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(54) **CLOSURE**

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EP 3 784 585 B9

Description

[0001] The present invention relates generally to a tethered closure cap and particularly, although not exclusively to a tamper-evident tethered closure.

[0002] Arranged on the lower edge of the cap wall of closure caps of this type is a retaining ring that engages beneath a bead on a container mouth when the closure cap is in position. On opening the container, the upper cap portion can be removed from the container mouth to enable dispensing, while the lower retaining ring remains firmly connected to the container mouth.

[0003] A known closure of this type is shown in KR100880006. Document CN1631740 shows another closure of this type, and discloses a closure according to the preamble of appended claim 1.

[0004] An aspect of the present invention provides a tamper-evident closure for a container neck including a retention bead, the closure comprising: a screw threaded cap comprising a top plate and a sidewall depending from the periphery thereof; and a retaining ring arranged beneath the sidewall; and a plurality of bridges connecting the retaining ring to the sidewall, wherein at least one of the bridges is frangible, and wherein only one of the bridges is non-frangible whereby to form a strong, non-frangible link between the ring and the sidewall, wherein the non-frangible link is adapted such that: when the cap is unscrewed and lifts up, the ring is pulled up locally and the presence of the non-frangible link causes part of the ring to be pulled up and over the retention bead in use, and when the screw threaded cap is disengaged from the neck it can be flipped over, characterised in that: the ring and the non-frangible link are adapted such that flipping of the cap causes localised regions of the ring either side to twist.

[0005] The non-frangible bridge may be longer, circumferentially, than the frangible bridge/s.

[0006] The width of the non-frangible bridge may be in the range 2mm to 10mm e.g. 6-7mm. Some aspects and embodiments relate to and/or are in combination with a short neck finish. For the purposes of this specification, a "short" neck finish can be defined as anything having a ratio, when calculated as the finish height (measured between the underneath of a transfer bead and the top of the finish referring to "D" dimension according to technical bottle neck drawing nomenclature in use within the beverage industry) divided by the diameter of the thread crest referring to "T" dimension according to technical bottle neck drawing nomenclature in use within the beverage industry, of 0.35 or below.

[0007] The closure comprises only one non-frangible bridge.

[0008] In some embodiments the bridge is formed by slitting. Alternatively or additionally, bridge may be formed by moulding.

[0009] In some embodiments the closure is configured to have a stable docking position relative to a container.

[0010] The non-frangible bridge causes local axial lifting of the ring when the cap is removed from a container neck in use. This comprises a mechanical overslip of the band over a bottle bead or the like. It may be the case that there is no relative movement between the cap and the ring in the region of the non-frangible bridge.

[0011] The cap is pivotable with respect to the ring by deformation of the ring.

[0012] The ring may be plastically and/or elastically deformable.

[0013] The cap may be pivotable with respect to the ring to provide a stable open position.

[0014] The ring may provide a tongue which is rotated when the ring is twisted and can engage with a container neck to hold the closure in a stable open position.

[0015] Also provided is a closure as described herein in combination with a container. The container may have a short neck finish.

[0016] Different aspects and embodiments of the invention may be used separately or together.

[0017] Further particular and preferred aspects of the present invention are set out in the accompanying independent and dependent claims.

[0018] The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings.

[0019] The example embodiments are described in sufficient detail to enable those of ordinary skill in the art to embody and implement the systems and processes herein described. It is important to understand that embodiments can be provided in many alternative forms and should not be construed as limited to the examples set forth herein.

[0020] Accordingly, while embodiments can be modified in various ways and take on various alternative forms, specific embodiments thereof are shown in the drawings and described in detail below as examples. There is no intent to limit to the particular forms disclosed. On the contrary, all modifications, equivalents, and alternatives falling within the scope of the appended claims should be included. Elements of the example embodiments are consistently denoted by the same reference numerals throughout the drawings and detailed description where appropriate.

[0021] Unless otherwise defined, all terms (including technical and scientific terms) used herein are to be interpreted as is customary in the art. It will be further understood that terms in common usage should also be interpreted as is customary in the relevant art and not in an idealised or overly formal sense unless expressly so defined herein.

[0022] In the following description, all orientational terms, such as upper, lower, radially and axially, are used in relation to the drawings and should not be interpreted as limiting on the invention.

[0023] Figure 1 shows a tamper-evident closure 10, not forming part of the invention, but shown for illustrative purposes. The closure 10 includes a shell 2 and a tamper-evident band 3. The shell 2 has a circular top plate 8 and

a side wall 9 depending from the periphery of the plate.

[0024] The band 3 is connected to the free end of the side wall 9 by a plurality of frangible bridges 4 and, in this embodiment, by a single thicker, non-frangible bridge 1.

[0025] The thick bridge 1 is designed so that the closure shell 2 remains connected on the tamper band 3, thereby allowing that after opening and reclosing in a normal use the closure remains attached on the container.

[0026] The plurality of frangible bridges 4 will get broken, indicating the evidence that the closure has been opened.

[0027] The "thick bridge" design is applicable to many different types of closures and products, for example for the beverage market e.g. flip-top sports caps and flat top caps.

[0028] In the embodiment shown here the number of thick bridges is one. In other embodiments, also not forming part of the invention, two or more neighbouring thick bridges may be used.

[0029] The width 5 of the thick bridge in this embodiment is a minimum of 1.5mm.

[0030] The thickness 6 of the bridge in this embodiment is a minimum of 0.5mm.

[0031] The closure 10 is shown in the closed, unopened position in Figure 2. In Figure 3 the closure 10 is shown in an opened position, in which the thicker bridge is shown to act like a hinge. In Figure 4 the closure 10 is shown attached to a screw threaded container neck 15. It will be seen that the band 3 remains on the neck whilst the cap shell 2 is unscrewed and then pivoted.

[0032] Figure 5 shows a closure 110 formed according to the present invention.

[0033] The closure 110 has a shell 102 connected to a band 103 initially by a plurality of frangible bridges 104 and also by a single thick bridge 101. The shell 102 has a plurality of axial ribs 106.

[0034] As can be seen in Figure 6, when the cap shell 102 is unscrewed from the container neck 115 the presence of the strong, non-frangible bridge 101 causes part of the band 103 to be pulled up and over the neck retention bead 117. Once the screw threaded cap 102 is disengaged from the screw threaded neck 115, the cap can be flipped over as shown in Figures 7 to 9. As the cap flips, the bridge 101 causes the localised regions 120, 125 of the band 103 on either side of the non-frangible bridge 101 to twist as the shell is pivoted away. Thus the bridge itself is not a hinge, but it effectively creates a zone of pivoting/hinging by forcing the localised twisting of the band.

[0035] In Figures 10A to 10D a closure 210 formed according to a further embodiment is shown and provides a similar effect to the closure 110. The reference numerals used in Figures 10A to 10D are placed between brackets, both in the Figures and in the text and therewith indicate features that are different from the features indicated by the reference numerals used in Figures 1 to 4, which numerals are not placed between brackets.

[0036] During opening, the strong "thick bridge" (1) pulls partially the tamper band ring (2) over the neck finish bead (3).

[0037] Once the closure shell (4) is disengaged from the neck finish thread (5), the consumer can flip back the closure into the open position (6).

[0038] When the consumer is pivoting the closure (4) to the open position (6), an appropriate definition of width and thickness of the thick bridge (1) will transmit a force into the tamper band ring (2), resulting in a rotation by torsion and thus creating local deformation (7) on the tamper band ring. This allows a stable docking position (8) against the neck finish secure bead (3).

