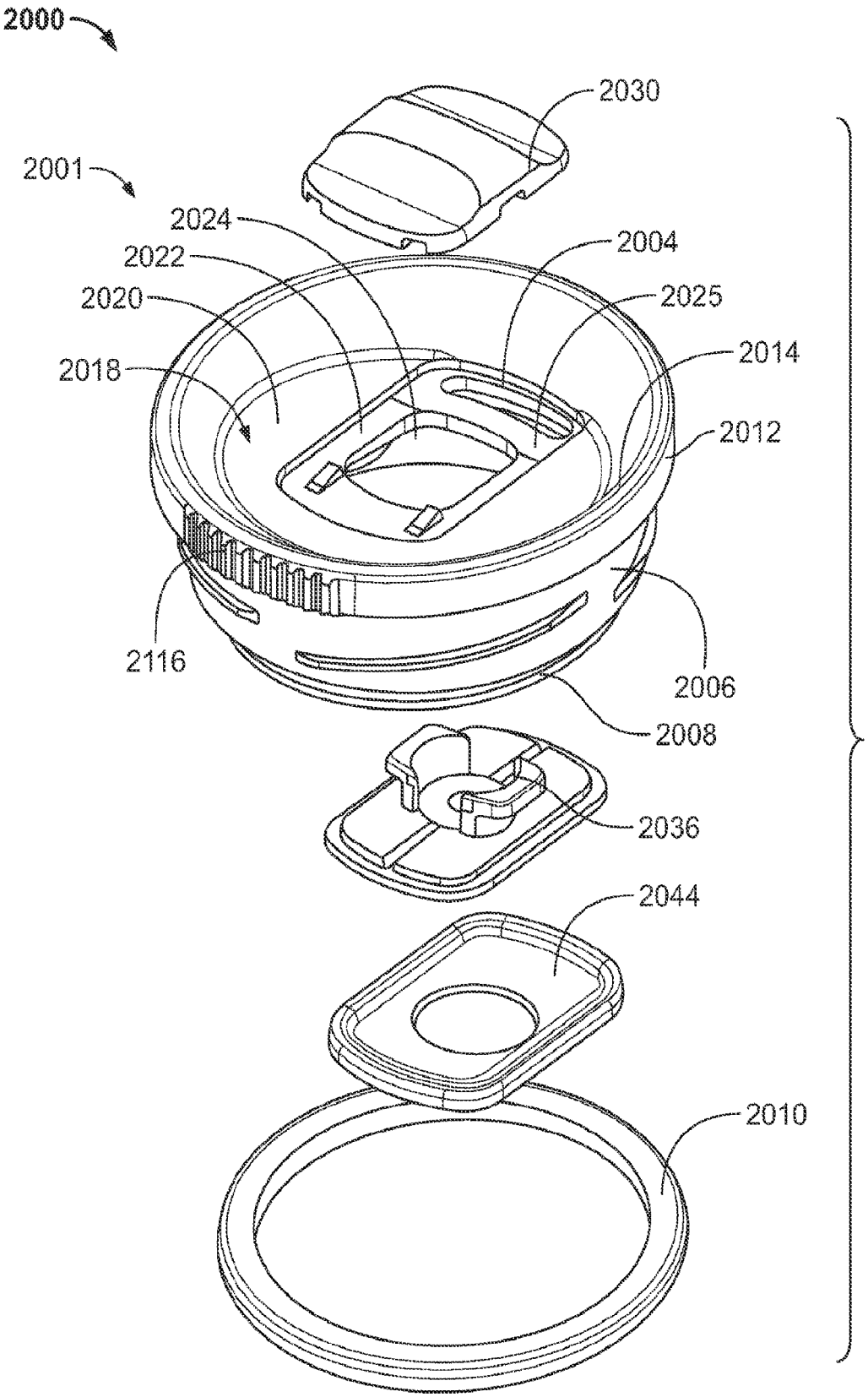
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FIG. 31

