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(54) **IMPROVEMENTS IN OR RELATING TO CONTAINER CLOSURES**

(57) A non-removable container closure comprises a body including a top plate (25) and a generally cylindrical side wall (30) with one or more snap-on features (35) provided on the inside of said side wall (30). The

body includes demoulding means for rotation during demoulding, wherein the closure is demoulded in a bayonet-like (unscrewing) movement.

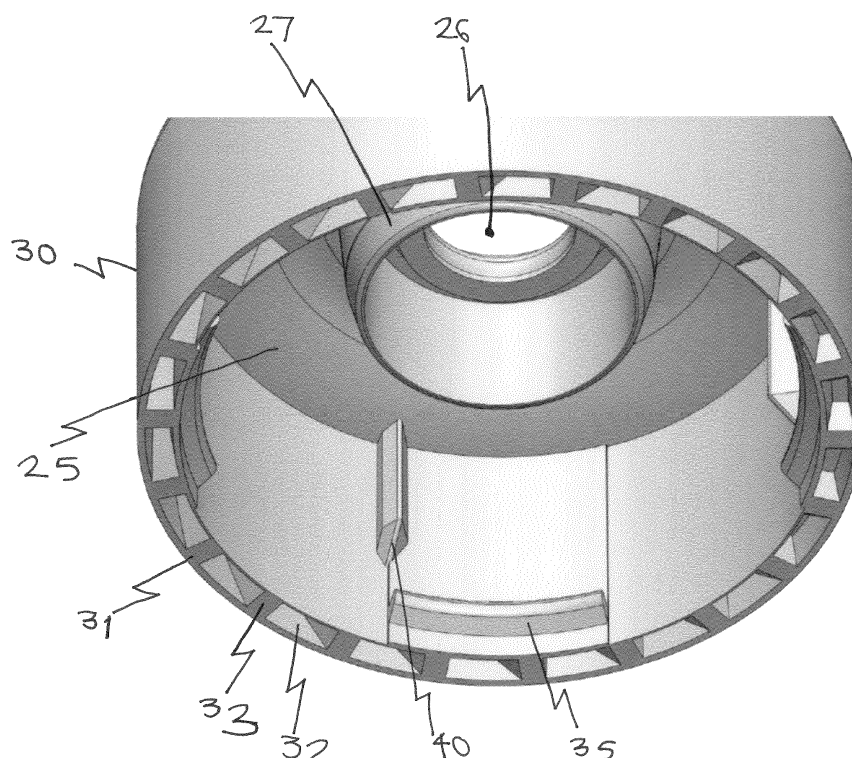


Figure 2

Description

[0001] The present invention relates generally to a closure and particularly to a closure for a container. The present invention also relates to a method of forming a closure and a method of demoulding a closure.

[0002] Closures for containers, such as bottles, are commonly moulded of plastic and are of two types. One type is a twist-on closure or screw closure that engages a threaded neck finish and is applied by threading it on the neck of the bottle. The other type of closure is a snap-on closure which has a peripheral skirt which receives the neck of the bottle and one or more annular beads on its inside wall that snap into receiving grooves or under corresponding beads, lugs or the like on the exterior of neck finish of the bottle.

[0003] As discussed above, non-removable closures normally have snap-on features which engage into or under a corresponding feature on a container. The features often result in an undercut.

[0004] Producing plastics parts with undercuts presents distinct challenges for moulders. Undercuts are protrusions or recessions in a part that prevent the mould, after the part is formed, from sliding away along the parting direction. These features inhibit the direct removal of the core, and as a result, generally necessitate using an additional mould piece, such as a side-core or an internal core lifter, to form the shape.

[0005] The present invention provides a non-removable container closure comprising a body including a side wall with one or more snap-on/clip-on features provided on the inside thereof, in which the body includes demoulding means for rotation during demoulding.

[0006] The demoulding means allows the closure body to be rotated during the demoulding process, which permit removal of the mould core.

