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(71) Applicant: **F. Ceredi S.p.A.**  
**40069 Zola Predosa (IT)**

(72) Inventor: **CEREDI, Fabio**  
**40069 Zola Predosa (BO) (IT)**

(74) Representative: **Studio Torta S.p.A.**  
**Via Viotti, 9**  
**10121 Torino (IT)**

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(54) **SEALING SYSTEM AND TIN FOR LIQUIDS**

(57) A tin for liquids, in particular paints, provided with a sealing system with a stopper (8; 108), a cap (9) and a container (10; 110) for additive substances; the stopper (8; 108) is configured to be hooked, in use, to the opening (7) of a cup shaped body (2) of a tin (1); wherein the cap (9) is configured to be applied to said stopper (8; 108); wherein, the container (10; 110) for additive substances is arranged, before the first opening, at least partially between the stopper (8; 108) and the cap (9).

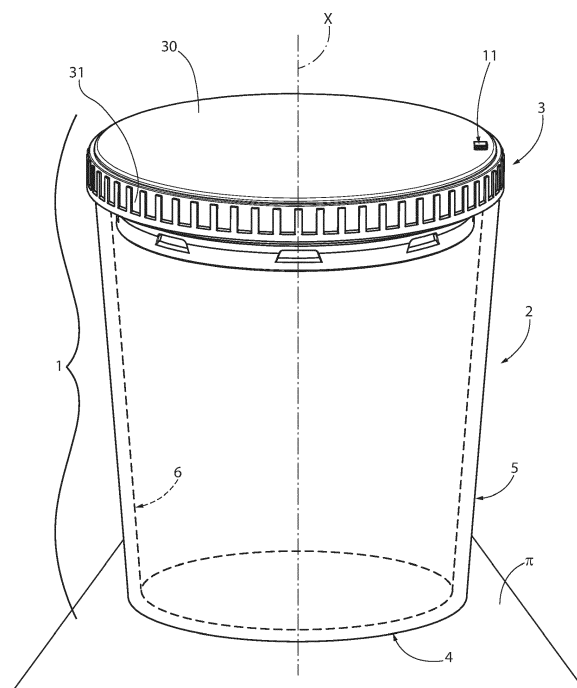


FIG.1

## Description

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102021000023429 filed on September 10, 2021.

### TECHNICAL FIELD

[0002] This patent application for an invention relates to a sealing system for a tin, in particular a tin for liquids.

### PRIOR ART

[0003] A tin for liquids, for example paints, of a known type comprises a cup shaped body that has a longitudinal axis and an upper window surrounded by a basically tubular sealing edge.

[0004] A tin for liquids of a known type comprises, in addition, a sealing system configured to hermetically close the tin itself at the sealing edge.

[0005] A sealing system of a known type comprises, in turn, a stopper and a cap.

[0006] The stopper is configured to be applied to the sealing edge of the tin. In general, the stopper comprises: an annular edge configured to engage, under pressure, with the sealing edge of the tin; a tubular shoulder configured to extend longitudinally partially within the tin; and an external collar that protrudes longitudinally from the annular edge towards the outside of the tin. Normally, the stopper comprises a removable membrane that, in use, hermetically closes the tin and is configured to be removed at the time of its first use.

[0007] The cap is configured to be applied to the external collar of the stopper; in general, the cap may be applied by screwing or pressure.

[0008] In the industry, it is known to automatically apply a sealing system of a known, pre-assembled type to the sealing edge of a tin.

### DESCRIPTION OF THE INVENTION

[0009] Once the tin is opened, in particular once the removable membrane of the stopper has been pulled away, for some types of liquids it is necessary to add an additive, which may be in the solid or liquid state, so as to obtain a given mixture.

[0010] For this type of liquid, it is known to provide the user with vials or small containers containing the additive substance, together with the tin. Usually, these vials or containers of additive are applied to the outside of the tin or are provided separately. This type of solution has the disadvantage of being voluminous, since it is necessary to provide an additional space, in addition to that of the tin, to house the external additive vial or container. In addition, this type of solution has the disadvantage that often during the storage and handling of the tins, the ad-

ditive vial or container is accidentally damaged or removed.

[0011] The purpose of the present invention is to provide a sealing system and a tin that overcome the problems identified above.

[0012] According to the present invention, a sealing system, as described in the attached claims, is provided.

[0013] According to the present invention, a tin, according to the attached claims, is provided.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0014] This invention will now be described with reference to the attached drawings that illustrate a non-limiting embodiment thereof, in which:

- Figure 1 is a perspective view of a tin comprising a sealing system according to this invention;
- Figure 2 is an exploded view of a sealing system according to this invention;
- Figure 3 is a plan view of the sealing system according to this invention;
- Figure 4 is a section along line IV-IV of Figure 3;
- Figure 5 is a section along line V-V of Figure 3;
- Figure 6 is an enlargement of the detail VI in Figure 5;
- Figures 7 and 8 are perspective views of a stopper of the sealing system according to this invention;
- Figures 9 and 10 are perspective views of a cap of the sealing system according to this invention;
- Figure 11 is a plan view of a variant of a stopper of the sealing system according to this invention;
- Figure 12 is a section along line XII-XII of Figure 11.

### PREFERRED EMBODIMENT OF THE INVENTION

[0015] In Figure 1, the reference number 1 indicates, as a whole, a tin according to this invention. The tin 1 comprises a cup shaped body 2 and a sealing system 3.

[0016] The cup shaped body 2 comprises, in turn, a bottom 4 and a side wall 5 that delimit an inner cavity 6. The cavity 6 connects with the outside through an opening 7.

[0017] The sealing system 3 is configured to be applied to the side wall 5 so as to close the opening 7. The sealing system 3 can preferably be opened/closed several times.

[0018] It should be noted that, hereinafter, the terms above/below, high/low, and the like are used with reference to the tin 1 when it is resting with the bottom 4 on a resting plane n.

[0019] According to the example illustrated, the cup shaped body 2 has a longitudinal axis X and is axisymmetric.

