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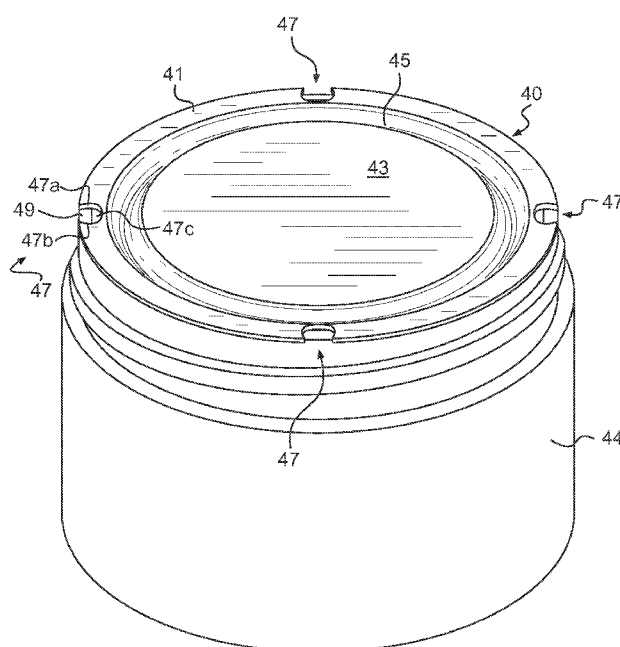
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GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

[Continued on next page]

(54) Title: CONTAINER VENTING DISC



**FIG. 5**

(57) Abstract: A container venting disc is punctuated with  
gaps around the periphery to allow gases from the interior  
of the container to vent. An intermediate ridge or layer that  
abuts or is proximal to the interior edge of the container lip  
is implemented to prevent the disc from significantly moving  
laterally and to also center the venting disc within the  
container mouth. The gap(s) forms a channel in the disc to  
allow gases to escape between the edge of the container  
mouth and the container cap. The simplicity of design al-  
lows for easy manufacture and simple placement in a con-  
tainer, such as for ajar or bottle.



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- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))* — *of inventorship (Rule 4.17(iv))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))* — *with international search report (Art. 21(3))*
- Published:**

## CONTAINER VENTING DISC

### Field

5 [0001] This subject matter relates to a sealing membrane for an enclosure capable of venting gases. More particularly, it relates to a venting disc for a container top.

### Background

10 [0002] The need to store material inside an enclosure such as a container is measured against the need for the consumer to be able to breach the enclosure to access the material. A typical breaching mechanism is a removable cap that is tightened or snapped over the container mouth. However, due to tampering or other concerns, an airtight liner or seal is usually secured over the container mouth. In some instances, the airtight liner or seal prevents the venting of gases that are built up from the stored material and the seal  
15 will eventually burst or the container will break. Several approaches, such as shown in U.S. Patents Nos. 5,579, 936 and 5,730,306 to Costa et al., show designs for allowing venting, but these designs are particularly suited for liquid materials and are somewhat complicated to manufacture.

20 [0003] What is desired is a sealing mechanism that is less complicated and also suited for non-liquid materials, such as pills, pastes or large granules, etc. To that end, the following description details a container venting disc that addresses these and other deficiencies in the industry.

### SUMMARY

25 [0004] The following presents a simplified summary in order to provide a basic understanding of some aspects of the claimed subject matter. This summary is not an extensive overview, and is not intended to identify key/critical elements or to delineate the scope of the claimed subject matter. Its purpose is to present some concepts in a simplified form as a prelude to the more detailed description that is presented later.

30 [0005] The foregoing needs are met, to a great extent, by the present disclosure wherein a venting removable cover for a container opening is provided, the container opening being sealable with a cap, comprising: a non-venting outer portion having a

predetermined dimension and shape to rest on a lip of the container opening; a non-venting inner portion that spans an interior face of the container opening; at least one non-venting intermediate portion bridging the outer portion and the inner portion, shaped to protrude into an interior of the container and being disposed at a position proximal to an interior edge of the lip of the container to prevent slippage of the removable cover from the container opening; and at least one venting gap through the outer portion, spanning from an outer edge of the outer portion to an outer perimeter formed by the at least one intermediate portion.

[0006] In another aspect of the present disclosure, a method for venting gases from a container opening covered by a removable venting disc is provided, the container opening being sealable with a cap, comprising: forming a non-venting outer portion of the removable venting disc having a predetermined dimension and shape to rest on a lip of the container opening; forming a non-venting inner portion of the removable venting disc that spans an interior face of the container opening; forming at least one non-venting intermediate portion of the removable venting disc bridging the outer portion and the inner portion, shaped to protrude into an interior of the container to prevent slippage of the removable cover from the container opening and disposed at a position proximal to an interior edge of the lip of the container; and forming at least one venting gap in the outer portion of the removable venting disc, spanning from an outer edge of the outer portion to an outer perimeter formed by the at least one intermediate portion.

[0007] In another aspect of the present disclosure, a venting removable cover for a container opening is provided, the container opening being sealable with a cap, comprising: non-venting means for resting on a lip of the container opening, having a predetermined dimension and shape; non-venting means for spanning an interior face of the container opening; non-venting means for bridging the means for resting on the lip and the means for spanning, shaped to protrude into an interior of the container to prevent slippage of the removable cover from the container opening, and disposed at a position proximal to an interior edge of the lip of the container; and means for venting gases through the means for resting, spanning from an outer edge of the means for resting to an outer perimeter formed by the means for bridging.

## BRIEF DESCRIPTION OF THE DRAWING

[0008] The features and nature of the present disclosure will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which reference characters identify corresponding items and processes throughout.

[0009] Fig. 1 is a top view of an exemplary venting disc.

[0010] Fig. 2 is a bottom prospective view of the exemplary venting disc of Fig. 1.

[0011] Fig. 3 is a top view of another exemplary venting disc.

[0012] Fig. 4 is a top view of another exemplary venting disc.

[0013] Fig. 5 is an exaggerated perspective view of another exemplary venting disc on a container.

[0014] Fig. 6 is an exploded perspective view of another exemplary venting disc on a bottle top.

[0015] Fig. 7 is a view of the A-A cross-section shown in Fig. 6.

[0016] Fig. 8 is a top view of another exemplary venting disc.

[0017] Fig. 9 is a top view of another exemplary venting disc with a tab.

[0018] Fig. 10 is a top view of another exemplary venting disc with a tab.

[0019] Fig. 11 is a top view of another exemplary venting disc with a design.

[0020] Fig. 12 is a top view of another exemplary venting disc with a design and tab.

## DETAILED DESCRIPTION

[0021] The disclosed methods and systems below may be described generally, as well as in terms of specific examples and/or specific embodiments. For instances where references are made to detailed examples and/or embodiments, it should be appreciated that any of the underlying principals described are not to be limited to a single embodiment, but may be expanded for use with any of the other methods and systems described herein as will be understood by one of ordinary skill in the art unless otherwise stated specifically.

[0022] The ability to “seal” a container top, but in a manner that is breachable by the customer, requires an exemplary venting disc to be removable. In various embodiments described herein, the exemplary seal is an easily manufacturable venting disc which can

be formed from a non-venting material or membrane that is tearable or puncturable, or configured to be removable via a tab or other exertion of force. Thus, the exemplary venting disc may be manufactured from any material that provides a robust “seal” while still allowing the customer to remove the seal, as needed. One of many possible non-limiting examples include materials selected from the group comprising: foil, plastic, fabric, metal, nylon, layered membranes, and so forth. In some embodiments, the method for attaching or securing the exemplary disc to the container mouth may be facilitated by tightening a cap or by adhering the disc to the container mouth lips using an adhesive or pressure, etc. In some embodiments, the exemplary venting disc may be of a one-time-use, while in other embodiments, the exemplary venting disc may be multiply used. Accordingly, the “longevity” of use intended for the exemplary venting disc can dictate the exemplary venting disc manufacturing material.

