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(54) **ORIENTATABLE SCREW CLOSURE AND NECK**

ORIENTIERBARER DREHVERSCHLUSS UND BEHÄLTERHALS

BOUCHON À VIS ORIENTABLE ET GOULOT D'UN RÉCIPIENT

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(56) References cited:
US-A- 3 610 454
US-A- 3 979 001
US-A- 4 032 028

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Description

[0001] The present invention relates generally to closures and particularly to closures with an anti-back off feature.

[0002] Screw-on closures have a tendency to loosen from a tightened condition on a threaded bottle neck finish i.e. they "back off". This tendency has a number of causes which include temperature change, creep in the bottle and cap materials, relaxation of a liner or sealant material, and vibration during handling and shipping. This problem is more frequently encountered when the screw threads have a high pitch (the distance from the crest of one thread to the next) to enable the cap to be quickly removed and reinstalled with limited twisting action.

[0003] Loose caps create problems for the manufacturer and retailer of packaged goods and even for the ultimate user. Loose caps can falsely indicate tampering and, of course, allow spillage or leakage of the contents as well as entrance of moisture into the container. A good moisture seal is especially important, for example, when products can be adversely affected by excess moisture content.

[0004] US 4 032 028 and US 3 979 00I describe closure and containers neck combinations with anti-back off features, wherein the former discloses the features of the preamble of claim 1. The present invention seeks to address problems with known closures.

[0005] The present invention provides, in combination, a closure and a container, the closure having a screw thread formation and the neck of the container having a screw thread formation, in which a recess or break is provided in the neck screw thread formation, in which one end of the closure screw thread formation comprises an abutment surface, in which at one end of the neck screw thread formation a thread stop is provided for engaging the abutment surface so as to orientate the closure on the container, and in which the closure screw thread formation is provided with an anti-backoff feature or releasably engaging in the recess or break to prevent backing off of the closure when screwed on, and the engagement of the anti-backoff formation can be overcome to unscrew the closure in use, characterised in that the closure screw thread formation is flared at least in the region of the abutment surface to maximise the stop surface area.

[0006] The abutment surface may form part of the anti-backoff formation.

[0007] The anti-backoff formation may be located at or towards the end of the closure screw thread.

[0008] A top surface of the closure screw thread may be profiled to engage in the neck thread recess or break.

[0009] The closure and/or container neck thread may be a single-start thread or a multi-start thread.

[0010] The neck may comprise two thread stops orientated approximately 180 degrees apart.

[0011] Anti-back off features on the cap and the neck may interact vertically.

[0012] The anti-back off features on the cap and the neck may interact on vertical diameters.

[0013] The closure screw thread formation may comprise a major thread segment and a minor thread segment.

[0014] The major thread segment may include an end region the top surface of which includes a ramp face leading to a terminal anti-back off formation.

[0015] The neck screw thread formation may terminate at one end with a ramp face leading to a recess.

[0016] The ramp faces may pass over each other when the closure is deliberately unscrewed.

[0017] The present invention may relate to a coffee cap.

[0018] The present invention may provide an orientated coffee cap and a container neck provided with co-operating formations for providing anti-back-off means.

[0019] The present invention is set out in the accompanying independent claim and dependent claims. Features of the dependent claims may be combined with the features of the independent claim as claimed. The present invention is more particularly shown and described, by way of example, with reference to the accompanying drawings, in which:

Figures 1 to 3 show a cap formed in accordance with an embodiment of the present invention having anti-back off features;
Figures 4 to 6 show a container with a neck for co-operating with the cap of Figures 1 to 3;
Figures 7 to 9 illustrate thread stop features on the cap of Figures 1 to 3;
Figures 10 to 12 illustrate thread stop features on the neck of Figures 4 to 6;
Figures 13 to 15 show a cap formed in accordance with a further embodiment of the present invention having anti-back off features;
Figures 16 to 18 show a container with a neck for co-operating with the cap of Figures 13 to 15;
Figures 19 to 21 illustrate thread stop features on the cap of Figures 13 to 15; and
Figures 22 to 24 illustrate thread stop features on the neck of Figures 16 to 18.

A list of captions for the drawings is given below:

Figure 2: "Sidewall of cap removed for illustration purposes"
Figure 2: "View showing anti-back off feature engaged. (Some clearance has been added to allow development of feature)
Figure 3: "Top surface of cap thread profiled to engage in neck thread recess"
Figure 3: "Sidewall of cap removed for illustration purposes"
Figure 5: "Rear surface of recess prevents cap thread "backing off"
Figure 6: "Recess in lower section of neck thread

profile to interact with similar feature on cap"
Figure 7: "Sidewall of cap removed for illustration purposes"
Figure 7: "Stop rib surface as large as possible for positive stop to orientate cap. In two places 180° apart"
Figure 7A: "Underside of thread "flared" to maximise stop surface area"
Figure 11: "Stop rib surface as large as possible for positive stop to orientate cap. In two places 180° apart"
Figure 12: "Sidewall of cap removed to illustrate thread interaction"
Figure 13: "Cap Anti-back off features"
Figure 14: "Sidewall of cap removed for illustration purposes"
Figure 14: "View showing anti-back off feature engaged. (Some clearance shown to allow development of feature)
Figure 15: "Sidewall of cap removed for illustration purposes"
Figure 15: "Top surface of cap thread profiled to engage in neck thread recess"
Figure 16A: "Neck Anti-back off features"
Figure 17: "Rear surface of recess prevents cap thread "backing-off""
Figure 18: "Recess/break in lower section of neck thread to interact with feature on cap"
Figure 19: "Cap thread stop features"
Figure 20: "Sidewall of cap removed for illustration purposes"
Figure 20: "Stop rib surface as large as possible for positive stop to orientate cap. In two places 180° apart"
Figures 19A and 20: "Underside of thread "flared" to maximise stop surface area"
Figure 22: "Neck thread Stop features"
Figure 23: "Stop rib surface as large as possible for positive stop to orientate cap. In two places 180° apart"
Figure 24: "Sidewall of cap removed to illustrate thread interaction"

[0020] 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 or its connection to a closure.

[0021] Example embodiments are described below 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 alternate forms and should not be construed as limited to the examples set forth herein.