[0020] According to variants not illustrated, the cup shaped body 2 may have a plurality of physical features that are different to those illustrated in the example. For example, the side wall 5 may be conical and/or have flaring and/or tapering and/or swelling and/or ribbing, and the like. Similarly, too, the bottom 4 may have physical

features that are different, for example it may have: ribbing and/or swelling and/or grooves, and the like.

**[0021]** According to the variants not illustrated, on the side wall 5, bosses or rivets may be welded, in a known way, for assembling a gripping handle or handles.

**[0022]** Without any loss of generality, and in a known way, the cup shaped body 2 may be made in several parts or in a single part. The cup shaped body 2 is preferably, but not necessarily, made of sheet metal, in particular tin-plate. According to a variant not illustrated, the cup shaped body 2 may be made, at least in part, or completely, of another kind of material. For example, as an alternative, the cup shaped body 2 may be made of plastic, glass, etc.

**[0023]** The sealing system 3 comprises, in turn, a stopper 8 and a cap 9.

**[0024]** Advantageously, the sealing system 3 comprises a container 10 for an additive substance. The term "additive substance" refers to the substance that the user must mix with the liquid contained in the tin 1. An additive substance according to this invention may be of any kind and in any state. For example, the additive substance may be of solid material, for example granulated or powdered material, and/or liquid and/or viscous or a combination of different materials.

**[0025]** Advantageously, before the first opening, the sealing system 3 contains the container 10 inside. Advantageously, the container 10 is placed between the stopper 8 and the cap 9.

**[0026]** The sealing system 3 comprises, in addition, a seal 11 placed between the cap 9 and the stopper 8. The seal 11 is configured to be deformed and/or broken when first opened, so as to enable the distancing of the cap 9 from the stopper 8 and the user to access the container 10.

**[0027]** According to the example illustrated, in Figure 2, the sealing system 3 comprises a single container 10.

**[0028]** A container 10 may be chosen from a group of containers that have different shapes and/or dimensions. For example, a container 10 may be chosen from a group of containers different from each another by: type and/or material and/or shape and/or capacity.

**[0029]** Merely by way of example, a container 10 may be: a vial, a bottle, a sachet, or an equivalent containing body. A container 10 may be made of any material or poly-material.

**[0030]** The seal 11 is configured to seal the sealing system 3. When first opened, the seal 11 changes the sealing system 3 so as to make it visible, or recognisable from the outside, when the sealing system 3 has already been opened.

**[0031]** According to the example illustrated, in Figures 2 to 8, the stopper 8 is configured to be applied to the opening 7 of the tin 1. In particular, the stopper 8 comprises (Figure 4): an annular edge 12 configured to engage, under pressure, with the sealing edge 7' (in general made by crimping sheet metal) that delimits the opening 7 of the tin 1; a tubular shoulder 13 configured to extend

longitudinally partially within the tin 1; and an external collar 14 that protrudes longitudinally from the annular edge 12 outside of the tin 1. According to the example illustrated, the collar 14 is threaded externally.

**[0032]** The collar 14 has a plurality of grooves 15 that protrude axially towards the outside of the tin 1 and that are radially distributed around the longitudinal axis X. According to the example illustrated, in Figure 8, the stopper 8 comprises a plurality of partitions 16, each of which is placed between two adjacent grooves 15.

**[0033]** According to the example illustrated, the grooves 15 are equal to each other and are uniformly distributed around the longitudinal axis X. According to a variant not illustrated, the dimension of the grooves 15 may be variable.

**[0034]** The stopper 8 comprises a removable membrane 18 that, in use, hermetically closes the tin 1, in particular the cavity 6. The membrane 18 is configured to be removed upon the first opening. According to the example illustrated, the membrane 18 has a removable portion 19 that is laterally delimited by a weakening line 20. The removable portion 19 is fixed to a gripping element 21 that is configured to be gripped, in use, by the user in order to pull, removing, the removable portion 19 and the membrane 18 upon the first opening of the tin 1.

**[0035]** According to the example illustrated in the figures, the gripping element 21 is a ring configured to be hooked with a finger by a user. According to the example illustrated, in Figures 7 and 8, the weakening line 20 is made on the side of the membrane 18 that faces, in use, the inside of the cavity 6.

**[0036]** The cap 9 is configured to screw on to the external collar 14 of the stopper 8.

**[0037]** The cap 9 has a wall 30 that has a perimeter in plan view basically corresponding to that of the opening 7 of the cup shaped body 2. The cap 9 comprises, in addition, a crown 31 that protrudes axially from the perimeter of the part 30 so as to basically form a cup shaped body. The crown 31 is entirely threaded so it can be screwed onto the collar 14 of the stopper 8.

**[0038]** According to the example illustrated, the wall 30 of the cap 9 is circular.

**[0039]** Advantageously, the seal 11 is integral with the cap 9. The seal 11 is configured so as to be deformed and/or break, in use, when the tin 1 is first opened.

**[0040]** According to the example illustrated, the seal 11 is formed from a strip 24 that protrudes from the wall 30 of the cap 9 on the side facing the stopper 8 when it is screwed on. The strip 24 protrudes from the cap 9 and interferes with the stopper 8. The rotation of the cap 9 in relation to the stopper 8 causes the deformation and/or breakage of the strip 24.

**[0041]** Advantageously, the seal 11 is visible from the outside; in this way, the user is able to check whether the tin 1 has already been opened, or not, just by looking at the cap 9.

**[0042]** According to the example illustrated in detail in Figures 5 and 6, the cap 9 has a window 26 and the seal

11 is arranged inside the window 26, so as to be visible from the outside. In particular, the seal 11 occupies a large part of the area of the window 26; therefore, before the first use, the cap 9 seems basically intact. In other words, in a tin 1 that has never been opened, there are no holes visible through the cap.

**[0043]** According to the example illustrated, in Figures 9 and 10, the strip 24 is a portion of the cap 9 cut in a U shape and bent so as to form an angle  $\alpha$  in relation to a direction of screwing/unscrewing. The cap 9 has a weakening line 28 at the strip 24 bending zone. The weakening 28 favours the bending or breakage of the strip 24 in relation to the remaining body of the cap 9.

