



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**03.06.2020 Bulletin 2020/23**

(51) Int Cl.:  
**B65D 85/804 (2006.01)**

(21) Application number: **18209248.6**

(22) Date of filing: **29.11.2018**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

Designated Extension States:  
**BA ME**

Designated Validation States:  
**KH MA MD TN**

(71) Applicant: **Société des Produits Nestlé S.A.**  
**1800 Vevey (CH)**

(72) Inventors:  

- **MAGNIET, Ines**  
**1814 La Tour-de-Peilz (CH)**
- **FLICK, Jean-Marc**  
**1405 Pomy (CH)**

(74) Representative: **Navarro Fernández, Maria Isabel**  
**Société des Produits Nestlé S.A.**  
**Avenue Nestlé 55**  
**1800 Vevey (CH)**

(54) **CAPSULE WITH INJECTOR INSERT**

(57) The invention relates to a capsule (1) for use in a beverage preparation device, the capsule containing nutritional ingredients for producing a nutritional liquid upon interaction with liquid fed into the capsule, the capsule (1) comprising a capsule body (2), an injector insert (3) and a top membrane (4), the capsule body (2) comprising an essentially cup-shaped ingredients compartment (5) and a laterally extending support seat (6) for supporting the injector insert (3), the injector insert (3) being an integrally formed part arranged essentially transversally within the capsule body

(2) and comprising one receiving compartment (7) for receiving one injection means (20a) for liquid and for gas of the beverage preparation device and outlet means (8) for communicating the receiving compartment (7) with the ingredients compartment (5) of the capsule, the injector insert (3) comprising a flat body portion (16) delimited by a groove (40), such that the receiving compartment (7) is configured as a separated and delimited compartment in the injector insert (3), separated from the flat body portion (16) and the groove (40), the receiving compartment (7) further comprising the outlet means (8) communicating with the ingredients compartment (5) of the capsule.

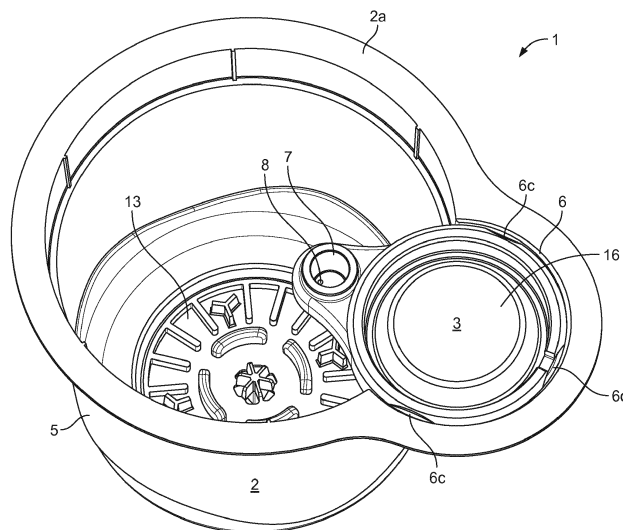


FIG. 1

## Description

### Field of the invention

**[0001]** The present invention relates to the field of capsules for beverage preparation in a beverage preparation device by mixing liquid with a nutritional substance held in the capsule. In particular, the invention relates to the field of preparation of nutritional liquids such as infant formula.

### Background and object of the invention

**[0002]** Capsules for the preparation of nutritional liquids such as infant formula are already available on the market. Such capsules usually hold a predefined amount of nutritional ingredients for preparing a single-serve portion of nutritional liquid such as infant formula upon reconstituting with liquid such as water. These capsules are usually designed for being used in conjunction with a beverage preparation device designed to inject liquid into the capsule and subsequently inject pressurized air in order to empty the capsule. Accordingly, a ready-to-feed single serve portion of nutritional liquid is provided.

**[0003]** EP 2 427 067 B1 for example relates to a capsule comprising a separate filter insert having a liquid inlet, a gas inlet and a fluid outlet for injecting liquid and gas into a compartment of the capsule containing nutritional ingredients. The liquid inlet is positioned such as to supply liquid through a filter membrane of the filter insert so that contaminant in the provided liquid may be removed. The gas inlet that enables filling of the ingredient compartment with pressurized air so as to empty the capsule after injection of water thereto is arranged to bypass the filter membrane.

**[0004]** A drawback of this capsule is the provision of a large amount of parts within the capsule that leads to a complex manufacturing process.

**[0005]** CN 106388596 A relates to a capsule for preparing a nutritional product comprising a fluid insert in the shape of a hollow column that extends inside the capsule and that is disposed essentially perpendicularly to a closing top lid of the capsule. The hollow column is provided with a water inlet and a water outlet whereby the water inlet is sealed by the top lid. The water inlet is also designed for having gas injected into the capsule after injection of the water.

**[0006]** This capsule suffers the drawback that the vertically arranged hollow column for providing liquid and air to the capsule does not enable optimized dissolution of the ingredients within the capsule and complete emptying of the capsule cannot be guaranteed. Furthermore, the provided structure leads to an increased pressure concentration at the center of the lid during preparation of the nutritional liquid which may lead to deflection and/or leakage of the lid of the capsule.

**[0007]** The present invention addresses the drawbacks of the prior art and aims at providing an enhanced

capsule that enables a facilitated manufacturing process and which provides means for guaranteeing an optimized dissolution and emptying of the capsule without deflection and/or leakage of its parts. Moreover, the capsule of the invention allows a guaranteed hygiene and cleanliness of the injector needle for providing liquid and/or air to the capsule, as it will follow from the attached Description.

**[0008]** This object is achieved by means of the features of the independent claims. The dependent claims develop further the central idea of the present invention.

### Summary of the invention

**[0009]** According to a first aspect, the invention relates to a capsule (1) for use in a beverage preparation device, the capsule containing nutritional ingredients for producing a nutritional liquid upon interaction with liquid fed into the capsule: the capsule comprises a capsule body, an injector insert and a top membrane, the capsule body comprising an essentially cup-shaped ingredients compartment and a laterally extending support seat for supporting the injector insert, the injector insert being an integrally formed part arranged essentially transversally within the capsule body and comprising one receiving compartment for receiving one injection means for liquid and for gas of the beverage preparation device and outlet means for communicating the receiving compartment with the ingredients compartment of the capsule. The injector insert comprises a flat body portion delimited by a groove, such that the receiving compartment is configured as a separated and delimited compartment in the injector insert, separated from the flat body portion and the groove, the receiving compartment further comprising the outlet means communicating with the ingredients compartment of the capsule.

**[0010]** Preferably, the injector insert in the capsule of the invention is void of filter means such as an antimicrobial filter.

**[0011]** Typically, in the capsule according to the invention, the support seat is arranged off-set to the cup-shaped ingredients compartment of the capsule body when seen in top view. The support seat preferably extends essentially parallel to the top membrane of the capsule.

**[0012]** In the capsule of the invention, the injector insert is preferably integrally formed of a single material, e.g. by means of injection molding.

**[0013]** According to a preferred embodiment, the injector insert in the capsule of the invention typically further comprises support means extending from the lower side of the injector insert to additionally support it within the capsule.