[0039] The closure relies on deformation of tamper-evident band to pivot. This arrangement also provides a stable opening position by plastic deformation.

[0040] Figure 11 shows a closure 310 formed according to a further embodiment.

[0041] The closure 310 comprises a top shell 302 and a tamper-evident band 303. The shell and band are connected by a plurality of frangible bridges 304. In one region a non-frangible bridge 301 is provided and connects the shell and band. In this region the band includes a depending tongue 335.

[0042] In use when the cap is unscrewed the cap lifts up and the bridge 301 pulls the band up locally (as described above). When the cap is then flipped over the band is locally twisted (as described above); and the tongue 335 rotates and sits on the container neck to provide a stable open position.

[0043] Figure 12 shows a closure 410, not forming part of the invention, but shown for illustrative purposes.

[0044] The closure 410 comprises a top shell 402 and a tamper-evident band 403. The shell and band are connected by a plurality of frangible bridges 404. In one region a pair of neighbouring non-frangible bridges 401a, 401b are provided and connect the shell and band. Between the bridges 401a, 401b an opening 430 is provided in the band (it does not extend all the way to the bottom of the band) and a tongue 435 depends from the free end of the shell wall 409 into the opening. On the interior of the band a plurality of projections 440 are formed for engaging under a container neck retention bead.

[0045] In use when the cap is unscrewed the cap lifts up and the bridges 401a, 401b pull the band up locally (as described above). When the cap is then flipped over the band is locally twisted (as described above); and the tongue 435 is inverted and can engage the container neck to provide a stable open position. This could be considered as a "double root" version with a tongue.

[0046] Figures 13 to 15 show a closure 510, not forming part of the invention, but shown for illustrative purposes.

[0047] The object of the closure 510 is to have a tethered cap to the bottle after opening it. The tamper-evident band, which stays on the neck of the bottle, is made by non-continuous cutting (slitting) plastic, which leaves several breakable elements (bridges) between the band and the cap. During the cutting operation of the band,

instead of creating only breakable elements (bridges), wider sectors are spared to create one or more links that can serves as a hinge area upon opening of the cap as shown in Figure 15.

[0048] Although illustrative embodiments of the invention have been disclosed in detail herein, with reference to the accompanying drawings, it is understood that the invention is not limited to the precise embodiments shown and that various changes and modifications can be effected therein by one skilled in the art without departing from the scope of the invention as defined by the appended claims and their equivalents.

Claims

1. A tamper-evident closure (110, 210, 30)

for a container neck including a retention bead, the closure comprising:
a screw threaded cap (102, 302)
comprising a top plate and a sidewall depending from the periphery thereof; and
a retaining ring (103, 303) arranged beneath the sidewall; and
a plurality of bridges connecting the retaining ring to the sidewall, wherein at least one of the bridges (104, 304) is frangible, and wherein only one of the bridges (101,301) is non-frangible whereby to form a strong, non-frangible link between the ring and the sidewall,
wherein the non-frangible link is adapted such that:

when the cap is unscrewed and lifts up, the ring is pulled up locally and the presence of the non-frangible link (101, 301) causes part of the ring (103, 303) to be pulled up and over the retention bead in use, and
when the screw threaded cap is disengaged from the neck it can be flipped over,

characterised in that
the ring (103, 303) and the non-frangible link (101, 301) are adapted such that flipping of the cap (102, 302)
causes localised regions (120, 125) of the ring on either side of the non-frangible link (101, 301) to twist.

2. A closure as claimed in claim I, in which the non-frangible bridge (101,301) is longer, circumferentially, than the frangible bridge/s (104, 304).

3. A closure as claimed in any preceding claim, in which the closure has a stable open position.

4. A closure as claimed in any preceding claim, in which the closure has a stable docking position.

5. A closure as claimed in any preceding claim, in which the sidewall is provided with a plurality of ribs (106).

6. A closure as claimed in any preceding claim, in which the ring (103, 303) is plastically and/or elastically deformable.

7. A closure as claimed in any preceding claim, in which the ring (103,303) is plastically deformed to provide a stable open position.

8. A closure (310) as claimed in any of claims 1 to 7, in which the ring (303) provides a tongue (335) which is rotated when the ring is twisted and can engage with a container neck to hold the closure in a stable open position.

9. A closure as claimed in any preceding claim, in which there is no relative axial movement between the cap (102, 302) and the ring (103, 303) in the region of the non-frangible bridge (101, 301).

10. A closure as claimed in any preceding claim in combination with a container.

11. A combination as claimed in claim 10, in which the container has a short neck finish.

Patentansprüche

1. Manipulationssicherer Verschluss (110, 210, 30) für einen Behälterhals mit einem Rückhaltewulst, wobei der Verschluss umfasst:

eine Schraubkappe (102, 302), die eine obere Platte und eine von deren Umfang herabhängende Seitenwand umfasst; und
einen unterhalb der Seitenwand angeordneten Haltering (103, 303); und
eine Vielzahl von Stegen, die den Haltering mit der Seitenwand verbinden, wobei mindestens einer der Stege (104, 304) zerbrechbar ist und wobei nur einer der Stege (101, 301) nicht zerbrechbar ist, um so ein starkes, nicht zerbrechbares Verbindungsglied zwischen dem Ring und der Seitenwand zu bilden,
wobei das nicht zerbrechbare Verbindungsglied so angepasst ist, dass:

wenn die Kappe abgeschraubt und hochgehoben wird, der Ring örtlich hochgezogen wird und das Vorhandensein des nicht zerbrechbaren Verbindungsglieds (101, 301) bewirkt, dass beim Gebrauch ein Teil des Rings (103, 303) nach oben und über

den Rückhaltewulst gezogen wird, und wenn die Schraubkappe vom Hals gelöst ist, diese umgedreht werden kann,

dadurch gekennzeichnet, dass
der Ring (103, 303) und das nicht zerbrechbare Verbindungsglied (101, 301) so angepasst sind, dass das Umdrehen der Kappe (102, 302) bewirkt, dass lokale Bereiche (120, 125) des Rings auf beiden Seiten des nicht zerbrechbaren Verbindungsglieds (101, 301) verdreht werden.

2. Verschluss gemäß Anspruch 1, bei dem der nicht zerbrechbare Steg (101, 301) in Umfangsrichtung länger als der/die zerbrechbare(n) Steg(e) (104, 304) ist.

3. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem der Verschluss eine stabile geöffnete Position aufweist.

4. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem der Verschluss eine stabile Andockposition aufweist.

5. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem die Seitenwand mit einer Vielzahl von Rippen (106) versehen ist.

6. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem der Ring (103, 303) plastisch und/oder elastisch verformbar ist.

7. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem der Ring (103, 303) plastisch verformt wird, um eine stabile geöffnete Position zu schaffen.

8. Verschluss (310) gemäß einem der Ansprüche I bis 7, bei dem der Ring (303) eine Zunge (335) aufweist, die beim Verdrehen des Rings gedreht wird und mit einem Behälterhals in Eingriff kommen kann, um den Verschluss in einer stabilen geöffneten Position zu halten.

9. Verschluss gemäß einem der vorhergehenden Ansprüche, bei dem im Bereich des nicht zerbrechbaren Stegs (101, 301) keine relative axiale Bewegung zwischen der Kappe (102, 302) und dem Ring (103, 303) stattfindet.