**[0023]** Fig. 1 is a top view of an exemplary venting disc 10 having a shape suitable for sealing a container (not shown) with an outer portion 11 and inner portion 13 bridged by a non-planar portion 15 distal to inner portion 13. The outer portion 11 is shown punctuated with a gap 17 having a predetermined size that is located adjacent to an exterior edge of the non-planar portion 15. When placed over a container mouth (not shown), the gap 17 provides an opening for gases to escape from the interior of the container to the exterior, while also preventing solid material or large sized materials to escape to the exterior. The non-planar portion 15 can operate to center the exemplary venting disc 10 about the container mouth and also to constrain the exemplary venting disc 10 from slipping off the container mouth. The outer portion 11 is of a predetermined size to constrain the gap 17 to provide a restricted opening between the lip of the container (shown in Fig. 5) and the exterior edge of the non-planar portion 15. These and additional aspects of this exemplary embodiment will be further evident in the following Figs.

**[0024]** Fig. 2 is a bottom prospective view of the exemplary venting disc 10 of Fig. 1. From this vantage point, non-planar portion 15 is shown as a “V”- like depression in the material of the exemplary venting disc 10 that circles the entire disc 10. The outer wall of the non-planar portion 15 can butt against the inner rim of a container lip and operates to prevent the exemplary venting disc 10 from slipping off the container mouth.

[0025] It should be appreciated that the terms planar and non-planar are used herein to differentiate the various sections of the disc 10. For example, the section 11 of the disc 10 that rests on the container top's lip (not shown) is differentiated from the section 15 of the disc 10 that abuts the inner edge of the container top's lip, by labeling the former as planar while the latter as non-planar. In some contexts, the non-planar portion can be referred to as an intermediate portion, without loss of generality. Therefore, the terms planar/non-planar are understood to encompass other contours for the surfaces of the disc 10. For example, it is contemplated that certain planar portions may be curved, having a concave, convex, or dome shape. Further, the outer rim 11 of the disc 10 that rests on the container's lip may be curved in one direction while the inner section 13 of the disc 10 may be flat, depressed, raised, or curved. Therefore, while the various embodiments described herein utilize the terms planar and non-planar, it should be understood that these terms can be broadly applied to refer to contours that are not planar.

[0026] Similarly, it should be appreciated that the term disc is also a generic term as used herein, being referable also to non-circular shapes such as squares, ovals, rectangles, and other shapes that may be used for container openings. Therefore, while the exemplary embodiments herein are illustrated as having a circular or "disc-like" shape, other shapes are understood to be within the purview of this disclosure.

[0027] Fig. 3 is a top view of another exemplary venting disc 20 having a contiguous portion 21 that spans the exemplary venting disc 20. Non-planar portions 25 are disposed in discrete segments about contiguous portion 21 at a predetermined distance from the edge of the exemplary venting disc 20 to operate in a similar fashion to the non-planar portion 15 shown in Figs. 1 and 2. Multiple gaps 27 of predetermined sizes are placed at the periphery of the exemplary venting disc 20. The arrangement and number of the gaps 27 with respect to the non-planar portions 25 can be modified, as according to design preference. As one of many possible examples, the gaps 27 may be co-radial with the non-planar portions 25, or less or more gaps 27 may be utilized as compared to the non-planar portions 25.

[0028] Fig. 4 is a top view of another exemplary venting disc 30 having non-planar portions 35 formed as dimples or discontinuous projections/depressions into the contiguous portion 31. Multiple gaps 37 of predetermined sizes are placed at the

periphery of the exemplary venting disc 30. Similarly, the arrangement and number of the gaps 37 with respect to the non-planar portions 35 can be modified, as according to design preference.

[0029] It should be noted that Figs. 3 and 4 illustrate the possibility of modifying the non-planar portions to be of different shape and arrangement about the respective disc. Therefore, while only a “V” or dimple shape is shown in the above Figs., other shapes known to one of ordinary skill in the art are contemplated herein and are understood to be within the purview of this disclosure. Similarly, the “symmetry” of the non-planar portions and the gaps about the exemplary discs may also be altered to allow for non-symmetric placement of the non-planar portions/gaps. As evident in Fig. 3 and Fig. 4, the gap shape may be variable. Therefore, the gap may have any desired geometric shape, such as for example, square, curved, oval, ornate, etc., without departing from the spirit and scope of this disclosure.

[0030] Fig. 5 is an exaggerated perspective view of another exemplary venting disc 40 on a container opening. The venting disc 40 has outer portion 41 bridged by non-planar portion 45 to inner portion 43. Gaps 47 are shown distributed about the outer portion 41 showing container lip 49 supporting the outer portion 41. The gap 47 is bounded by fore and rear sides 47a and 47b and the inner edge of the container lip 49 to result in an opening 47c that is smaller than the actual size of the gap 47. Accordingly, with an understanding of the container lip 49 thickness/size, the gap 47 can be determined to generate an actual opening 47c sized to allow gases to vent from the interior of the container 44 while preventing the exit of the material (not shown) from inside the container 44.

[0031] Fig. 5 is an exaggerated view in that the non-planar portion 45 is shown to be significantly displaced from the container lip 49, to allow the opening 47c to be easily viewable in this illustration. Generally, the non-planar portion 45 will be, in many instances, closer to the container lip 49, especially if the individual material inside the container is smaller than the gap 47. As will be further evident below, the material type and size will help determine the appropriate size of the opening 47c.

[0032] Fig. 6 is an exploded perspective view of another exemplary venting disc 50 on a container or bottle top 64. Bottle top 64 can be a typical bottle in that inner section



66 is rimmed with lip 67 and surfaced with a spiral thread 69 for tightening on cap 62. The exemplary venting disc 50 is configured with a ringed non-planar portion 55 that is circumvented with gaps 57. The exemplary venting disc 50 may be secured to the bottle top 64 by use of the cap 62 or by use of an adhesion mechanism or other securing  
5 mechanism, as according to design preference. Cross section of cut line A-A in a non-exploded view is described below.

[0033] Fig. 7 is a view of the A-A cross-section shown in Fig. 6, where cap 62 is secured to the bottle 64 via bottle thread(s) 69 and cap thread 79. Of note is that gases 75 from the interior of the bottle can escape through the disc 50 via the opening formed  
10 between the inner edge of the bottle 90, the edge of the non-planar portion 55 proximal to the inner edge of the bottle, and the gap 57. The gases 75 channel out (and also in) through the open spiral spaces formed between the cap thread 79 and the bottle thread 69. As should be apparent, the non-planar portion 55, when properly sized with respect to the bottle top, can be configured to have a slight amount of lateral play within the bottle top.  
15 Accordingly, at least one gap 57 will be positioned to allow the necessary opening for the gases 75 to escape.

[0034] Fig. 8 is a top view of another exemplary venting disc 60. Outer portion 61 is bridged by non-planar portion 65 to inner planar portion 63. Gaps 67 are disposed about the disc 60, but with dimensions that protrude into inner planar portion 63. In this  
20 embodiment, it is contemplated that the material being stored in the container is a paste or non-liquid material that will not, by virtue of its viscosity or makeup, pass through the gaps 67. Analogously, the material may be of a size that is larger than the gap 67 size.

[0035] Fig. 9 is a top view of another exemplary venting disc 70 with a tab 72. This embodiment illustrates the ability to affix a tab 72 at one end of the disc 70 for easy disc  
25 removal. Non-planar portion 75 circumvents the entire disc 70 to bridge gaps 77 with inner portion 73. As illustrated, a design 74 can be embossed, printed, etc. on the interior 73 of the disc 70, if so desired.