**[0014]** Preferably, the support means is situated parallel and adjacent to the inner side of the capsule body when the insert is placed in the capsule body.

**[0015]** In the capsule according to the invention, the insert typically comprises on its lower side one or a plu-

ality of reinforcing ribs or nerves.

**[0016]** Preferably, in the capsule of the invention, the receiving compartment is closed-off by the top membrane of the capsule.

**[0017]** According to a preferred embodiment, the outlet means of the injector insert in the capsule of the invention are arranged off-set to a central axis of the ingredients compartment. In the capsule of the invention, typically, the outlet means are at least partially arranged to provide a swirling movement of liquid provided to the ingredients compartment.

**[0018]** Furthermore, in a preferred embodiment, the top membrane in the capsule of the invention is a pierceable thin membrane covering the receiving compartment of the injector insert.

**[0019]** In a second aspect, the invention further relates to a beverage production system, comprising the cited capsule and a beverage preparation device comprising one means for supplying a liquid and a gas to the capsule.

### Brief description of the drawings

**[0020]** Further features, advantages and objects of the present invention will become apparent for a skilled person when reading the following detailed description of embodiments of the present invention, when taken in conjunction with the figures of the enclosed drawings.

Fig. 1 shows a capsule with an injector insert in perspective top view according to the present invention;

Fig. 2 shows the capsule of Fig. 1 in sectional side view;

Figs. 3a-b show a preferred embodiment of the injector insert of the capsule according to the invention in perspective top view and bottom view, respectively;

Fig. 4 shows the capsule of Fig. 1 according to the invention together with an injection plate of a beverage preparation device in perspective top view;

Fig. 5 shows the capsule and the injection plate of Fig. 4 in sectional side view;

Figs. 6a-b show a preferred embodiment of the injector insert of the capsule according to the invention in perspective top view and bottom view, respectively, different to those views in Figures 3a-b.

### Detailed description of the figures

**[0021]** Figures 1 and 2 relate to a preferred embodiment of a capsule 1 according to the invention. Figures 3a and 3b relate to a more detailed view of an injector insert 3 as will be described here below.

**[0022]** The capsule 1 comprises a capsule body 2, an

injector insert 3 and a top membrane 4 (not shown for clarity in fig. 1). The capsule 1 preferably consists of the aforementioned parts only. In addition, the capsule 1 may comprise an outlet membrane 14 (see fig. 2) arranged at a bottom portion of the capsule 1. The outlet membrane 14 is preferably arranged to cover protruding opening elements 13 provided in the bottom portion of the capsule 1 and opens under pressure increase within the capsule, preferably by means of interaction of the membrane 14 with the opening elements 13. The outlet membrane is preferably connected to and/or sealed to a circumferential planar bottom portion 13a surrounding the opening elements 13.

**[0023]** The capsule body 2 comprises an essentially cup-shaped ingredients compartment 5 and a laterally extending support seat 6 for supporting the injector insert 3. The support seat 6 extends to a single lateral side of the capsule only.

**[0024]** The capsule body 2 is preferably an integral part made e.g. by means of injection molding. The capsule body 2 is preferably made from plastic such as polyethylene or polypropylene. The above-mentioned opening means 13 are preferably formed integrally in the bottom portion of the body 2. The body 2 further comprises a preferably centrally arranged outlet duct 15b for draining the resulting nutritional liquid from the capsule. The outlet duct 15b is preferably arranged opposite to an inlet face 15a of the capsule 1, which is preferably constituted by the top membrane 4.

**[0025]** The laterally extending support seat 6 is integrally formed with the capsule body 2 and the ingredients compartment 5 of the capsule. The support seat 6 is preferably arranged at an uppermost rim portion of the capsule body 2 and is preferably formed as recess or cut-out provided in the capsule body 2. The support seat 6 is arranged laterally off-set to the cup-shaped ingredients compartment 5 and in particular laterally off-set to a central axis Z thereof when seen in top view. The support seat 6 is thus laterally extending away from the rest of the capsule body 2 at a top portion thereof.

**[0026]** The support seat 6 is of essentially arc-shaped or half-moon shaped form. The seat 6 comprises a preferably planar bottom surface 6a and a sidewall portion 6b integrally formed with the body 2 of the capsule. The planar bottom surface 6a preferably extends essentially parallel to the top membrane 4. The sidewall portion 6b is preferably a continuous planar wall portion which is of rounded form in top view. The seat 6 preferably comprises at least one or more protruding engagement means 6c for engaging at least a portion of the injector insert 3 when provided to the support seat 6. The engagement means 6c may be a connecting hook or nose formed in the sidewall portion 6b of the seat 6. The injector insert 3 may be provided with at least one or a plurality of dedicated conformably shaped counterparts for being engaged by the engagement means 6c.

**[0027]** The injector insert 3 is an integrally formed part that is arranged essentially transversally within the cap-

sule body 2. This means that the injector insert 3 extends essentially parallel to the top membrane 4 of the capsule. Further, the extension of the injector insert 3 in said transversal direction is preferably larger than its vertical extension, i.e. in a direction parallel to axis Z of the capsule 1.

**[0028]** The injector insert 3 is preferably shaped such as to be received and supported within the support seat 6 of the capsule 1. Thereby, the injector insert 3 may comprise a substantially flat circular body portion 16; a portion of which is at least housed in the support seat 6 and which is preferably conformably shaped thereto. An outer circular wall portion 3b is preferably conformably shaped to the inner wall portion 6b of the support seat. The outer wall portion 3b may comprise at least one or preferably a plurality of engagement means 3c to engage with the correspondingly arranged engaging means 6c of the support seat 6.

**[0029]** The injector insert 3 preferably further comprises support means 17 such as a support ridge extending from the lower side of the injector insert, as represented in Figure 3b. The support ridge 17 is preferably conformably shaped to the inner side wall of the body 2 in order to additionally support the injector insert 3 within the capsule 1. In particular, the support ridge 17 is situated in parallel and adjacent to the inner side wall of the capsule body 2 when the injector insert 3 is placed in the capsule body.

**[0030]** In the embodiment shown in Figures 1, 2 and 3a-b, the injector insert 3 further comprises a receiving compartment 7 designed to receive injection means 20a for liquid and/or gas of the beverage preparation device (see Figure 5). The receiving compartment 7 is preferably in the form of a circular aperture, formed as a recess in the body of the injector insert. When looking at the upper part or side of the injector insert 3 (top side), there is a flat body portion 16 surrounded by a circular groove 40 delimited by the outer wall portion 3b with the at least one or a plurality of engagement means 3c. The flat portion 16 is used to facilitate the vacuum handling on the production assembly line thus allowing a perfect placement of the insert 3 under the recess 6.

**[0031]** The receiving compartment 7 is preferably arranged to extend from a protruding portion 16a extending substantially flat from the outer circular portion 3b, on one of the sides of the injector insert 3. There is no communication between the circular groove 40 and the receiving compartment 7 in the injector inlet 3. On the lower side of the insert 3, there is the support ridge 17 and one or a plurality of reinforcing ribs or nerves 41. The dimensions of the receiving compartment 7 are such that they allow the easy connection of injections means 20a for liquid and/or gas of the beverage preparation device.