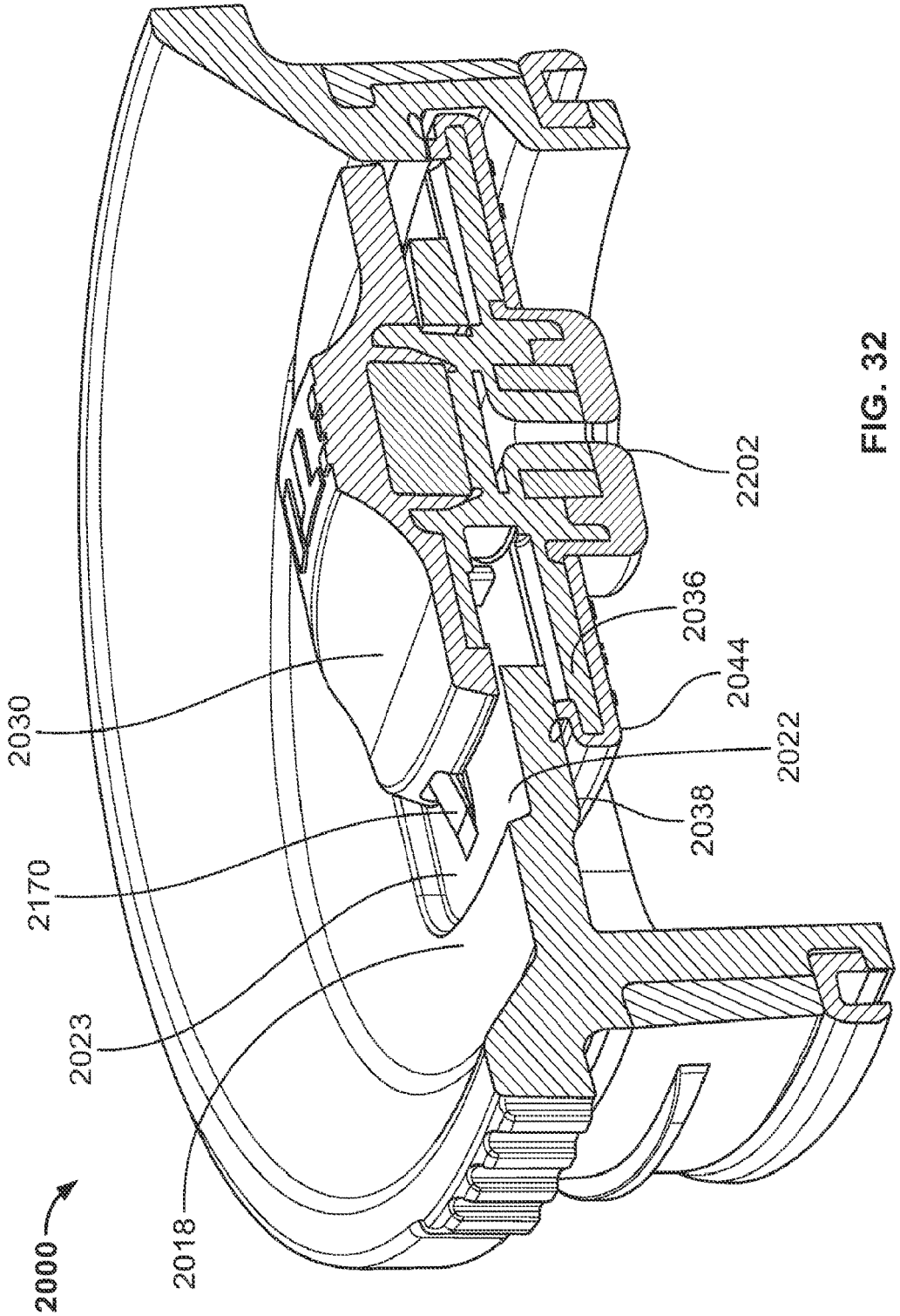

FIG. 32

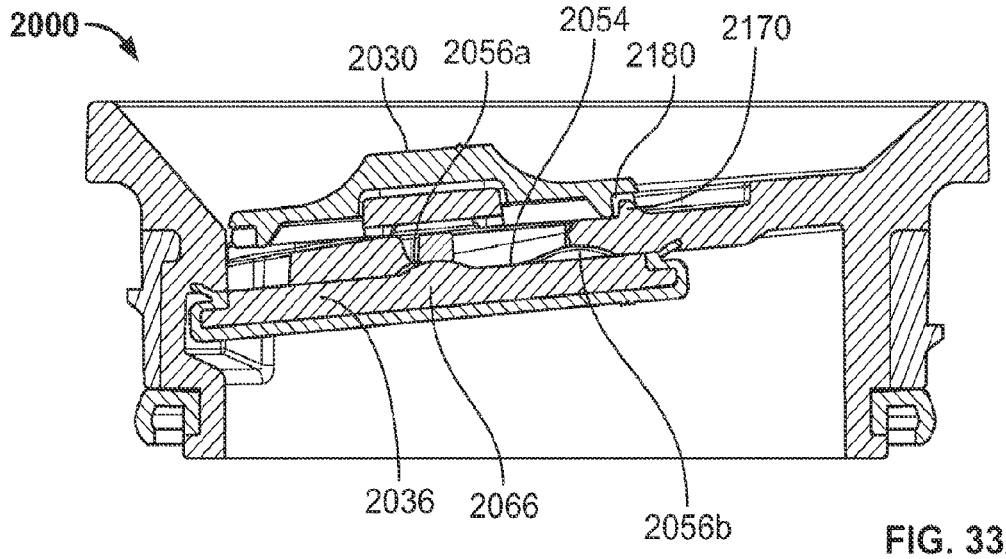

FIG. 33A

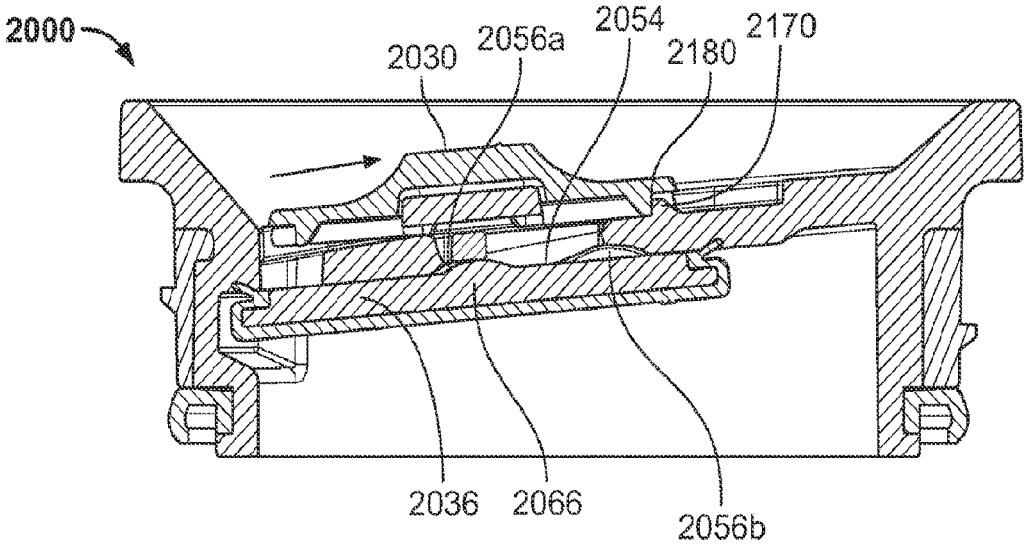

