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(54) **CLOSURE ASSEMBLY FOR CONTAINERS**

(57) Closure assembly comprising a neck (1), which in turn comprises a first threaded surface (3) and a coupling element (4), and a closure cap (2) linked to the neck (1). The cap has a base which surrounds the outside of the neck (1), with an internal face with a second threaded surface (6) able to be coupled to the first threaded surface (3) for a threaded coupling between the neck (1) and the cap (2) with the container. An upper lid, linked to the base, closes the cap. The second threaded surface (6) comprises a plurality of projections (8) aligned and separated from each other to retain the cap (2) on the neck (1) by means of a free rotation between both elements caused by the interaction of said projections (8) with the first threaded surface (3). The projections (8) have first (α) and second (β) angles of inclination.

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Description

OBJECT OF THE INVENTION

[0001] The present invention falls within the technical field of closures arranged on the necks, the holes for pouring or the openings for unloading, and relates to a closure assembly made up of a closure cap able to be coupled to the neck of a container, especially a bottle containing liquids.

[0002] The cap of the closure assembly of the invention comprises a base able to be linked by means of threading to the neck of the bottle, and a lid articulated with the base for opening and closing, which enables the outlet of the liquid without needing to unscrew the base, and it is mainly characterised in that said cap remains joined to the neck of the bottle by mechanical means at all times, thereby facilitating the recycling process thereof.

BACKGROUND OF THE INVENTION

[0003] Currently, a wide variety of threaded caps for bottle closures are known and used. Among these are those referred to commercially as "sports" caps, which usually comprise a base able to be threaded to the neck of a bottle, and a cap articulated with respect to the base which enables the outlet of the contents of the bottle through a nozzle, without needing to completely unscrew the cap.

[0004] The main application of these caps is in bottles containing liquids consumed while playing sports, such as water or isotonic drinks, since they enable an opening, closing and outlet for liquids that are easy, quick and able to be executed with just one hand or finger of a user, preventing accidental spills.

[0005] These caps likewise have additional safety elements, such as means for preventing unwanted opening and handling, or elements to indicate the opening, which can inform the user about whether the bottle in question has been previously opened.

[0006] Thus, caps have emerged, such as those described in the patent with publication number WO2017178665, of this same applicant, which are made up of a base and a lid articulated by a hinge, comprising at least one opening indicator, allowing the user to know that a container has been opened at least once. Prior to the first opening, the opening indicator is attached to the lid a separable connector which is broken when the container is opened. The base further comprises a housing that receives the opening indicator after its separation and shows it to the user through at least one window, enabling manipulation to be detected.

[0007] However, and given that the joint between the base of the cap and the neck of the bottle is threaded, additionally secured by means of a lower seal provided with breakage lines, there is always the possibility of breaking said seal in order to completely unscrew the cap and separate it from the neck, thus being able to freely access the contents of the bottle without needing to manipulate the hinged lid.

[0008] Moreover, in its latest publications, the environmental organisation ECOEMBES, which promotes recycling in Spain, recommends depositing both the bottles and the corresponding caps thereof in the yellow recycling container, joined together whenever possible. The main reason is that due to the small size thereof, it has been detected that if the caps are deposited and transported loose, they can be lost when transferred to the management plant or they can end up in different destinations than plastic recycling after going through the different screens to which the raw waste is subjected, such as the different processes for treating the waste (biostabilisation of the organic matter, anaerobic digestion, landfill, incinerator). This leads to a loss of resources, apart from increasing pollution caused by plastic.

[0009] For these reasons it is necessary to have a bottle closure the cap of which always remains joined to the neck of said bottle, which is more environmentally-friendly, thus preventing both unwanted manipulation and the aforementioned recycling drawbacks.

DESCRIPTION OF THE INVENTION

[0010] The closure assembly of the present invention basically comprises a container neck and a closure cap. The neck of the container, with essentially tubular geometry, has an external surface comprising:

- a first threaded surface, and
- a hook or coupling element, located on the bottom of the first threaded surface, and which preferably consists of a prominent sector with ring-shaped geometry, of the type commonly used to support and couple a ring which acts as a security seal.

[0011] Moreover, the cap in turn comprises:

- a lower base able to be coupled to the outside of the neck, thanks to a side wall with essentially ring-shaped geometry, and
- a lid linked to the base in a collapsible manner, for which it incorporates an articulation, preferably a hinge, for relative movement of the lid with respect to the base between an open position, wherein the outlet of the liquid contained in the container is enabled, and a closed position, wherein said outlet is prevented.