[0007] The snap-on feature may comprise a snap bead, for example in some embodiments a plurality of arcuate snap bead portions/segments are provided and are mutually spaced on the interior of the side wall, projecting radially onwards therefrom.

[0008] In some embodiments for at least some or all of the snap bead portions a corresponding axial lug is provided.

[0009] The lugs may be axially spaced from the respective bead portions and may be circumferentially situated at one end thereof.

[0010] An end of the side wall (for example the "rim" of a free end, such as an end opposite a top wall/plate) may include one or more unscrewing features, such as cavities (which may receive teeth), for allowing the closure to be rotated during demoulding.

[0011] The snap bead may be located proximal to the free end of the side wall.

[0012] The snap bead may extend radially inwards and upwards from the interior of the side wall.

[0013] The body may include a dispensing orifice. The orifice may, for example, be provided generally centrally

in a top plate. The body may include a self-closing valve.

[0014] The closure may include a top plate from which the side wall depends.

[0015] The present invention also provides a one-piece moulded closure for closing an opening of a bottle, the closure comprising a top wall and a side wall depending from the periphery thereof, in which the end of the sidewall opposite the top wall includes one or more unscrewing features for allowing the closure to be rotated during demoulding.

[0016] Closures formed in accordance with the present invention may form part of a dispensing pump. In some aspects and embodiments the closure may be formed as part of a flip-top dispensing closure, with a base and a lid connected by a hinge.

[0017] The closure may be a snap-on closure, with the closure including a special snapping feature.

[0018] The snap-on feature may be provided on a closure base. The closure may also comprise a lid. The base and lid may be connected or connectable together, for example with a hinge.

[0019] The closure may be a tube closure.

[0020] The closure may be a dispensing closure, with a dispensing orifice (for example formed generally centrally in a base).

[0021] The closure may include one or more demoulding teeth and/or cavities. The teeth/cavities may be formed at the open end of a base side skirt.

[0022] The closure may be substantially non-removable i.e. the intention is that once it is applied to a container (neck) it cannot easily be removed. In this case there is no requirement for a TE band, since it is not desired to remove the closure from the tube or bottle.

[0023] The present invention also provides a moulded closure for closing an opening of a container, the closure comprising a top wall and a side wall depending from the periphery thereof, in which the end of the sidewall opposite the top wall includes one or more unscrewing features for allowing the closure to be rotated during demoulding.

[0024] In some embodiments cavities localised around and within the rim of a skirt are provided, hence the transmissible torque applied to the closure and subsequently to the teeth between the cavities is different.

[0025] Examples of embodiments of the present invention include:

- food (such as ketchup) bottles
- non-removable closures in order to make sure only the "proper stuff" is served and the original bottle cannot be refilled
- closures for ketchup, mayo, honey
- wide mouth closures
- tubes
- cosmetic tube closures in order to have non-removable closures for cream etc. products
- pharmaceutical applications, wherein the pump comprises such a snap on feature and is thereby

non-removable connected to the bottle (increase safety of the product).

[0026] The present invention also provides a closure as described herein in combination with a container.

[0027] Different aspects and embodiments of the invention may be used separately or together.

[0028] The present invention is more particularly shown and described, by way of example, with reference to the accompanying drawings.

[0029] 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 alternate forms and should not be construed as limited to the examples set forth herein.

[0030] 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.

[0031] 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.

[0032] The scope of the invention is indicated by the appended claims. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.

[0033] There is shown a closure generally indicated 10 which is attached to the neck 15 of a container 20.

[0034] The closure 10 comprises a body that includes a domed top plate 25 and a generally cylindrical sidewall 30.

[0035] The top plate 25 is generally disc-shape and has a central dispending orifice 26. An annular skirt 27 is provided and depends from the top plate 25 around the region of the orifice. When the closure is applied to the container the skirt 27 extends into an opening 16 in the neck 15.