FIG. 33B

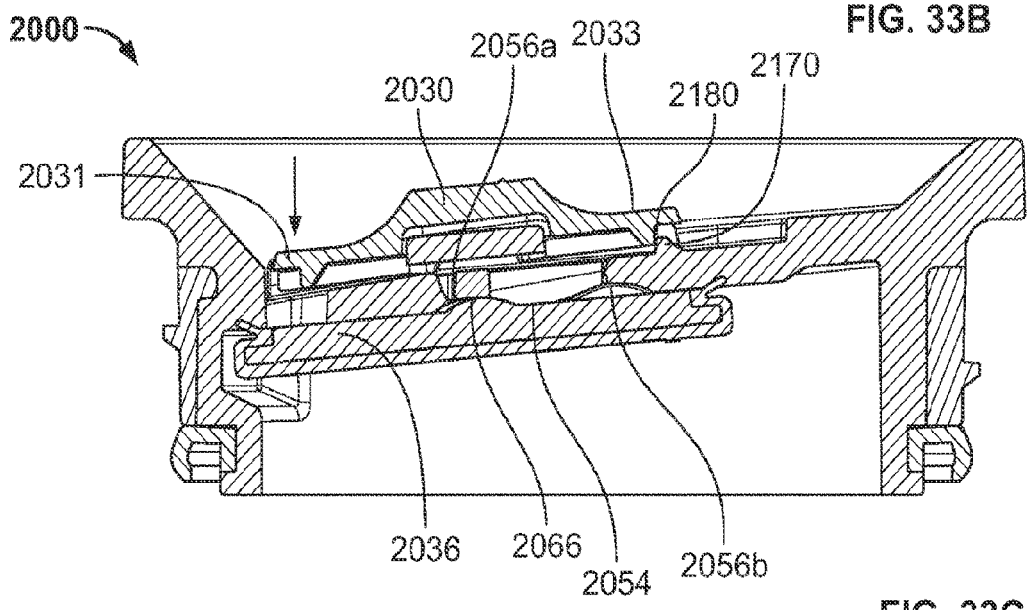

FIG. 33C

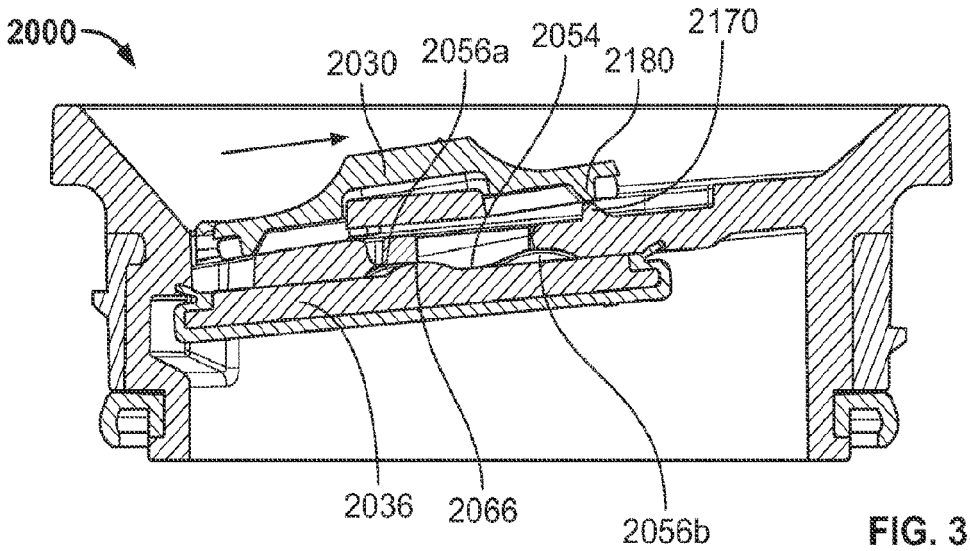

FIG. 33D