10. Verschluss gemäß einem der vorhergehenden Ansprüche in Kombination mit einem Behälter.

11. Kombination gemäß Anspruch 10, bei der der Behälter eine Kurzhalsausführung aufweist.

Revendications

1. Fermeture inviolable (110, 210, 30) pour un col de contenant incluant une baguette de retenue, la fermeture comprenant :

un bouchon fileté à vis (102, 302) comprenant une plaque supérieure et une paroi latérale pendant depuis la périphérie de celle-ci ; et
une bague de retenue (103, 303) agencée en dessous de la paroi latérale ; et
une pluralité de raccords reliant la bague de retenue à la paroi latérale, dans laquelle au moins un des raccords (104, 304) est cassable, et dans laquelle seulement un des raccords (101, 301) est non cassable, pour ainsi former une liaison non cassable forte entre la bague et la paroi latérale, dans laquelle la liaison non cassable est adaptée de telle sorte que :

lorsque le bouchon est dévissé et se lève, la bague est tirée vers le haut localement et la présence de la liaison non cassable (101, 301) fait en sorte qu'une partie de la bague (103, 303) soit tirée vers le haut et par-dessus la baguette de retenue durant l'utilisation, et
lorsque le bouchon fileté à vis est séparé du col il peut se retourner, **caractérisé en ce que**
la bague (103, 303) et la liaison non cassable (101, 301) sont adaptées de telle sorte que le retournement du bouchon (102, 302) entraîne la torsion de régions localisées (120, 125) de la bague de chaque côté de la liaison non cassable (101, 301).

2. Fermeture selon la revendication 1, dans laquelle le raccord non cassable (101, 301) est plus long, circonférentiellement, que le(s) raccord(s) cassable(s) (104, 304).

3. Fermeture selon une quelconque revendication précédente, dans laquelle la fermeture a une position ouverte stable.

4. Fermeture selon une quelconque revendication précédente, dans laquelle la fermeture a une position de fixation stable.

5. Fermeture selon une quelconque revendication précédente, dans laquelle la paroi latérale est pourvue d'une pluralité de nervures (106).

6. Fermeture selon une quelconque revendication précédente, dans laquelle la bague (103, 303) est plastiquement et/ou élastiquement déformable.

7. Fermeture selon une quelconque revendication précédente, dans laquelle la bague (103, 303) est plastiquement déformée pour fournir une position ouverte stable.

8. Fermeture (310) selon l'une quelconque des revendications 1 à 7, dans laquelle la bague (303) fournit une languette (335) qui est tournée lors de la torsion de la bague et peut entrer en prise avec un col de contenant pour maintenir la fermeture dans une position ouverte stable.

9. Fermeture selon une quelconque revendication précédente, dans laquelle il n'y a aucun mouvement axial relatif entre le bouchon (102, 302) et la bague (103, 303) dans la région du raccord non cassable (101, 301).

10. Fermeture selon une quelconque revendication précédente, en association avec un contenant.

11. Combinaison selon la revendication 10, dans laquelle le contenant a une finition à col court.

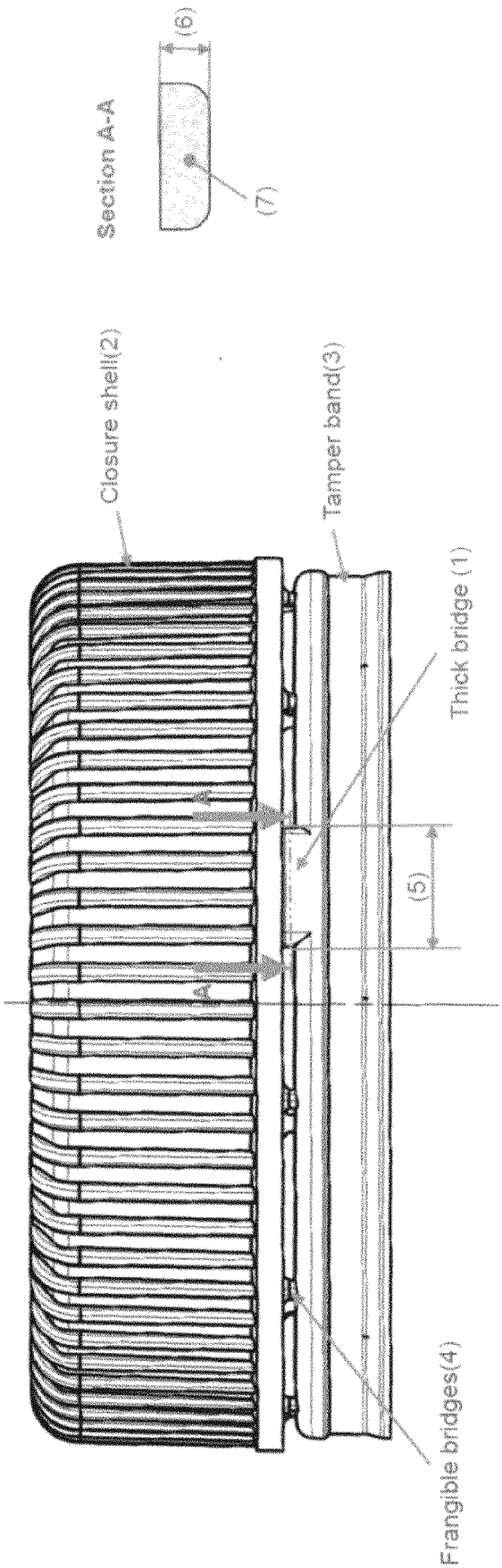
Section A-A
(6)
(7)
Closure shell(2)
Tamper band(3)
Thick bridge (1)
(5)
A
A
Frangible bridges(4)