[0036] Fig. 10 is a top view of another exemplary venting disc 80 with a tab 82. In this embodiment, more gaps 87 are presented as well as being more curved in shape than  
30 that of the embodiment shown in Fig. 9. Additionally, the non-planar portions 85 are not continuous around the disc 80. Inner portion 83 is shown with an optional design 84.

[0037] Fig. 11 is a top view of another exemplary venting disc 90 with a design 94. It is noted that gaps 97 can be coordinated in position around outer portion 91 to “flow” with various elements of the design 94. As shown in the above embodiments, gaps 97 are situated in the outer portion 91 being bridged by non-planar portion 95 to inner portion 93.

[0038] Fig. 12 is a top view of another exemplary venting disc 100 with a design 104 and tab 102. The design 104 is an expanded version of the design 94 shown in Fig. 11. Gaps 107 are situated around outer portion 101, being bridged by non-planar portion 105 to inner portion 103.

[0039] As should be apparent from the above descriptions, various modifications to the arrangement/shape/etc. can be made to the exemplary embodiments without departing from the spirit and scope of this disclosure. For example, in Fig. 10, while four gaps are “paired” with four non-planar portions 85, it may be desirable to only have three or two non-planar portions 85. Additionally, these non-planar portions 85 may be longer or shorter, if so desired. Additionally, the designs being shown may be altered, as well as the tabs shapes and number, without departing from the spirit and scope of this disclosure.

[0040] The previous description of the disclosed embodiments is provided to enable any person skilled in the art to make or use the present disclosure. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without departing from the spirit or scope of the disclosure. Thus, the present disclosure is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

## CLAIMS

What is claimed is:

1. A venting removable cover for a container opening, the container opening being sealable with a cap, comprising:
  - 5 a non-venting outer portion having a predetermined dimension and shape to rest on a lip of the container opening;
  - a non-venting inner portion that spans an interior face of the container opening;
  - at least one non-venting intermediate portion bridging the outer portion and the inner portion, shaped to protrude into an interior of the container and being  
10 disposed at a position proximal to an interior edge of the lip of the container to prevent slippage of the removable cover from the container opening; and
  - at least one venting gap through the outer portion, spanning from an outer edge of the outer portion to an outer perimeter formed by the at least one intermediate  
15 portion.
2. The cover of claim 1, wherein the shape of the non-venting outer portion is circular.
3. The cover of claim 1, wherein the shape of the non-venting outer portion is rectangular.
- 20 4. The cover of claim 1, wherein the shape of the non-venting outer portion is oval.
5. The cover of claim 1, wherein the at least one gap abuts an outer edge of the at least one non-venting intermediate portion.
6. The cover of claim 1, wherein the at least one venting gap is square-  
25 shaped.
7. The cover of claim 1, wherein the at least one venting gap is curved in shape.
8. The cover of claim 1, wherein the at least one non-venting intermediate portion is V-shaped.
- 30 9. The cover of claim 1, wherein the at least one non-venting intermediate portion is dome-shaped.

10. The cover of claim 1, wherein the at least one gap spans into the non-venting inner portion.

11. A method for venting gases from a container opening covered by a removable venting disc, the container opening being sealable with a cap, comprising:

5 forming a non-venting outer portion of the removable venting disc having a predetermined dimension and shape to rest on a lip of the container opening;

forming a non-venting inner portion of the removable venting disc that spans an interior face of the container opening;

10 forming at least one non-venting intermediate portion of the removable venting disc bridging the outer portion and the inner portion, shaped to protrude into an interior of the container to prevent slippage of the removable cover from the container opening and disposed at a position proximal to an interior edge of the lip of the container; and

15 forming at least one venting gap in the outer portion of the removable venting disc, spanning from an outer edge of the outer portion to an outer perimeter formed by the at least one intermediate portion.

12. The method of claim 11, further comprising tightening a cap onto the lip of the container.

20 13. The cover of claim 11, wherein the shape of the non-venting outer portion is circular.

14. The cover of claim 1, wherein the shape of the non-venting outer portion is rectangular.

15. The cover of claim 11, wherein the shape of the non-venting outer portion is oval.

25 16. The cover of claim 11, wherein the at least one gap abuts an outer edge of the at least one non-venting intermediate portion.

17. The cover of claim 11, wherein the at least one venting gap is square-shaped.

30 18. The cover of claim 11, wherein the at least one venting gap is curved in shape.

19. The cover of claim 11, wherein the at least one non-venting intermediate portion is V-shaped.

20. The cover of claim 11, wherein the at least one non-venting intermediate portion is dome-shaped.

5 21. The cover of claim 11, wherein the at least one gap spans into the non-venting inner portion.

22. A venting removable cover for a container opening, the container opening being sealable with a cap, comprising:

10 non-venting means for resting on a lip of the container opening, having a predetermined dimension and shape;

non-venting means for spanning an interior face of the container opening;

non-venting means for bridging the means for resting on the lip and the means for spanning, shaped to protrude into an interior of the container to prevent slippage of the removable cover from the container opening, and disposed at a position proximal to an interior edge of the lip of the container; and

15 means for venting gases through the means for resting, spanning from an outer edge of the means for resting to an outer perimeter formed by the means for bridging.

20 23. The cover of claim 22, wherein the shape of the means for resting is circular.

24. The cover of claim 22, wherein the shape of the means for resting is rectangular.

25. The cover of claim 22, wherein the shape of the means for resting is oval.

25 26. The cover of claim 22, wherein the means for venting gases abuts the means for bridging.

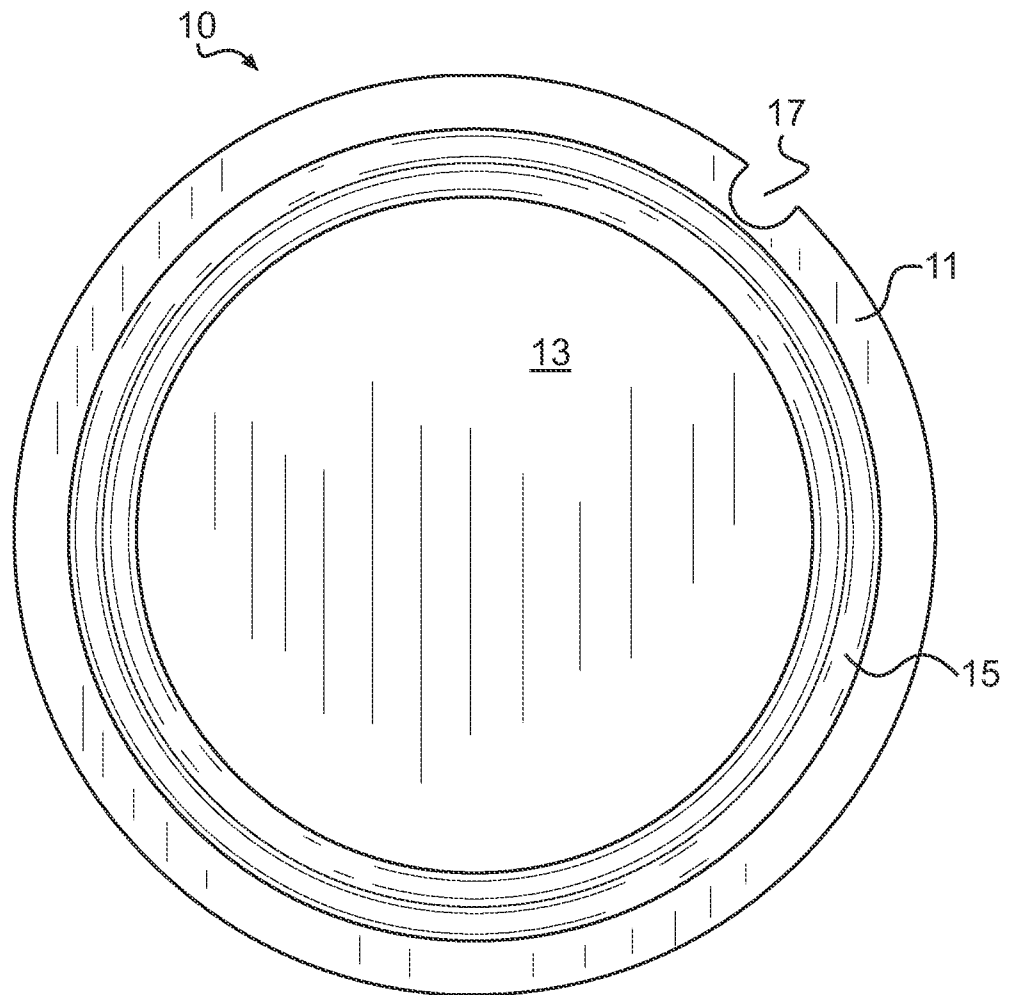
27. The cover of claim 22, wherein the means for venting gases is square-shaped.