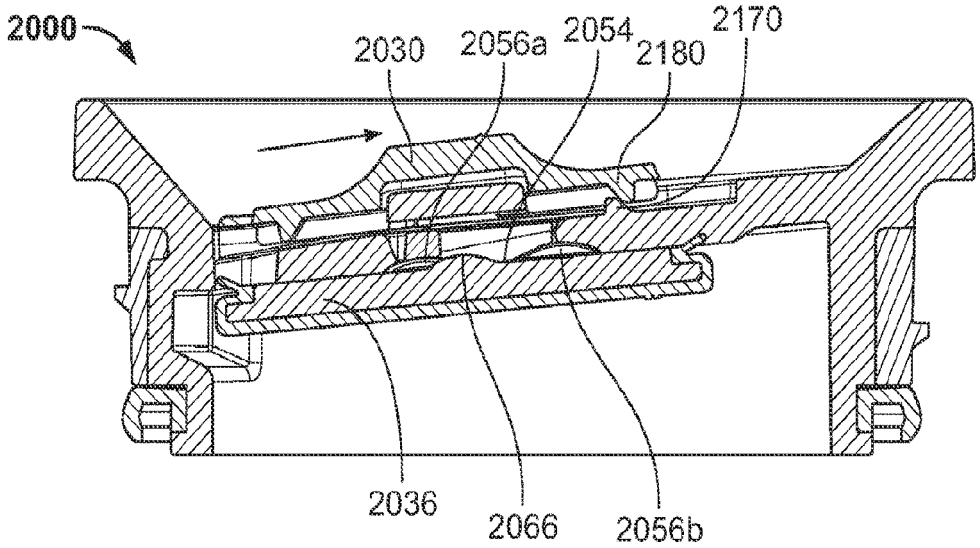

FIG. 33E

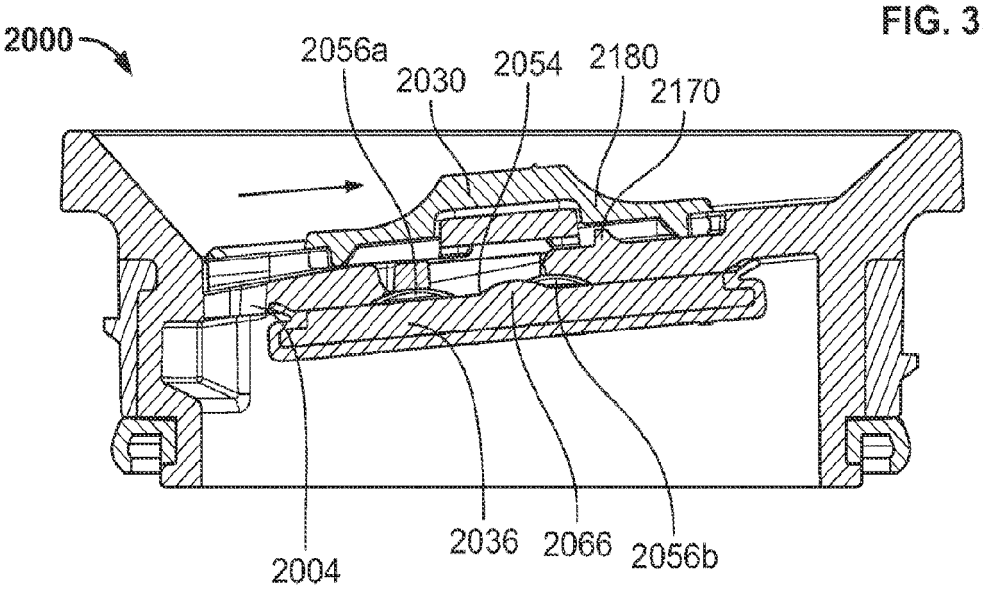

FIG. 33F

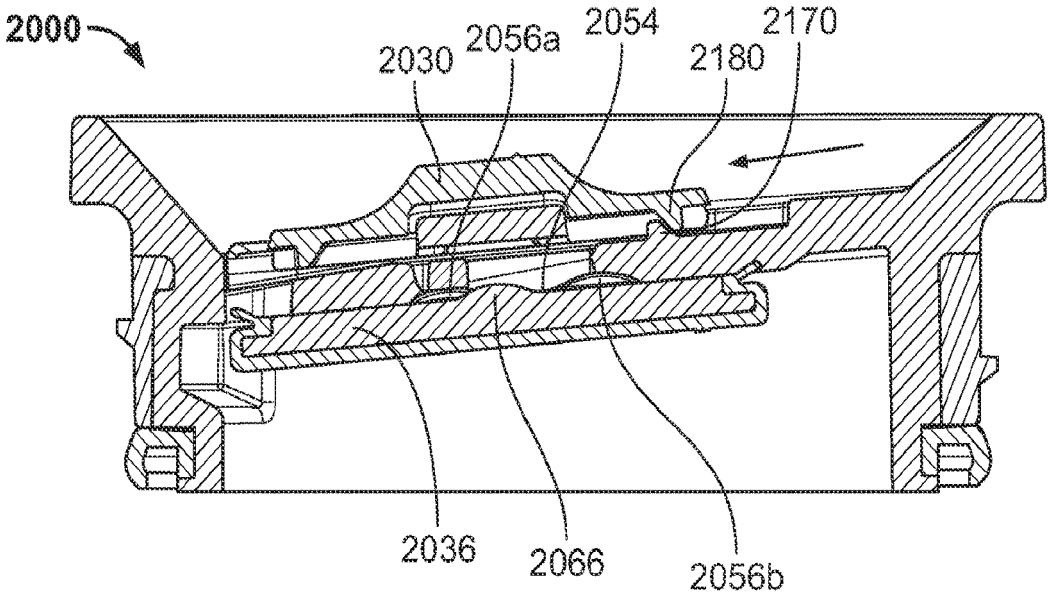