**[0044]** When first used, the strip 24 protrudes inside a groove 15. In particular, the strip 24 has a free end 27 that, in the rest position, protrudes inside of a groove 15.

**[0045]** When the cap 9 rotates in the screwing direction d1, the strip 24 is pushed near the weakening line 28 against the partitions 16 and is pushed outside by the groove 15. In this way, the cap 9 is free to rotate in the screwing direction d1. In this way, it is possible to prepare the sealing system 3 by screwing the cap 9 on the stopper 8 without breaking the seal 11.

**[0046]** As much as the cap 9 rotates in the unscrewing direction d2, the free end 27 is pushed against the side of a partition 16, hindering the translation of the strip 24 in the unscrewing direction d2.

**[0047]** The rotation of the cap 9 in the unscrewing direction d2 causes, then, the deformation, in particular the bending, of the strip 24 that is abutted against the wall 30 of the cap 9 or is even removed.

**[0048]** In this case, then, the area of the window 26 is completely open, leaving a hole visible through the wall 30 of the cap 9.

**[0049]** According to variants not illustrated, the seal 11 can be made according to different embodiments. For example, serrations may be provided that connect the cap 9 to the stopper 8 and that are broken when first opened, in a similar way to what happens to drink bottles.

**[0050]** Advantageously, the sealing system 3 comprises, in addition, the container 10 that is housed between the cap 9 and the stopper 8.

**[0051]** Advantageously, the stopper 8 has a housing for housing the container.

**[0052]** According to the example illustrated, in Figures 2 to 8, the membrane of the stopper is shaped so as to have a housing 33 for housing the container 10.

**[0053]** In particular, the housing 33 is made at the centre of the membrane 18 so as to be, in use, basically coaxial to the longitudinal axis X of the cup shaped body 2.

**[0054]** The housing 33 has a basically truncated cone shape. Without any loss of generality, and according to variants not illustrated, the housing 33 may have different shapes from that illustrated, for example it may be cylindrical, parallelepiped in shape, a truncated pyramid, or the like.

**[0055]** Advantageously, the gripping element 21 is ar-

ranged inside the housing 33. Advantageously, the gripping element 21 has the shape of a ring. In this way, the gripping element 21 does not interfere with the container 10, avoiding potential damage to the same.

**[0056]** According to the example illustrated, the weakening line 20 made on the membrane 18 engages part of the surface of the bottom 34 and part of the side surface 35 of the housing.

**[0057]** According to the example illustrated in Figure 2, the container 10 comprises a containment body 38 with a semispherical shape.

**[0058]** Advantageously, the containment body 38 with the semispherical shape of the container 10 makes it possible to maximise the containing volume by reducing the bulk as much as possible.

**[0059]** The container 10 comprises, in addition, a flat wall 39 with a basically circular cross section.

**[0060]** The wall 39 has a lateral bevel 40 that facilitates, in use, the gripping of the container 10 by a user.

**[0061]** According to a variant not illustrated, the container 10 comprises a sheath at least partially made of paper for printing instructions.

**[0062]** At the time of the first use, the container 10 is housed inside the housing 33 so as to be placed between the user and the gripping element 21.

**[0063]** Advantageously, on the wall surface 39 of the container 10 or, if present, on the paper sheath, the instructions for use and any warnings are printed.

**[0064]** For the production of a tin 1, according to this invention, the sealing system 3 of the type described above, is pre-assembled and, following this, is hooked to the opening 7 of the cup shaped body 2. The operations for applying the sealing system 3 to the cup shaped body 2 are basically known.

**[0065]** For the pre-assembly of the sealing system 3, the container 10 is inserted between the cap 9 and the stopper 8 so as to position the container 10 correctly in the corresponding housing 33 and, therefore, the cap 9 is screwed on.

**[0066]** At the end of the screwing of the cap 9, the seal 11 is positioned so that the strip 24 is positioned inside of a groove 15.

**[0067]** In use, to access the liquid contained in the tin 1, a user must unscrew the cap 9. During the rotation of the cap 9 in the unscrewing direction d2, the free end 27 of the strip 24 comes into contact with a partition 16 of the stopper 8, preventing the rotation of the strip 24 itself. Therefore, by continuing the rotation of the cap 9 in the unscrewing direction d2, and applying a light pressure, the user causes the bending and/or breakage of the strip. In this way, the window 26 is freed, making a hole visible from the outside through the cap 9.

**[0068]** Advantageously, after the cap 9 has been unscrewed for the first time a hole is clearly visible from the outside through the wall 30. This makes it possible to easily check, for example at the time of purchase, whether the tin 1 has been opened/interfered with. The presence of the seal 11 is a guarantee for the user of the

presence of the container 10 inside the sealing system 3.

**[0069]** Having unscrewed the cap 9, the user must remove the container 10 to be able to access the gripping element 21. In this way, advantageously, the user is naturally induced to notice any warnings (such as warnings about toxic, damaging, explosive, inflammable materials, etc.) and/or instructions for use.

**[0070]** In Figures 11 and 12, the reference number 108 indicates a variant of the stopper 8 according to this invention. In Figures 11 and 12, the elements common with the stopper 8 maintain the same numbering and are not repeated hereinafter for brevity's sake. The stopper 108 is configured to be able to interact with a cap 9 according to the methods described above with reference to the stopper 8. In other words, one stopper 8 and the other stopper 108 are interchangeable.

**[0071]** According to the variant illustrated in Figures 11 and 12, the sealing system 3 that comprises the stopper 108 contains, in use, a plurality of containers 110; in particular, in the example illustrated, there are two containers 110.

**[0072]** As mentioned above, the containers 10, 110 may be of any kind or shape. The containers 110 illustrated in Figures 11 and 12 are elongated vials. In this case, the stopper 108 has two housings 133 that are made inside of a circular crown 140 of the membrane 18 of the stopper 108.

**[0073]** The housings 133 protrude, in use, towards the inside of the cavity 6 of the cup shaped body 2.

**[0074]** According to a variant not illustrated, the number and type of containers 10, 110 may be different from those described above. For example, a container 10, 110 could be a sachet (like a sachet of sugar, oil, sauce, or the like).