Figure 1

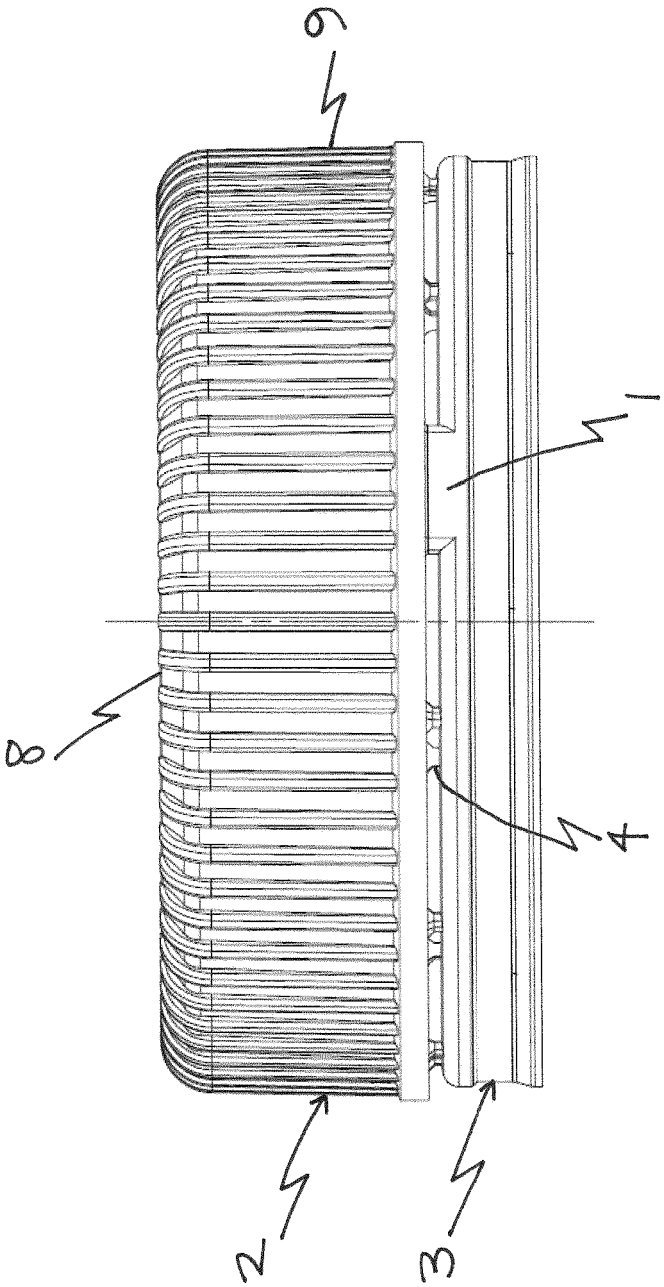

Figure 2

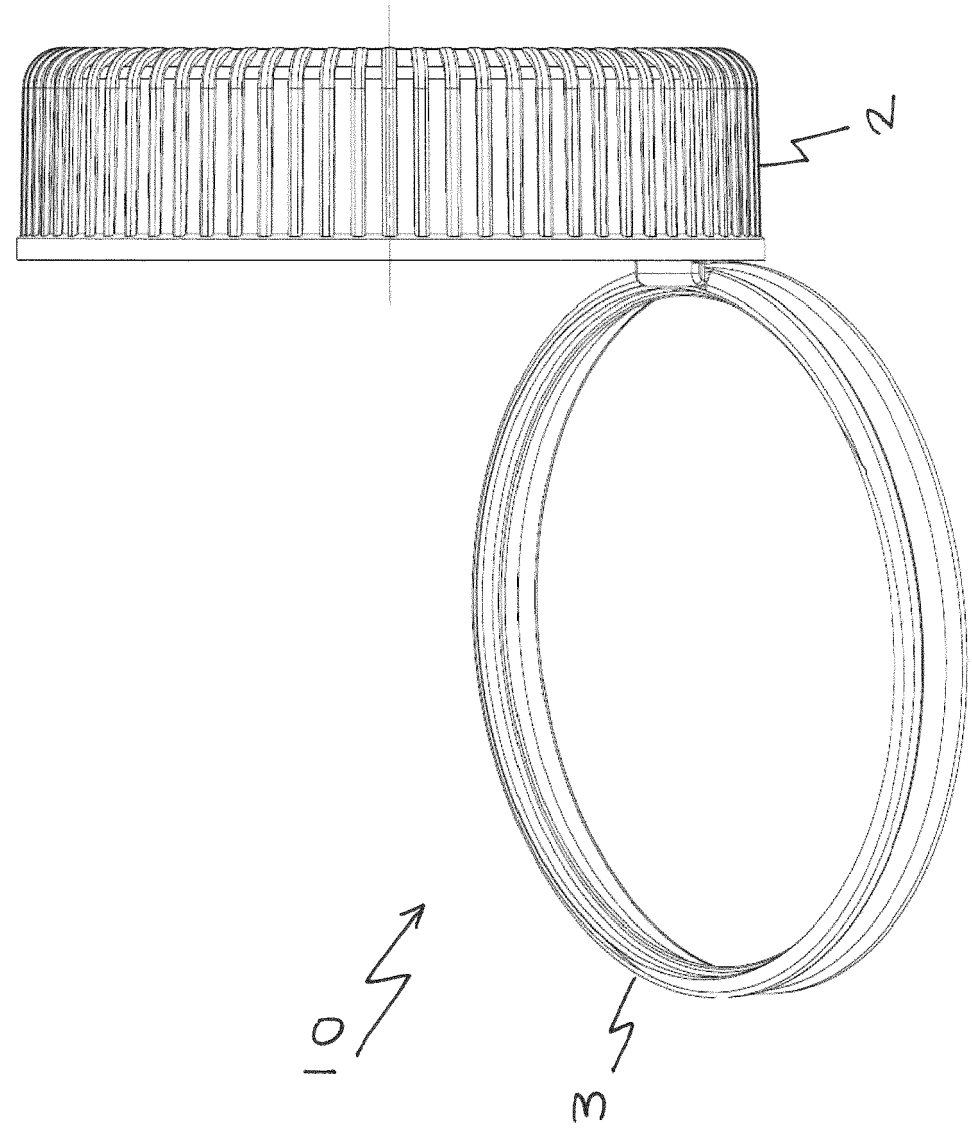

Figure 3

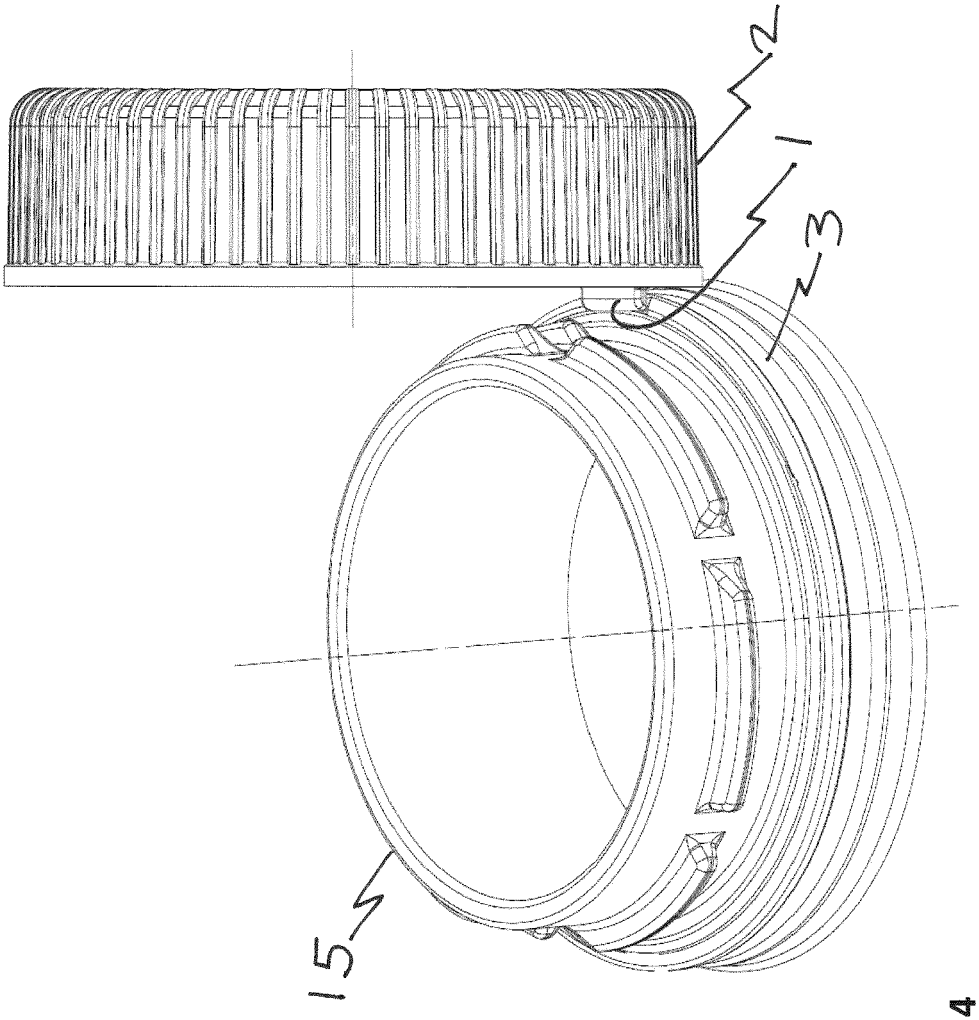

Figure 4