FIG. 34

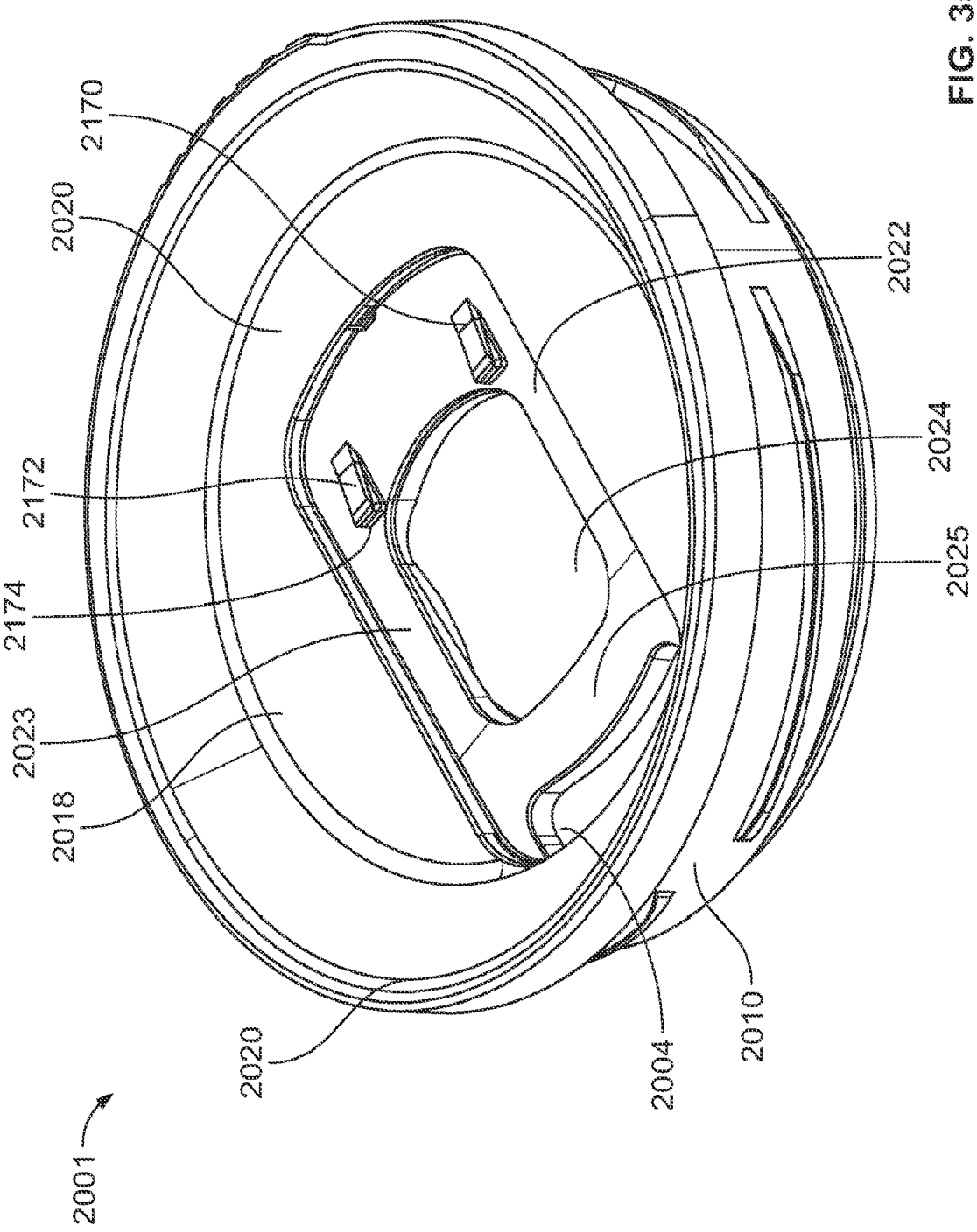
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FIG. 35