**[0032]** The injector insert 3 further comprises outlet means 8 for enabling a fluid communication between the receiving compartment 7 and the ingredients compartment 5 of the capsule: by fluid we should understand both liquid and gas communication. The outlet means 8

is preferably formed by an opening or outlet duct arranged at the bottom of the receiving compartment 7. The diameter of the outlet opening is preferably within the range of 0.2 to 2mm, preferably between 0.5 and 1.5mm. The small size of this outlet means 8 allows creating a jet of liquid inside the ingredients compartment 5 of the capsule 1 for a good dissolution of the nutritional substance inside of it. Through this same small outlet means 8 air is then injected so that any remaining liquid inside the capsule is delivered as well.

**[0033]** The outlet means 8 are preferably arranged offset to the central axis Z of the ingredients compartment 5 of the capsule 1, as it can be seen in Figure 2, for example. The outlet means 8 may be formed by a bore or opening comprising a central axis that is arranged essentially parallel to the central axis Z of the ingredients compartment.

**[0034]** The top membrane 4 of the capsule 1 is preferably a piercable thin membrane that is arranged to cover the capsule body 2 and the injector insert 3 provided thereto. The top membrane 4 is preferably connected to and/or sealed to an upper rim portion 2a of the capsule body 2. The membrane 4 may additionally be connected to and/or sealed to the injector insert 3. Thereby, the top membrane 4 closes-off the receiving compartment 7 of the injector insert 3. The top membrane 4 together with the support seat 6 thus holds the injector insert 3 in place within the capsule 1.

**[0035]** Figure 5 relates to the capsule according to Figures 1 to 4 when being engaged by a beverage preparation device according to the invention (not shown). The beverage preparation device which is known as such may comprise an injection plate 20 which is designed to selectively contact a fluid inlet face 15a of the capsule 1. Thereby, the injection plate 20 is preferably arranged in parallel to the top membrane 4 of the capsule 1 when the capsule 1 is engaged by the beverage preparation device (see Fig. 5).

**[0036]** The injection plate 20 of the device preferably comprises the injection means 20a of the device, which are designed for providing liquid and/or gas to the capsule 1. The injection means 20a is preferably a needle element which protrudes from a lower surface of the injection plate 20. The needle is designed to pierce the top membrane 4, thus opening the inlet face 15a of the capsule. The injection means 20a in the machine will be configured to inject water and also air through the corresponding injection means connection 35 in the injection plate 20, so the injection means 20a will connect or engage in this connection 35 of the injection plate 20. The injection means 20a will inject water first into the capsule, in order to mix and prepare the nutritional substance arranged in the capsule that will be delivered through the outlet duct 15b, and then these means 20a will inject air so as to empty the content of substance prepared in the capsule, so the injection will be sequential (first water, then air). As the nutritional liquids prepared in the capsule of the invention will be preferably for infant formulae, it is very

important that it is ensured that all the content in the capsule is delivered, so the air injected at the end ensures the delivery of the remaining product in the capsule.

**[0037]** In a preferred embodiment, the beverage preparation device will receive the capsule, e.g. in a dedicated receiving means such as a drawer or the like. Subsequently, the injection plate 20 will be lowered onto the top membrane 4 in order to open the top membrane 4 by means of the protruding injection means 20a connecting the injection plate 20 through the injection means connection 35. The injection plate 20 preferably comprises sealing means 20c that seal locally, i.e. in direct vicinity, about the circumference of the injection means 20a. As alternative or in addition, the injection plate 20 may as well comprise sealing means that contact e.g. the upper rim portion 2a of the capsule in a fluid-tight manner.

**[0038]** After the injection means 20a are connected to the capsule 1 and are thus received by the receiving compartment 7, the device preferably provides first liquid to the receiving compartment 7 by means of the injection means 20a. The liquid will then go through the outlet means 8 of the compartment 7. The liquid will then interact with the ingredients held in the compartment 5 in order to reconstitute a nutritional beverage. Upon rising pressure within the compartment 5, the outlet membrane 14 will open or tear, e.g. by means of interaction with the protruding opening elements 13 of the capsule. The nutritional beverage may then be drained from the capsule via the outlet duct 15b. After a preferably predetermined amount of liquid such as water has been supplied to the capsule, the liquid provision will be stopped. The same injection means 20a connecting the plate 20 in the injection means connection 35 will then inject air, so that any remaining liquid may thus be emptied from the capsule 1. As previously explained, first water will be injected to prepare the nutritional beverage and then air will be injected in order to empty the remaining beverage in the capsule. After the beverage preparation process, the capsule 1 may be removed from the beverage preparation device in order to insert a new capsule for consecutive beverage preparation.

**[0039]** The configuration of the injector insert 3 is much simpler as there is only one injection means 20a connecting with it, in the receiving compartment 7: the same and only injections means 20a are configured to inject water and also air, preferably sequentially. It is extremely important in the configuration of the invention that the injection means 20a are clean and do not get contaminated when the nutritional beverage (typically milk) is prepared, as the beverage is intended for infant and babies consumption. When you inject water into the compartment 7 and through the outlet means 8, no fluid can move up through the outlet means 8 as they are of extremely small size (this small size is intended for creating a jet of water inside the capsule volume and thus a good mixing of the product. There is no risk either of the injection means 20a (typically a needle) being contaminated as injection is made into the compartment 7 and no product

from inside the capsule goes up through the outlet means 8 and into the compartment 7.

**[0040]** When there is only one injection means 20a the injector insert 3 can be made quite simple, light and less material is needed for configuring this element. The circular groove 40 surrounding the flat body portion 16 of the insert 3 is made in order to lower the material needed for the said element 3, so it is made lighter. The injection plate 20 is also configured to position correctly the capsule in the preparation machine, and it is also the interface for the capsule and the machine, in order to have a correct connection of the injection means 20a.

**[0041]** The injector insert 3 of the invention is made in such a way that it comprises a receiving compartment 7 which is isolated from the rest of the insert 3, thus being configured as a separated compartment where the injection of fluid takes place, and goes into the inner volume of the capsule 5 (ingredients compartment), through the outlet means 8. The outlet means 8 provides a fluidic restriction thus allowing the formation of a liquid jet that will further enhance the dissolution of the product held in the compartment 2. With such configuration, the risk of contamination is avoided as the injection means 20a connect directly into the receiving compartment 7 and the prepared beverage cannot go up into the compartment 7 through the small outlet means 8. The liquid injected in the compartment 7 induces a pressure level P1 which is above the pressure P2 of the compartment 2. Therefore, this resulting  $\Delta P$  ( $P1 - P2$ ) is maintained up to the end of the beverage preparation process: as the compartment 2 is opened through the membrane 14, a cross contamination of the compartment 7 cannot happen thanks to the fact that  $P1 > P2$ . The advantage of such configuration is that both fluid (typically water) and air are injected into the receiving compartment 7 by one injection means 20a, first injecting fluid and then air, sequentially. Only one compartment is needed for receiving the injection means 20a and for injecting water and air. The injection means 20a can be configured to inject sequentially and/or simultaneously the fluid (water) and air. The rest of the insert 3 is made with less material (lighter), comprising a circular groove 40 which alleviates weight from the part, as described.