[0012] The side wall of the base has an internal face intended to stay facing the external surface of the neck, for which it comprises a second threaded surface, able to be coupled to the first threaded surface defined in said neck.

[0013] The second threaded surface of the cap consists of a discontinuous thread, made up of at least one set of consecutively grouped projections, which are

aligned and separated from each other.

[0014] Thus, when a user intends to separate and remove the cap by unscrewing it from the neck, they then rotate said cap with respect to the neck. The threaded surfaces, machined for mutual coupling, move between each other, causing the inner face of the base to slide over the external surface of the neck. At a given time, the projections of the second threaded surface interact with the first threaded surface, producing jumps which cause the decoupling between both threaded surfaces, whereby the cap turns freely with respect to the neck, thus preventing the removal thereof from the bottle.

[0015] The closure assembly of the invention solves the aforementioned problems of the state of the art since it ensures, by simple mechanical means, a permanent joining to the container whereon it is inserted, thus achieving the dual functionality of first preventing unwanted manipulations, by ensuring that the outlet flow of the liquid contained inside the bottle is made only through a pouring hole covered by an articulated lid. Second, it prevents the detachment thereof from the body of the bottle during the recycling processes, thus removing or minimizing the inconveniences described.

[0016] Manufacturing the closure of the invention only requires not machining the tips in the aluminum part of industrial moulds. This closure assembly likewise guarantees optimal resistance to pressure and prevents the generation of additional waste that is difficult to treat, such as the known sealing collars coupled to the neck of the bottle.

DESCRIPTION OF THE DRAWINGS

[0017] As a complement to the description provided herein, and for the purpose of helping to make the features of the invention more readily understandable, in accordance with a preferred practical exemplary embodiment thereof, said description is accompanied by a set of drawings which, by way of illustration and not limitation, represent the following:

Figure 1 shows a top perspective view of the closure assembly.

Figure 2 shows a bottom perspective view of the cap.

Figure 3 shows a top perspective view of a transverse cross section of the cap.

Figure 4 shows a top perspective view of a transverse cross section of the closure assembly.

Figure 5 shows a bottom plan view of the cap, in which the arrangement of the projections of the second threaded surface is appreciated.

Figure 6 shows a view of a detail of the cross section of figure 4, in which the joint between cap and neck is seen.

PREFERRED EMBODIMENT OF THE INVENTION

[0018] A detailed explanation of a preferred exemplary embodiment of the object of the present invention is provided below with the help of the figures referred to above.

[0019] As seen in the figures, and according to a possible practical embodiment of the invention, the closure assembly of the present invention is made up of a neck (1) of a bottle-type liquid container, and a cap (2) able to be linked to the neck (1), which consists of a rotating body.

[0020] The neck (1), with essentially tubular geometry, has a curved outer surface comprising a first threaded surface (3) and a coupling element (4), located on the bottom of the first threaded surface (3), and which consists of the preferred embodiment described herein in a prominent sector with ring-shaped geometry.

[0021] Moreover, the cap (2) comprises a lower base, with essentially cylindrical geometry, and an upper cover, linked in an articulated manner to the base, both elements being made in this preferred embodiment by moulding plastic material.

[0022] The base, intended to surround the outer surface of the neck (1), has an external face and an internal face. The external face incorporates a plurality of transverse grooves (5) distributed uniformly along all the surface thereof to facilitate the grip of the cap (2), while the internal face, able to face the neck (1), in turn comprises a second threaded surface (6) and a coupling (7), located on the bottom of the second threaded surface (6). In this preferred embodiment, the coupling (7) consists of a continuous ring-shaped projection.

[0023] As illustrated in figure 2, the second threaded surface (6) consists of a discontinuous thread, made up of a plurality of projections (8) which are aligned and separated from each other, intended to interact with the first threaded surface (3) to first establish a threaded closure between cap (2) and neck (1), and second, prevent the removal by means of unscrewing the cap (2), the projections (8) producing jumps when interacting with the first threaded surface (3) which cause the cap (2) to rotate freely with respect to the neck (1), whereon it is thus retained.

[0024] In the preferred embodiment described herein, the second threaded surface (6) is made up of three groups with three projections (8) each. As illustrated in figure 5, for each of these groupings, the projections (8) have first (α) and second (β) inclination angles, defined between the perimeter edges thereof and a central axis of rotation which is perpendicular to the centre of the cap (2).