**[0075]** According to one variant not illustrated, the stopper may be without specific housings for the container. In this case, the container is inserted in the space normally existing between the stopper and the cap.

**[0076]** Advantageously, a sealing system 3 of the type described above makes it possible to provide a tin 1 provided with additive material in an integrated and compact way. In other words, a tin 1 according to this invention does not need to be sold together with other containers separately; it does not need to include containers for an additive applied to the outside of the tin itself.

**[0077]** Therefore, advantageously, a tin 1 provided with a sealing system 3 according to this invention is simple to store and there are no issues relating to the possible damage of external elements.

**[0078]** Advantageously, a sealing system 3 according to this invention makes it possible to render visible, immediately from the outside, whether a first opening has occurred or not, or if the cap 9 has already been unscrewed. In other words, the sealing system 3 according to this invention, via the seal 11 makes it possible to guarantee the user the integrity of the tin 1 upon its first use.

**[0079]** Therefore, advantageously, a tin 1 provided with a sealing system 3 according to this invention may

be sold in places that are not continuously monitored (for example on shelves in large warehouses) ensuring the user the integrity of its contents and, in particular, the presence and integrity of the container 10, 110 containing the additive substance housed between the cap 9 and the stopper 8, 108.

**[0080]** Advantageously, the sealing system 3 according to this invention is particularly compact and has external dimensions, in particular the thickness or the extension along the longitudinal axis X of the cup shaped body 2, basically the same as those of sealing systems already on the market.

**[0081]** Therefore, advantageously, the sealing system 3 according to this invention may be handled both individually and assembled to the cup shaped body 2 precisely with the same methods and equipment commonly used.

**[0082]** Advantageously, a tin 1 provided with a sealing system 3 according to this invention does not require more storage space than those already in use though containing, in an integrated way inside, a container 10, 110 for an additive.

**[0083]** A sealing system 1 of the type described above is simple and economical to manufacture.

## Claims

1. A sealing system for a tin (1) for liquids, in particular paints, comprising a stopper (8; 108), a cap (9) and a container (10; 110) for additive substances; the stopper (8; 108) is configured to be hooked, in use, onto a cup shaped body (2) of a tin (1); wherein the cap (9) is configured to be coupled with the stopper (8; 108); wherein, the container (10; 110) for additive substances is housed, before the first opening, at least partially between the stopper (8; 108) and the cap (9).