[0022] 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 and as well as individual embodiments the invention is intended to cover combinations of those embodiments as well. On the contrary, all 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.

[0023] The terminology used herein to describe embodiments is not intended to limit the scope. The articles "a," "an," and "the" are singular in that they have a single referent; however, the use of the singular form in the present document should not preclude the presence of more than one referent. In other words, elements referred to in the singular can number one or more, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises," "comprising," "includes," and/or "including," when used herein, specify the presence of stated features, items, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, items, steps, operations, elements, components, and/or groups thereof.

[0024] 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 idealized or overly formal sense unless expressly so defined herein.

[0025] Referring first to Figures 1 to 3 there is shown a closure generally indicated 10. The closure 10 comprises a top plate 15 and a side wall 20 which depends from the periphery of the top plate 15.

[0026] The side wall 20 comprises four gently curving sides 22a, b, c, d joined by curved corners 24a, b, c, d to form a generally square section. A generally cylindrical thread-bearing socket 25 is formed in the interior of the closure, depending from the top plate and extending from the side wall 20.

[0027] The interior of the socket 25 is provided with screw thread formations, in this embodiment including a major 30 and a minor 35 screw thread segment.

[0028] The thread pattern is repeated on the other side of the socket (not visible in the drawings).

[0029] The major thread segment 30 includes an end region 40. The top surface of the end region 40 includes a ramp face 45 leading to a terminal anti-back off formation 50. The thread segment is thicker (vertically) in this region.

[0030] Figures 4 to 6 show a container generally indicated 60. The container 60 comprises a base 65 and a side wall 70 which terminates with a neck finish 75.

[0031] The neck finish 75 comprises a transfer bead 77 above which a screw thread formation 80 is provided.

[0032] The formation 80 terminates at one end with a ramp face 82 leading to a recess 85 (the thread thins in the vertical direction).

[0033] Figure 2 shows the closure screwed on to the neck finish. The anti-back off formation 50 engages in the recess 85. The rear face 86 of the recess prevents backing off. This means that when the closure is fully screwed on it cannot back off the neck finish. The closure can be unscrewed because the engagement of the formation in the recess can be overcome by the normal unscrewing action and without undue force i.e. the anti-back off functionality does not prevent unscrewing *per* se but merely prevent the gradual relative rotation between the closure and the container that would otherwise occur. The ramp faces 45, 82 can pass over each other when the closure is deliberately unscrewed.

[0034] In this embodiment the closure and container neck are formed to provide an orientating function as well. Figures 7 to 12 illustrate this in more detail.

[0035] The major thread segment 30 terminates with an abutment face 31. In this embodiment the underside of the thread is flared to maximise the stop surface area.

[0036] The neck finish 75 is provided with a thread stop 79, which in this embodiment is immediately adjacent the thread recess 85.

[0037] When the closure is screwed onto the neck finish the abutment face 31 abuts against the thread stop 79 (see Figures 2 and 12). This defines a required relative orientation between the closure and the container in the fully screwed on position. In this embodiment two thread stops 79 are provided approximately 180 degrees apart.

[0038] Figures 13 to 24 show a closure 110 and container 160 formed according to an alternative embodiments.

[0039] The closure 110 and container 160 are similar to the closure 10 and container 60 of Figures 1 to 12. In this embodiment, instead of a recess in the neck finish thread there is a thread break 190. A gap is thereby formed between the end face 192 of the thread 130 and the thread stop 179. The break 190 may comprise a complete absence of material extend from the neck finish, or may be a gentle ramp or a section of screw thread of much reduced diameter, the purpose being to form the abutment face 192 at or towards the end of the thread 180.

[0040] Use of the closure 110 is similar to the closure 10. The closure 110 is screwed onto the neck finish 175 until the abutment face 13 hits the thread stop 190. If the closure starts to back off the formation 150 will abut against the end face 192 to prevent further unwanted relative rotation.

[0041] 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 in the appended claims.

Claims

1. In combination, a closure (10) and a container (60), the closure having a screw thread formation (30, 35) and the neck (75) of the container having a screw thread formation (80), in which a recess or break (85) is provided in the neck screw thread formation, in which one end of the closure screw thread formation (30, 35) comprises an abutment surface (31), in which at one end of the neck screw thread formation (80) a thread stop (79) is provided for engaging the abutment surface (31) so as to orientate the closure on the container, and in which the closure screw thread formation (30, 35) is provided with an anti-backoff feature (50) for releasably engaging in the recess or break (85) to prevent backing off of the closure when screwed on, and the engagement of the anti-backoff formation (50) can be overcome to unscrew the closure in use, **characterised in that** the closure screw thread formation (30, 35) is flared at least in the region of the abutment surface (31) to maximise the surface area of the thread stop (79) engaging the abutment surface (31).

2. A combination as claimed in claim 1, in which the anti-backoff formation (50) is located at or towards the end of the closure screw thread formation (30, 35).

3. A combination as claimed in claim 1 or claim 2, in which the abutment surface (31) forms part of the anti-backoff formation (50).

4. A combination as claimed in any preceding claim, in which a top surface of the closure screw thread formation (30, 35) is profiled to engage in the neck thread recess or break (85).

5. A combination as claimed in any preceding claim, in which the closure and/or container neck thread is a single-start thread.

6. A combination as claimed in any of claims 1 to 4, in which the closure and/or neck thread is a multi-start thread.

7. A combination as claimed in any preceding claim, in which the neck comprises two thread stops (79) orientated approximately 180 degrees apart.

8. A combination as claimed in any preceding claim, in which anti-back off features (50, 85) on the closure (10) and the neck (75) interact vertically.

9. A combination as claimed in any preceding claim, in which the closure screw thread formation comprises a major thread segment (30) and a minor thread segment (35).

10. A combination as claimed in claim 9, in which the major thread segment (30) includes an end region (40) the top surface of which includes a ramp face (45) leading to a terminal anti-back off formation (50).

11. A combination as claimed in claim 10, in which the neck screw thread formation (80) terminates at one end with a ramp face (82) leading to a recess (85).

12. A combination as claimed in claim 11, in which the ramp faces (45, 82) pass over each other when the closure (10) is deliberately unscrewed.

