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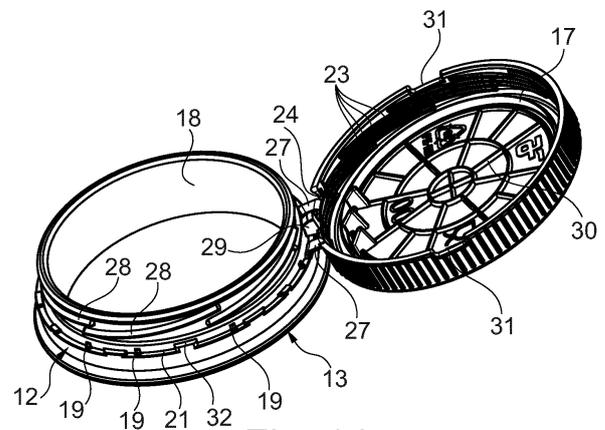
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(54) **COMPACT FAST-OPENING CAP AND CAP AND MOUTHPIECE ASSEMBLY FOR A CONTAINER**

(57) A compact fast-opening cap for a container, wherein said cap is suitable for being arranged on a substantially cylindrical mouthpiece (13), which provides an annular perimetric rib (25) protruding outwardly from one of its external side surfaces, the cap comprising:

- a base ring (12), for preventing its separation from said mouthpiece (13) of the container,
- a protective cap or cover (14) for opening and closing said mouthpiece (13) of the container,
- a hinge arrangement (26) which makes said base ring (12) and said cover (14) integral with each other and which can be produced in a single piece by moulding plastic material;
- a series of frangible bridges (19) which connects a lower edge (20) of the cover (14) with an upper edge (21) of the base ring (12) when said cover (14) is arranged for closure on said ring base and on said mouthpiece (13),
- wherein said hinge arrangement (26) comprises a pair of strips or bridges (27) spaced apart, which connect the cover (14) and the base ring (12) and an extension enlarged outwardly (29) which forms an integral part of a lower end of the cover (14) facing said base ring (12), said extension (29) becoming engaged with said perimetric rib (25) of said mouthpiece when said cover rotates around said hinge arrangement (26) from a closed position to an open position to create a stable positioning in the open position of said cover (14),
- wherein a multi-thread or multi-start thread (23) is provided inside a side wall (16) of the cover (14), which is coupled with a series of threads (28) formed on an external wall of the mouthpiece (13).



**Fig. 14**

## Description

**[0001]** The present invention relates to a compact fast-opening cap and a cap and mouthpiece assembly for a container.

**[0002]** For the closing of liquid containers, caps can generally be provided which are arranged on the mouthpiece of the container and have a normal tamper-proof ring to which a protective cover is attached.

**[0003]** Some of these caps are snap-arranged on the mouthpiece of the container and create the required seal thanks to the presence of a complementary projection and recess produced on the mouthpiece of the container and inside a protective cover, respectively.

**[0004]** Other caps are screwed onto a mouthpiece of the container and the cover must be unscrewed from the mouthpiece to gain access to the contents.

**[0005]** In both cases, the cover of the cap can be rotated for opening and closing around a hinge arrangement formed between the tamper-proof ring and the cover that prevents the cover from becoming dispersed in the environment, once removed.

**[0006]** These caps have an extremely small encumbrance and are generally used in containers for milk, water, soft drinks, etc. which at the most have internal pressures of one bar. They are not suitable however for carbonated water at two-three bars or other pressurized liquids.

**[0007]** On the one hand, these known caps, when removed on opening by forcing the snap engagement and breaking their frangible bridges, tend to return to the closed or semi-closed position, hindering for example the user in pouring directly from the mouthpiece or even in drinking the contents.

**[0008]** When broken, the frangible bridges naturally reveal the first opening and exert a usual anti-tampering action on the internal contents of the container.

**[0009]** The hinge arrangement generally formed next to the protective cover and the mouthpiece of the container limits the access space to the mouth of the container to a minimum, if one should or wish to drink.

**[0010]** Furthermore, this type of hinge arrangement creates a certain recall elasticity between the cover and the ring which, as already mentioned, greatly hinders pouring or access to the contents. And this causes an obstacle and inconvenience for the use of a container equipped with this type of cap.

**[0011]** Furthermore, as already mentioned, where there is a threading between the cap and mouthpiece, unscrewing does not entail rapid access to the contents.

**[0012]** The general objective of the present invention is to provide a compact fast-opening cap and a cap and mouthpiece assembly for a container which solves the problems associated with the prior art indicated above.

