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(71) Applicant: **Capsol S.p.A.**
23892 Bulciago (LC) (IT)

(72) Inventor: **ROVELLI, Ivan Maria**
23892 BULCIAGO (LC) (IT)

(74) Representative: **Vanosi, Adelio Valeriano**
ADV IP S.r.l.
Corso di Porta Vittoria, 29
20122 Milano (IT)

(54) RESERVOIR CAP

(57) A reservoir cap (1) configured to be coupled to a neck (4A) of a container (4) at its opening (5), comprising a body (3) having a cup-shaped portion (9) closed at its bottom by a breakable wall (31), the first body (3) comprising at least one sealing element (32) with said neck (4A), the cap also comprising a cutter (2) provided with a head (20) from which extends a cylindrical surface (21) which is internally hollow that, when coupled to the cup-shaped portion, forms together with at least a part of the cup-shaped portion (9) a reservoir (S) for said product (10), the cutter sliding in a sealed manner inside the cup-shaped portion (9) and comprising a cutting surface (24) of the breakable wall (31) formed at a free end (22) of the cylindrical surface, the cup-shaped portion (9) being configured so that, when the cap is placed on the container (4) and the product is in the reservoir (S), the cutter (2), pushed with force against the breakable wall (31) thereof, at least partially separates the breakable wall from the cup-shaped portion (9) which causes the introduction of said product by fall into the container (4), characterised in that at least a part of the outer surface of the cutter is made of said thermoplastic material that absorbs moisture.

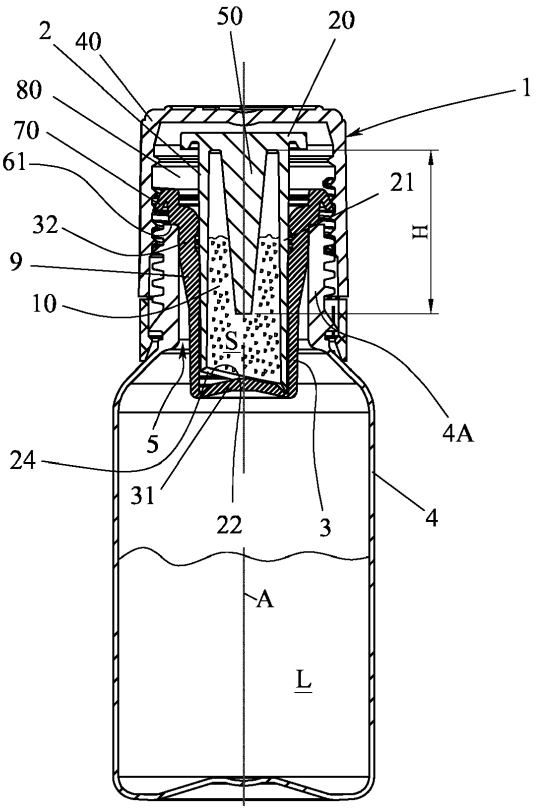

FIG.1

EP 3 351 486 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a reservoir cap.

PRIOR ART

[0002] A known reservoir cap is described in patent document EP2704962-A1.

[0003] Such a reservoir cap is provided with a cutter inside which a hollow sleeve or cup-shaped element made of a material that absorbs moisture is inserted.

[0004] It has been verified that the configuration of the cap described in the patent document does not allow an effective protection of the product inside the reservoir from moisture.

[0005] Furthermore, the emptying of the product contained in the reservoir is difficult, especially if the product is moistened and thus 'packed'.

[0006] Last but not least, the presence of an absorbing material as described decreases the volumetric capacity of the reservoir itself.

SUMMARY OF THE INVENTION

[0007] The object of the present invention is to provide a reservoir cap which is improved with respect to those described in the prior art.

[0008] This and other objects are achieved by a reservoir cap made according to the appended claims.

[0009] Advantageously, a reservoir cap according to the invention improves the protection against moisture of the product present in the reservoir.

[0010] Furthermore, advantageously, a reservoir cap according to the present invention improves the emptying of the product with respect to the caps described in EP2704962-A1.

[0011] Even more advantageously, a reservoir cap according to the present invention allows an increase in the volumetric capacity of the reservoir with respect to reservoirs with "sleeve" or "cup-shaped" moisture absorbing material inserted inside the cutter.

BRIEF DESCRIPTION OF THE FIGURES

[0012] Further features and advantages of the invention will become apparent from the description of a preferred but non-exclusive embodiment of the device, shown by way of a non-limiting example in the accompanying drawings, in which:

figure 1 is an axial section view of a reservoir cap according to the present invention, in a first operative configuration, when accommodated on a container;

figure 2 is an axial section view of the reservoir cap of figure 1, shown in a second operative configuration;

figures 3 and 3A are an axial and a lateral section, respectively, of a variant of a detail of the cap in figure 1;

figures 4 and 4A are an axial and a lateral section, respectively, of another variant of the detail in figure 3;

figures 5 and 6 are lateral sections of further variants of the detail in figure 3;

figures 7 and 7A are a plan view and an axial section, respectively, of yet another variant of the detail in figure 3; and

figures 8 and 8A are a plan view and an axial section, respectively, of a further variant of the detail in figure 3.