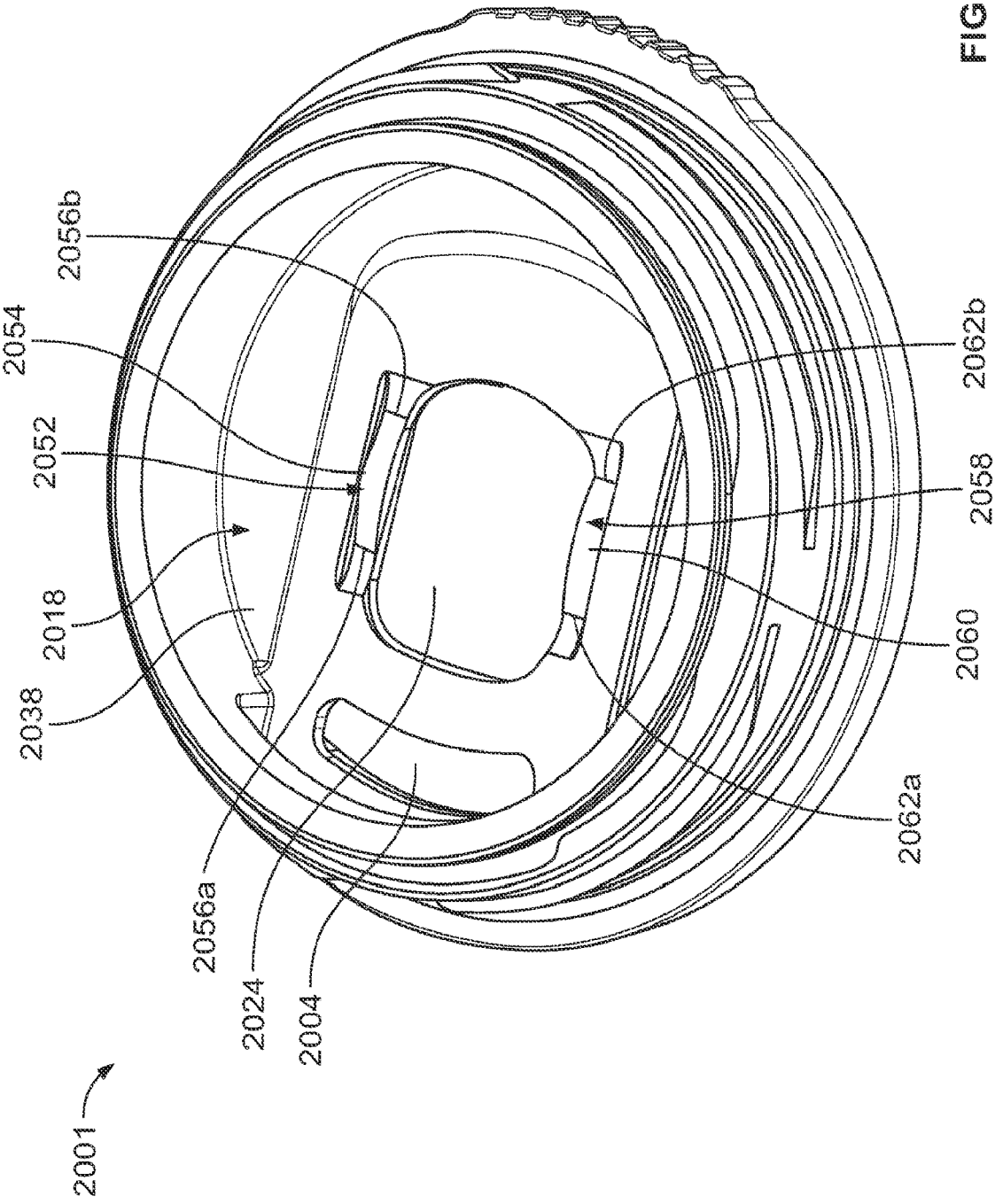
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FIG. 36