[0036] One end of the sidewall extends from the periphery of the top plate. The other end (the free end) of the sidewall terminates with a rim 31. A plurality of mutually spaced arcuate cavities 32 are formed in the rim i.

e. around the circumference of the free end. The material of the rim between the cavities forms teeth/drive dogs 33.

[0037] On the interior surface of the sidewall a plurality of arcuate retention bead segments 35 are provided. The segments 35 are mutually spaced around the sidewall, at or towards the end proximal the rim 31. The segments extend radially inwards and upwards (towards the top plate).

[0038] Also provided on the interior surface of the sidewall are a plurality of elongate anti-rotation lugs 40. In this embodiment each lug has a corresponding bead segment. The lugs extend axially, at one end to the top plate and at the other end terminating axially above their respective bead segment (spaced therefrom) and being in line with one side/end of the segment. This produces a generally L-shape configuration (with a small axial gap).

[0039] The neck 15 includes an annular snap bead 17 extending circumferentially therearound, and also a plurality of axial anti-rotation lugs 45, which in this embodiment extend from the bead to the rim of the neck.

[0040] When the closure is fitted onto the neck the bead segments 35 on the body snap/clip under the bead 17. This prevents the closure from being removed from the container.

[0041] In addition, the closure lugs 40 will engage the neck lugs 45 to prevent rotation of the closure (limited rotation of the closure may be possible).

[0042] In this embodiment the closure is formed by a moulding process, such as injection moulding.

[0043] The cam design is demoulded via an unscrewing process.

[0044] The mould (not shown) for the moulding process has a central core with four sliders. The sliders move in parallel with a first demoulding stroke. The location of the slider is shown by A in Figure 4.

[0045] In a second demoulding step the closure is rotated 90 degrees via the cavities/drive dogs in the area B. For example unscrewing teeth can be inserted into the rim cavities.

[0046] The principle works a little like a bayonet fitting.

[0047] 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.

Claims

1. A non-removable container closure comprising a body including a side wall with one or more snap-on features provided on the inside thereof, in which the body includes demoulding means for rotation during demoulding.
2. A closure as claimed in claim 1, in which the snap-

on feature comprises a snap bead.

3. A closure as claimed in claim 2, in which a plurality of arcuate snap bead portions are provided and are mutually spaced on the interior of the side wall, projecting radially on wards therefrom. 5
4. A closure as claimed in claim 3, in which for each snap bead portion a corresponding axial lug is provided. 10
5. A closure as claimed in claim 4, in which the lugs are axially spaced from the respective bead portions and are circumferentially located at one end thereof. 15
6. A closure as claimed in any preceding claim, in which an end of the side wall includes one or more unscrewing features for allowing the closure to be rotated during demoulding. 20
7. A closure as claimed in claim 6, in which the end of the side wall is provided with one or more cavities for allowing the body to be rotated during demoulding. 25
8. A closure as claimed in any preceding claim, in which the snap bead is located proximal to the free end of the side wall.
9. A closure as claimed in any preceding claim, in which the snap bead extends radially inwards and upwards from the interior of the side wall. 30
10. A closure as claimed in any preceding claim, in which the body includes a dispensing orifice. 35
11. A closure as claimed in any preceding claim, comprising a top plate from which the side wall depends.
12. A one-piece moulded closure for closing an opening of a bottle, the closure comprising a top wall and a side wall depending from the periphery thereof, in which the end of the sidewall opposite the top wall includes one or more unscrewing features for allowing the closure to be rotated during demoulding. 40 45
13. A closure as claimed in any preceding claim, in which the closure forms part of a dispensing pump.
14. A closure as claimed in any of claims 1 to 12, in which the closure is formed as part of a flip-top dispensing closure. 50
15. A closure as claimed in any preceding claim in combination with a container. 55