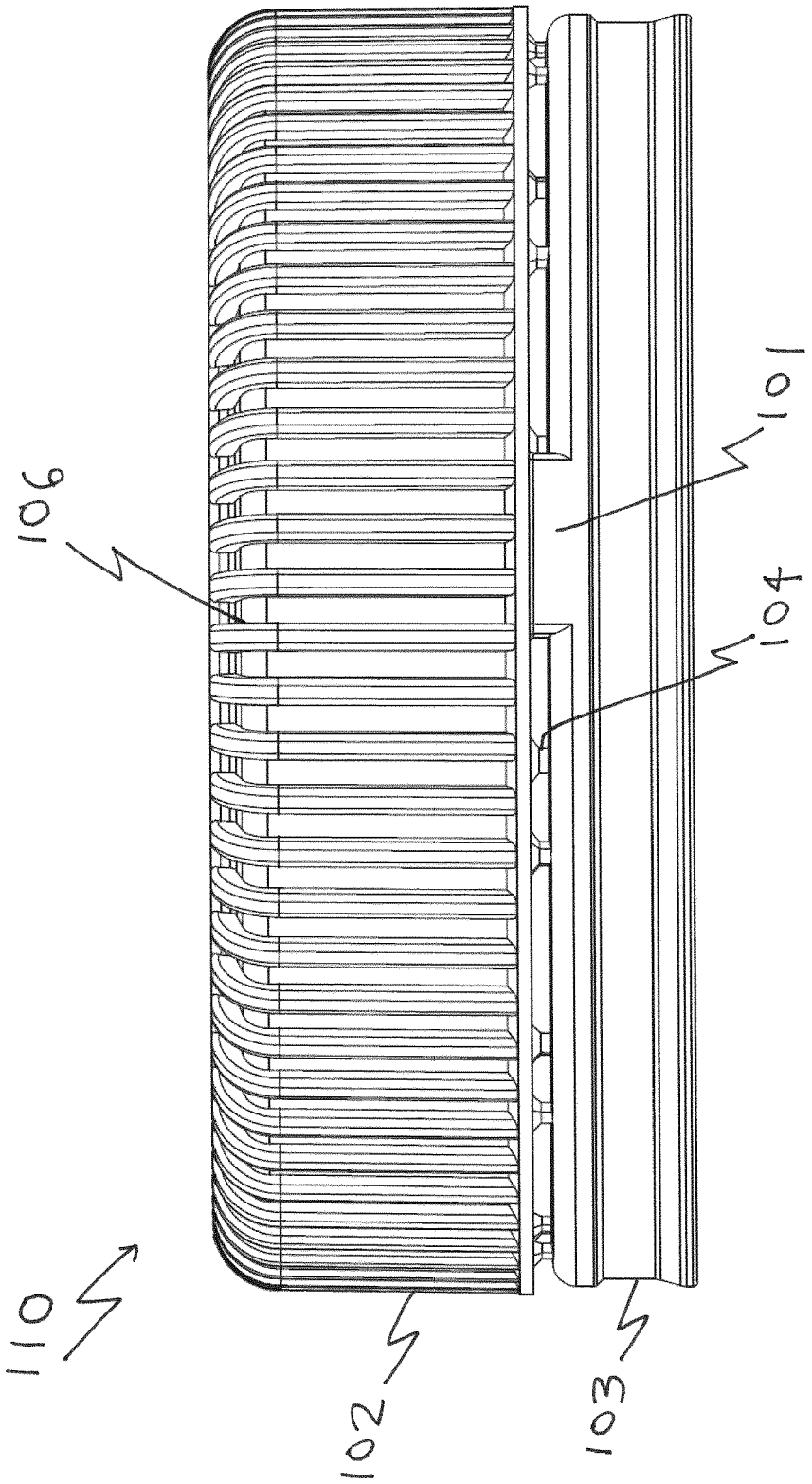

Figure 5

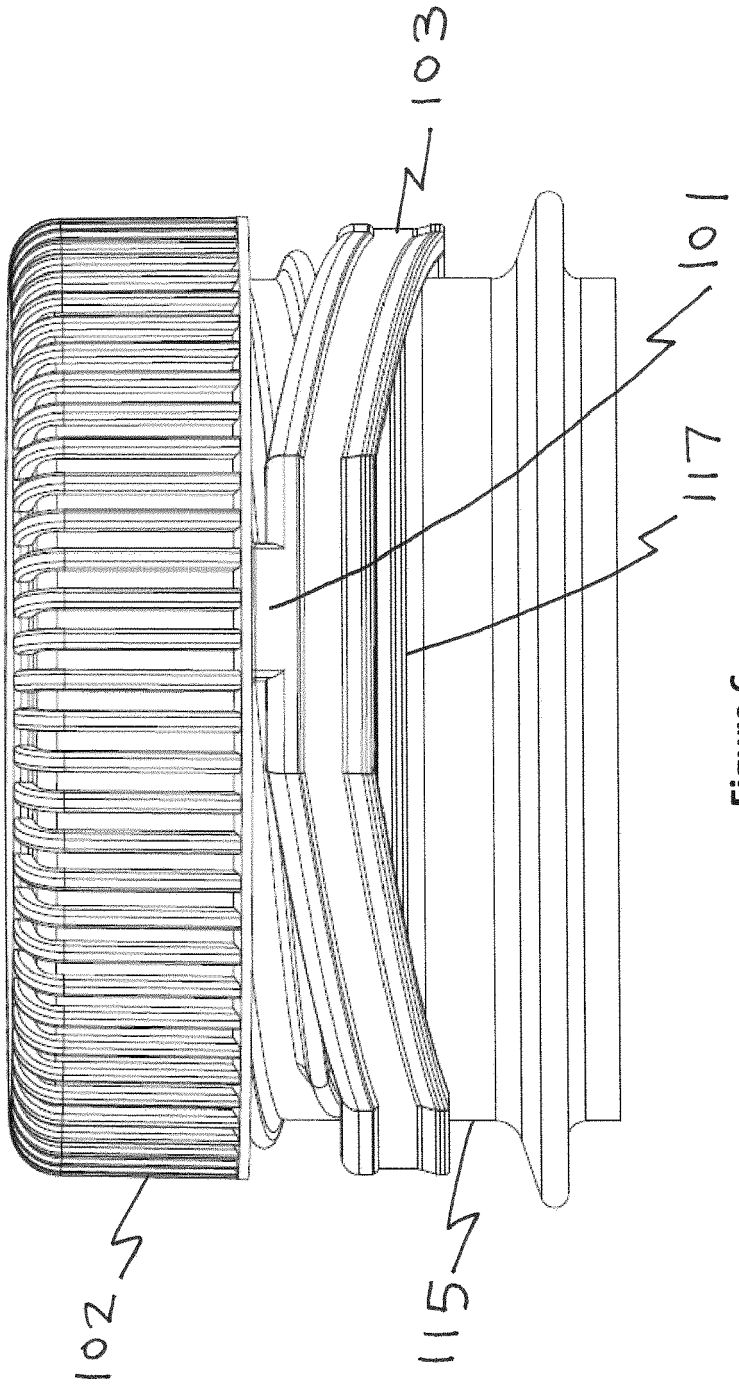

Figure 6

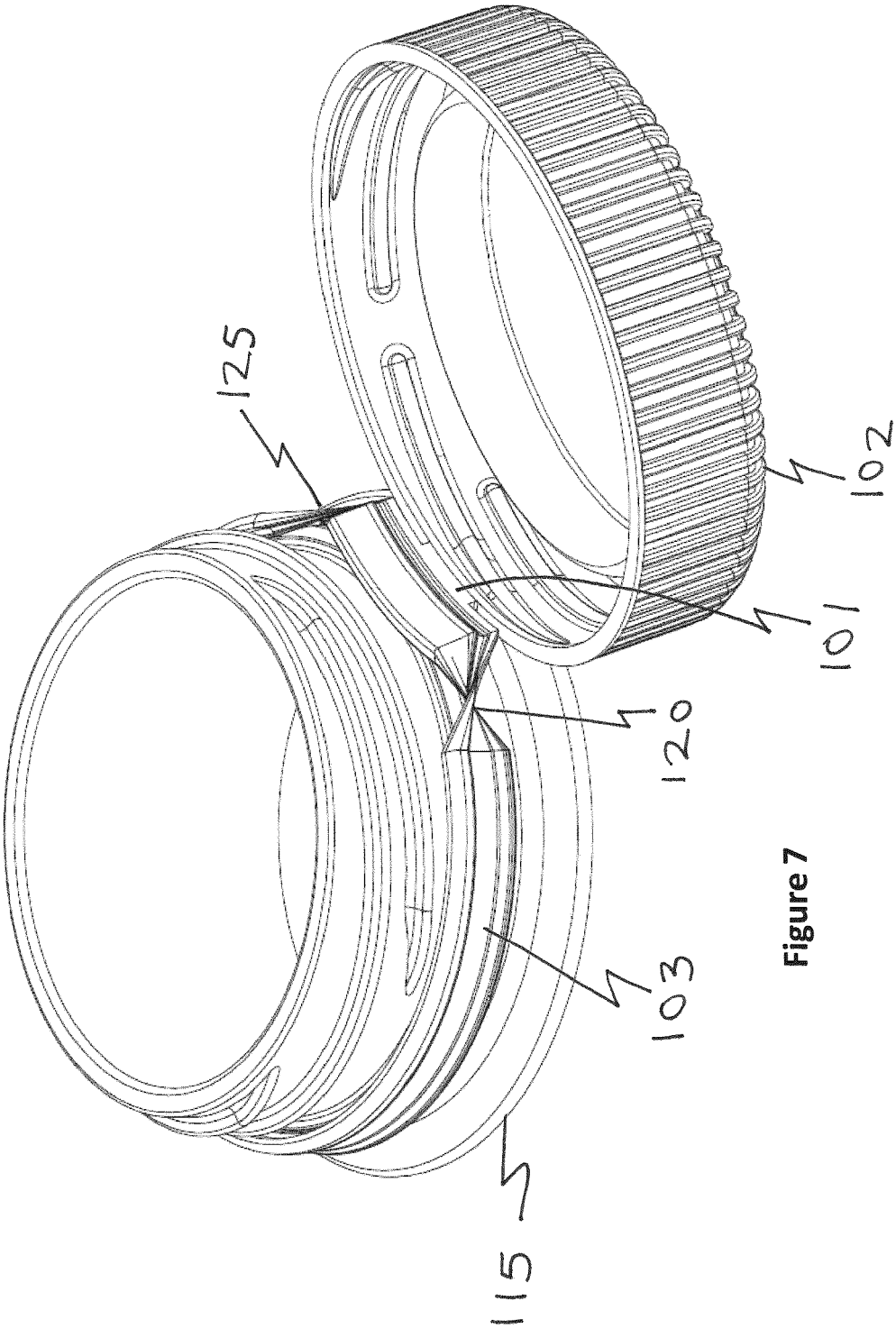

Figure 7

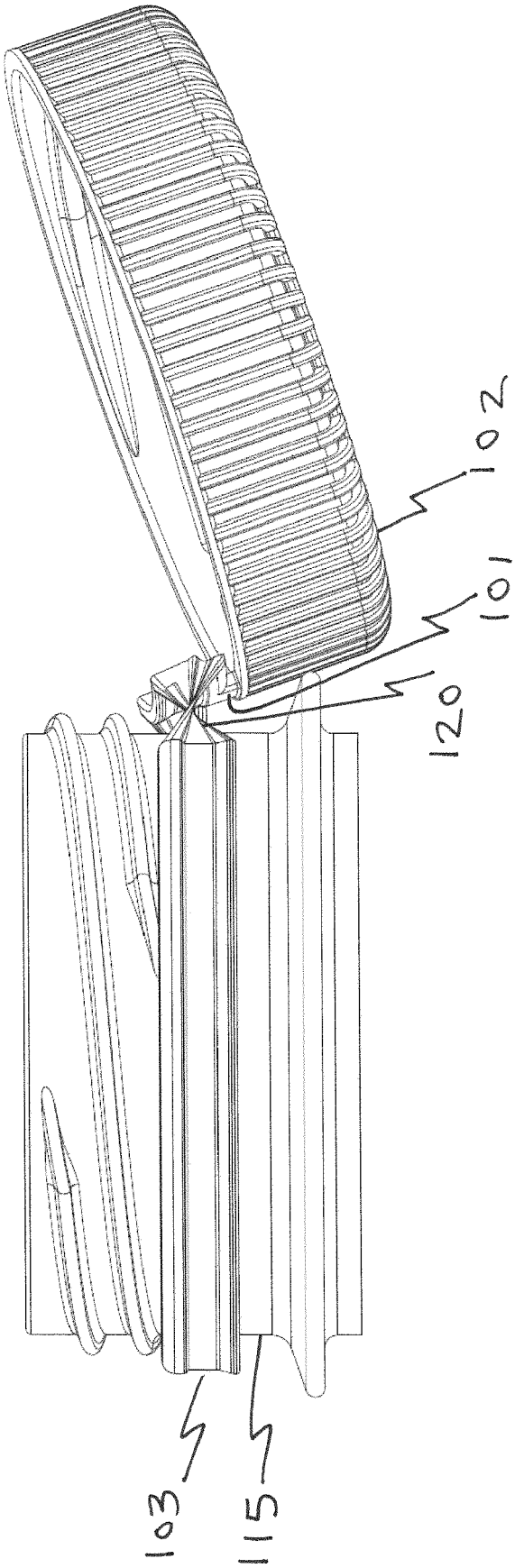