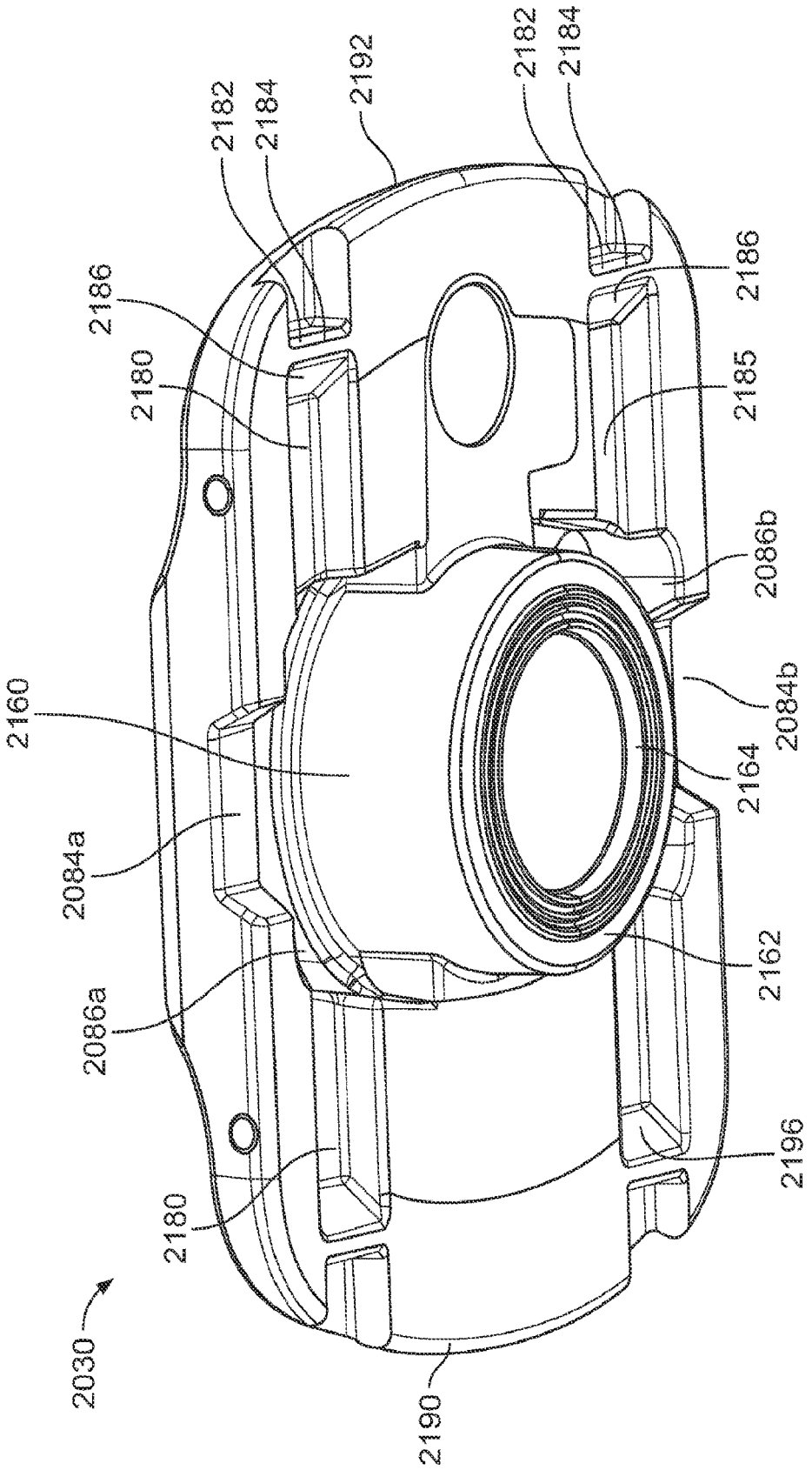
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FIG. 37