Patentansprüche

1. Kombination aus einem Verschluss (10) und einem Behälter (60), wobei der Verschluss eine Schraubengewindegestaltung (30, 35) und der Hals (75) des Behälters eine Schraubengewindegestaltung (80) hat, in der eine Aussparung oder Unterbrechung (85) in der Schraubengewindegestaltung des Halses vorgesehen ist,
wobei ein Ende der Schraubengewindegestaltung (30, 35) des Verschlusses eine Anlagefläche (31) aufweist, wobei an einem Ende der Schraubengewindegestaltung (80) des Halses ein Gewindestopp (79) zum Eingreifen der Anlagefläche (31) vorgesehen ist, um so den Verschluss am Behälter auszurichten, und wobei die Schraubengewindegestaltung (30, 35) des Verschlusses mit einem Merkmal (50) gegen selbsttätiges Lösen vorgesehen ist, das lösbar in die Aussparung oder die Unterbrechung (85) eingreift, um ein selbsttätiges Lösen des Verschlusses im aufgeschraubten Zustand zu verhindern, und der Eingriff der Gestaltung (50) gegen selbsttätiges Lösen überwunden werden kann, um den in Gebrauch befindlichen Verschluss aufzuschrauben,
dadurch gekennzeichnet, dass die Schraubengewindegestaltung (30, 35) des Verschlusses in wenigstens dem Bereich der Anlagefläche (31) aufgeweitet ist, um den Flächenbereich des Gewindestopps (79), der in die Anlagefläche (31) eingreift, zu maximieren.

2. Kombination nach Anspruch 1, bei der die Gestaltung (50) gegen selbsttätiges Lösen sich an oder in Richtung des Endes der Schraubgewindegestaltung (30, 35) des Verschlusses befindet.

3. Kombination nach Anspruch 1 oder 2, bei der die Anlagefläche (31) einen Bestandteil der Gestaltung (50) gegen selbsttätiges Lösen bildet.

4. Kombination nach einem der vorhergehenden Ansprüche, bei der eine Oberfläche der Schraubengewindegestaltung (30, 35) des Verschlusses profilmäßig dazu ausgebildet ist, in die Gewindeaussparung oder Unterbrechung (85) des Halses einzugreifen.

5. Kombination nach einem der vorhergehenden Ansprüche, bei der der Verschluss und/oder das Gewinde des Behälterhalses ein Gewinde mit einem einzelnen Anfangspunkt ist.

6. Kombination nach einem der vorhergehenden Ansprüche 1 bis 4, bei der der Verschluss und/oder das Gewinde des Behälterhalses ein Gewinde mit mehreren Anfangspunkten ist.

7. Kombination nach einem der vorhergehenden Ansprüche, bei der der Hals zwei Gewindestopps (79) aufweist, die in etwa 180° voneinander beabstandet ausgerichtet sind.

8. Kombination nach einem der vorhergehenden Ansprüche, bei der die Merkmale (50, 85) gegen selbsttätiges Lösen am Verschluss (10) und dem Hals (75) vertikal interagieren.

9. Kombination nach einem der vorhergehenden Ansprüche, bei der die Schraubengewindegestaltung des Verschlusses ein Hauptgewindesegment (30) und ein kleineres Gewindesegment (35) aufweist.

10. Kombination nach Anspruch 9, bei der das Hauptgewindesegment (30) einen Endbereich (40) enthält, dessen Oberfläche eine schräge Seitenfläche (45) enthält, die zu einer abschließenden Gestaltung (50) gegen selbsttätiges Lösen führt.

11. Kombination nach Anspruch 10, bei der die Schraubengewindegestaltung (80) des Halses an einem Ende mit einer schrägen Seitenfläche (82) endet, die in einer Aussparung (85) mündet.

12. Kombination nach Anspruch 11, bei der die schrägen Seitenflächen (45, 82) einander überlagern, wenn der Verschluss (10) mit Absicht aufgeschraubt wird.

Revendications

1. Combinaison d'un bouchon (10) et d'un récipient (60), le bouchon présentant une formation de filetage (30, 35) et le col (75) du récipient présentant une formation de filetage (80), où un évidement ou une cassure (85) est prévu dans la formation de filetage de col, où une première extrémité de la formation de filetage de bouchon (30, 35) comprend une surface de butée (31), où au niveau d'une première extrémité de la formation de filetage de col (80) une butée de filet (79) est prévue en vue de s'engager avec la surface de butée (31) de sorte à orienter le bouchon sur le récipient, et où la formation de filetage de bou-

chon (30, 35) est dotée d'un élément anti-dévissage (50) destiné à s'engager avec possibilité de libération dans l'évidement ou la cassure (85) pour éviter un dévissage du bouchon lorsqu'il est vissé, et l'engagement de la formation anti-dévissage (50) peut être contrecarré pour dévisser le bouchon lors d'une utilisation, **caractérisée en ce que** la formation de filetage de bouchon (30, 35) est évasée au moins dans la région de la surface de butée (31) pour maximiser l'aire de surface de la butée de filet (79) s'engageant avec la surface de butée (31).

2. Combinaison selon la revendication 1, dans laquelle la formation anti-dévissage (50) est située au niveau de ou vers l'extrémité de la formation de filetage de bouchon (30, 35).

3. Combinaison selon la revendication 1 ou la revendication 2, dans laquelle la surface de butée (31) constitue une partie de la formation anti-dévissage (50).

4. Combinaison selon l'une quelconque des revendications précédentes, dans laquelle une surface supérieure de la formation de filetage de bouchon (30, 35) est profilée pour s'engager dans l'évidement ou la cassure de filet de col (85).

5. Combinaison selon l'une quelconque des revendications précédentes, dans laquelle le filet de bouchon et/ou de col de récipient est un filet à unique départ.

6. Combinaison selon l'une quelconque des revendications 1 à 4, dans laquelle le filet de bouchon et/ou de col de récipient est un filet à multiples départs.

7. Combinaison selon l'une quelconque des revendications précédentes, dans laquelle le col comprend deux butées de filet (79) orientées qui sont approximativement diamétralement opposées.