Figure 8

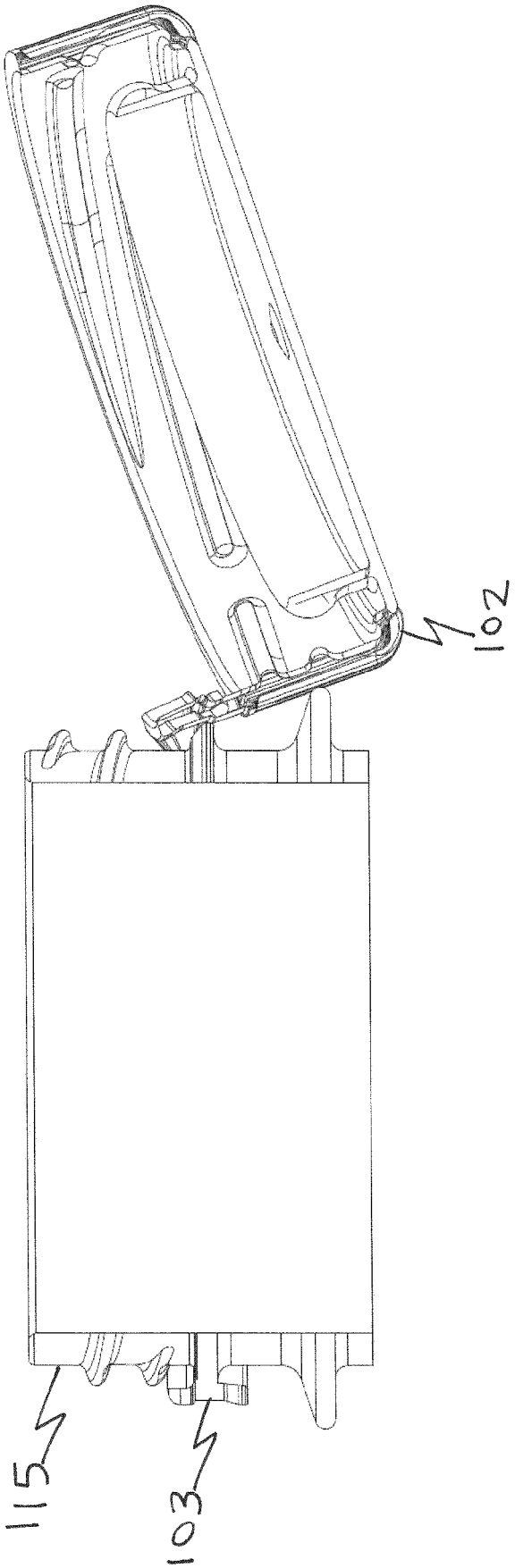

Figure 9

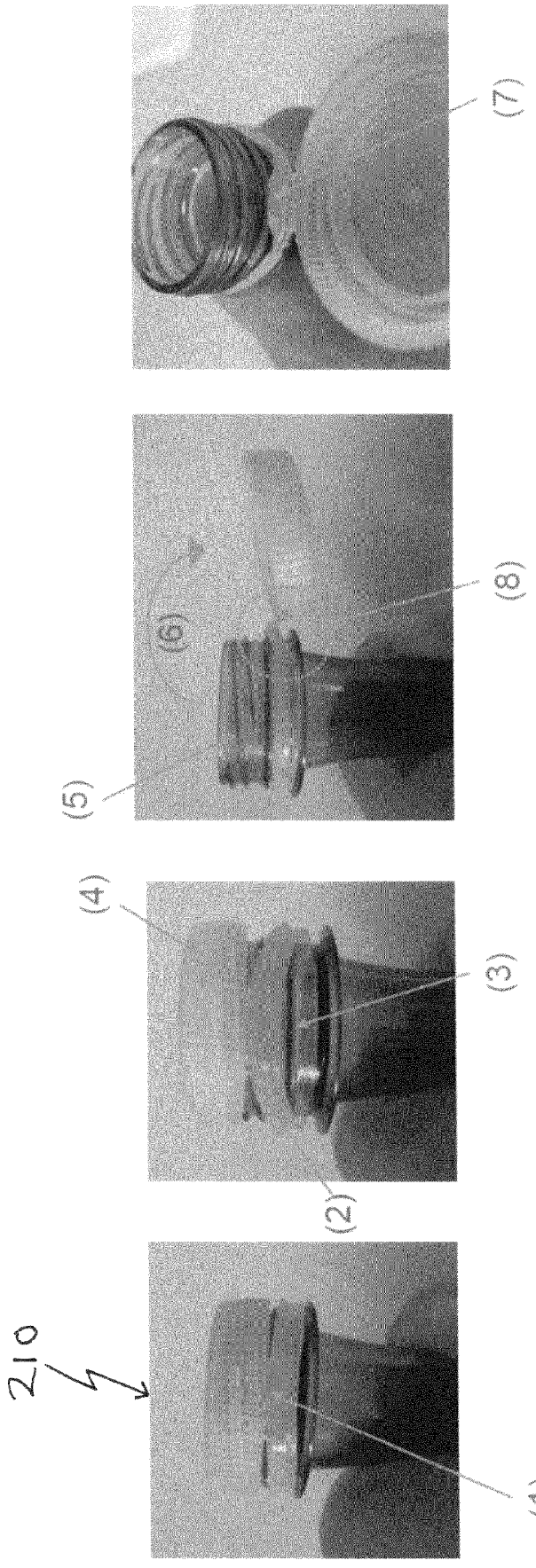

Figure 10A

Figure 10B

Figure 10C

Figure 10D