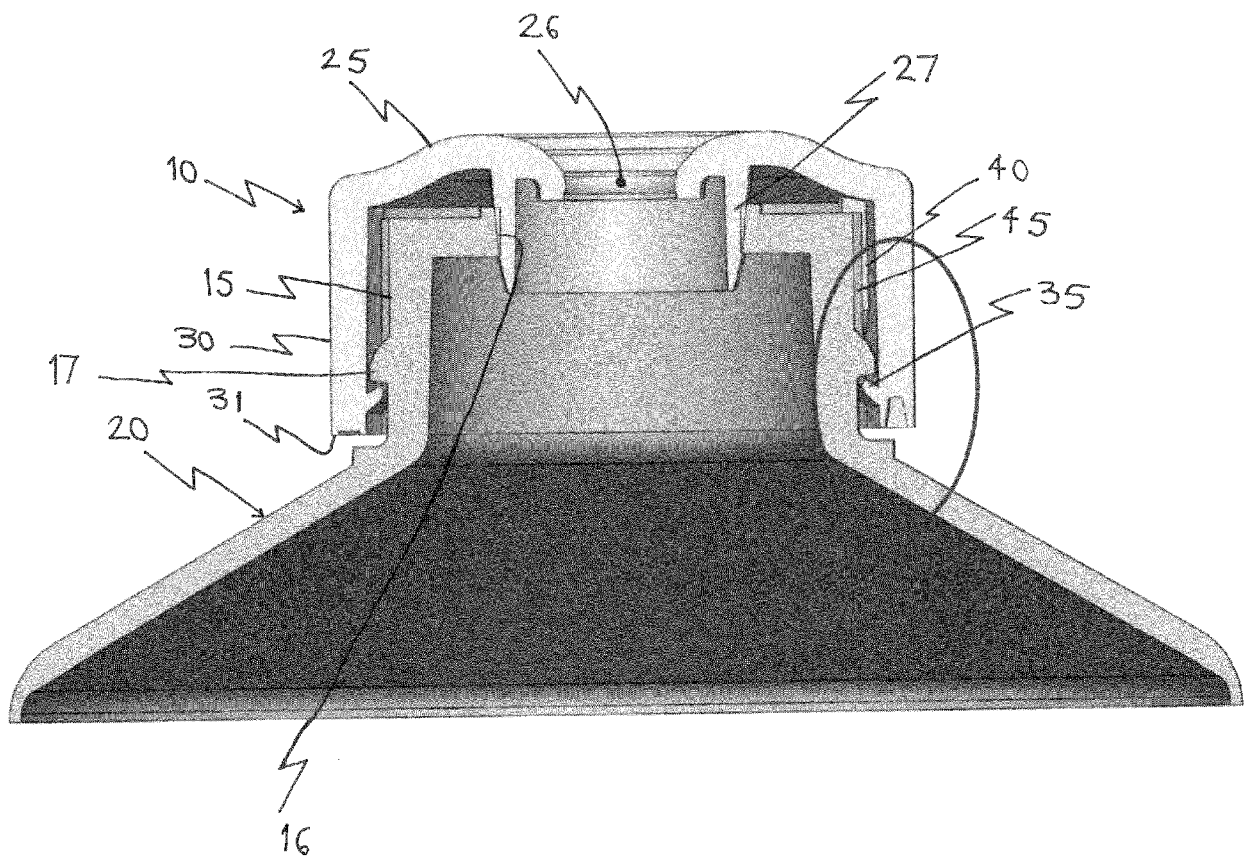