8. Combinaison selon l'une quelconque des revendications précédentes, dans laquelle des éléments anti-dévissage (50, 85) sur le bouchon (10) et le col (75) interagissent de manière verticale.

9. Combinaison selon l'une quelconque des revendications précédentes, dans laquelle la formation de filetage de bouchon comprend un segment de filet principal (30) et un segment de filet secondaire (35).

10. Combinaison selon la revendication 9, dans laquelle le segment de filet principal (30) inclut une région d'extrémité (40) dont la surface supérieure inclut une face inclinée (45) aboutissant à une formation anti-dévissage terminale (50).

11. Combinaison selon la revendication 10, dans laquelle la formation de filetage de col (80) se termine au niveau d'une première extrémité avec une face inclinée (82) aboutissant à un évidement (85).

12. Combinaison selon la revendication 11, dans laquelle les faces inclinées (45, 82) passent l'une sur l'autre lorsque le bouchon (10) est dévissé de manière délibérée.

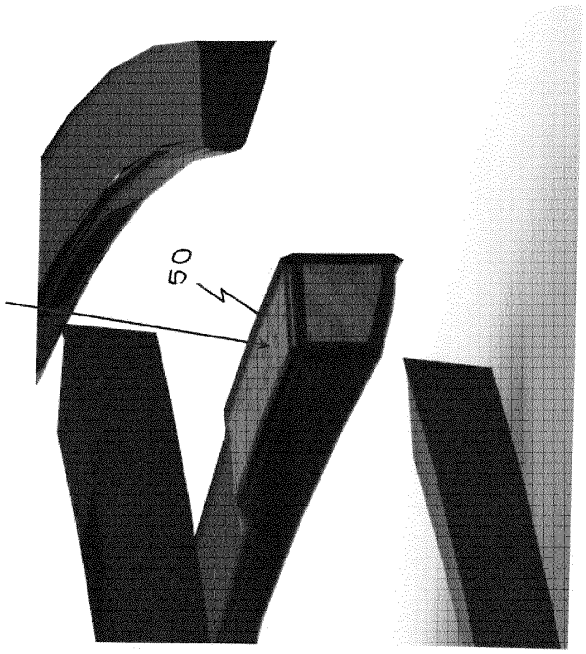


Figure 3

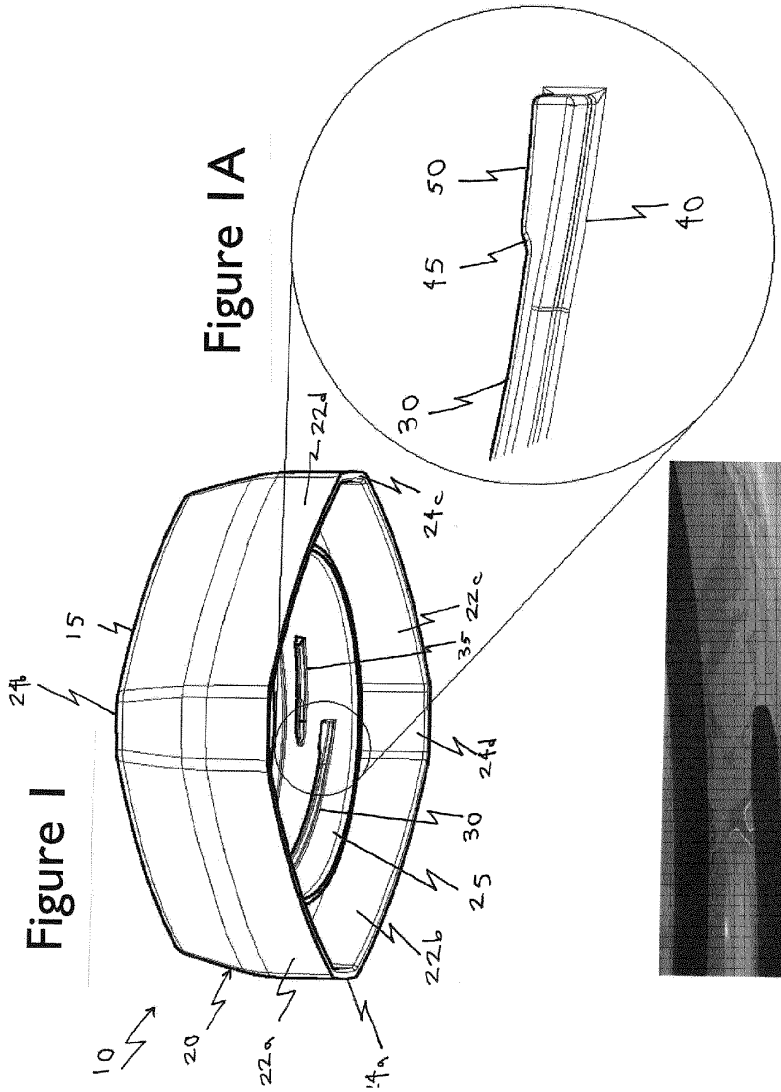


Figure IA

Figure I

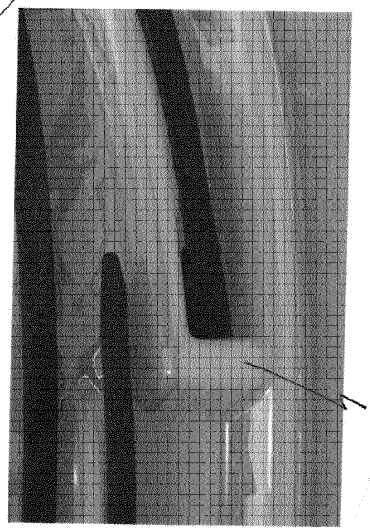


Figure 2

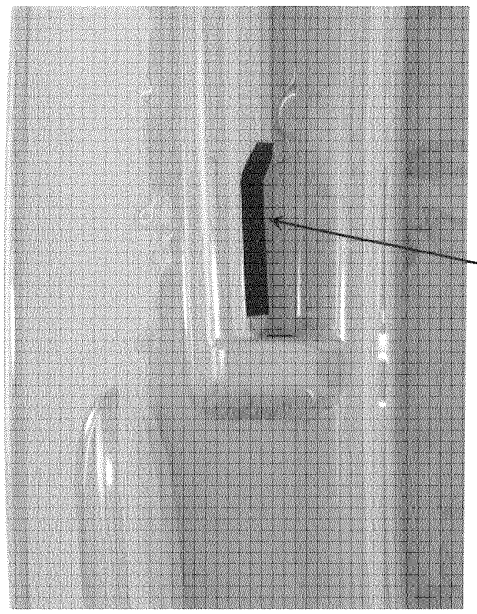


Figure 6

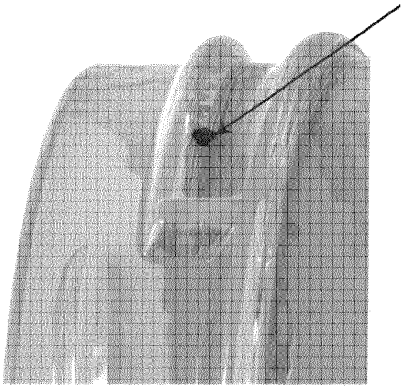


Figure 5

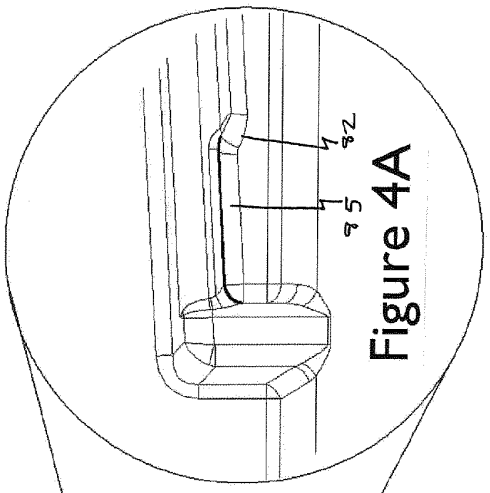


Figure 4A

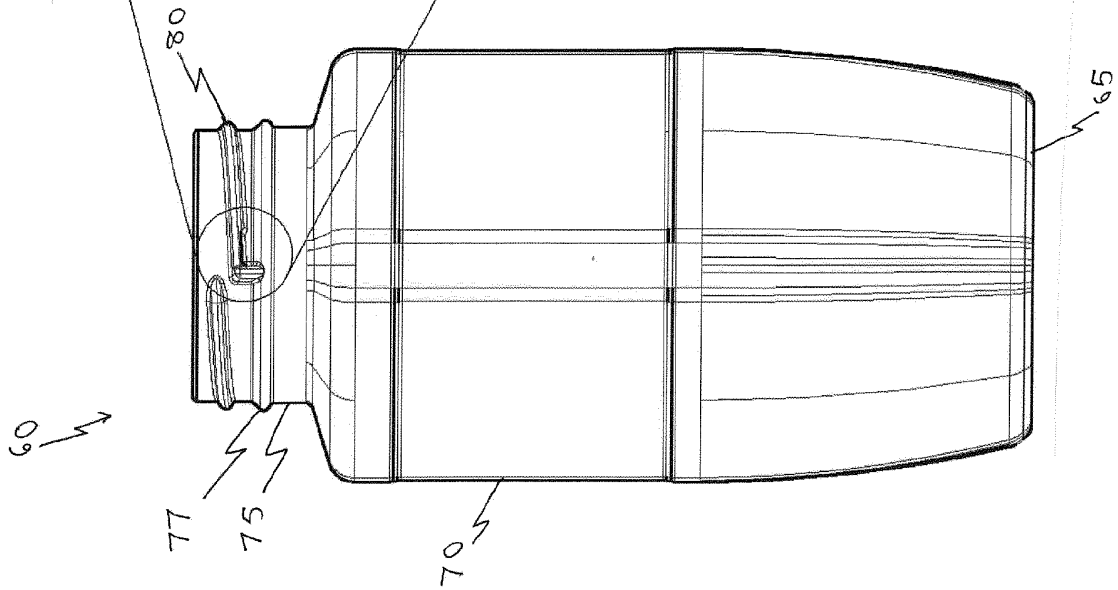


Figure 4

Figure 9



Figure 7A

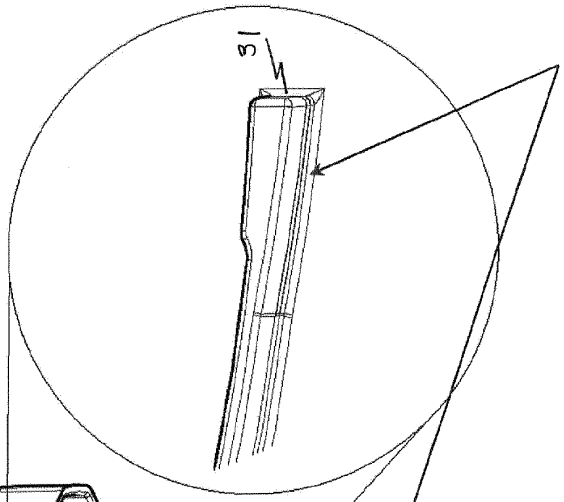


Figure 7

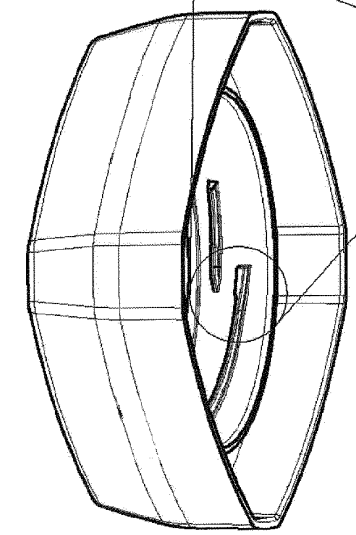
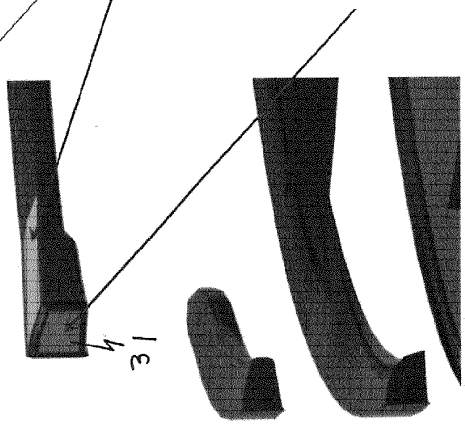