28. The cover of claim 22, wherein the means for venting gases is curved in shape.

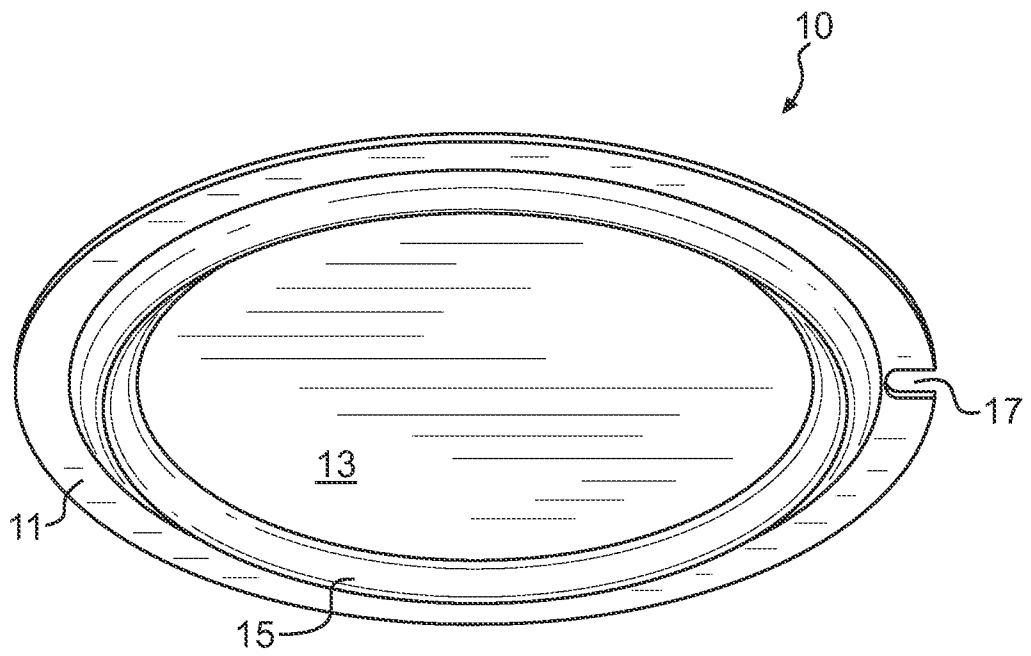
30 29. The cover of claim 22, wherein the means for bridging is V-shaped.

30. The cover of claim 22, wherein the means for bridging is dome-shaped.

31. The cover of claim 22, wherein the means for venting gases spans into the non-venting means for spanning the interior face.