**[0042]** Although the present invention has been described with reference to preferred embodiments thereof, many modifications and alternations may be made by a person having ordinary skill in the art without departing from the scope of this invention which is defined by the appended claims.

## Claims

1. A capsule (1) for use in a beverage preparation device, the capsule containing nutritional ingredients for producing a nutritional liquid upon interaction with liquid fed into the capsule,

- the capsule (1) comprising a capsule body (2), an injector insert (3) and a top membrane (4), the capsule body (2) comprising an essentially cup-shaped ingredients compartment (5) and a laterally extending support seat (6) for supporting the injector insert (3), the injector insert (3) being an integrally formed part arranged essentially transversally within the capsule body (2) and comprising one receiving compartment (7) for receiving one injection means (20a) for liquid and for gas of the beverage preparation device and outlet means (8) for communicating the receiving compartment (7) with the ingredients compartment (5) of the capsule, wherein the injector insert (3) comprises a flat body portion (16) delimited by a groove (40), such that the receiving compartment (7) is configured as a separated and delimited compartment in the injector insert (3), separated from the flat body portion (16) and the groove (40), the receiving compartment (7) further comprising the outlet means (8) communicating with the ingredients compartment (5) of the capsule.
2. The capsule according to claim 1, wherein the injector insert (3) is void of filter means such as an antimicrobial filter.
  3. The capsule according to claim 1 or 2, wherein the support seat (6) is arranged off-set to the cup-shaped ingredients compartment (5) of the capsule body (2) when seen in top view.
  4. The capsule according to any of claims 1 to 3, wherein the support seat (6) extends essentially parallel to the top membrane (4) of the capsule.
  5. The capsule according to any of the preceding claims, wherein the injector insert (3) is integrally formed of a single material, e.g. by means of injection molding.
  6. The capsule according to any of the preceding claims, wherein the injector insert (3) further comprises support means (17) extending from the lower side of the injector insert (3) to additionally support it within the capsule.
  7. The capsule of claim 6 wherein the support means (17) is situated parallel and adjacent to the inner side of the capsule body (2) when the insert (3) is placed in the capsule body (2).
  8. The capsule according to any of the preceding claims, wherein the insert (3) comprises on its lower side one or a plurality of reinforcing ribs or nerves (41).
  9. The capsule according to any of the preceding claims, wherein the receiving compartment (7) is closed-off by the top membrane (4) of the capsule.
  10. The capsule according to any of the preceding claims, wherein the outlet means (8) of the injector insert (3) are arranged off-set to a central axis (Z) of the ingredients compartment (5).
  11. The capsule according to any of the preceding claims, wherein the outlet means (8) are at least partially arranged to provide a swirling movement of liquid provided to the ingredients compartment (5).
  12. The capsule according to any of the preceding claims, wherein the top membrane (4) is a piercable thin membrane covering the receiving compartment (7) of the injector insert (3).
  13. A beverage production system, comprising the capsule (1) according to any of the preceding claims and a beverage preparation device comprising one means (20a) for supplying a liquid and a gas to the capsule.