[0025] These inclination angles (α, β) define an angular contact between the first (3) and the second threaded surfaces (6) such that it enables, first, during the elaboration of the closure assembly, the application of a torque which ensures a correct seal between the neck (1) and the cap (2), preventing the separation thereof and accidental spilling of the housed liquid. Second, said angles (α, β) collaborate in the interaction which causes the jumps between threaded surfaces (3,6) which retain the cap (2) on the neck (1).

[0026] Figures 5 and 6 show that in the preferred em-

bodiment thereof, two adjacent projections (8) of each grouping have a similar value for the first inclination angle (α), said value being 18.1°, while the third projection (8) of the set has the second inclination angle (β), with a value of 9.7°.

[0027] Moreover, the coupling (7) is intended to be coupled on the bottom of the coupling element (4) in order to ensure the joint between cap (2) and neck (1).

[0028] The cap (2) likewise comprises a nozzle (9), which projects from the top of the base, the nozzle (9) being equipped with a plurality of outlet openings (10) and a dispenser (11) for controlling the flow of liquid passing through the openings (10).

[0029] On the other hand, the cap (2) comprises an upper closure (12), for preventing the outlet of the liquid through the nozzle (9), a gripping element (13) for facilitating the opening of the closure (12), a hinge (14) for articulating the cap (2) on the base (1), and auxiliary fastening means (15) which are linked to the base (1) in order to maintain the joint of the cap (2) during the opening thereof.

Claims

1. A closure assembly comprising:

- a neck (1), which in turn comprises:
  - a first threaded surface (3), and
  - a coupling element (4), and
- a closure cap (2) linked to the neck (1) which in turn comprises:
  - a lower base intended to surround the outside of the neck (1), which has:
    - an external face, and
    - an internal face intended to stay facing the neck (1), which has a second threaded surface (6) able to be coupled to the first threaded surface (3) in order to establish a threaded coupling between the neck (1) and the cap (2) with the container, and
  - an upper cover, linked in an articulated manner to the base,

the closure cap being **characterised in that** the second threaded surface (6) comprises a plurality of projections (8) aligned and separated from each other in order to retain the cap (2) on the neck (1) by means of a free rotation between both elements caused by the interaction of said projections (8) with the first threaded surface (3).

2. The closure assembly according to claim 1 **characterised in that** the second threaded surface (6) comprises three projections (8).

3. The closure assembly according to claim 1 **characterised in that** the projections (8) have first (α) and second (β) inclination angles, defined between the respective perimeter edges thereof and a central axis of rotation which is perpendicular to the centre of the cap (2).

4. The closure assembly according to claim 3 **characterised in that** the first inclination angle (α) has a value of 18.1°.

5. The closure assembly according to claim 3 **characterised in that** the second inclination angle (β) has a value of 9.7°.

6. The closure assembly according to claim 1 **characterised in that** the cap (2) additionally comprises a nozzle (9) projecting from the top of the base.

7. The closure assembly according to claim 6 **characterised in that** the nozzle (9) comprises:

- a plurality of outlet openings (10), and
- a dispenser (11) for controlling the outlet flow.

8. The closure assembly according to claim 6 **characterised in that** the cap (2) additionally comprises an upper seal (12) for plugging the nozzle (9).

9. The closure assembly according to claim 1 **characterised in that** the cap (2) additionally comprises a hinge (14) in order to be articulated on the base.

10. The closure assembly according to claim 1 **characterised in that** the cap (2) additionally comprises auxiliary fastening means (15) linked to the base.

11. The closure assembly according to claim 1 **characterised in that** the external face incorporates a plurality of grooves (5) for gripping.