Figure 1

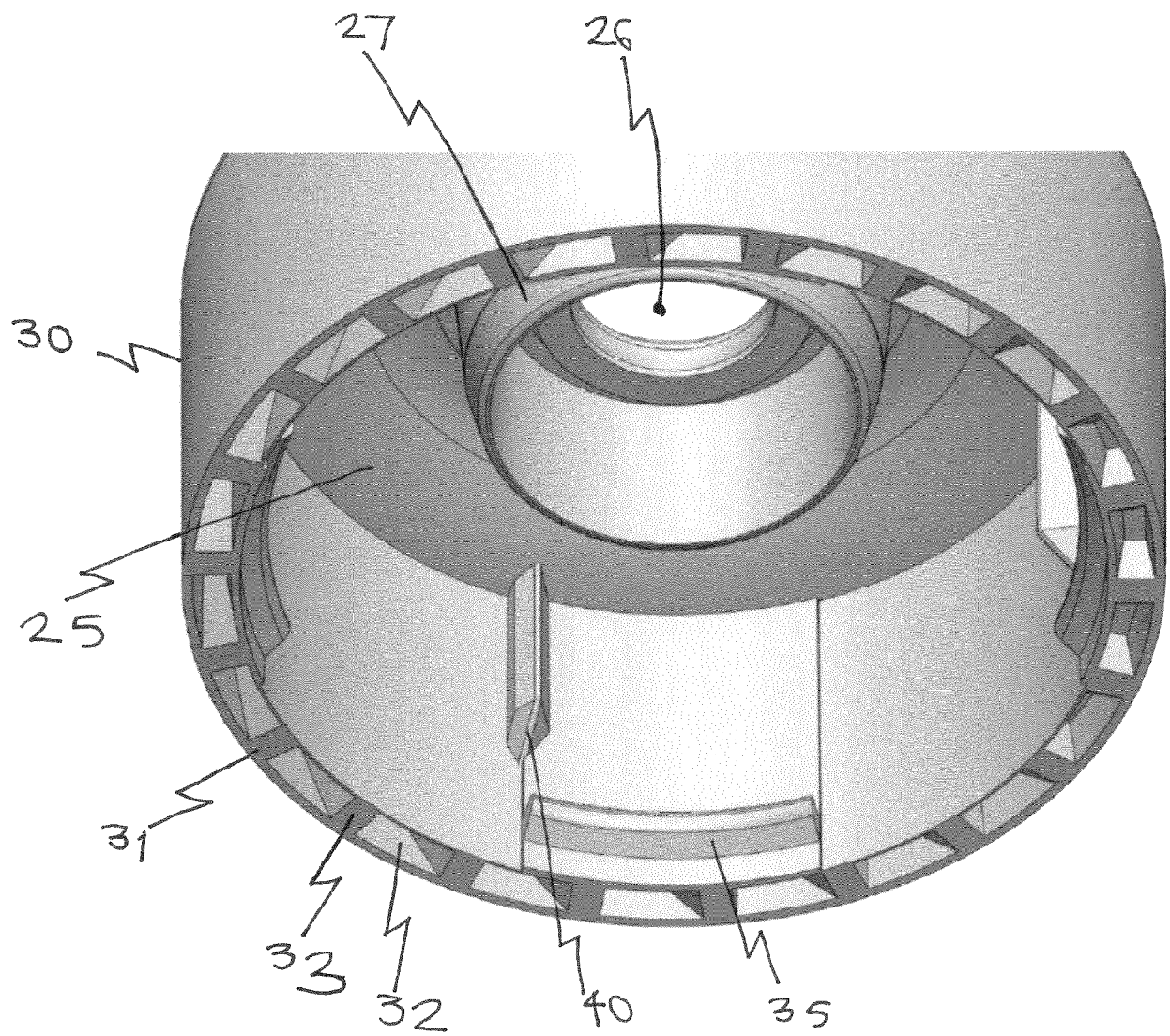