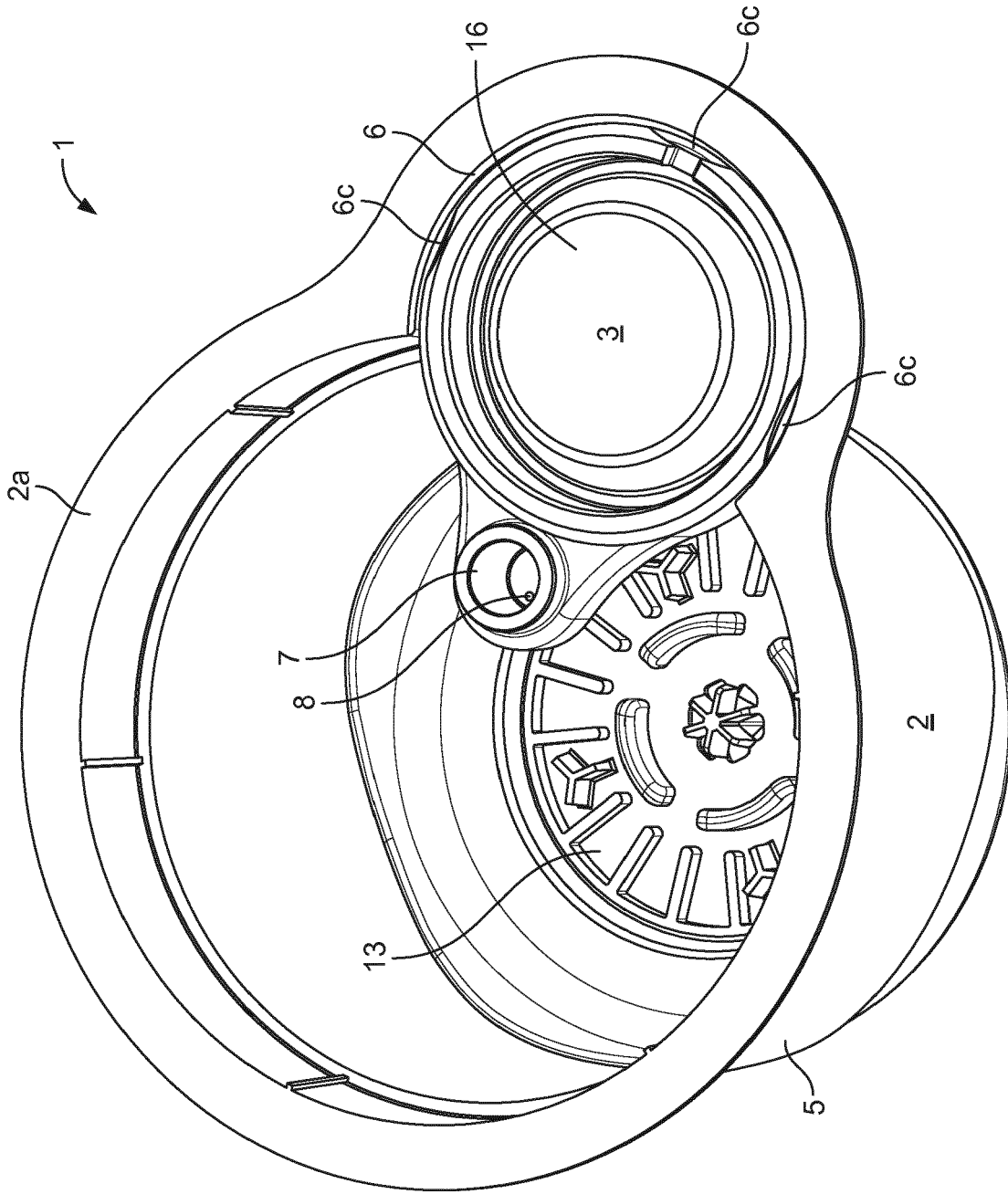


FIG. 1

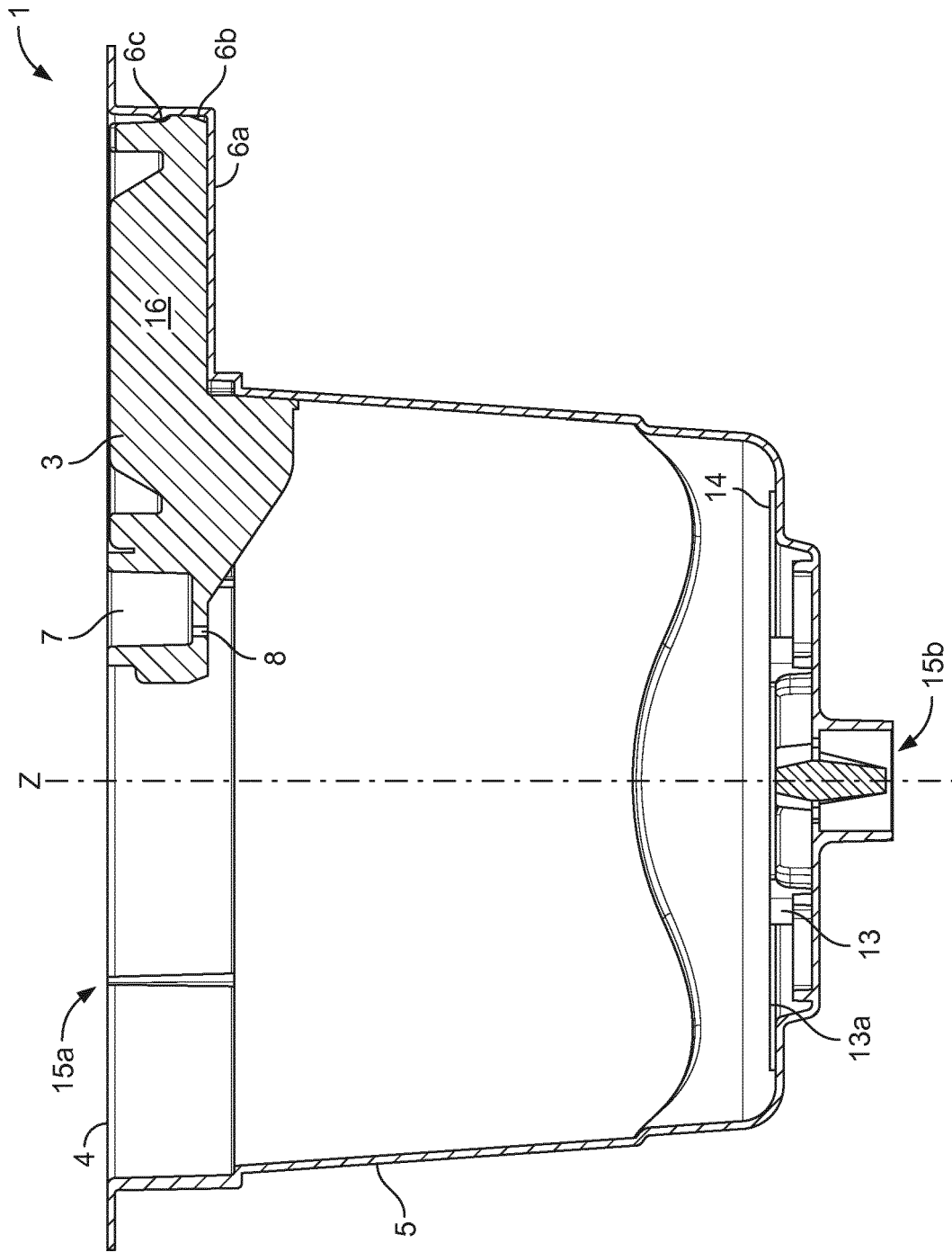


FIG. 2



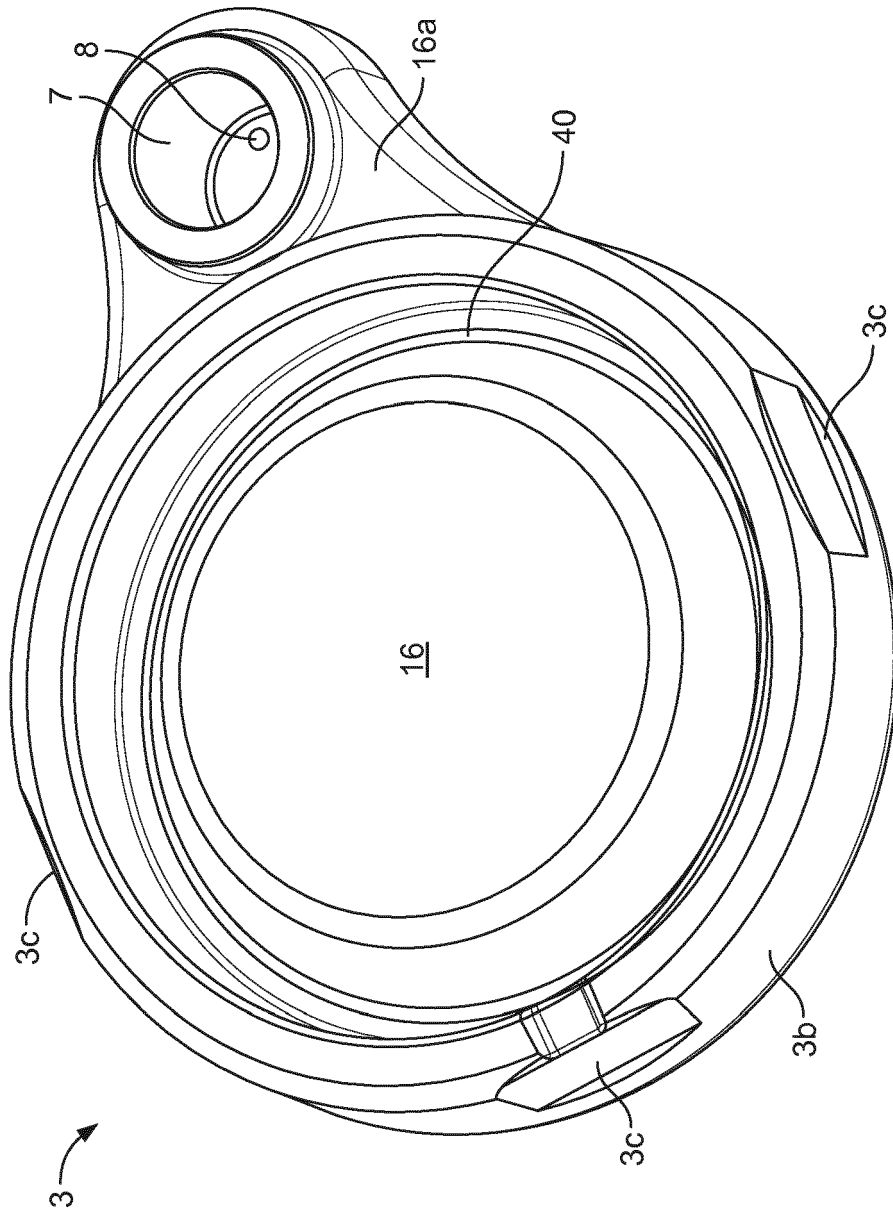


FIG. 3A

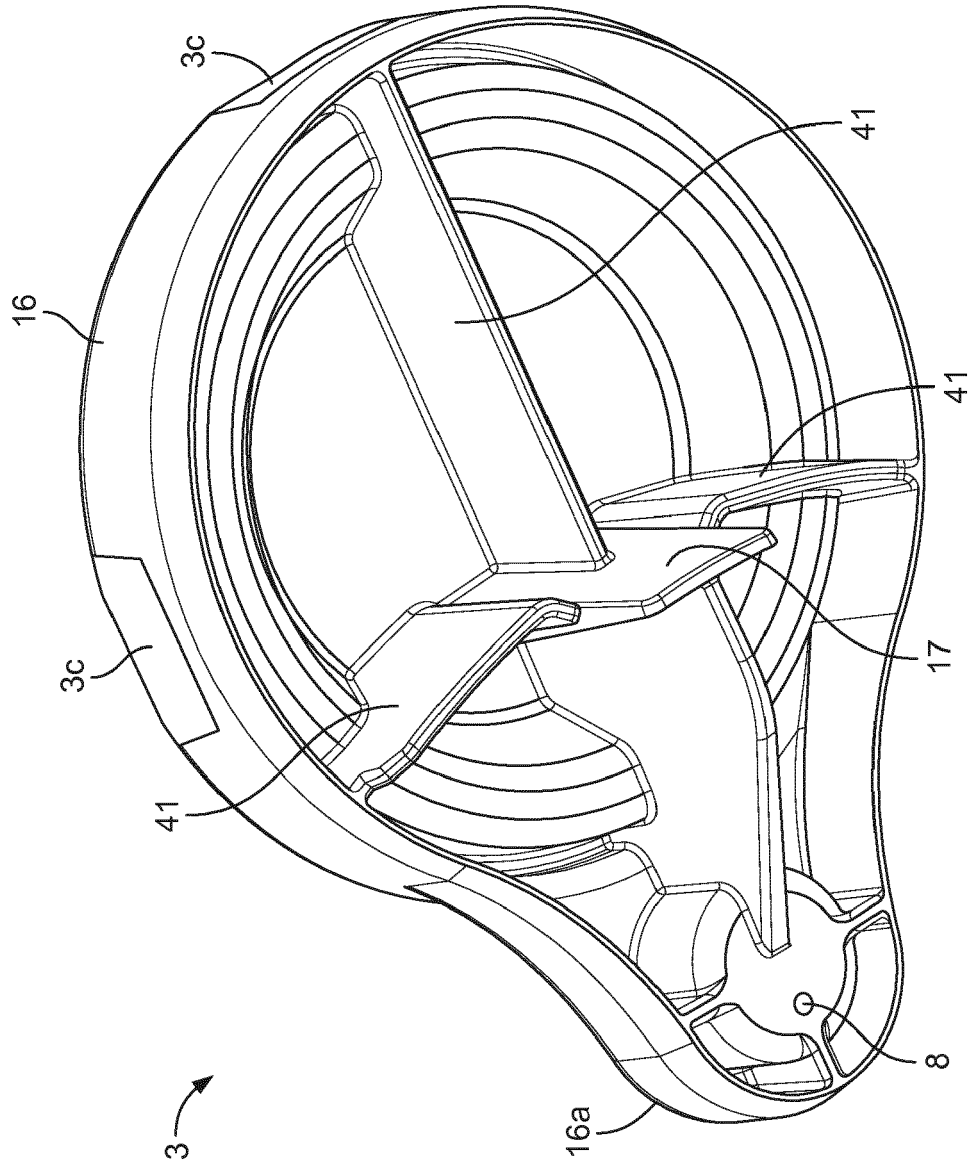


FIG. 3B

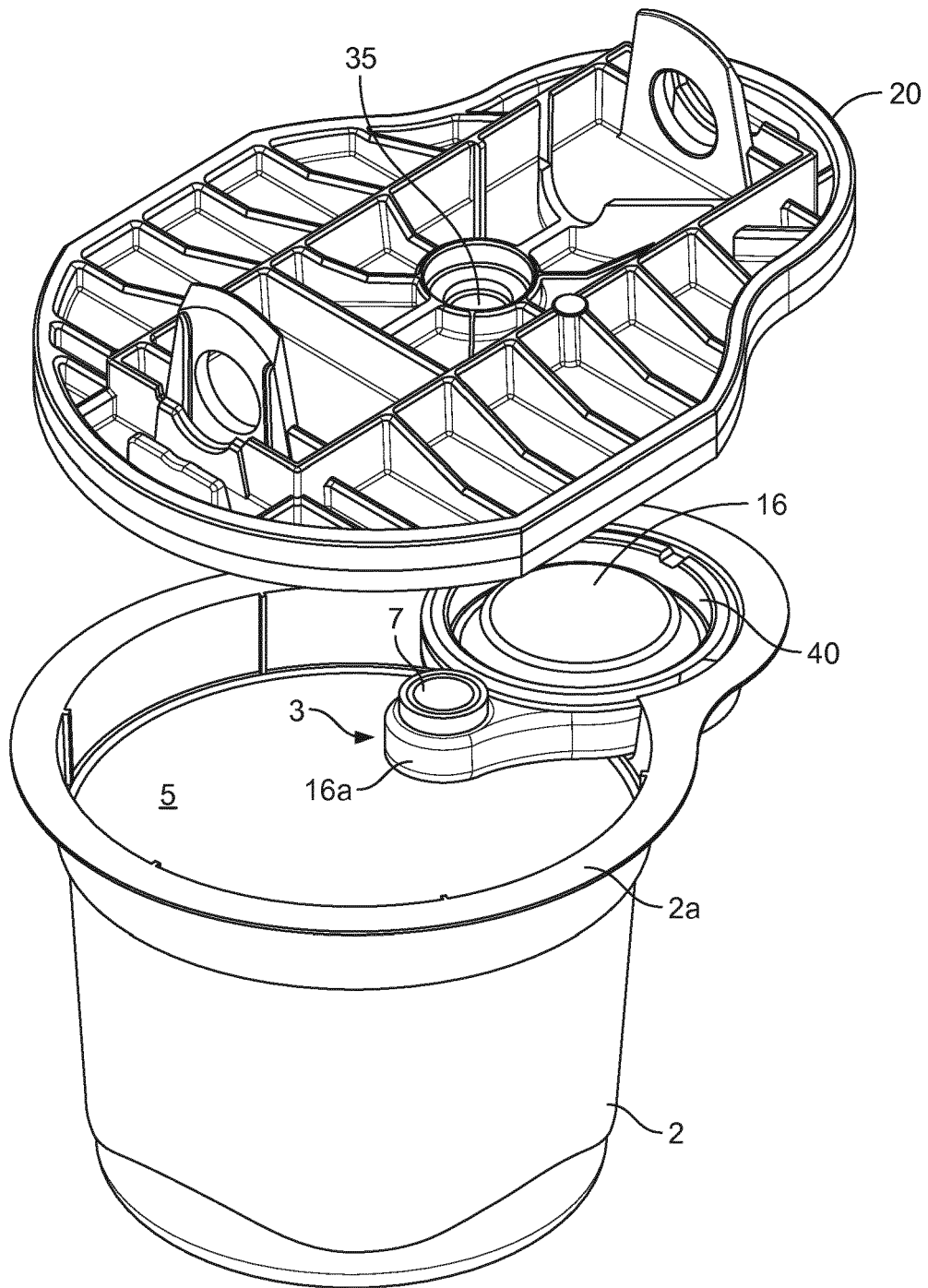


FIG. 4

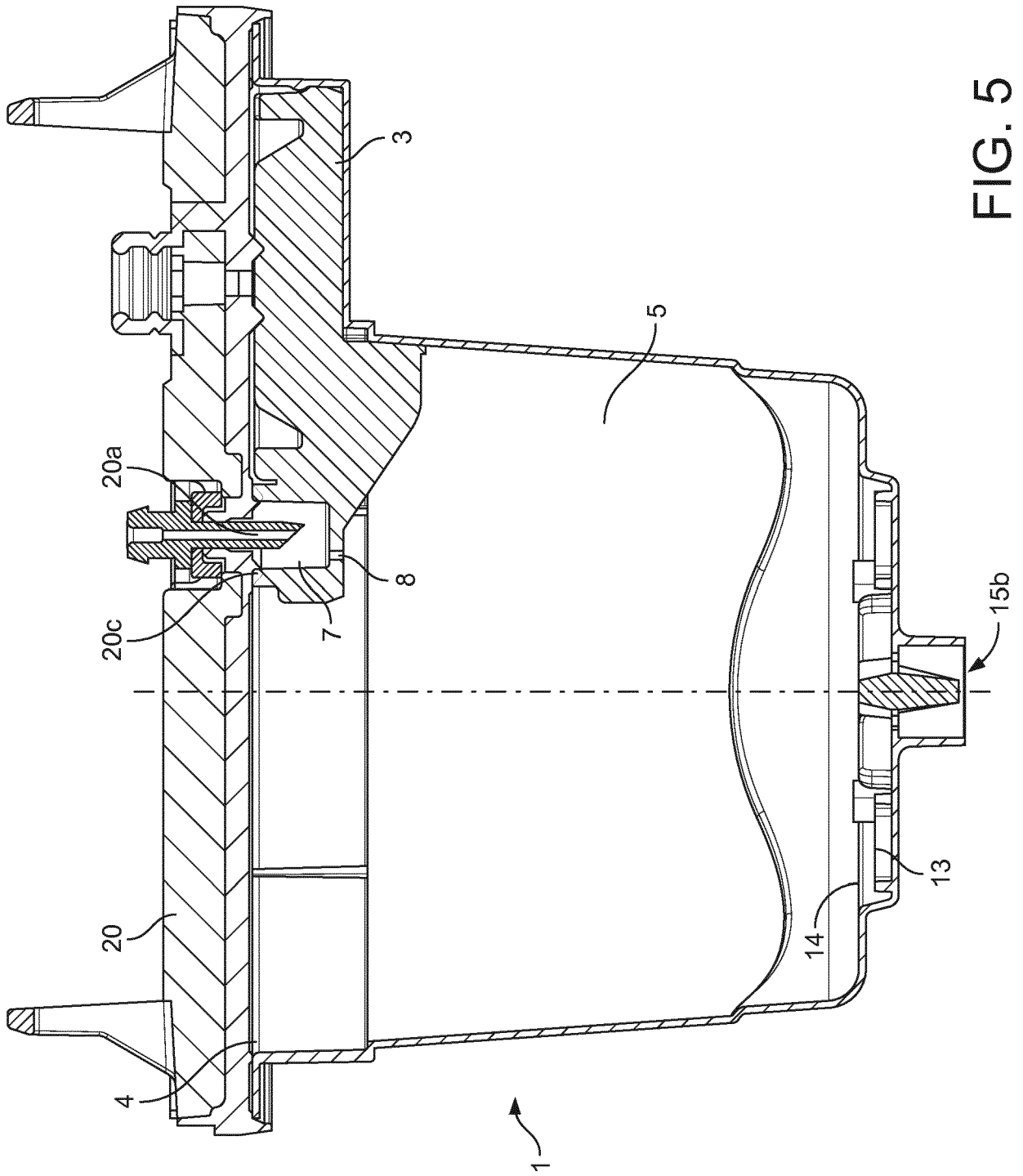


FIG. 5

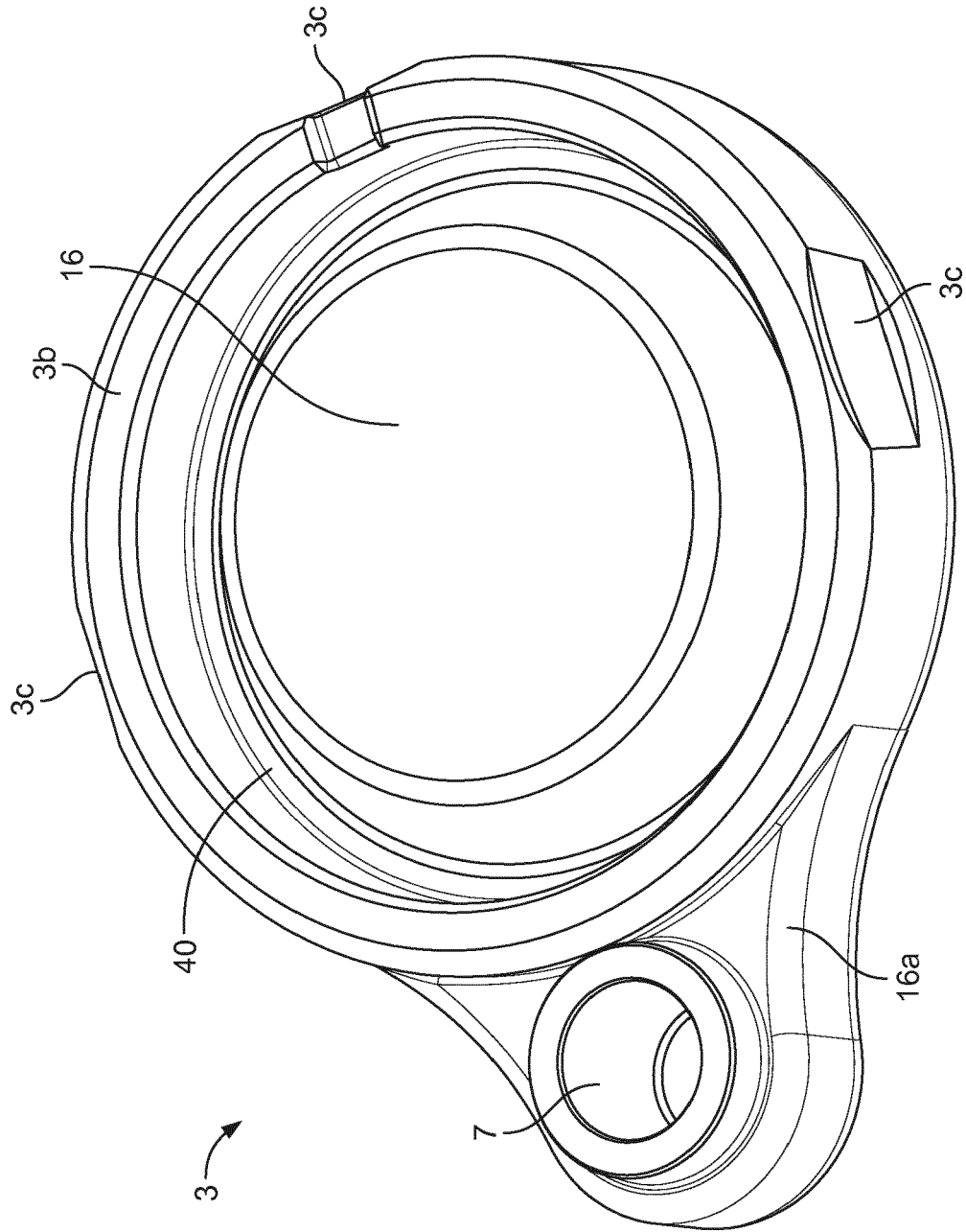


FIG. 6A

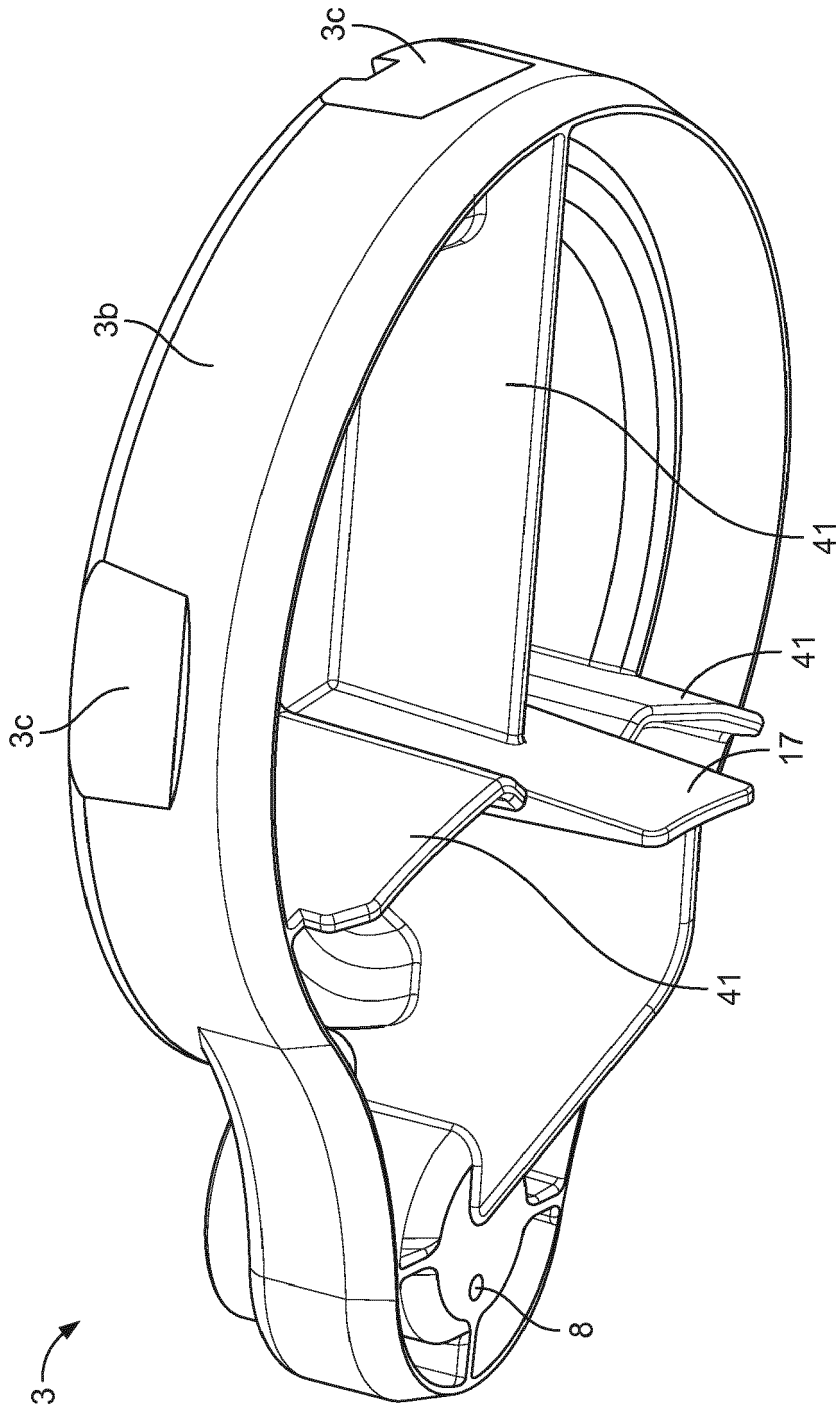


FIG. 6B



EUROPEAN SEARCH REPORT