Figure 8



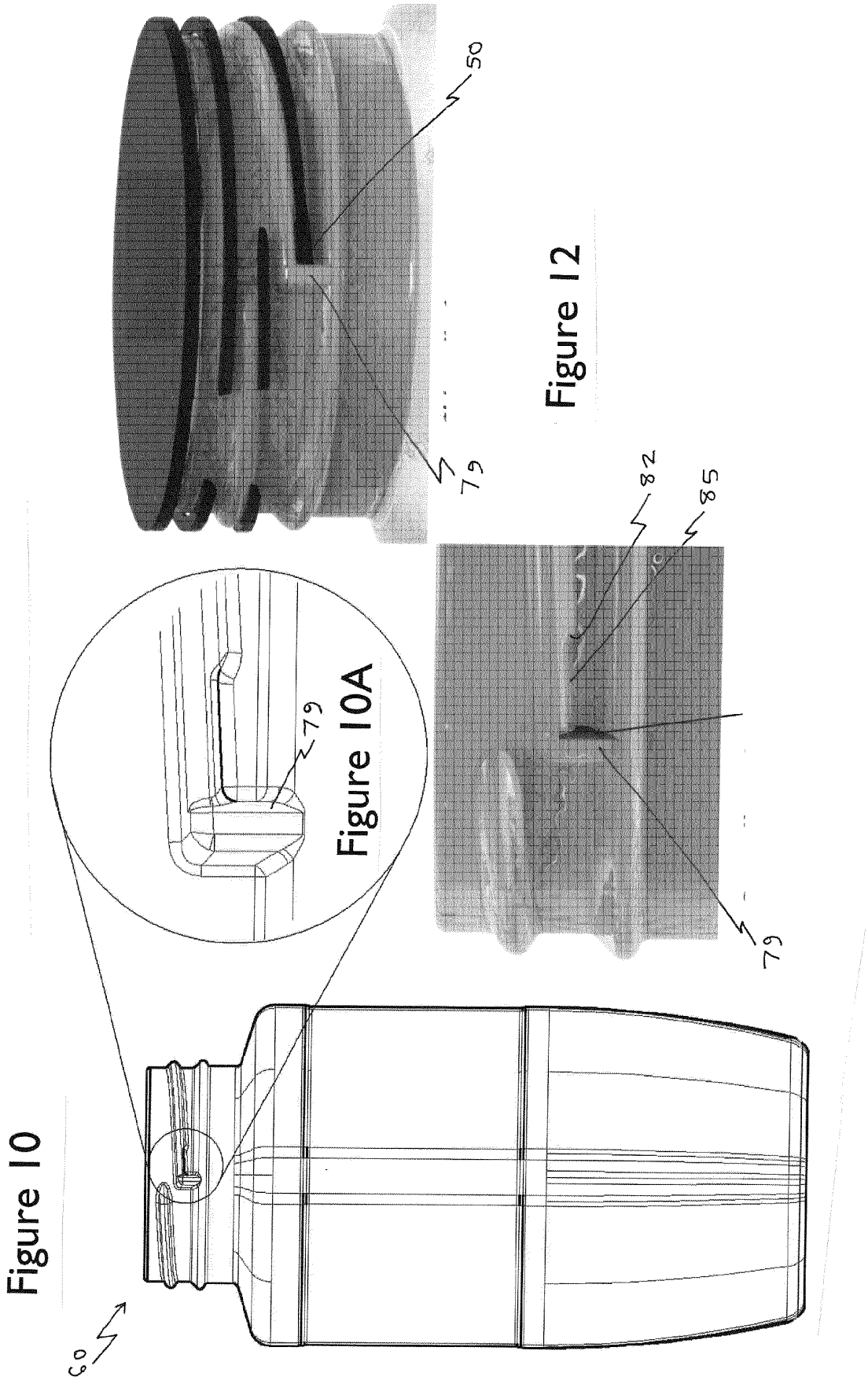


Figure 10

Figure 11

Figure 12

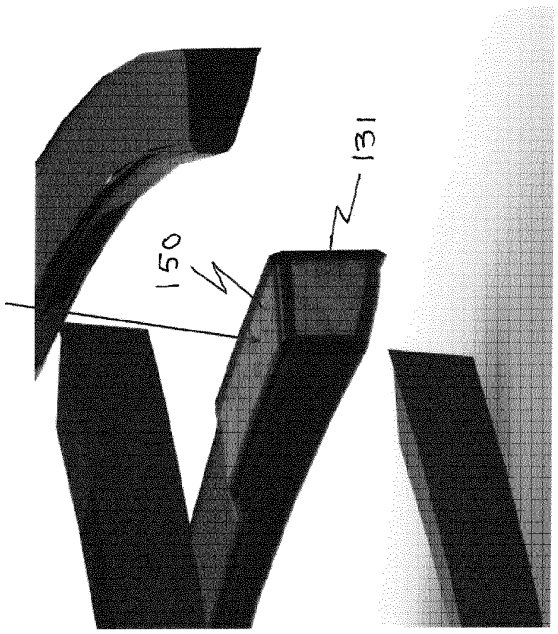


Figure 15

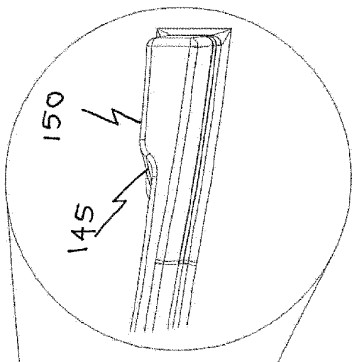


Figure 13A

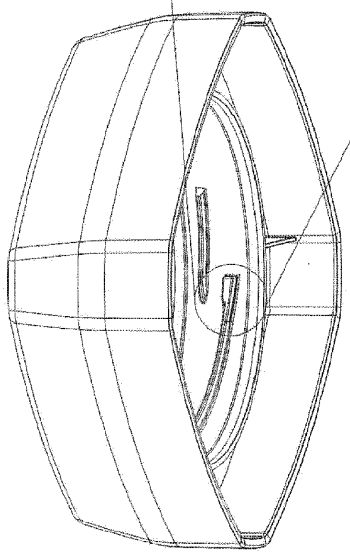


Figure 13

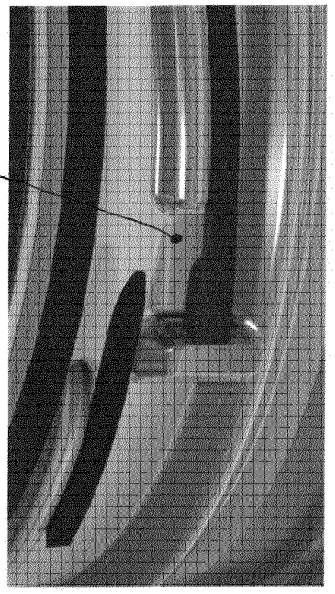


Figure 14

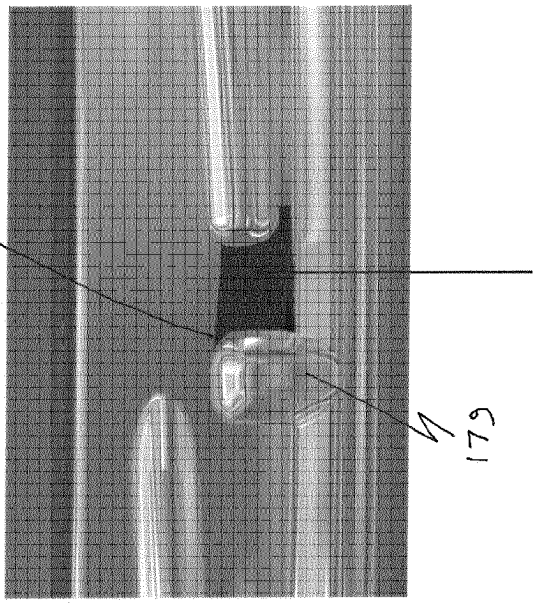


Figure 18