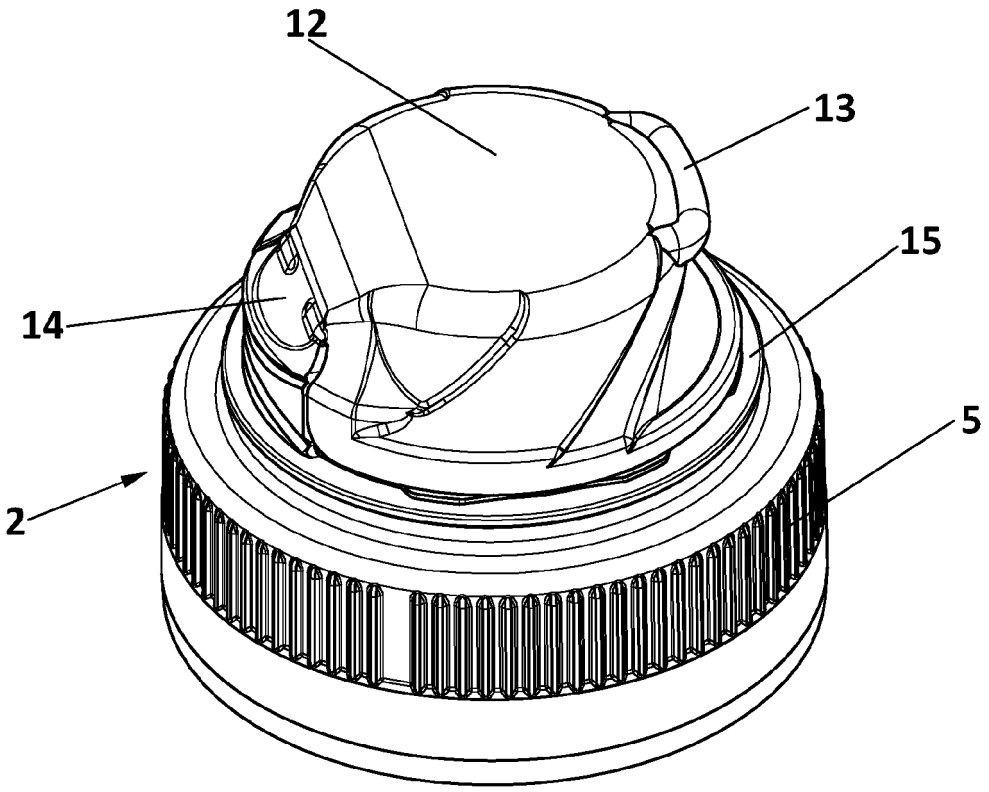

FIG. 1

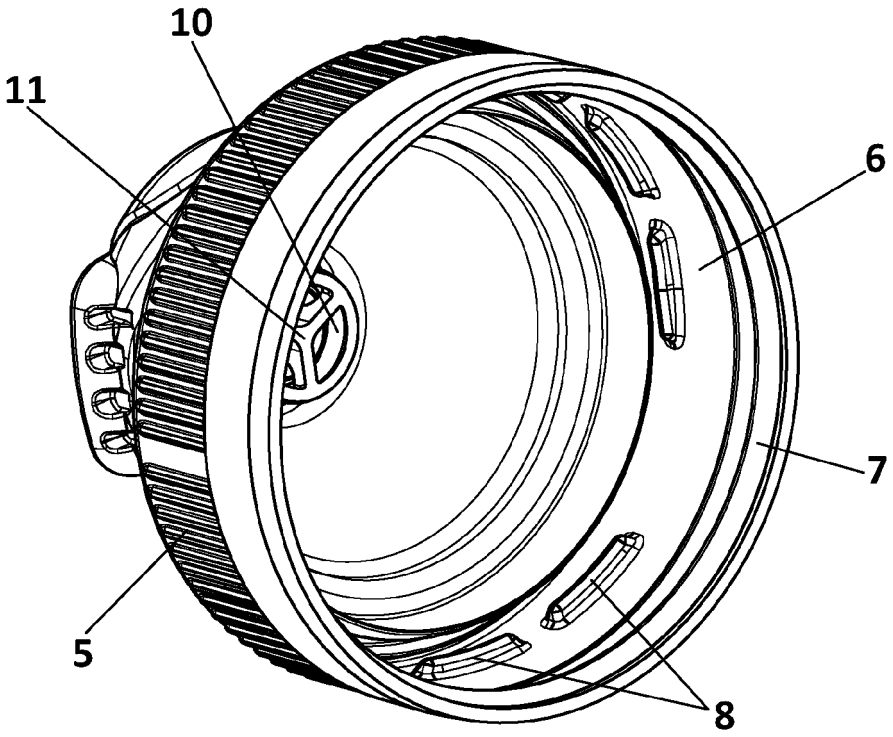

FIG. 2

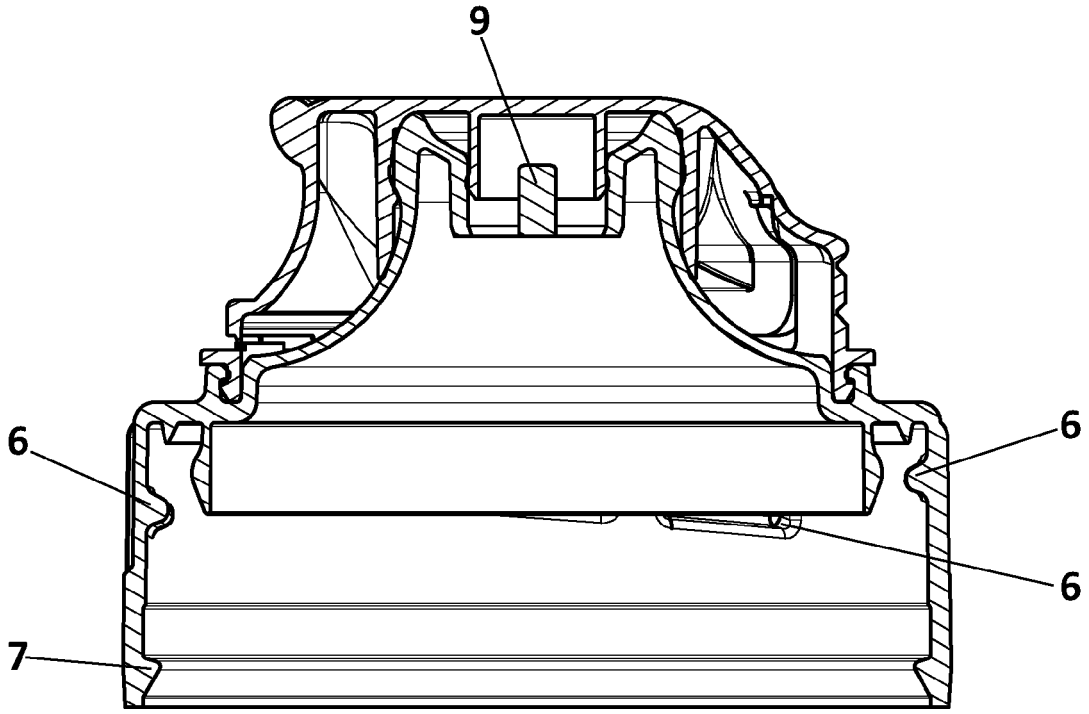

FIG. 3

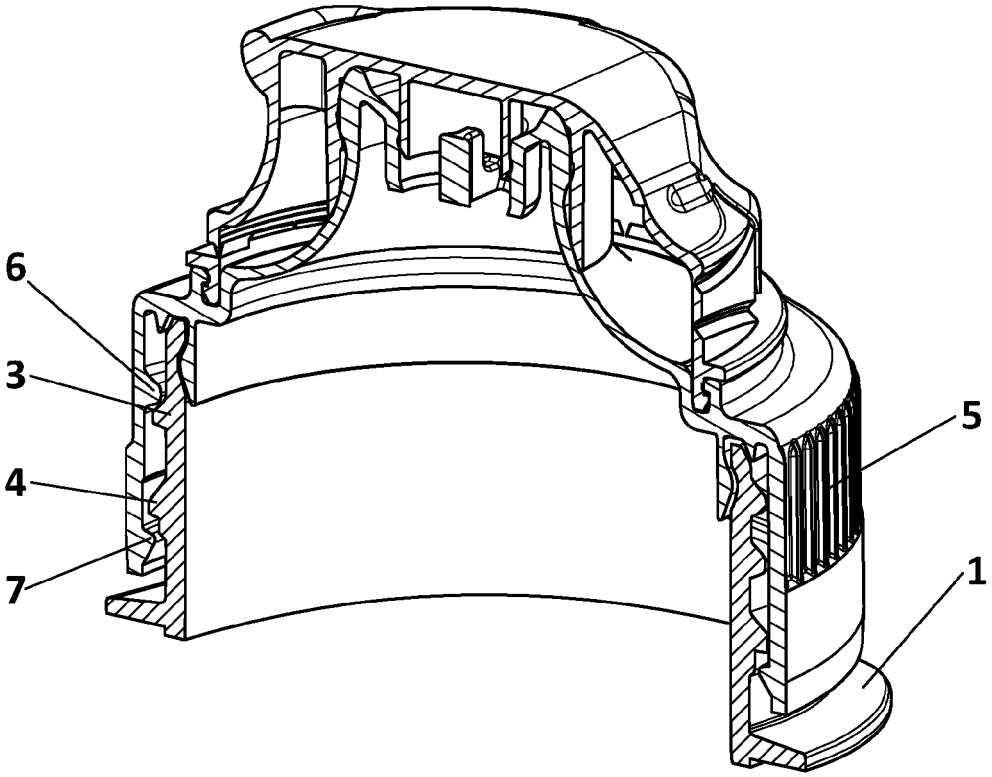

FIG. 4