**[0013]** A further objective is to provide a compact fast-opening cap and a cap and mouthpiece assembly for a container wherein a rapid opening of the cover is obtained with respect to the mouthpiece in the presence of a

threading that constrains them together.

**[0014]** Another objective of the present invention is to provide a compact fast-opening cap and a cap and mouthpiece assembly for a container which provides for an opening blockage of the protective cover, once rotated for opening, which overcomes the drawbacks of the known art maintaining the position.

**[0015]** Yet another objective of the present invention is to provide a compact fast-opening cap and a cap and mouthpiece assembly for a container capable of solving the above-mentioned drawbacks of the prior art in an extremely simple, economical and particularly functional way.

**[0016]** A further objective of the present invention is to provide a compact fast-opening cap and a cap and mouthpiece assembly for a container which allows it to be rapidly opened and allows easy access to the mouthpiece of the container and wherein the cover is kept stably open.

**[0017]** Last but not least, an objective of the present invention is to provide a cap for a container that can be produced by moulding HDPE whereas the mouthpiece is made of PET or an equivalent material.

**[0018]** The above objectives are achieved by a cap for a container produced according to independent claim 1 and the following subordinate claims.

**[0019]** The structural and functional characteristics of the present invention and its advantages with respect to the known art will become even more evident from the following description, referring to the attached schematic drawings, which show an embodiment example of the invention itself.

**[0020]** In the drawings:

- figure 1 is a perspective view from above of a compact cap according to the present invention in a closed position;
- figure 2 is a rear raised side view of the cap shown in figure 1 in correspondence with the hinge arrangement;
- figure 3 is a sectional view along the line III-III of figure 2;
- figure 4 is a raised sectional view along the line IV-IV of figure 5;
- figure 5 is a plan view from above of the cap of figure 1;
- figure 6 is a sectional view along the line VI-VI of figure 5;
- figure 7 is an enlarged detail of an end of the section of figure 6;
- figure 8 is a raised side view of a mouthpiece of a container suitable for receiving a cap of figure 1;
- figure 9 is a perspective view from above of the mouthpiece alone of figure 8;
- figure 10 is a raised section of the cap of figure 3 assembled on the sectioned mouthpiece of figure 8;
- figures 11 and 12 are enlarged details of the two ends of the assembled section shown in figure 10;

- figure 13 is a raised view of the cap assembly mounted on the mouthpiece of a cap and mouthpiece assembly according to the present invention in an open position;
- figure 14 is a perspective view from above of a cap and container assembly of figure 13 in an open position.

**[0021]** With reference to the illustrative and non-limiting figures, an embodiment is shown of a compact fast-opening cap and a cap and mouthpiece assembly for a container, produced according to the present invention.

**[0022]** Indications such as "vertical" and "horizontal", "upper" and "lower" (in the absence of other indications) should be read with reference to the assembly (or operating) conditions and referring to the normal terminology used in current language, wherein "vertical" indicates a direction substantially parallel to that of the force of gravity vector "g" and a horizontal direction perpendicular to it.

**[0023]** A compact fast-opening cap according to the invention is indicated as a whole with 11 and essentially comprises a base ring 12, to prevent its separation from a mouthpiece 13 forming part of or applicable to a container, and protective cover 14 for opening and closing the mouthpiece 13 of the container.

**[0024]** This type of cap 11, as can be understood, can be produced in a single piece by moulding plastic material, more particularly made of HDPE, whereas the mouthpiece is made of PET.

**[0025]** The cover 14, essentially of an inverted cup shape, has a flat upper closing wall 15 and a knurled cylindrical side wall 16. Furthermore, from the upper flat wall 15 inside the cover 14, a collar or annular element 17 with a smaller diameter than the cover extends towards the inside of the cap, coaxial to it and suitable for engaging in an internal wall 18 of the mouthpiece 13 of the container. This arrangement favours and creates an effective seal for the liquid contained in the container.

**[0026]** A series of frangible bridges 19 connects a lower edge 20 of the cover 14 with an upper edge 21 of the base ring 12. This substantially cylindrical base ring 12 has an annular rib 22 protruding inwardly for engagement beneath a perimetric annular rib 25 protruding outwardly from an external side surface of the mouthpiece 13 of the container.

**[0027]** Said cap 11 has a hinge arrangement 26, in a corresponding slot or side notch 24, formed mainly in the cover 14, which makes the cover 14 and the base ring 12 integral with each other, but rotatable with respect to each other as will be seen hereunder.

**[0028]** This hinge arrangement 26 comprises a pair of spaced flat, flexible and foldable strips or bridges 27 which connect the cover 14 and the base ring 12. According to the present invention, the positioning of an enlarged outward extension 29 is also provided specifically in the middle. This enlarged extension 29 is an integral part of a lower end of the shaped side wall 16 of the cap 14 near the lower edge 20, which faces the base

ring 12.