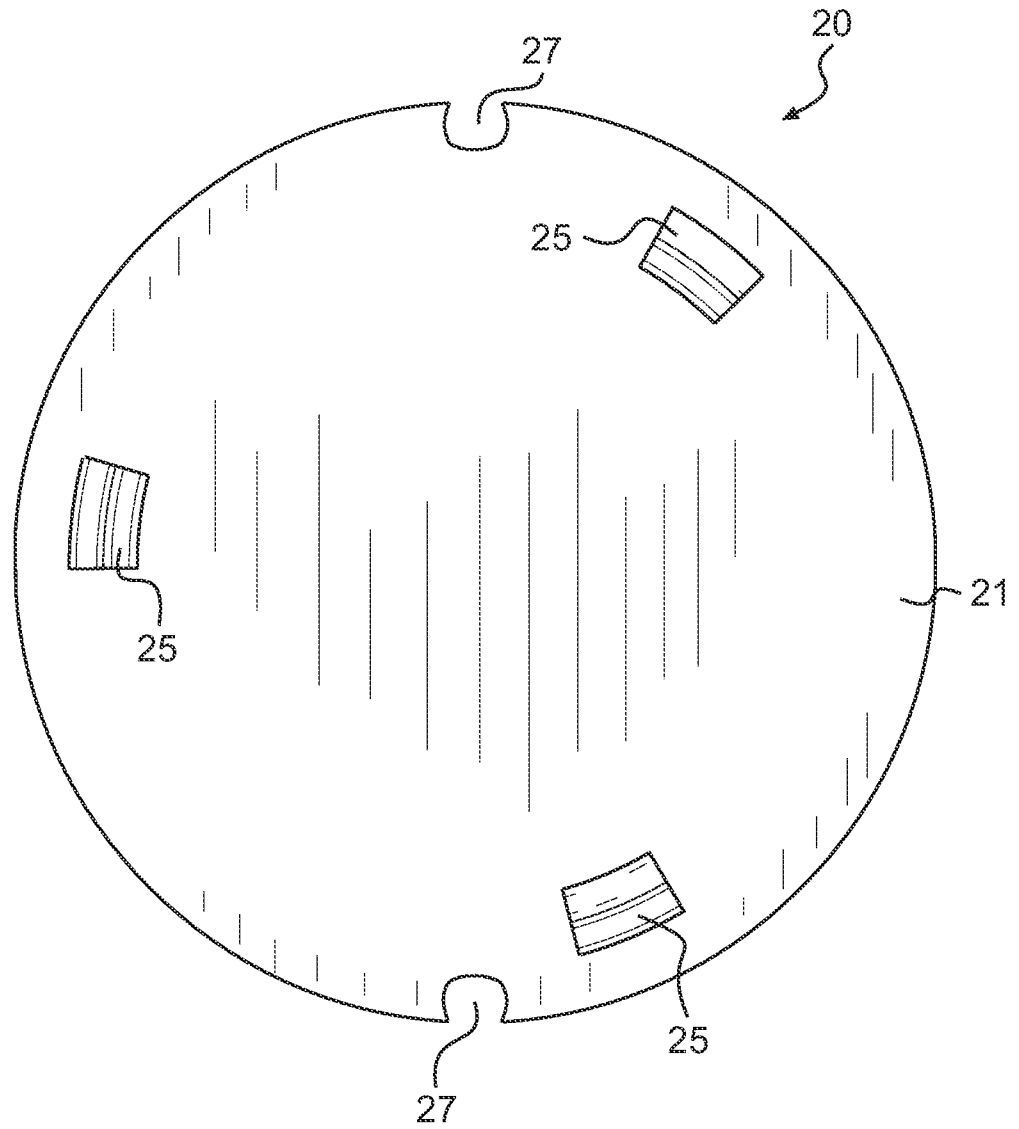


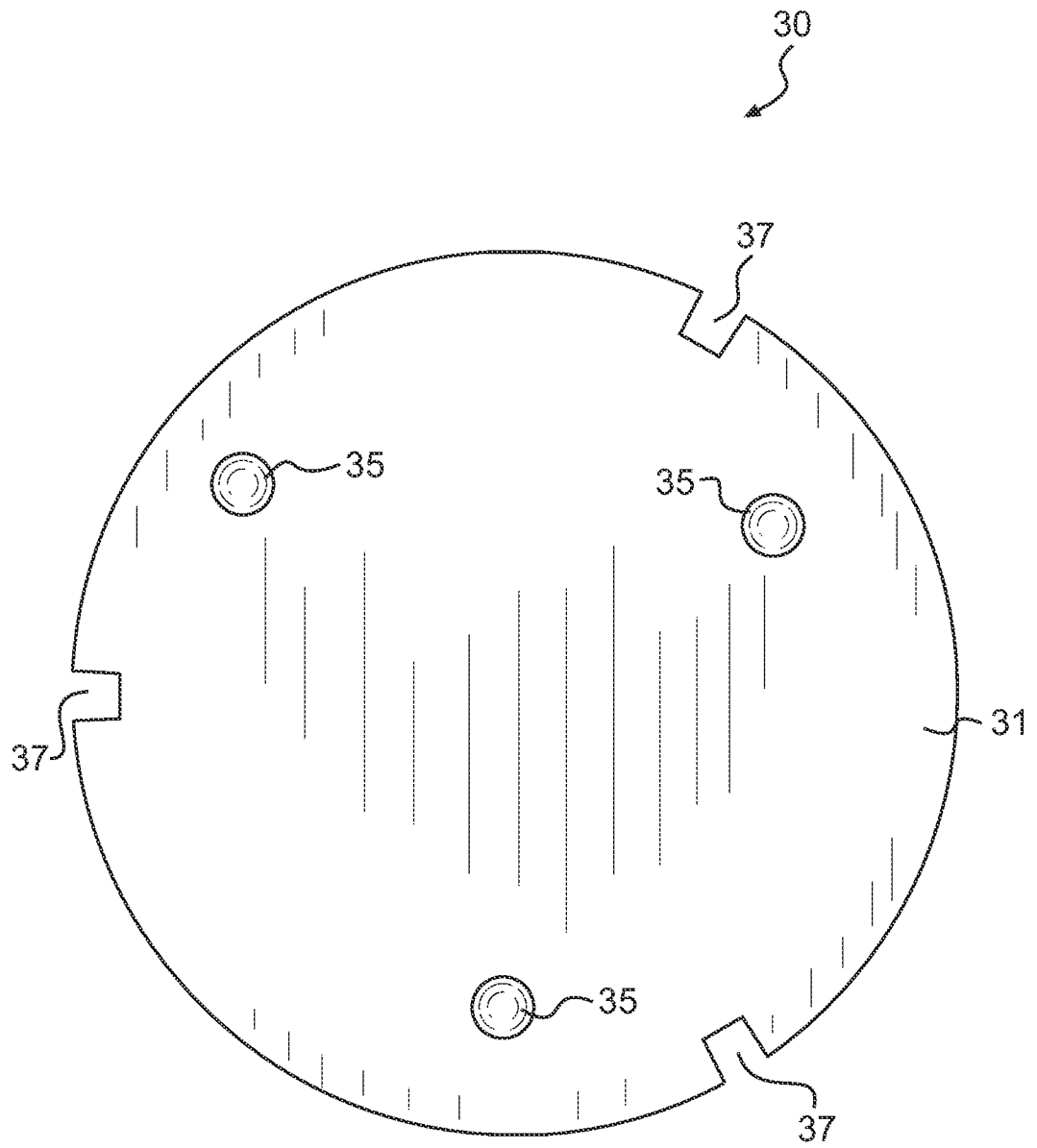
**FIG. 1**



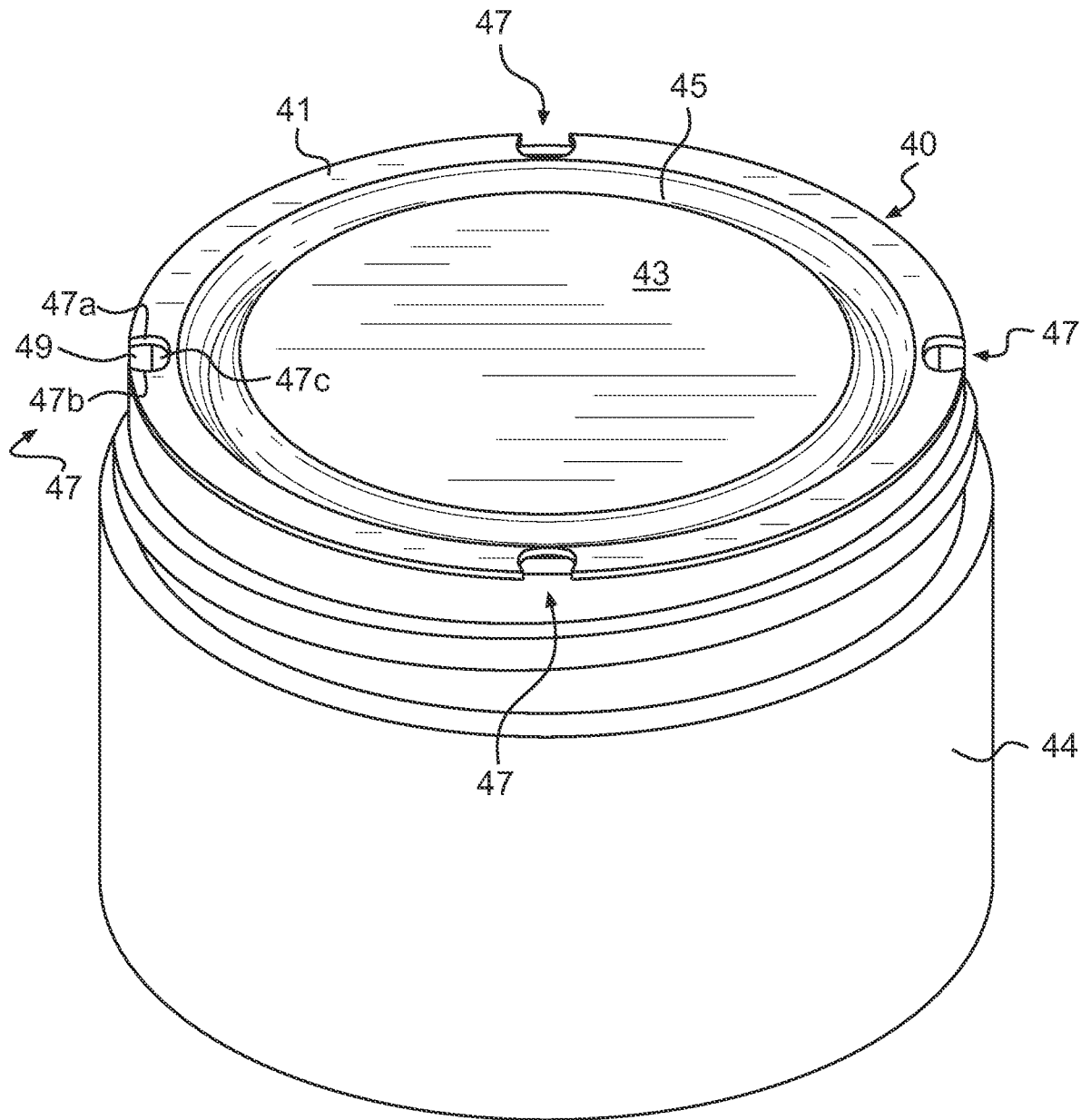
**FIG. 2**



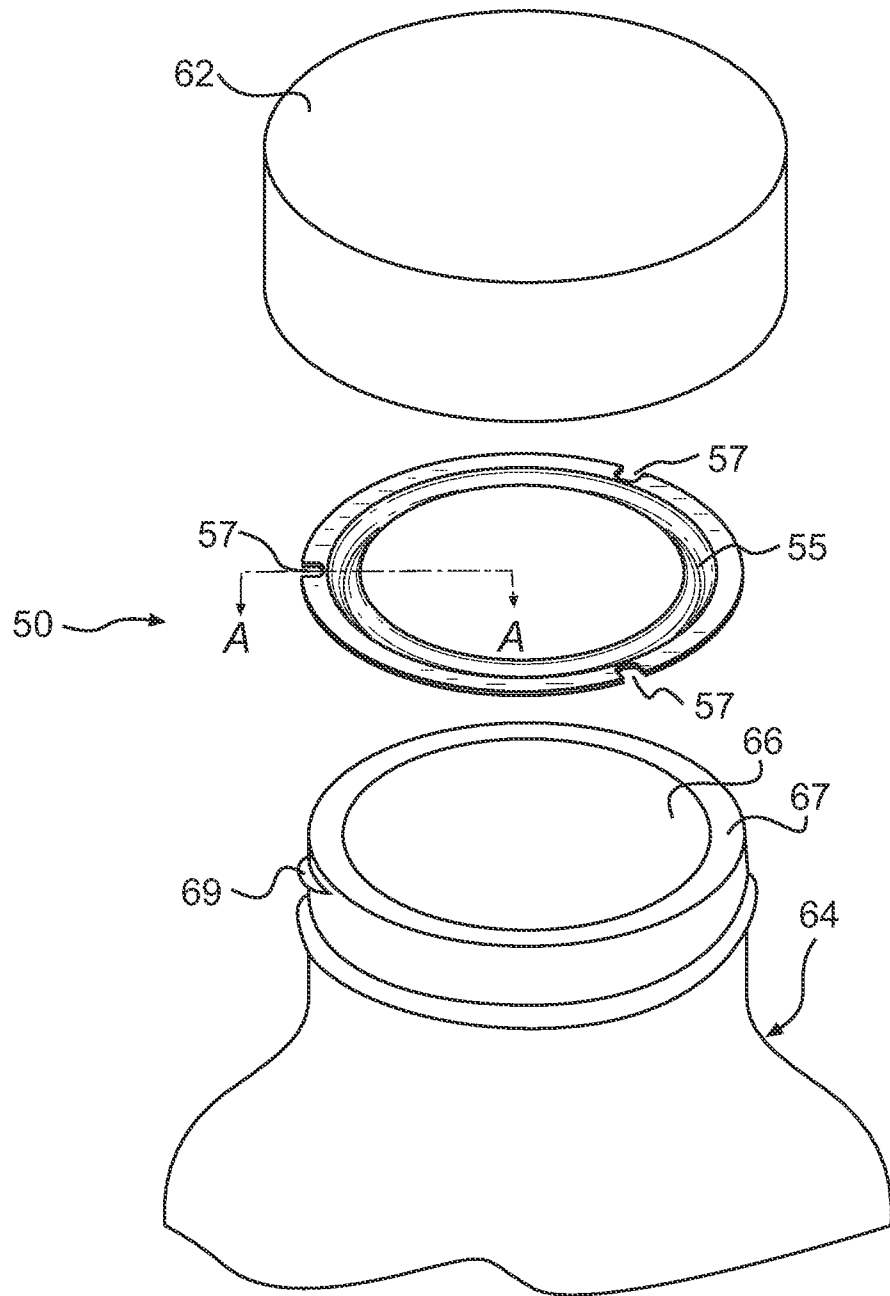
**FIG. 3**



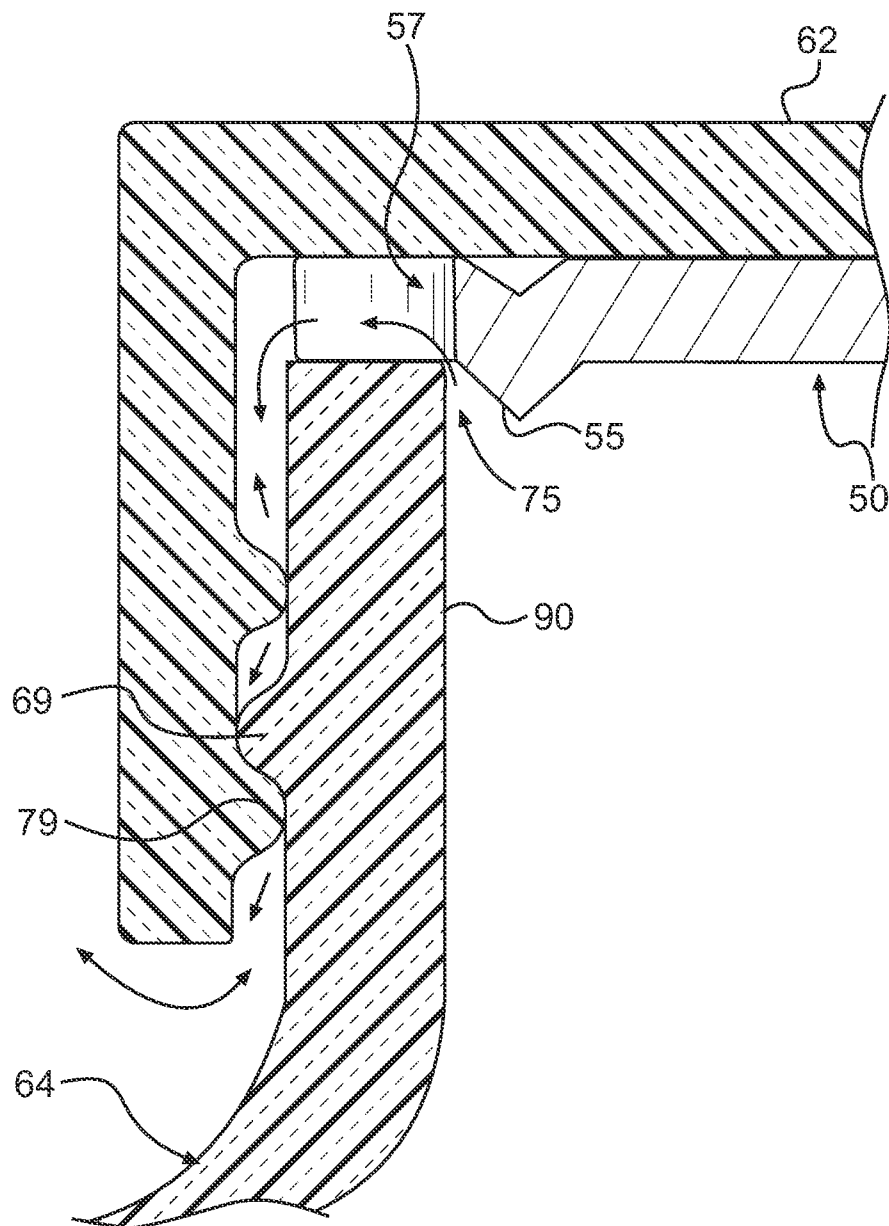
**FIG. 4**



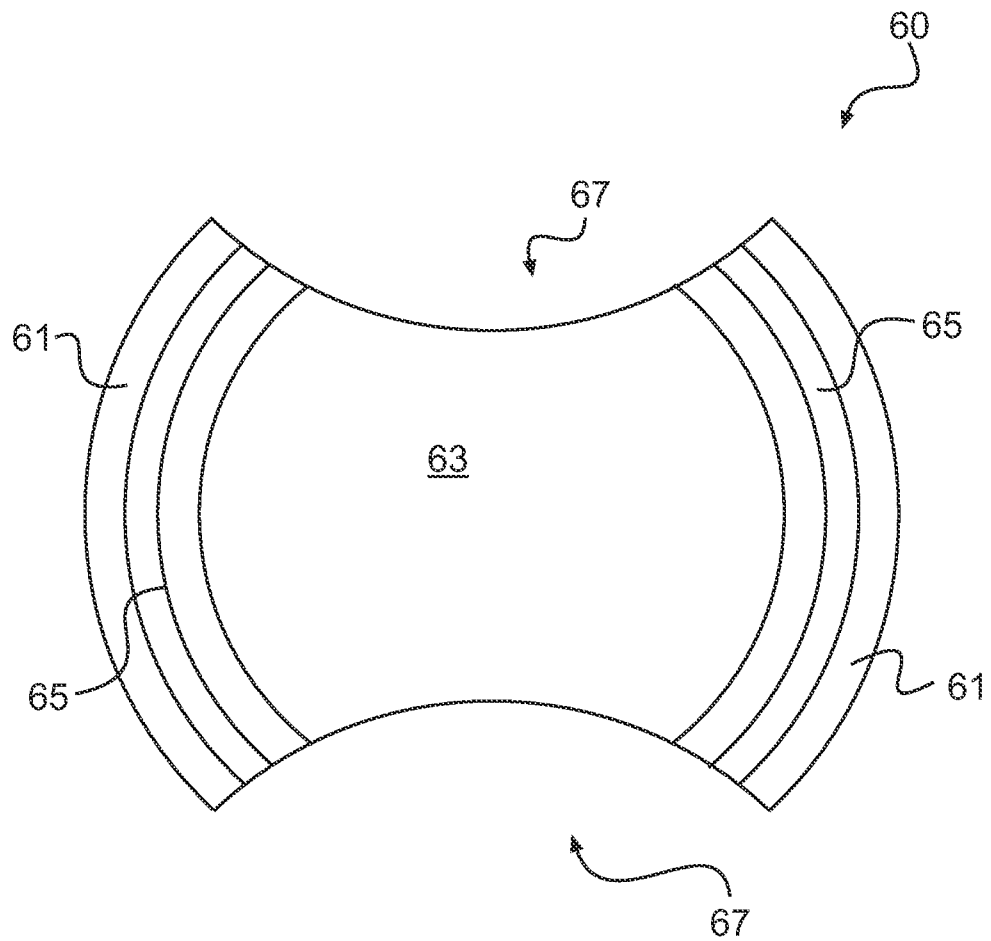
**FIG. 5**



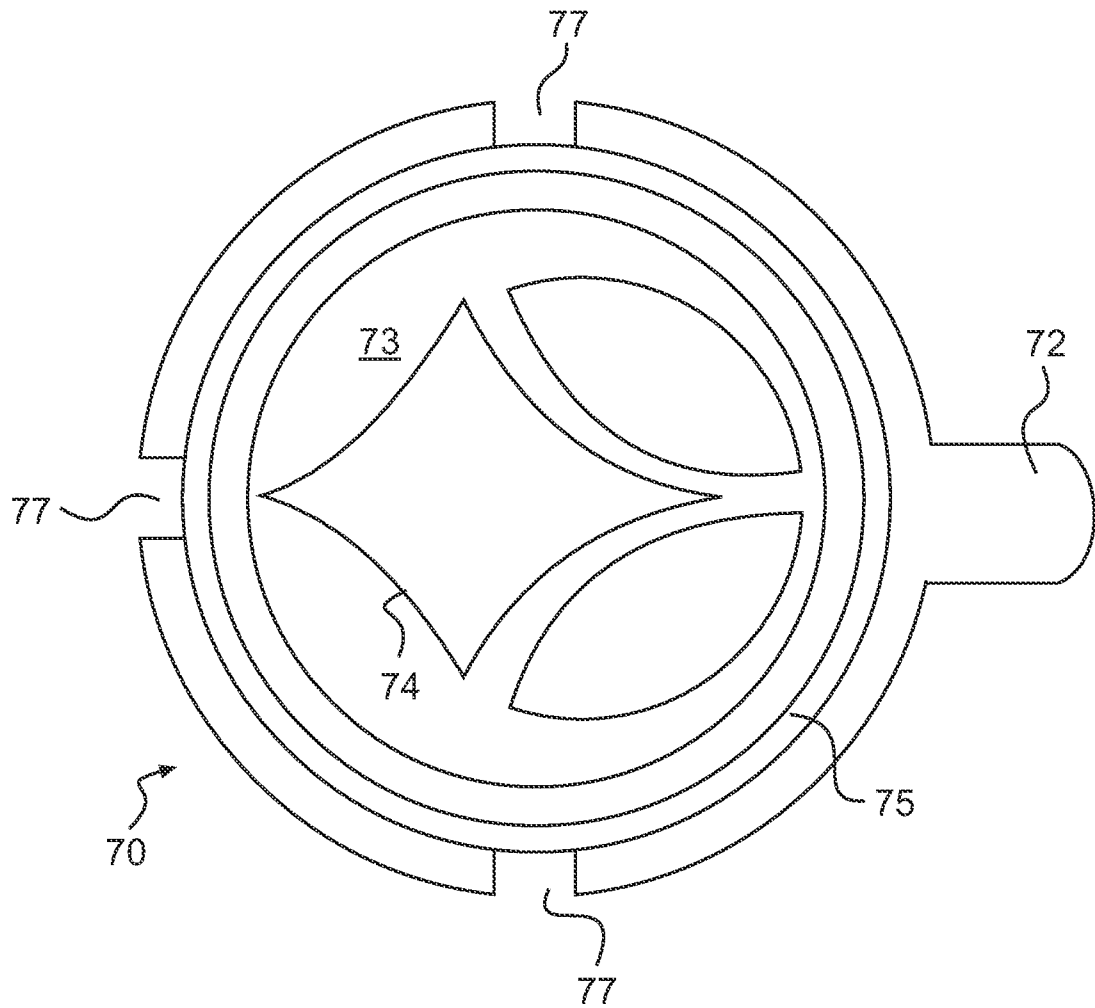
**FIG. 6**



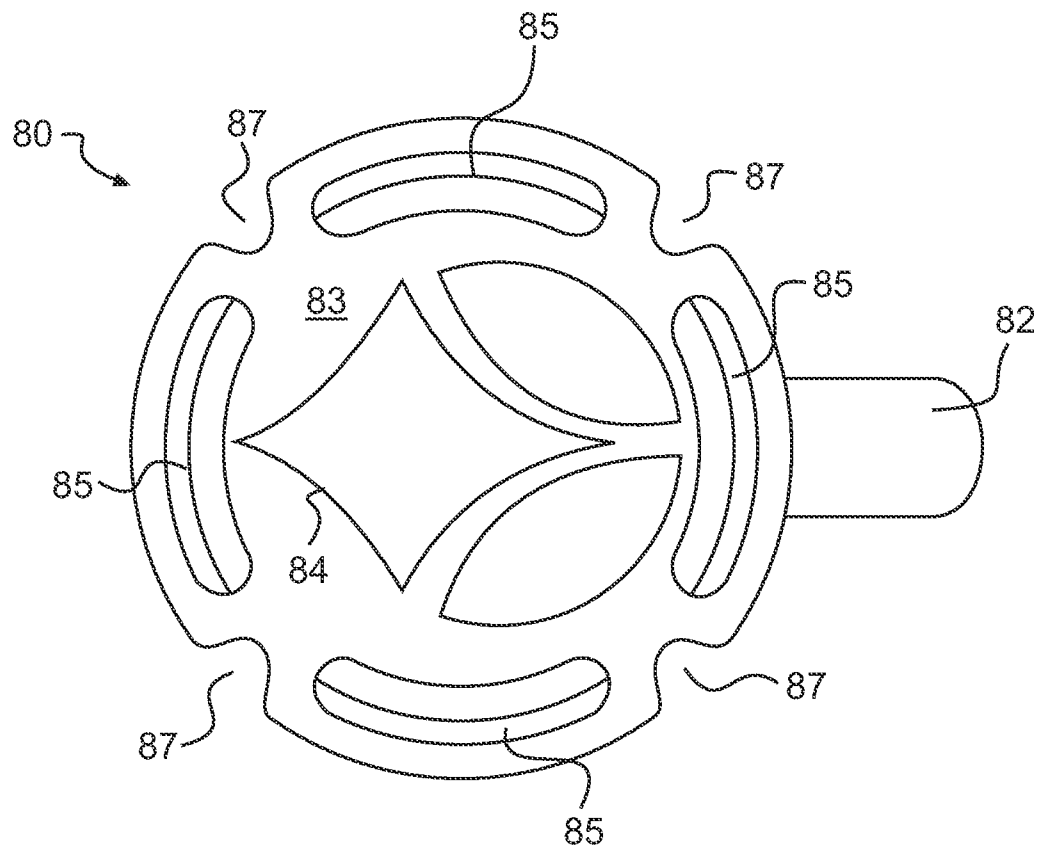