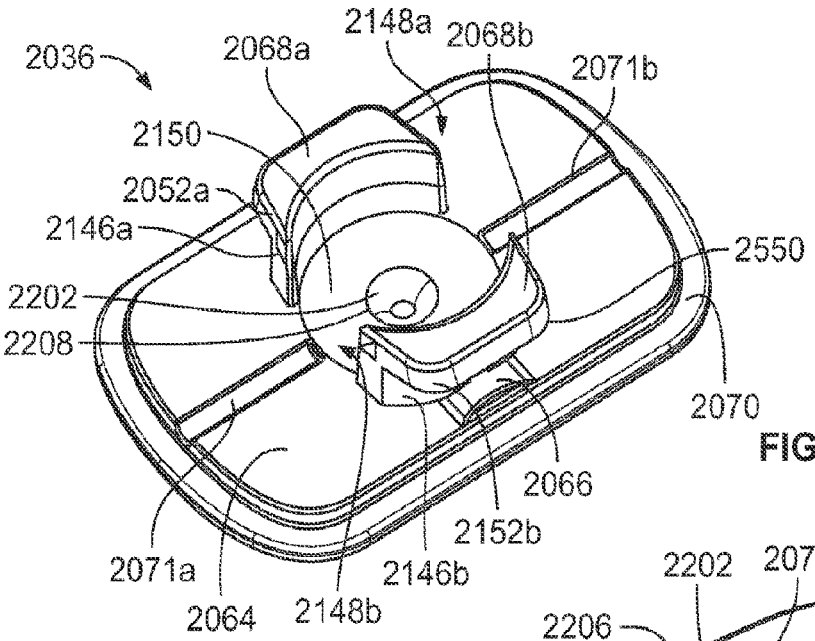

FIG. 38

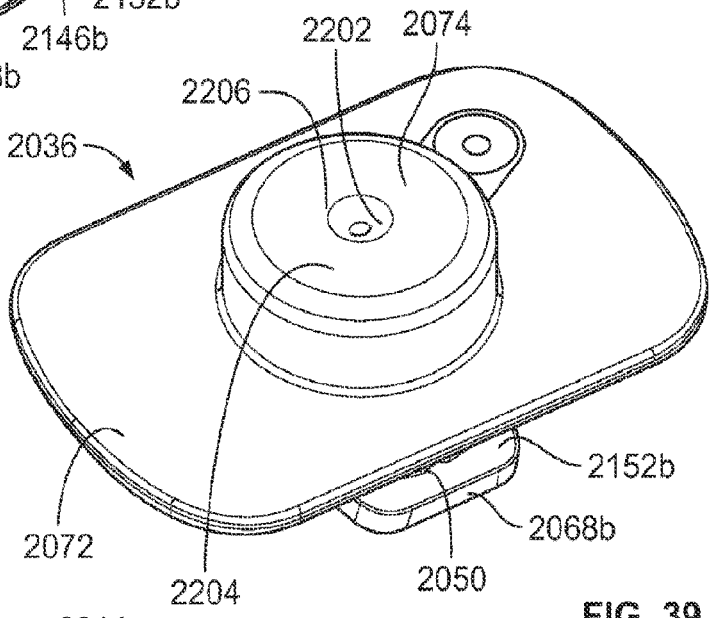

FIG. 39

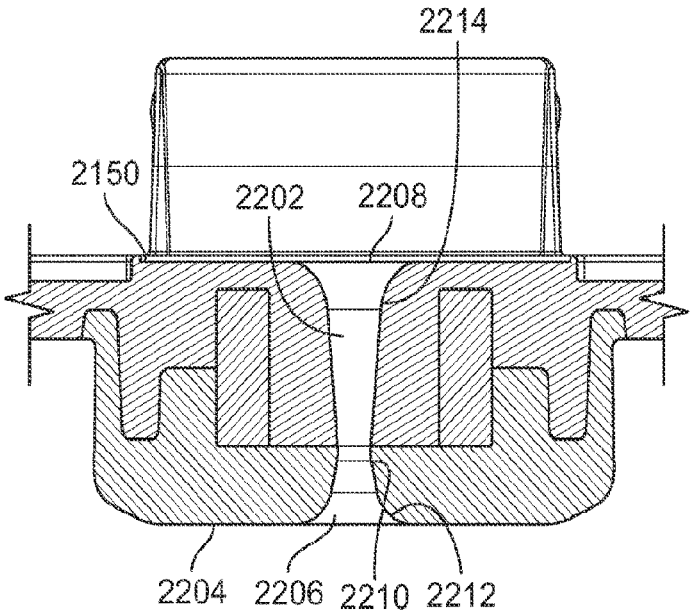

FIG. 40

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EUROPEAN SEARCH REPORT

Application Number
EP 24 17 1364

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 August 2024	Serrano Galarraga, J

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