**[0029]** Said extension 29 enlarged outwardly is shaped and has facets 33 such as to create a cam effect which, when the cover 14 rotates for opening, increases the engagement of the cover with said perimetric rib 25 of the mouth 13.

**[0030]** Thanks to the presence of this extension 29, the cover 14 remains permanently rotated in an open position (figure 14) specifically due to the engagement of the extension 29 with the rib 25 of the mouthpiece 13 of the container.

**[0031]** This engagement occurs when the extension 29, on entering into engagement with the mouthpiece 13 when the cover 14 rotates from a closed position to an open position, causes a stable positioning between the parts and consequently a stable positioning of the cover in an open position.

**[0032]** The cap according to the present invention also provides that a multi-thread or multi-start thread 23 be provided inside a side wall 16 of the cover 14, which is suitable for being coupled with a series of threads 28 formed on an external wall of the mouthpiece 13.

**[0033]** In particular, twelve sections of thread are provided inside the side wall 16 of the cover 14, to form the multi-thread or twelve-start thread 23.

**[0034]** The mouthpiece 13, on the other hand, provides on its external side wall, six sections of thread 28 to create an arrangement such as to be easily and correctly coupled with the twelve-start thread 23 inside the cover 14.

**[0035]** This arrangement provides a rapid opening between the parts.

**[0036]** Furthermore, it should be noted that the cover 14 is made of a particularly thin material and in its internal wall it provides a reinforcing and strengthening web 30.

**[0037]** The figures also show how, on one side, the cover 14 provides two recessed seats 31 arranged on opposite sides near the lower edge 20 and, on the other side, the upper edge 21 of the base ring 12 has two teeth or shaped extensions 32, also arranged on opposite sides.

**[0038]** It can thus be understood how a cap according to the present invention solves the problems associated with the above-mentioned known art.

**[0039]** The opening of the cap with rotation of the cover 14 from the ring 12 is shown in figure 14.

**[0040]** Figures 13 and 14 show how the hinge arrangement 26 allows the cover 14 to be rotated by almost 180° with respect to the closed position (figures 1 and 10) thanks to the presence of the hinge arrangement 26 which allows this rotation.

**[0041]** This rotation is allowed once the cover 14 has broken the bridges 19 by rotation with respect to the ring 12, i.e. around a vertical axis Y as indicated by the arrows on the wall 15 of the cover. And immediately afterwards, by rotating the cover 14 with respect to the ring 12, again around the axis Y according to the arrow F, the multi-thread coupling 23, 28 allows rapid lifting and unscrewing of the cover 14 with respect to the ring 12. Once the

unscrewing has been completed, the cover 14 is rotated around the hinge 26.

[0042] This arrangement achieves a fast opening between the parts.

[0043] Once the opening shown in figures 13 and 14 has been effected, the engagement of the extension 29 on the rib 25 present on the mouthpiece 13 of the container creates a stable positioning of the cover 14 in an open position.

[0044] In order to avoid rotation of the ring 12 around the mouthpiece 13, two teeth 32 have been provided, which engage beneath the rib 25, once the cover 14 is rotated open around the hinge 26, and block any possibility of rotation between the parts around the axis Y.

[0045] In the closed position, however, a sealed and safe position is created between the parts which serves to reveal, as in all caps of this type, that the contents of the container are the original contents filled by the packer of the same.

[0046] It has thus been seen and understood how a cap and a cap and mouthpiece assembly according to the invention, once opened, according to the present invention, while allowing its ample and above all extremely fast opening, also allows easy access to the mouthpiece of the container on which it is positioned.

[0047] Furthermore, the cap is very small in size, which makes it suitable for specific applications where spaces are limited.

[0048] In addition, the constraint between the base or tamper-proof ring and the cover gives rise to a cap wherein, once the cover has been removed from the mouthpiece of the container, the cover is not separated from the attachment ring to the container.

[0049] It should also be considered how this type of cap is extremely simple and convenient to produce as it can be produced by moulding HDPE or the like in a single piece, which in itself guarantees an optimal seal.

[0050] It can also be noted that a cap thus produced, for example in containers for fresh milk or non-carbonated drinks, reduces its weight, i.e. that of the container or mouthpiece. The product therefore uses less HDPE and has a lighter weight, without anything being dispersed in the environment as the cap remains attached to the container or bottle.

[0051] The objective mentioned in the preamble of the description has thus been achieved.

[0052] The protection scope of the present invention is defined by the enclosed claims.