2. A sealing system according to claim 1, wherein the stopper (8; 108) comprises: an annular edge (12) configured to be attached, in use, by pressure on a sealing edge (7') which delimits an opening (7) of the tin (1); and an external collar (14) which axially protrudes, in use, outwards from the annular edge (12) of the tin (1); wherein the collar (14) is externally threaded; wherein the cap (9) is configured to be screwed, in use, upon said collar (14).
3. A sealing system according to any one of the preceding claims and comprising a seal (11) which is interposed between the cap (9) and the stopper (8; 108); wherein the seal (11) is configured to be deformed and/or broke when the sealing system (3) is first opened.
4. A sealing system according to claim 3 wherein said seal (11) is visible from the outside; in particular, said

cap (9) has a window (26) and the seal (11) is disposed within said window (26), so as to open a hole through the cap (9) once the cap (9) has been unscrewed.

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5. A sealing system according to claim 3 or 4, wherein the collar (14) has a plurality of grooves (15) which protrudes, in use, axially outwards from the collar (14); wherein the collar (14) comprises a plurality of partitions (16), each of which is interposed between two adjacent grooves (15); wherein, said seal (11) comprises a strip (24) which is integral with the cap (9) and is housed, at the moment of the first opening, within a groove (15) of said collar (14).  
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6. A sealing system according to any one of the preceding claims, wherein the stopper (8; 108) comprises a removable membrane (18), which is configured to be removed when the sealing system (3) is first opened; in particular, the membrane (18) has a removable portion (19), which is laterally delimited by a weakening line (20); wherein the stopper (8; 108) comprises a gripping element (21) which is configured to be grasped, in use, by the user to pull and remove the removable portion (19) with the membrane (18) when the sealing system (3) is first opened.  
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7. A sealing system according to claim 6, wherein the stopper (8) has a housing (33) to house at least partially a respective container (10); wherein said gripping element (21) is housed within said housing (33); wherein the container (10) comprises a containment body (38) and a circular shaped wall (39) having a lateral bevel (40); wherein said containment body (38) is housed within said housing (33) and the wall (39) is interposed between the containment body (38) and the cap (9).  
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8. A sealing system according to any one of the preceding claims and comprising a plurality of containers (10; 110).  
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9. A sealing system according to any one of the preceding claims, wherein each container (10; 110) is chosen within a group of containers different from each another for: type and/or material and/or shape and/or capacity.  
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10. A tin for liquids, in particular paints, comprising the sealing system according to any one of claims from 1 to 9.  
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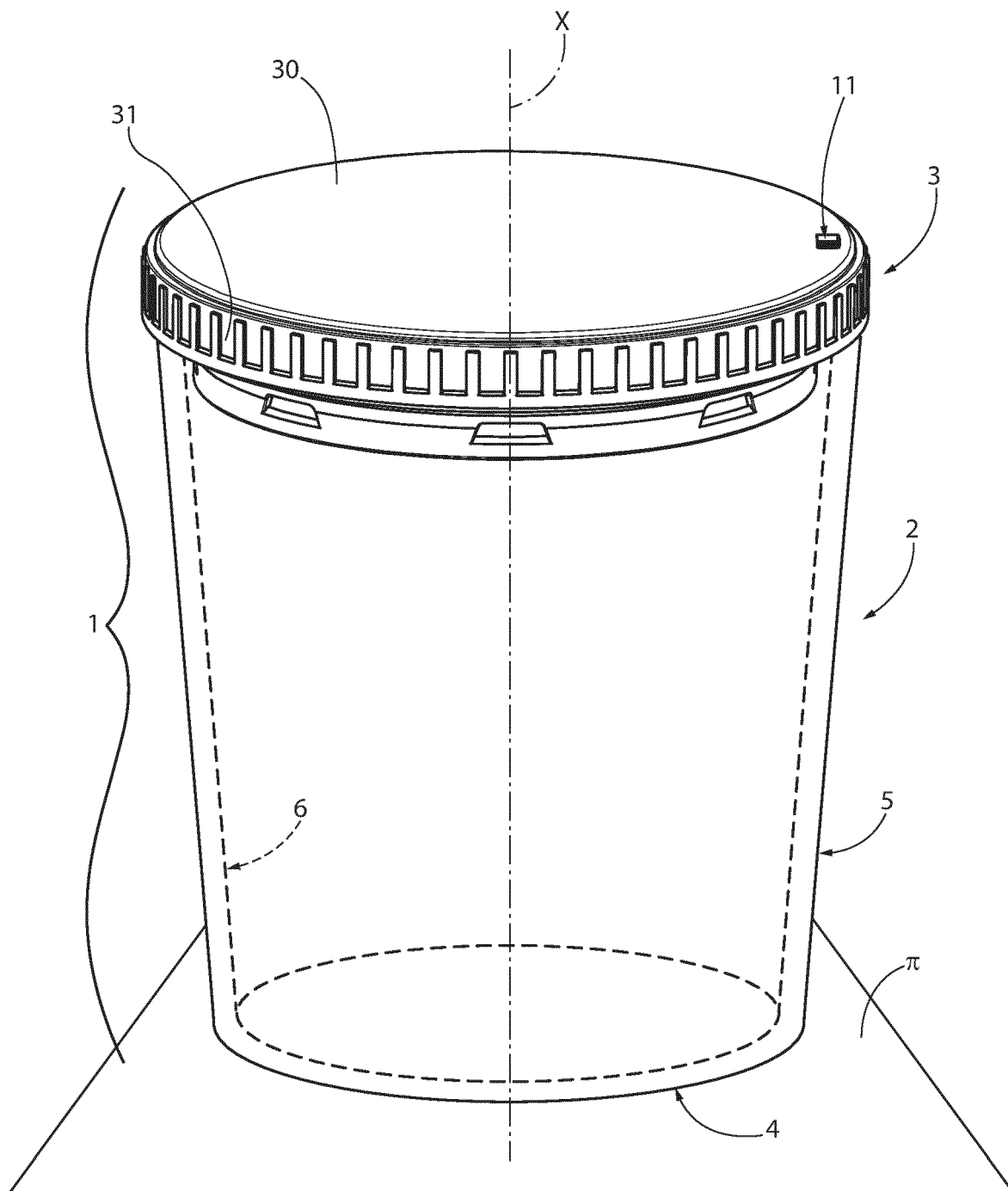