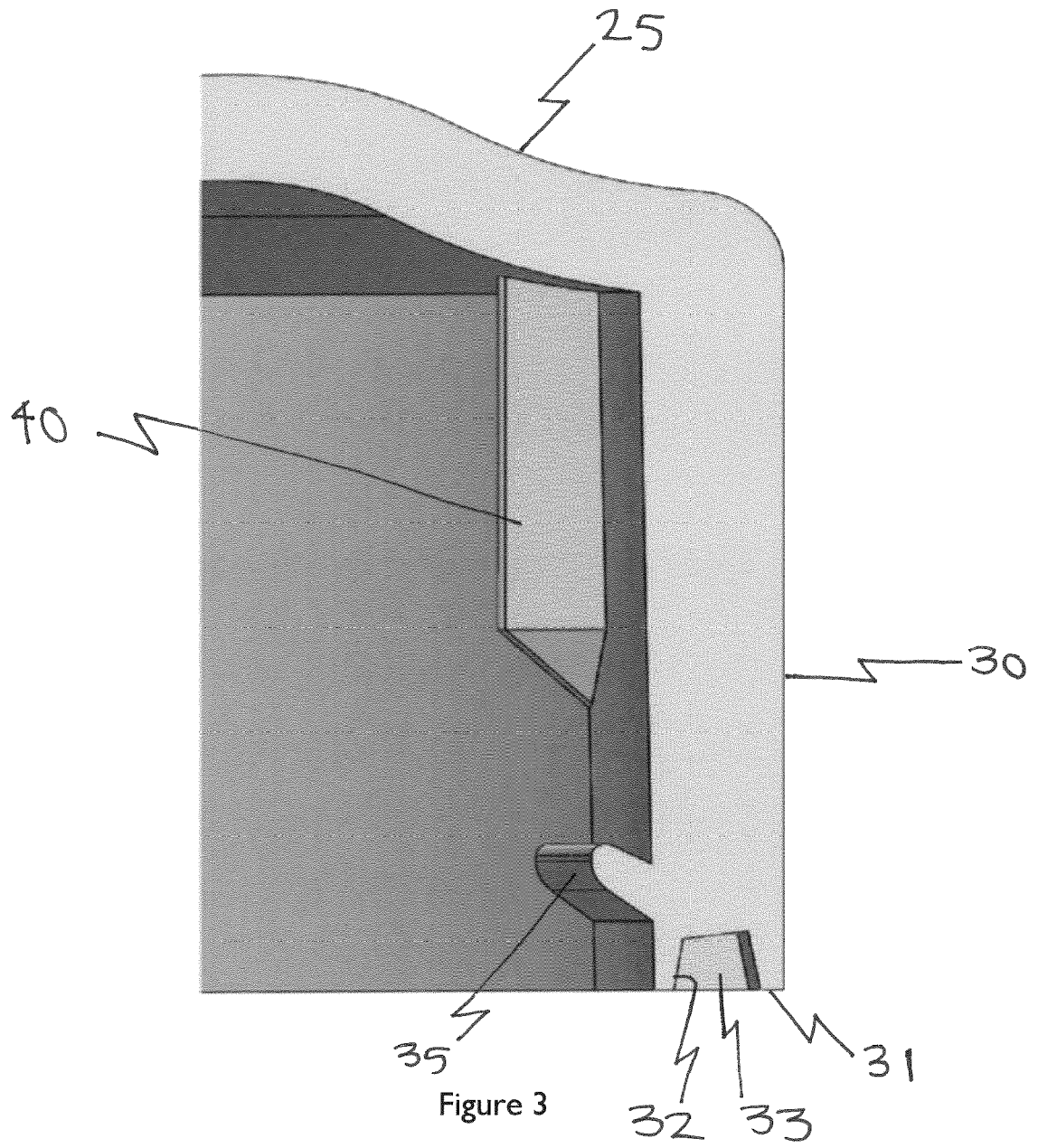