## Claims

1. A compact fast-opening cap for a container, wherein said cap is suitable for being arranged on a substantially cylindrical mouthpiece (13), which provides an annular perimetric rib (25) protruding outwardly from one of its external side surfaces, the cap comprising:

- a base ring (12), for preventing its separation from said mouthpiece (13) of the container,
- a protective cap or cover (14) for opening and closing said mouthpiece (13) of the container,
- a hinge arrangement (26) which makes said base ring (12) and said cover (14) integral with each other and which can be produced in a single piece by moulding plastic material;
- a series of frangible bridges (19) which connects a lower edge (20) of the cover (14) with an upper edge (21) of the base ring (12) when said cover (14) is arranged for closure on said ring base and on said mouthpiece (13),
- wherein said hinge arrangement (26) comprises a pair of strips or bridges (27) spaced apart, which connect the cover (14) and the base ring (12) and an extension enlarged outwardly (29) which forms an integral part of a lower end of the cover (14) facing said base ring (12), said extension (29) becoming engaged with said perimetric rib (25) of said mouthpiece when said cover rotates around said hinge arrangement (26) from a closed position to an open position to create a stable positioning in the open position of said cover (14),
- wherein a multi-thread or multi-start thread (23) is provided inside a side wall (16) of the cover (14), which is coupled with a series of threads (28) formed on an external wall of the mouthpiece (13).

2. The cap according to claim 1, **characterized in that** twelve sections of thread are provided inside a side wall (16) of the cover (14), to form the multi-thread or twelve-start thread (23) .
3. The cap according to claim 2, **characterized in that** six sections of thread (28) are provided on an external side wall of said mouthpiece (13), to provide an arrangement such as to be coupled with the twelve-start thread (23) arranged inside the cover (14).
4. The cap according to one or more of the previous claims, **characterized in that** said extension (29) enlarged outwardly is shaped and has facets (33) such as to create a cam effect which, when the cover (14) rotates for opening, increases the engagement of the cover with said perimetric rib (25) of the mouth (13).
5. The cap according to one or more of the previous claims from 1 to 4, **characterized in that** said pair of strips or bridges (27) spaced apart that connect the cover (14) and the base ring (12), are foldable.
6. The cap according to one or more of the previous claims from 1 to 5, **characterized in that** said cover (14) has an essentially inverted cup shape, and pro-

vides a flat upper closing wall (15) and a knurled side wall (16).

7. The cap according to claim 6, **characterized in that** from said upper wall (15) inside the cover (14), a collar or annular element (17) having a smaller diameter than the cover, coaxial, and suitable for engaging in an internal wall (18) of the mouth (13), extends towards the internal part of the cap.
8. The cap according to one or more of the previous claims, **characterized in that** a lower edge (20) of said cover (14) has two recessed seats (31) arranged on opposite sides and that an upper edge (21) of the base (12) has two shaped teeth or extensions (32), also arranged on opposite sides and insertable in said recessed seats (31).
9. The cap according to one or more of the previous claims from 6 to 8, **characterized in that** said cover (14) is made of a particularly thin material and in one of its internal walls arranged beneath said external wall (15), it provides a reinforcing and strengthening web (30).
10. The cap according to one or more of the previous claims, **characterized in that** said cap is made of HDPE and said mouthpiece (13) of PET.
11. A cap and mouthpiece assembly for a container comprising a substantially cylindrical mouthpiece (13), wherein said cap is fast-opening and comprises:

- a base ring (12), for preventing its separation from said mouthpiece (13) of the container,
- a protective cap or cover (14) for opening and closing said mouthpiece (13) of the container,
- a hinge arrangement (26) which makes said base ring (12) and said cover (14) integral with each other and which can be produced in a single piece by moulding plastic material;
- a series of frangible bridges (19) which connects a lower edge (20) of the cover (14) with an upper edge (21) of the base ring (12) when said cover (14) is arranged for closure on said ring base and on said mouthpiece (13),
- wherein said hinge arrangement (26) comprises a pair of strips or bridges (27) spaced apart, which connect the cover (14) and the base ring (12) and an extension enlarged outwardly (29) which forms an integral part of a lower end of the cover (14) facing said base ring (12), said extension (29) becoming engaged with said perimetric rib (25) of said mouthpiece when said cover rotates around said hinge arrangement (26) from a closed position to an open position to create a stable positioning in the open position of said cover (14),

- wherein a multi-thread or multi-start thread (23) is provided inside a side wall (16) of the cover (14), which is coupled with a series of threads (28) formed on an external wall of the mouthpiece (13).