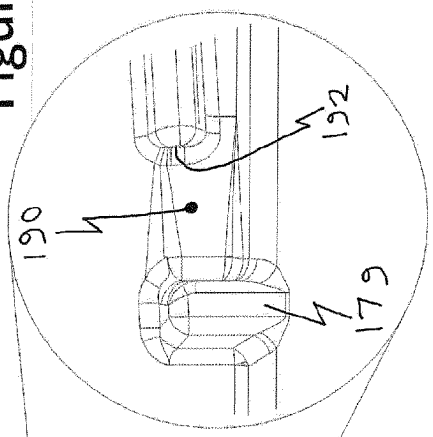


Figure 16A

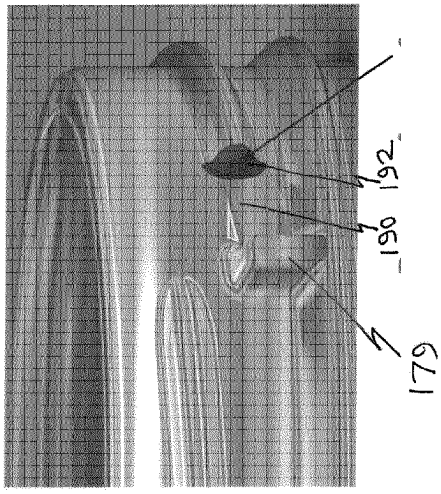


Figure 17

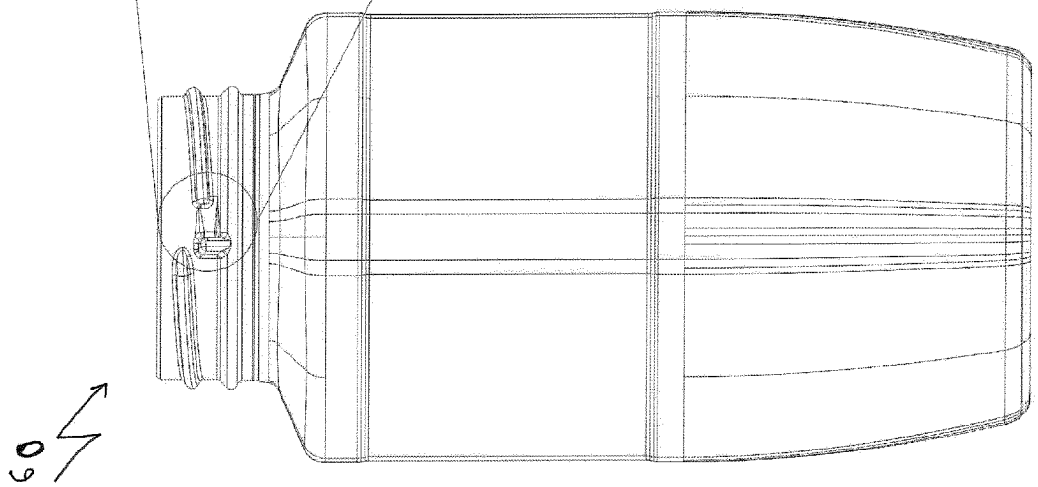


Figure 16

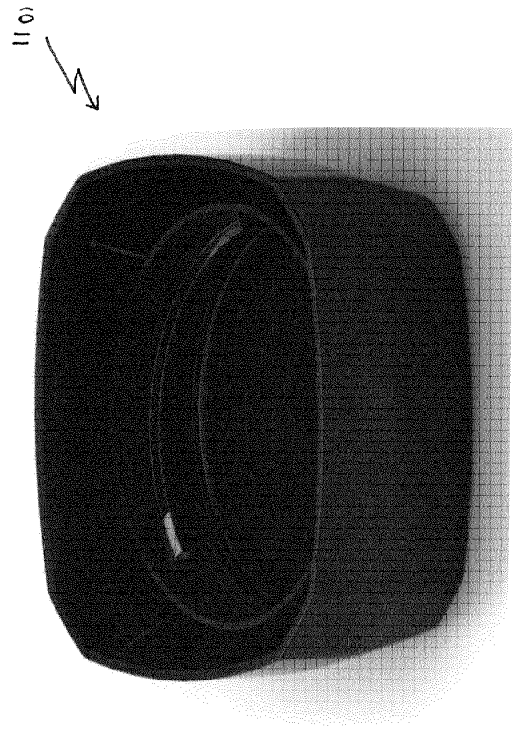


Figure 21

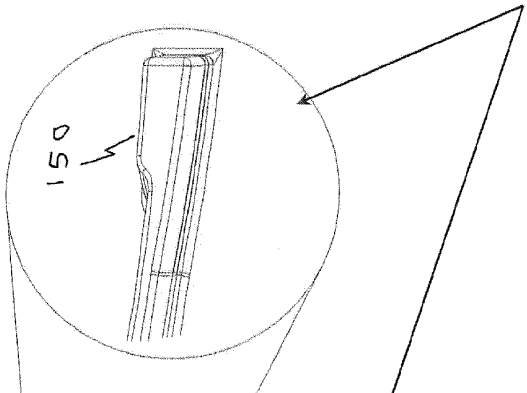


Figure 19A

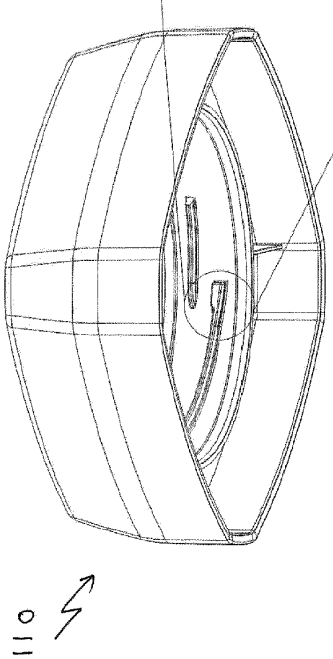


Figure 19

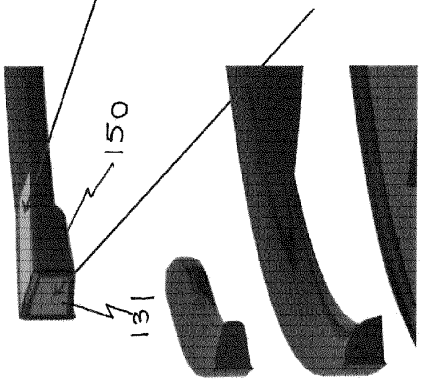