Figure 2



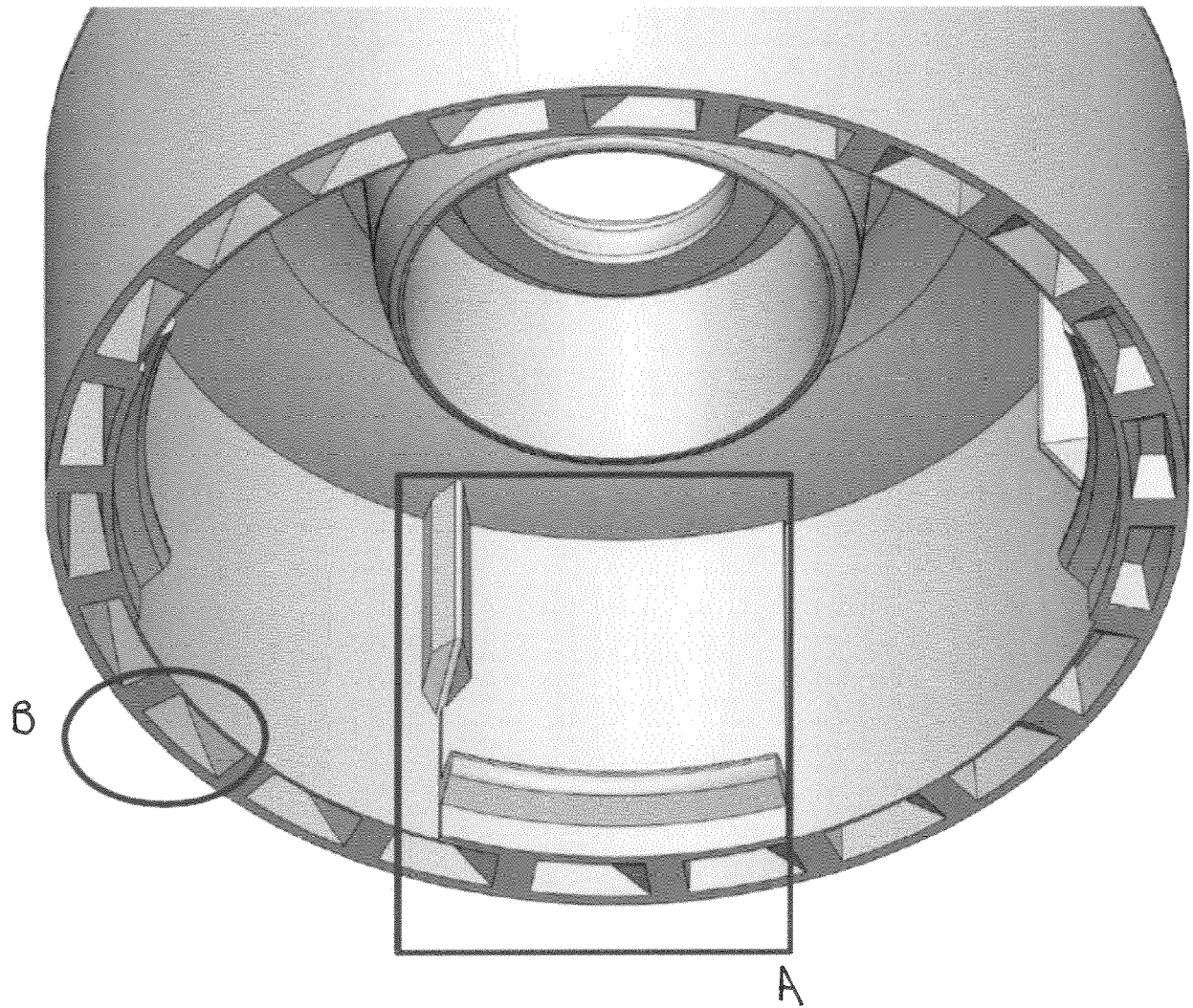


Figure 4



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Application Number
EP 18 16 8600

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 September 2018	Examiner Dederichs, August
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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Y	US 2010/096415 A1 (DENNIS STEPHEN R [US]) 22 April 2010 (2010-04-22) * Snap-fit pump dispenser, optionally non-removable from container once snapped on; paragraph [0020]; claims; figures *	13	
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