12. The assembly according to claim 11, **characterized in that** twelve sections of thread are provided inside a side wall (16) of the cover (14), to form the multi-thread or twelve-start thread (23).
13. The assembly according to claim 12, **characterized in that** six sections of thread (28) are provided on an external side wall of said mouthpiece (13), to provide an arrangement such as to be coupled with the twelve-start thread (23) arranged inside the cover (14).
14. The assembly according to one or more of the previous claims from 11 to 13, **characterized in that** said extension (29) enlarged outwardly of said cap is shaped and has facets (33) which are such as to create a cam effect which, when the cover (14) rotates for opening, increases the engagement of the cover with said perimetric rib (25) of the mouthpiece (13).
15. The assembly according to one or more of the previous claims from 11 to 14, **characterized in that** said cap is made of HDPE and said mouthpiece (13) of PET.

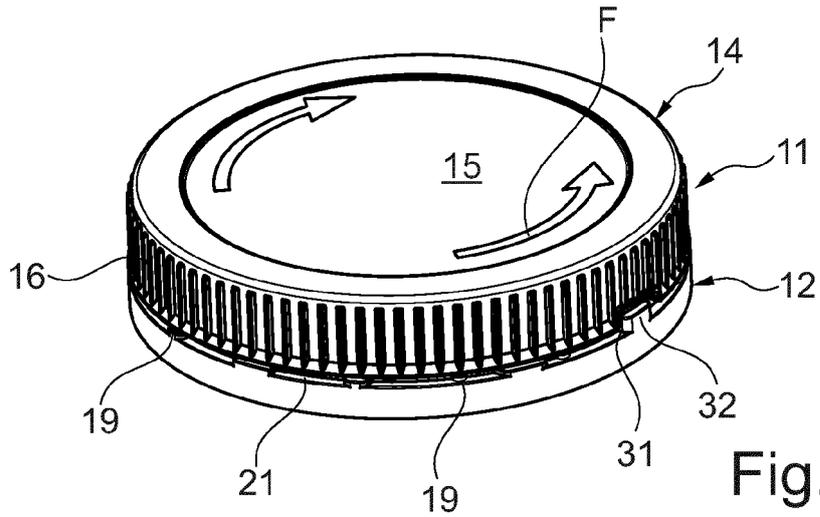


Fig. 1

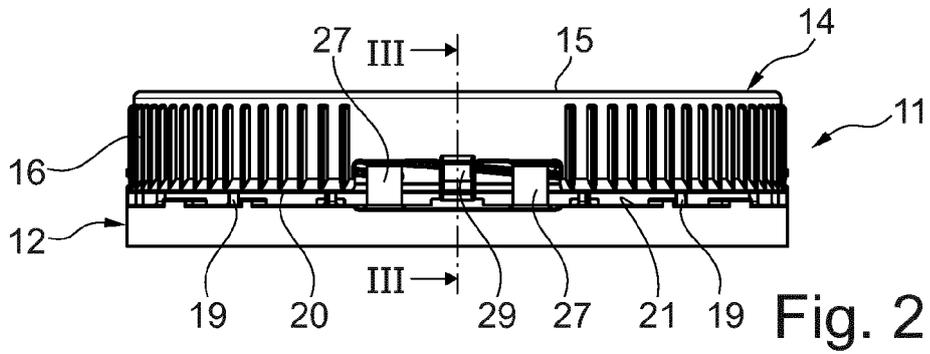


Fig. 2

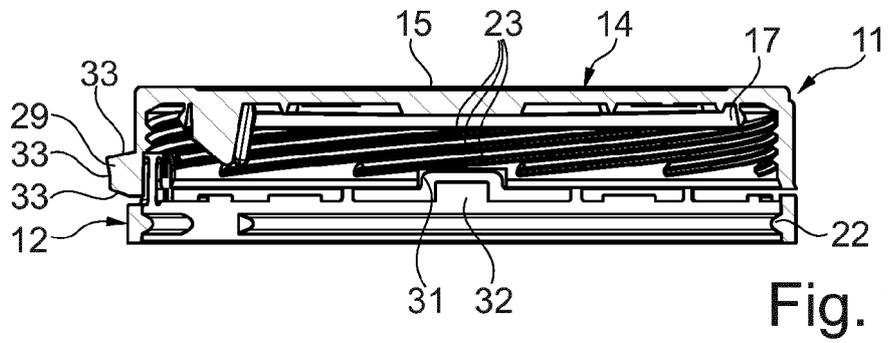


Fig. 3

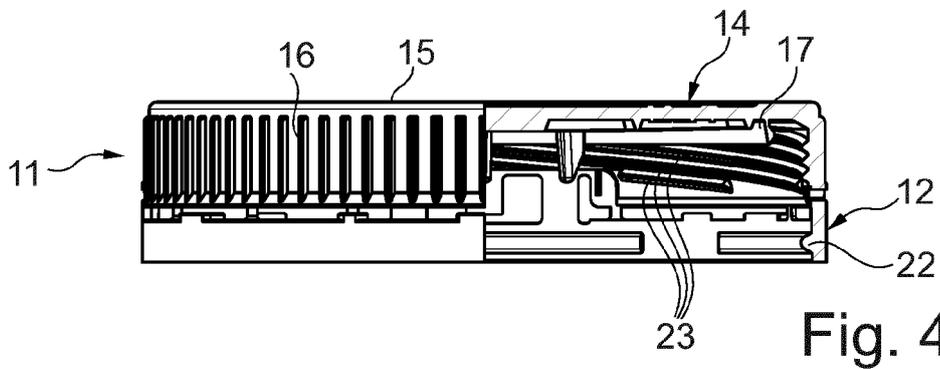


Fig. 4

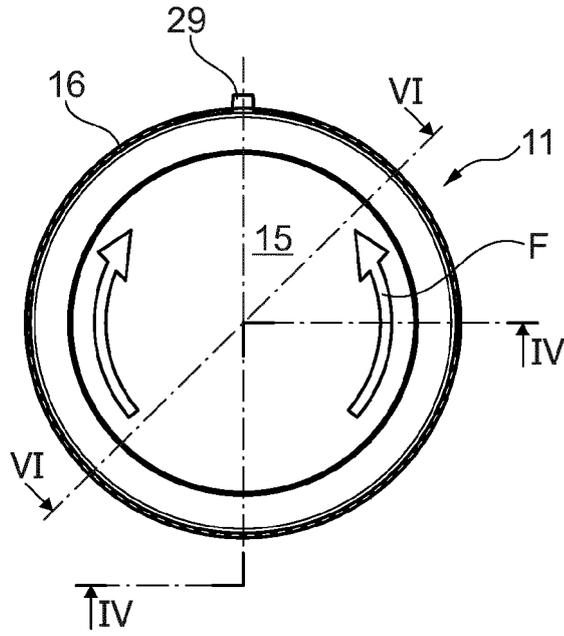


Fig. 5

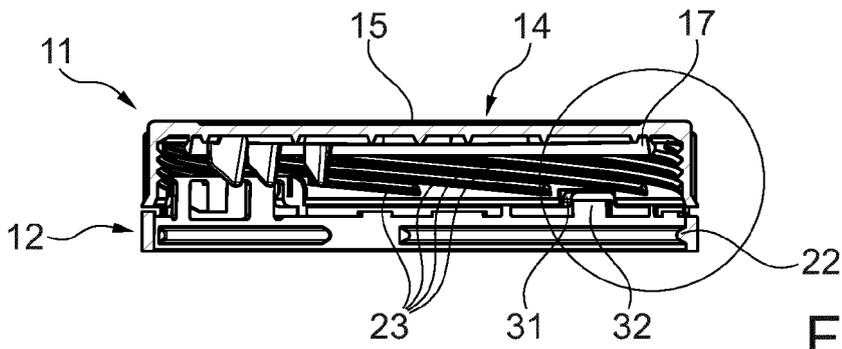