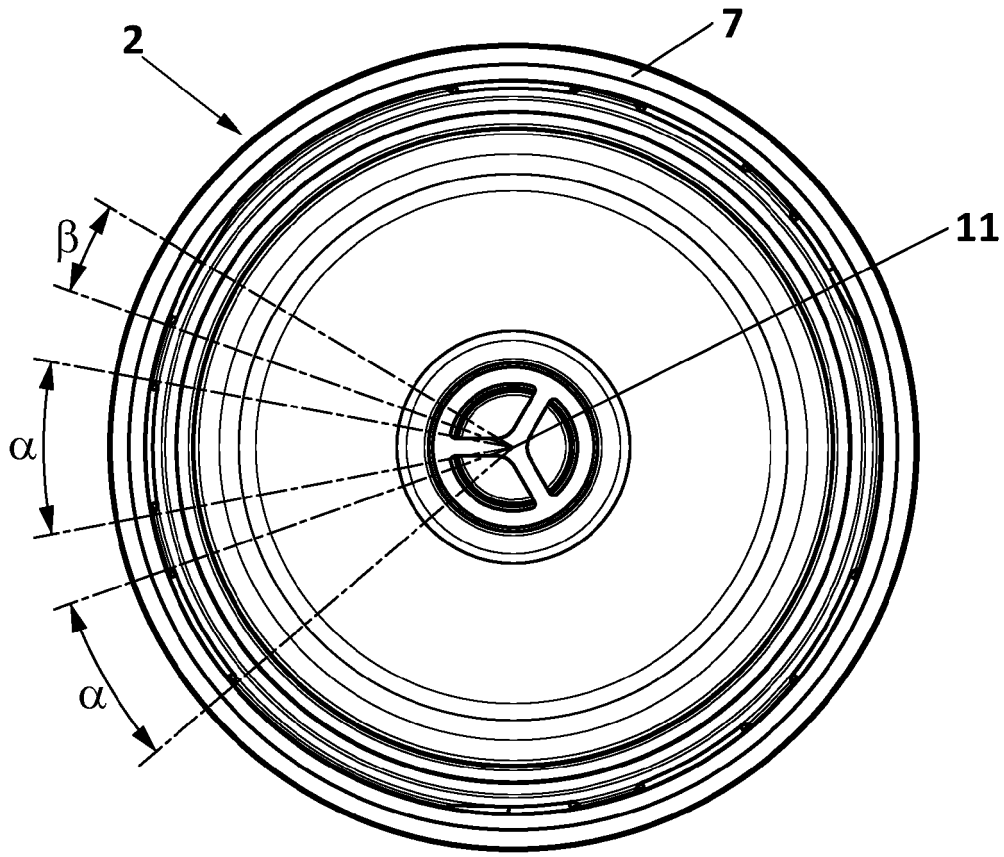

FIG. 5

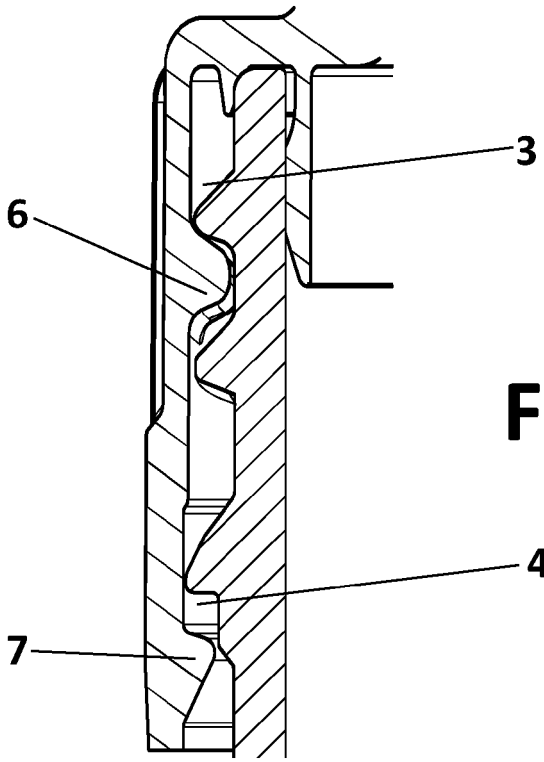

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 19 38 3033

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 April 2020	Dominois, Hugo

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 38 3033

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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