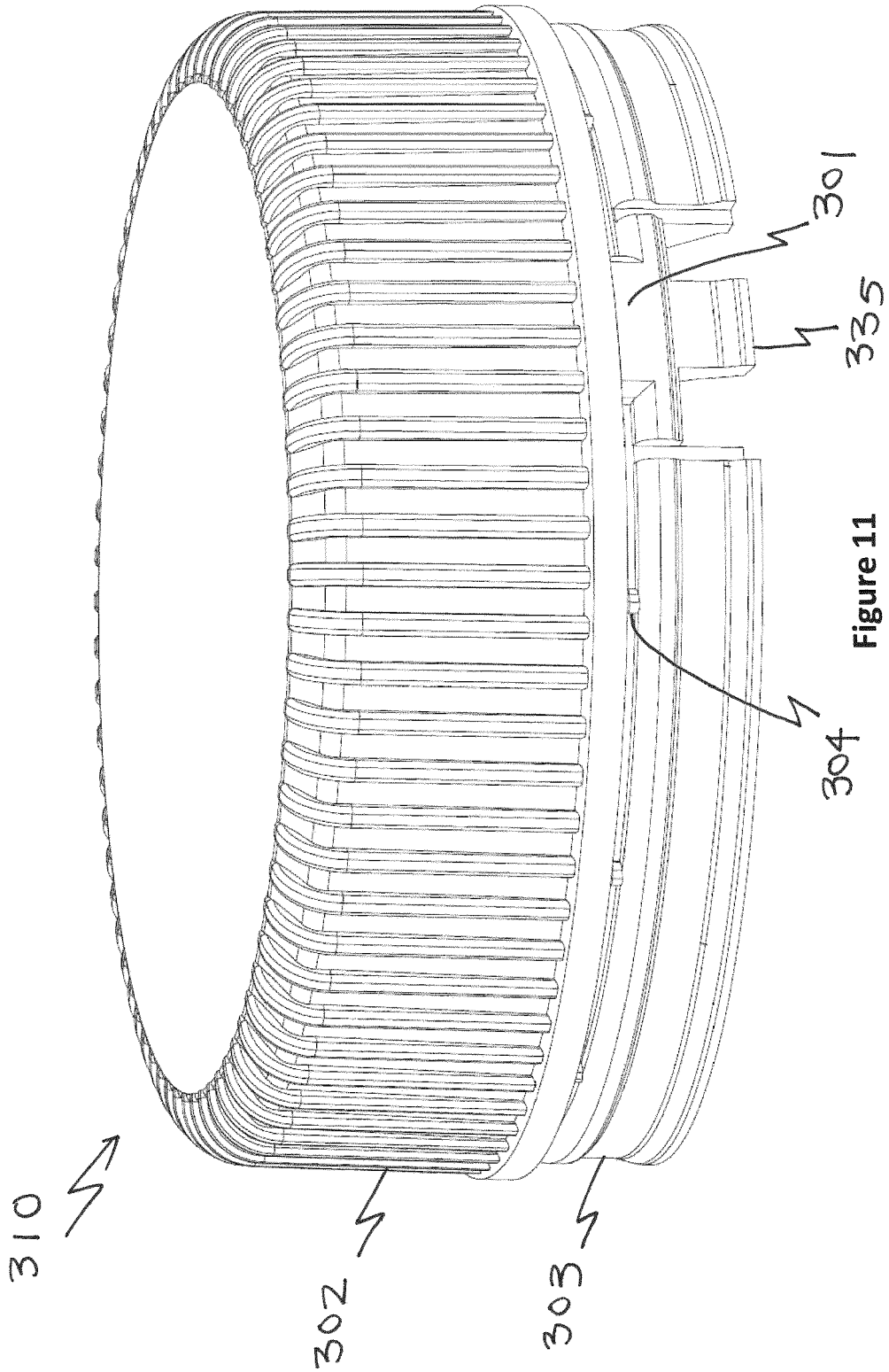

Figure 11

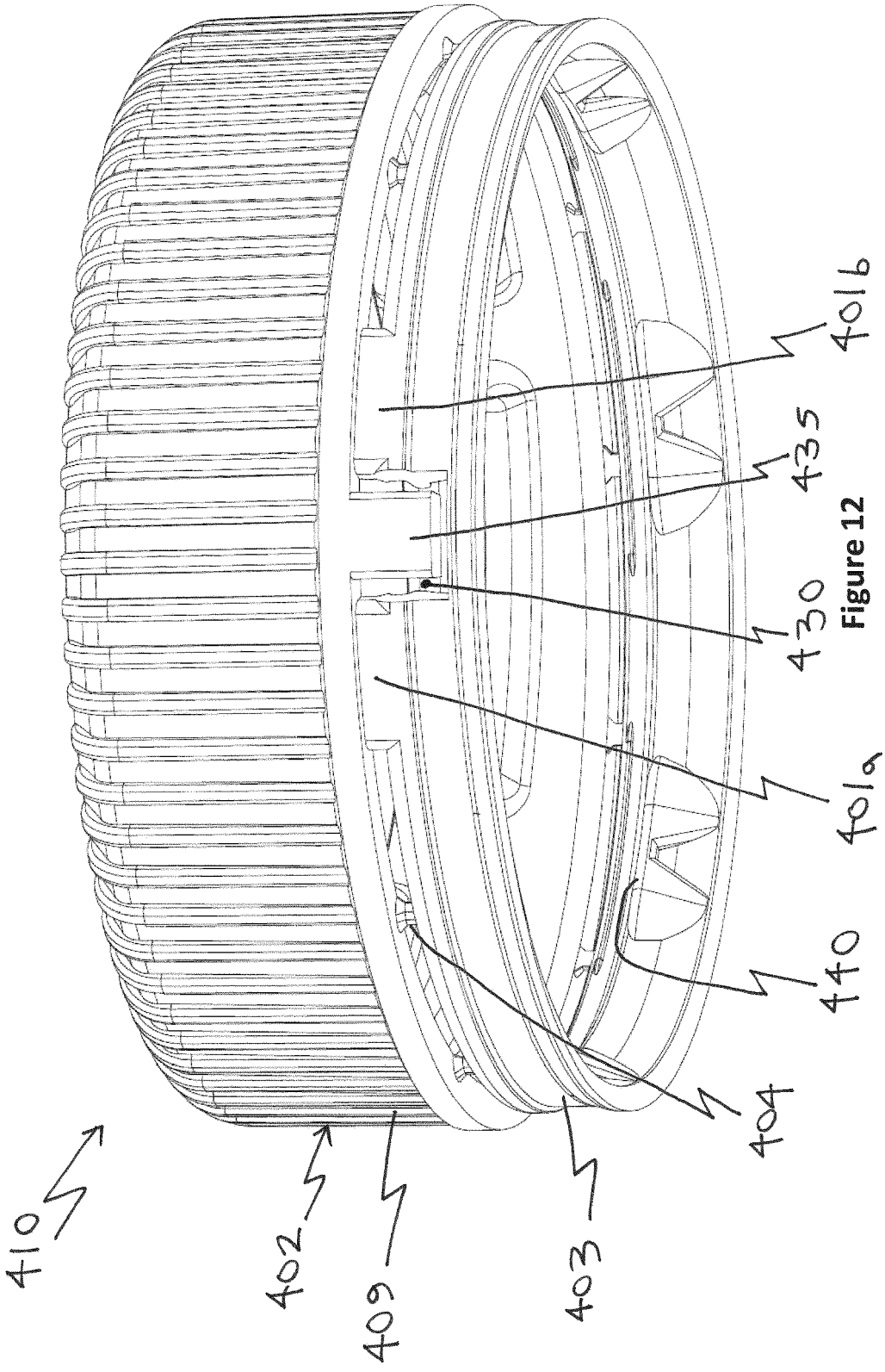

Figure 12

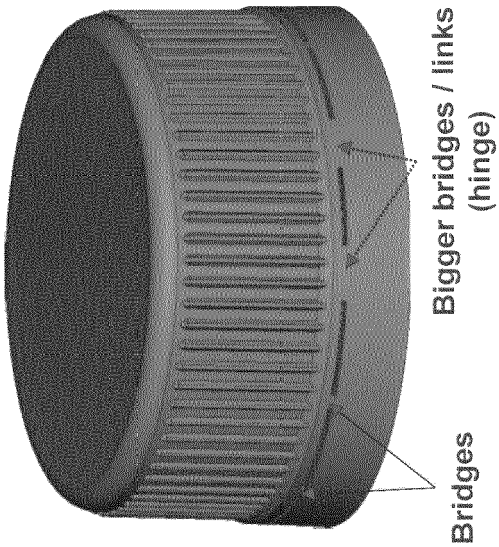

Figure 14

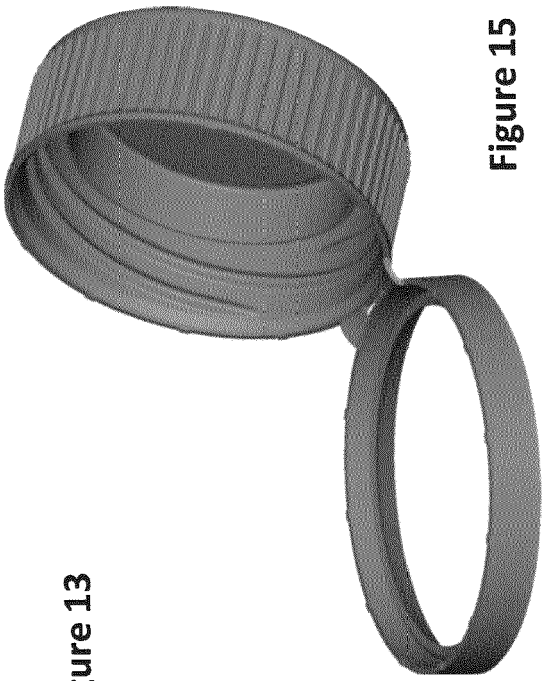

Figure 15

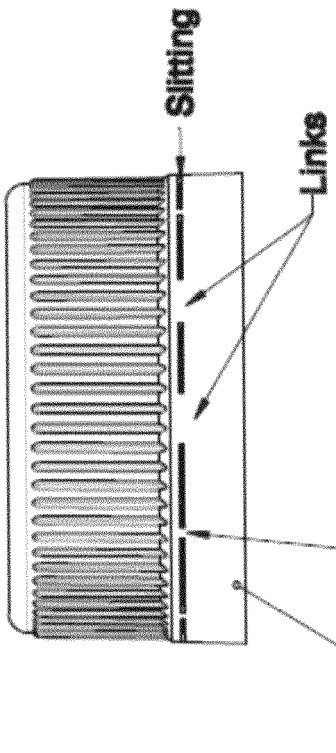

Figure 13

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 100880006 **[0003]**
- CN 1631740 **[0003]**