Fig. 6

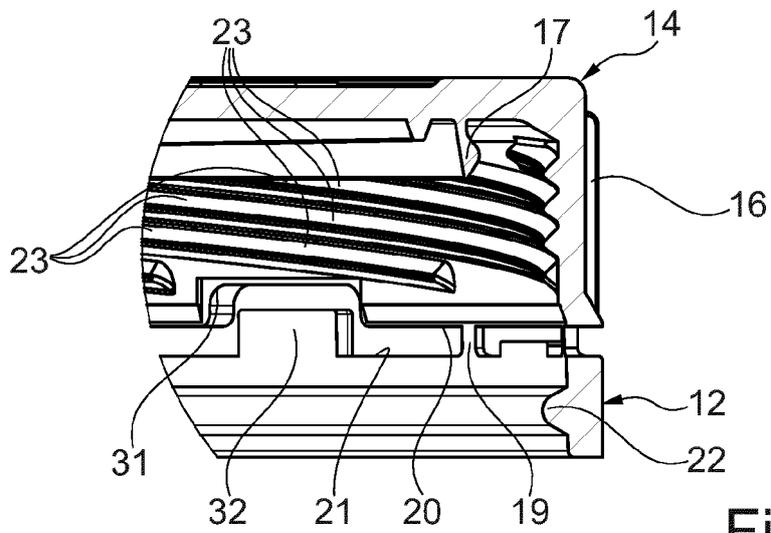


Fig. 7

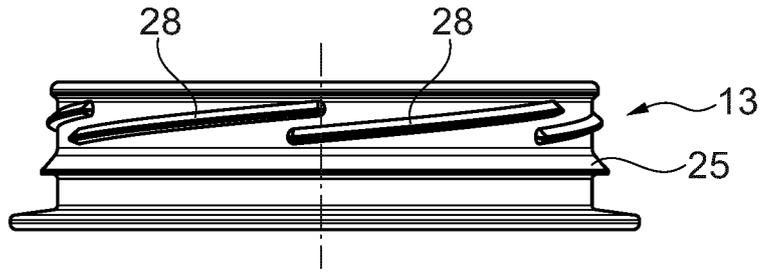


Fig. 8

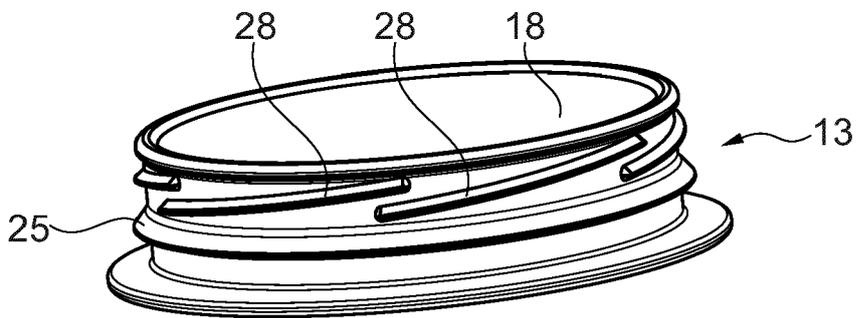


Fig. 9

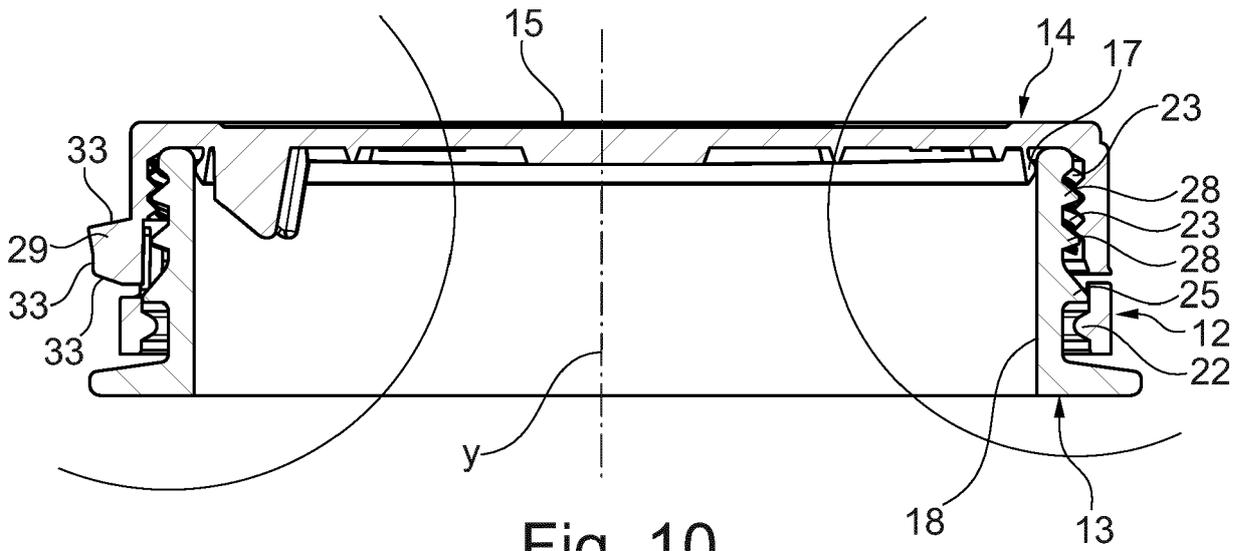


Fig. 10

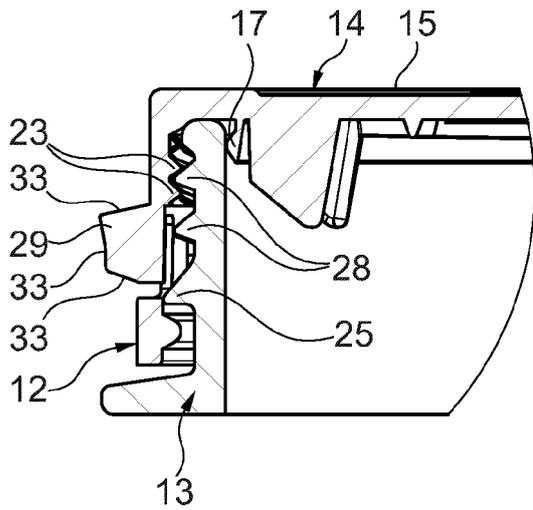


Fig. 11

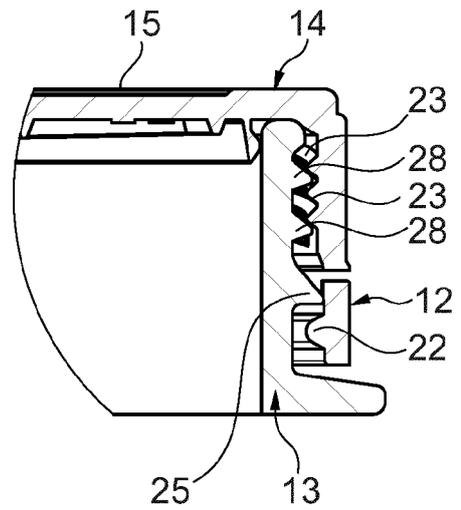


Fig. 12

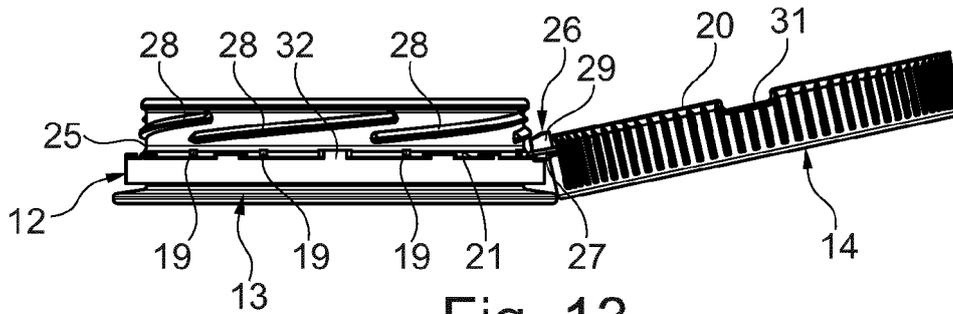


Fig. 13

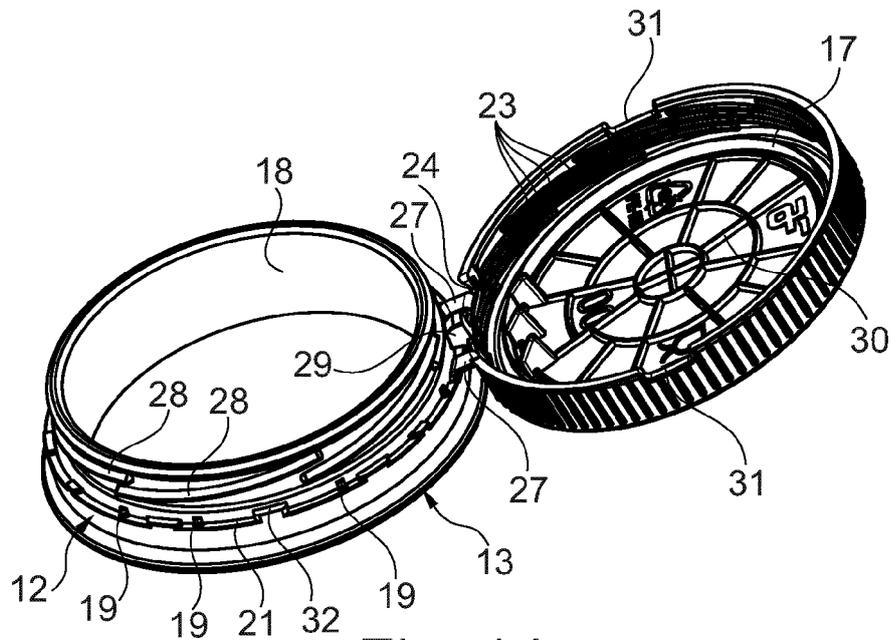


Fig. 14



EUROPEAN SEARCH REPORT

Application Number  
EP 22 17 9387

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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)
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Y	* figures 1, 4 * * paragraphs [0013], [0022], [0023] * -----	4, 14	B65D55/16
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Y	* figures 2, 6, 13 *	4, 14	
A	* page 3, lines 30, 31 * * page 7, lines 10 - 31 * -----	8	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>18 November 2022</b>	Examiner <b>Dogantan, Umut H.</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	

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

EP 22 17 9387

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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18-11-2022

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