**FIG. 7**



**FIG. 8**

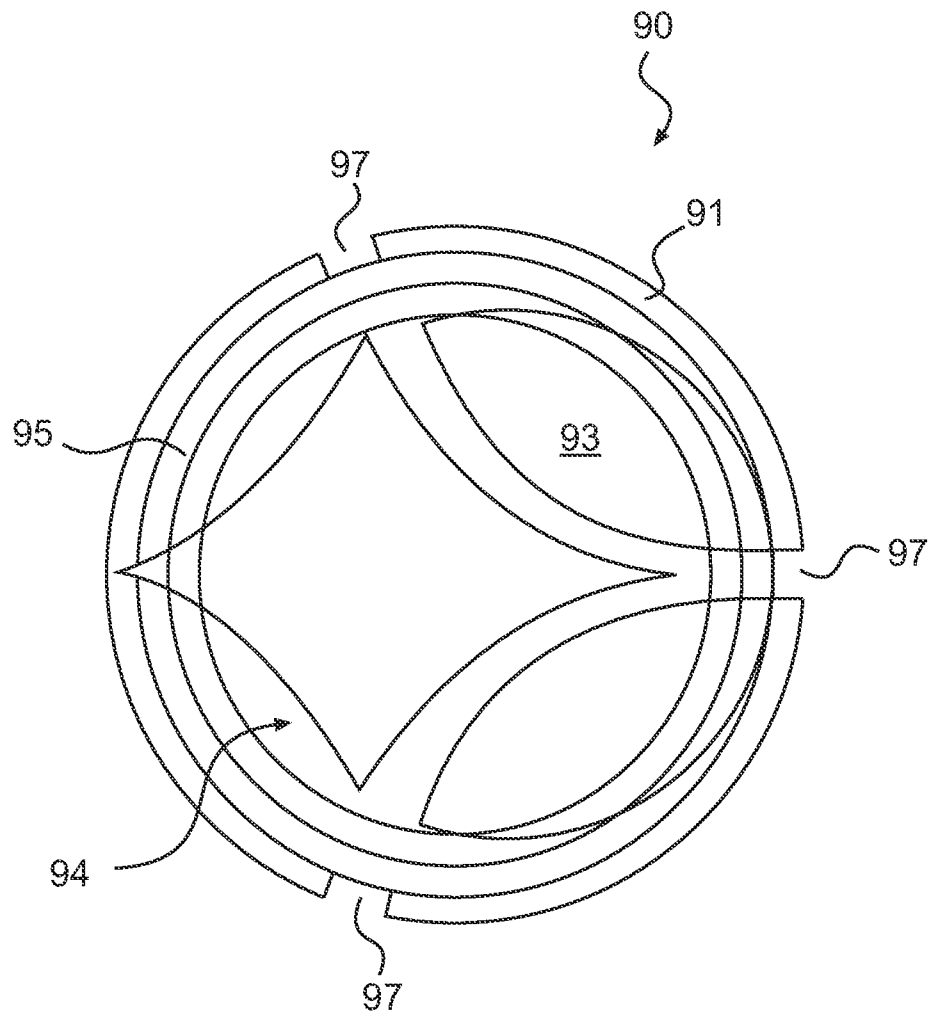


**FIG. 9**

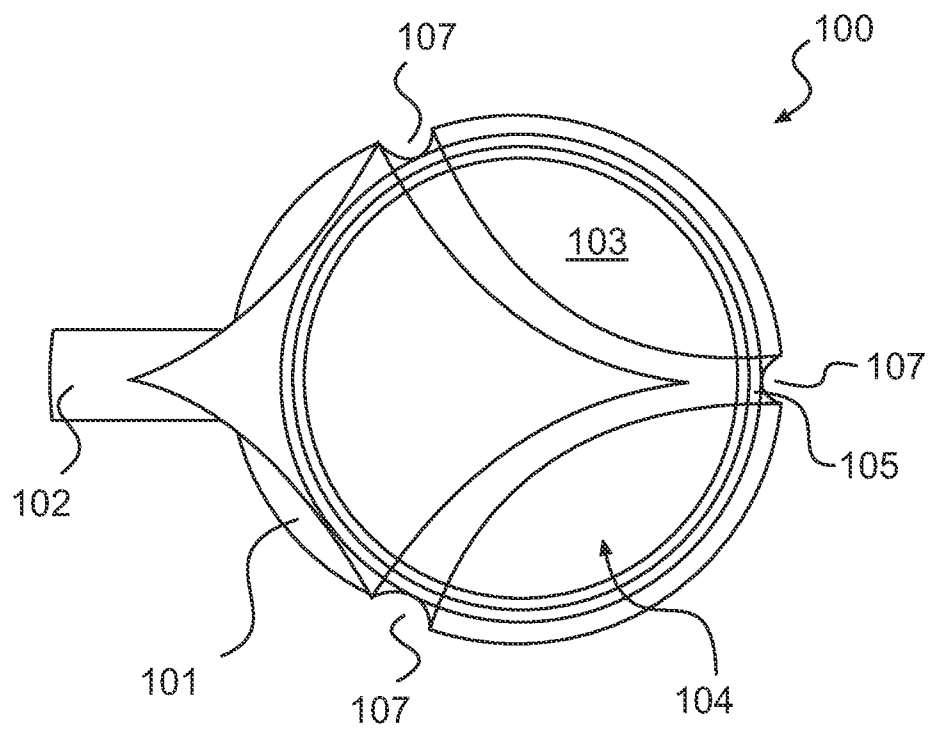


**FIG. 10**





**FIG. 11**



**FIG. 12**

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/020464

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B65D 51/16 (2011.01)

USPC - 215/307

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

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - B65D 51/16; B67D 3/00 (2011.01)

USPC - 215/232, 234, 261, 307; 220/366.1, 367.1; 222/481

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

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

MicroPatent, Google Patents, Google

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,730,306 A (COSTA et al) 24 March 1998 (24.03.1998) entire document	1-31
Y	US 2006/0108366 A1 (LIU) 25 May 2006 (25.05.2006) entire document	1-31
Y	US 5,579,936 A (COSTA et al) 03 December 1996 (03.12.1996) entire document	3-4, 14-15, 24-25
Y	US 5,988,414 A (SCHWARZ et al) 23 November 1999 (23.11.1999) entire document	9, 20, 30
A	US 6,202,871 B1 (KELLY) 20 March 2001 (20.03.2001) entire document	1-31
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Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

23 February 2011

Date of mailing of the international search report

11 MAR 2011

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