FIG.1

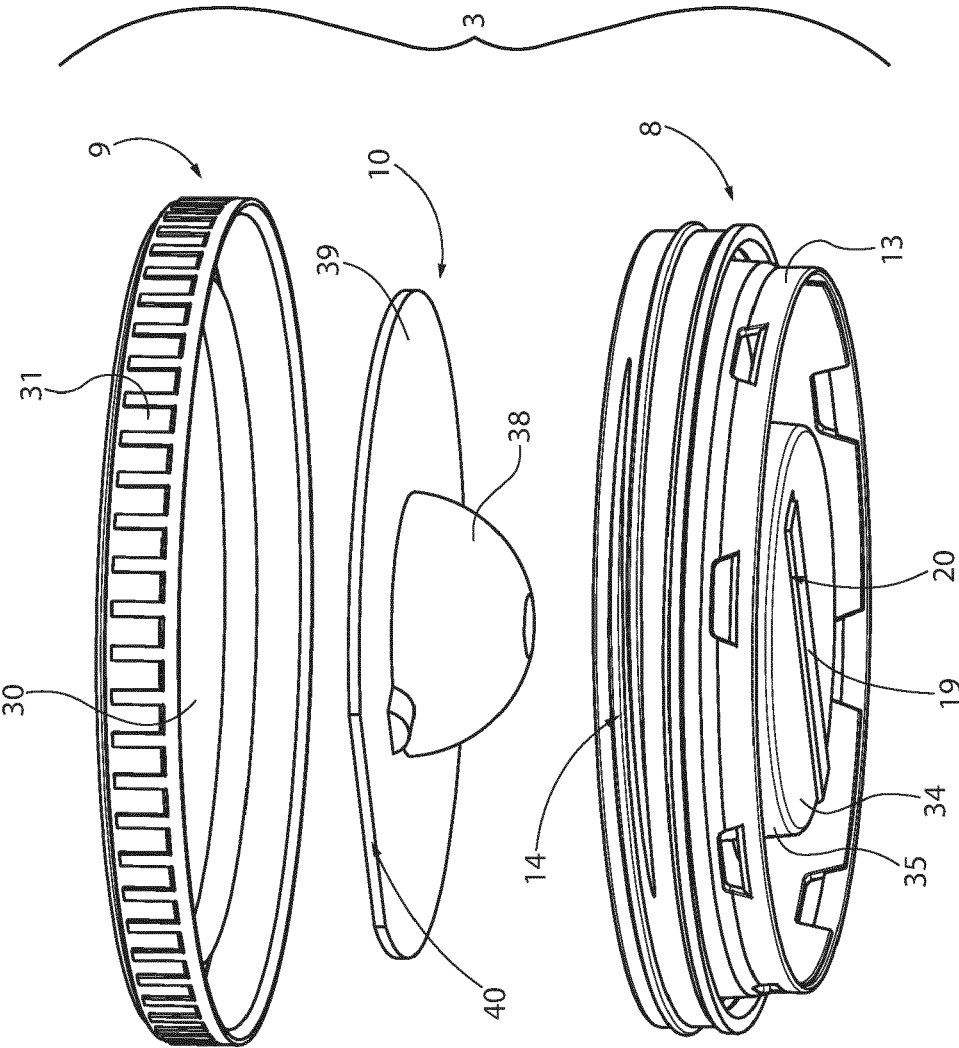
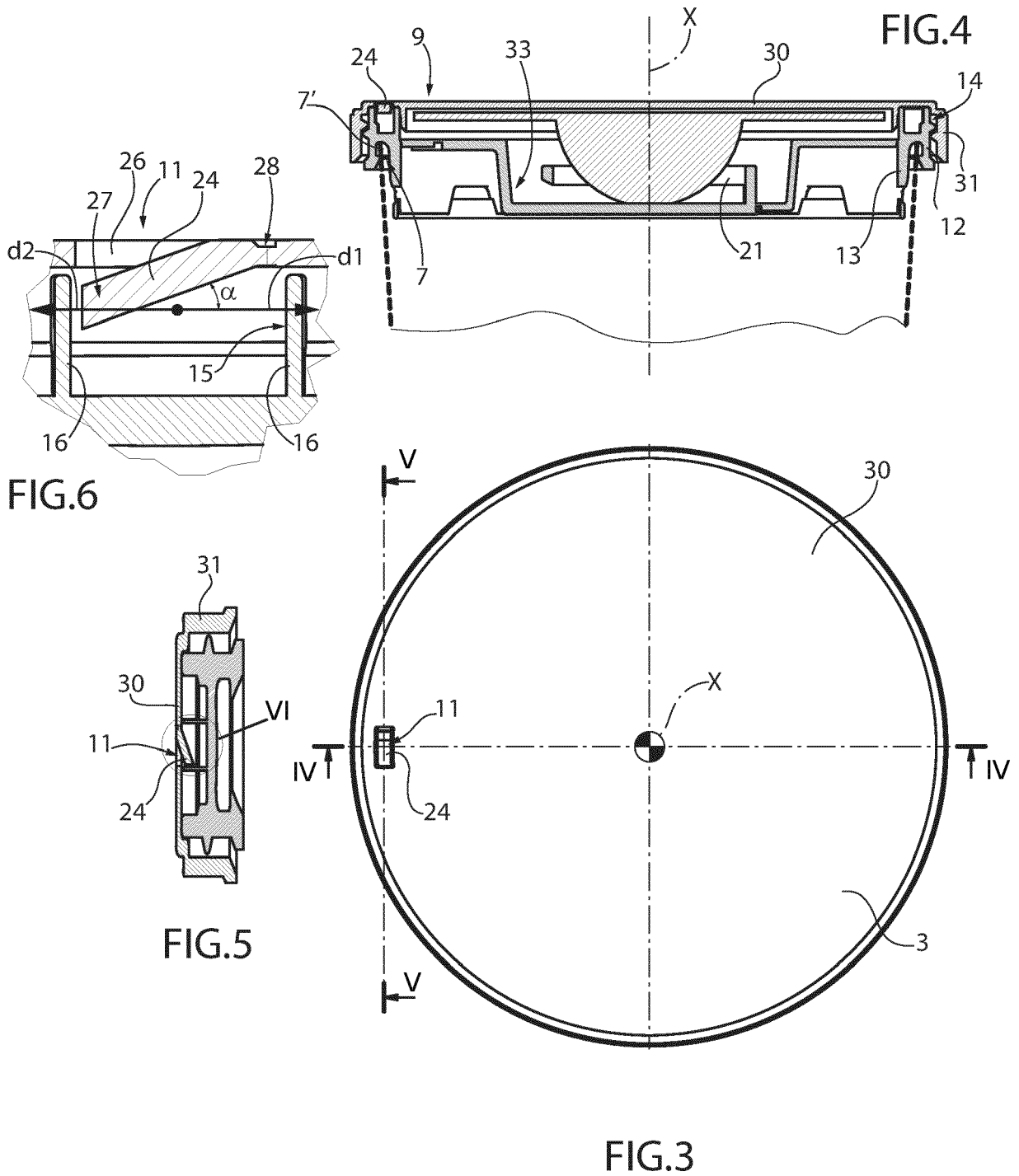