Figure 20

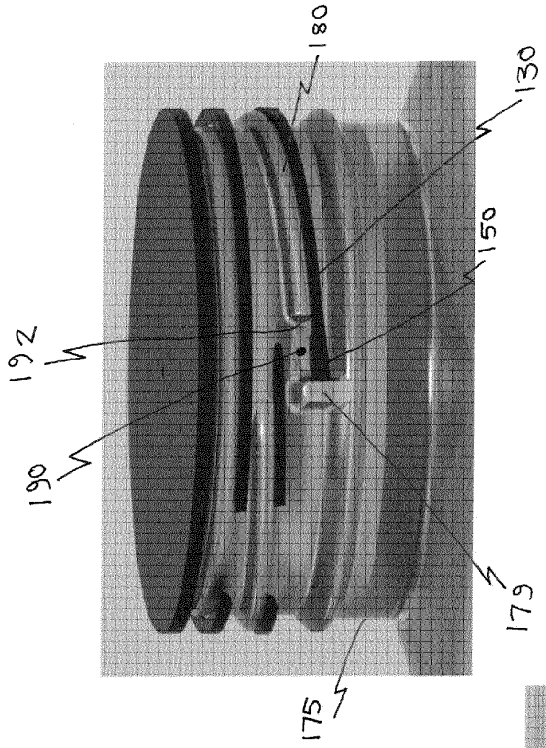


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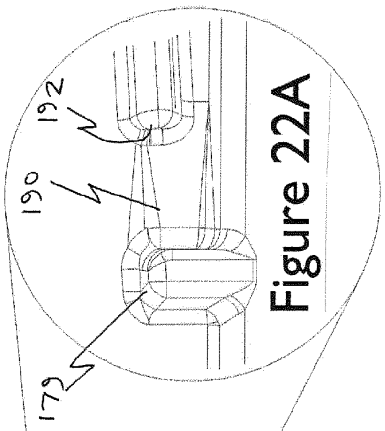


Figure 22A

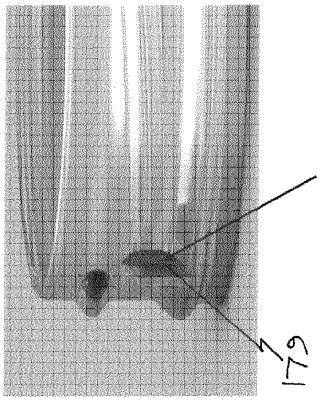


Figure 23

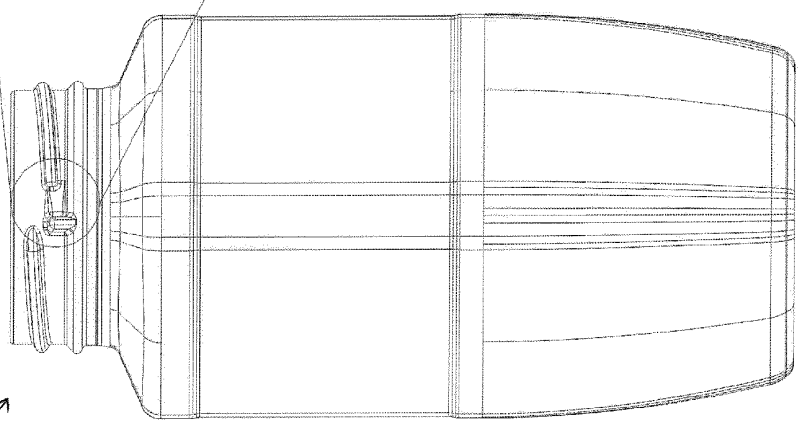


Figure 22

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4032028 A **[0004]**
- US 397900I A **[0004]**