Application Number  
EP 18 20 9248

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2014/202383 A1 (NESTEC SA [CH]) 24 December 2014 (2014-12-24) * page 9, line 11 - line 21; figure 1 * -----	1-13	INV. B65D85/804
A	WO 2014/082924 A1 (NESTEC SA [CH]) 5 June 2014 (2014-06-05) * paragraph [0065] - paragraph [0068]; figures 1-3 * -----	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>24 May 2019</b>	Examiner <b>Derrien, Yannick</b>
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	

EPO FORM 1503 03/02 (P04/C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 18 20 9248

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-05-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014202383 A1	24-12-2014	AU 2014283588 A1	05-11-2015
		CL 2015003501 A1	07-10-2016
		CN 105324038 A	10-02-2016
		EP 3010356 A1	27-04-2016
		PH 12015502455 A1	22-02-2016
		RU 2016101192 A	19-07-2017
		US 2016120356 A1	05-05-2016
		WO 2014202383 A1	24-12-2014
		-----	-----
WO 2014082924 A1	05-06-2014	CN 104955745 A	30-09-2015
		EP 2925638 A1	07-10-2015
		ES 2588920 T3	07-11-2016
		PL 2925638 T3	31-05-2017
		US 2015284179 A1	08-10-2015
		WO 2014082924 A1	05-06-2014
-----	-----	-----	-----



**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- EP 2427067 B1 [0003]
- CN 106388596 A [0005]