FIG.2



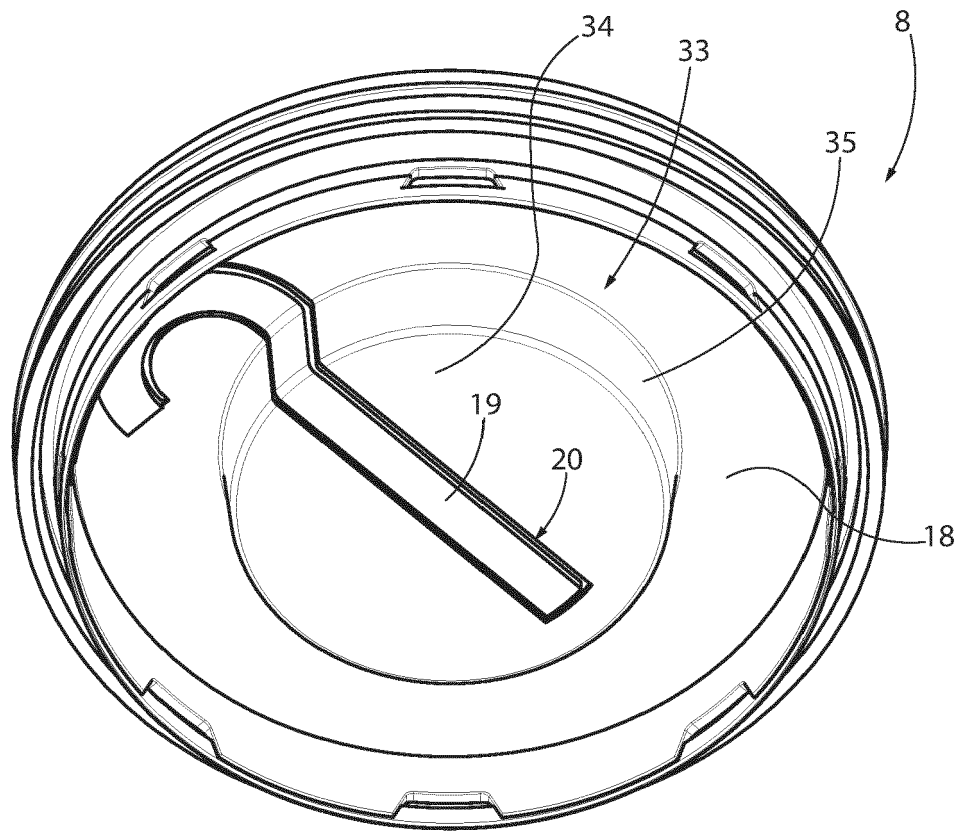


FIG. 7

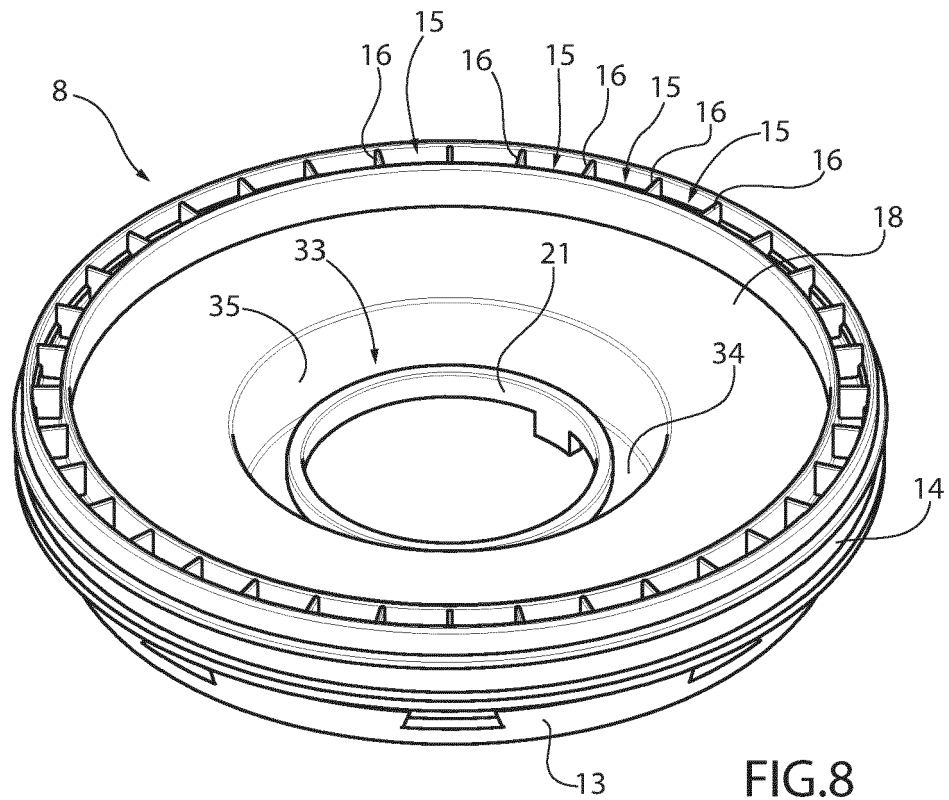


FIG. 8

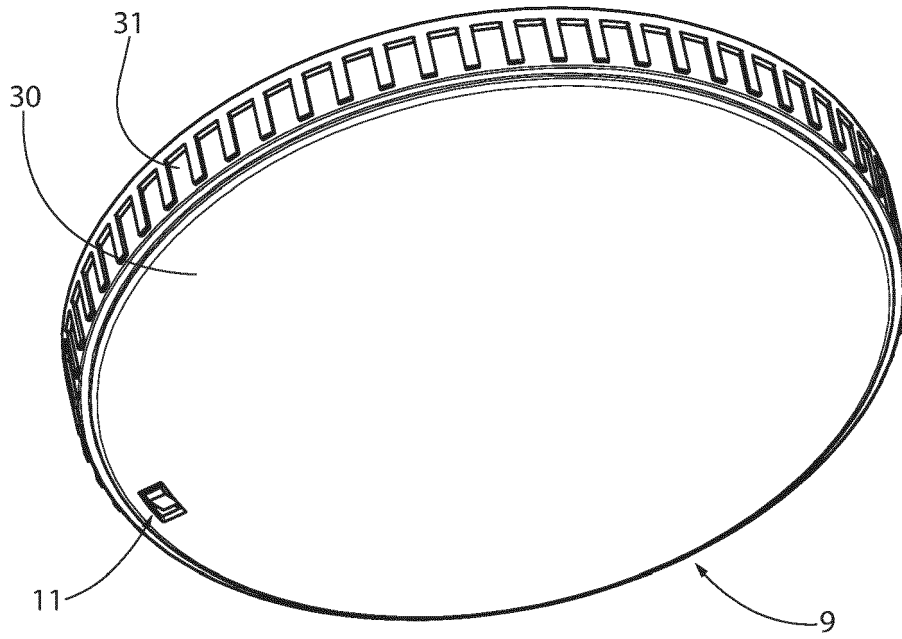


FIG. 9

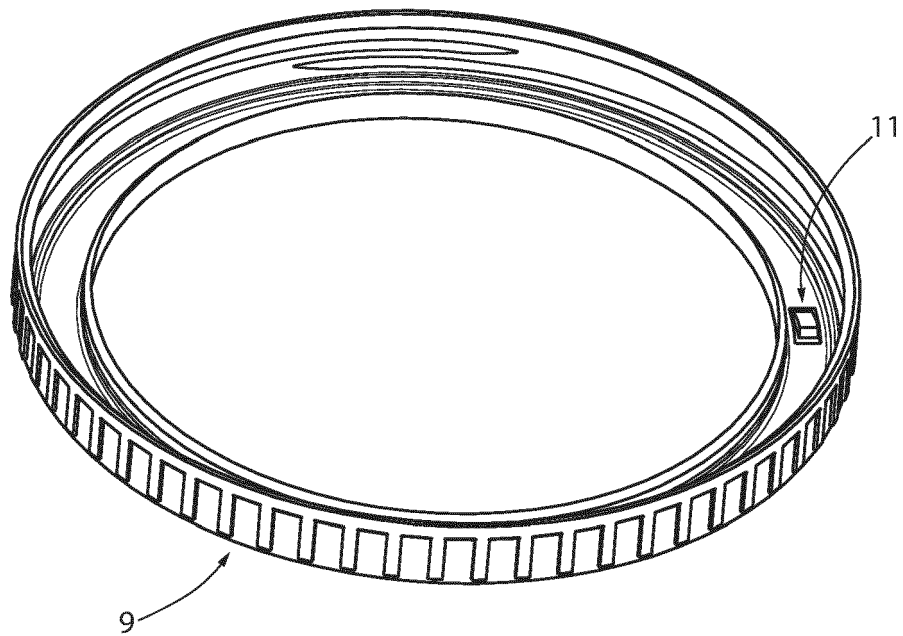
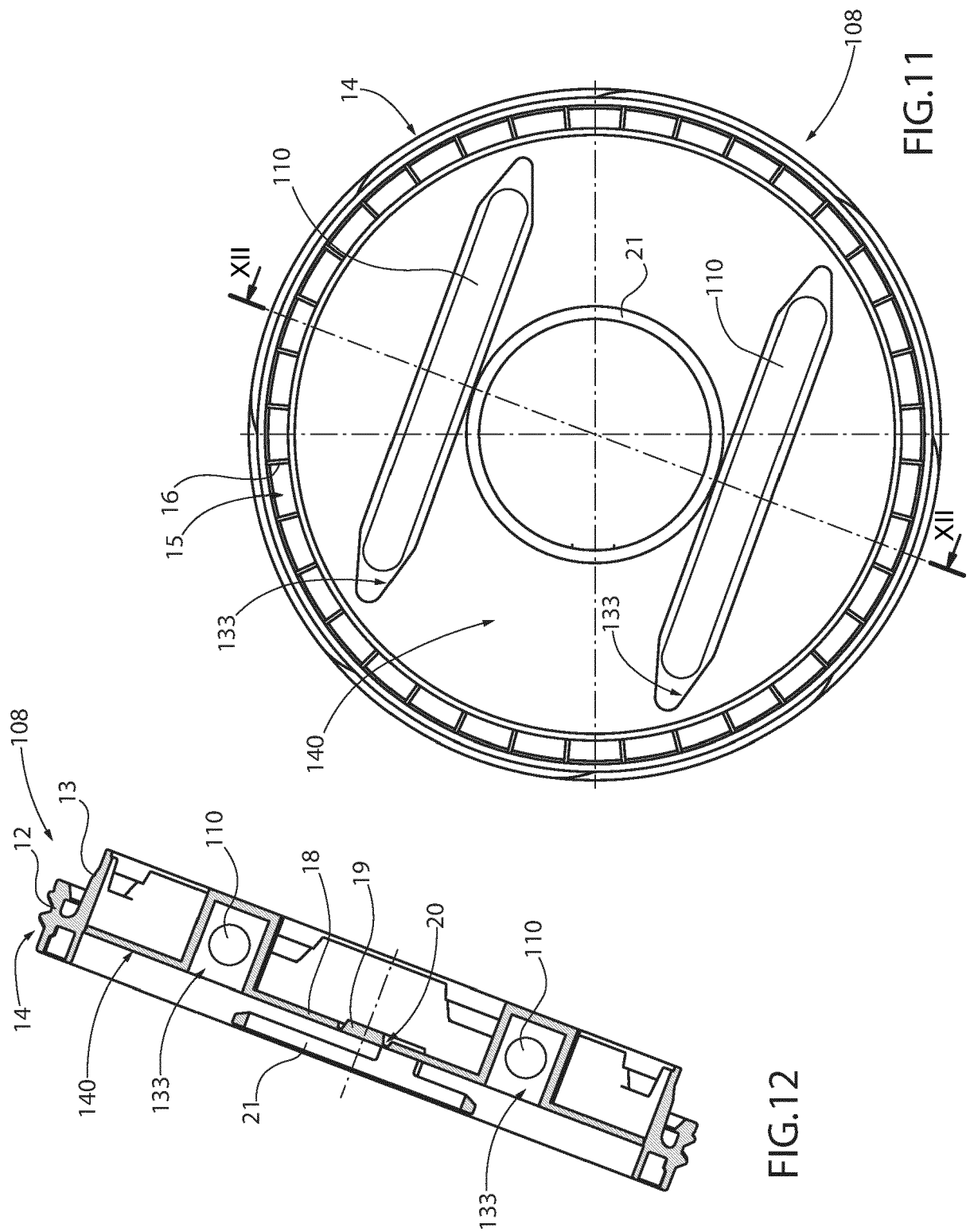


FIG. 10





## EUROPEAN SEARCH REPORT

Application Number

EP 22 19 3827

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## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2014/078814 A1 (BUCK RONALD MARK [US]) 22 May 2014 (2014-05-22)	1, 3, 4, 8-10	INV. B65D51/28
A	* paragraph [0007] * * paragraph [0119] - paragraph [0120]; figure 30 *	2, 5-7	B65D55/02 B65D51/22
X	FR 2 225 355 A1 (HENKEL & CIE GMBH [DE]) 8 November 1974 (1974-11-08)	1, 8-10	
A	* the whole document *	2-7	
X	US 4 055 270 A (UNDERWOOD J LARRY) 25 October 1977 (1977-10-25)	1, 8-10	
Y	* the whole document *	2	
A		3-7	
X	WO 2011/018593 A1 (CONVENIENCE HEALTHCARE LTD [GB]; BOWDLER PETER THOMAS [GB]) 17 February 2011 (2011-02-17)	1, 2, 8-10	
A	* page 4, line 11 - page 6, line 20; figures 1, 2 *	3-7	
X	US 3 433 378 A (ROSS DONALD J) 18 March 1969 (1969-03-18)	1, 8-10	TECHNICAL FIELDS SEARCHED (IPC)
Y	* column 2, line 10 - column 3, line 46; figures 1-3 *	2	B65D
A	GB 2 404 910 A (U POL LTD [GB]) 16 February 2005 (2005-02-16)	1-10	
A	* the whole document *		
A	WO 2012/163409 A1 (CARMEL PHARMA AB [SE]; ROSENQUIST TOBIAS [SE]) 6 December 2012 (2012-12-06)	3	
	* the whole document *		
The present search report has been drawn up for all claims			

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EPO FORM 1503 03:82 (P04C01)

Place of search

The Hague

Date of completion of the search

20 January 2023

Examiner

Mans-Kamerbeek, M

## 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

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

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