DETAILED DESCRIPTION OF THE INVENTION

[0013] With reference to the above figures, a reservoir cap is shown, globally denoted by reference numeral 1.

[0014] The reservoir cap 1 is configured to be coupled to a neck 4A of a container 4 at its opening 5.

[0015] Specifically, the cap 1 comprises a body 3 which defines a cup-shaped portion 9 closed at its bottom by a breakable wall 31. The body 3 comprises at least one sealing element 32 with said neck 4A, which can be formed by an outer surface of the cup-shaped portion 9, of a diameter such as to couple with slight interference and in a sealed manner with the inner part of the neck of the container 4.

[0016] The body 3 can further be provided with a shoulder 61 intended to abut with a front surface of the opening 4A, so as to form a stop for insertion of the body 3 into the opening 4A.

[0017] The cap 1 comprises a cutter 2, which may have a mushroom shape. It may be provided with a head 20 from which extends a cylindrical surface 21 which is internally hollow that, when coupled to the cup-shaped portion 9, forms together with at least a part of such a cup-shaped portion 9 a reservoir S in which a product 10 can be contained.

[0018] By way of example, the product 10 may be a powder containing one or more of: lactic ferments, bacteria, vitamins, food supplements for both therapeutic and dietary use.

[0019] The cutter 2 is sliding in a sealed manner inside the cup-shaped portion 9. For this purpose, on the outer surface of the cutter (better shown in fig. 3A, even if relating to another embodiment), a larger diameter area 63 may be provided (for example close to the head 20) intended to couple with slight interference and in a sealed manner with the inner surface of the cup-shaped body.

[0020] The interference between the cutter and the

cup-shaped body is in any case such as to allow an axial sliding of the cutter with respect to the cup-shaped body, when the first is loaded by a predetermined pressure.

[0021] The cutter, and specifically a free end of the cylindrical surface 21 thereof, defines a cutting surface 24 of the breakable wall 31. Advantageously, the free end 22 of the cutter 2 lies in a plane angled relative to a longitudinal axis A of the cutter, so as to form a 'blade' which facilitates the rupture of the bottom by concentrating the pressure in a single portion of the free end.

[0022] The cup-shaped portion 9 is configured so that when the cap 1 is placed on the container 4 and the product is in the reservoir S, the cutter 2, pushed with force against the breakable wall 31 thereof, at least partially separates the breakable wall from the cup-shaped portion 9 which causes the introduction of the product by fall into the container 4 (see figure 2).

[0023] Advantageously, a screw mounting lid 40 can be provided. The lid can be advantageously screw mounted on a thread provided on the container 4, near the mouth 4A thereof.

[0024] Once a possible seal of the lid 40 has been removed, it can be screwed completely. In this way, the lid 40 itself can press on the cutter, thus breaking the bottom 31 of the cup-shaped body.

[0025] When the lid 40 is present, the body 3 can be totally enclosed between the container 4 and the lid.

[0026] Advantageously, it is possible to provide sealing means adapted to prevent an air leakage between the body 3 and the lid 40. In a non-limiting example, such sealing means may comprise a lip 70 protruding from the body 3, which rests on the inner surface of the lid 40, above a threaded portion thereof.

[0027] According to an aspect of the present invention, at least a part of the outer surface of the cutter is made of said thermoplastic material that absorbs moisture.

[0028] In this way, the moisture-absorbing material minimises the entry of moisture from the external environment into the reservoir. In this configuration, the presence of the lid 40 is particularly advantageous, both in the presence of said sealing means 70 and in their absence.

[0029] Advantageously, if the part of the outer surface of the cutter made of moisture absorbing material is in communication with the chamber 80 formed between the lid 40 and the body 3 (or more generally with the container 4), it is possible to remove moisture from chamber 80, thus improving the product preservation.

[0030] If the part of the outer surface of the cutter made of moisture absorbing material is instead inside the cup (and is specifically in that area between a seal between the cup and the cutter and the breakable bottom 31), it can absorb any moisture originating from the liquid L of the container that transpires through the cup-shaped body (and possibly through the collapsible bottom thereof).

[0031] In a preferred embodiment, at least a part of the free end 22 of the cutter is made of a thermoplastic material that absorbs moisture. In fact, it has been verified that, in the configuration with integral collapsible bottom 31, and with the cutter 21 in the position of figure 1, this is the first area of the cutter which comes into contact with the moisture which transpires from the collapsible bottom.

[0032] Moreover, since the moisture absorbing material is substantially rigid, and in any case more rigid than the remaining thermoplastic material of which the cutter is usually made, use in such a position improves the 'cutting' of the collapsible bottom.

[0033] In an even more advantageous configuration, the cutter 2 is made in one piece by moulding of plastic material, and is entirely made of said thermoplastic material that absorbs moisture.

[0034] Given the considerable mass of the cutter, the effect of moisture absorption is even more pronounced, especially since the moisture absorbing material, in addition to being present on the outer surface of the cutter, it is also present inside the reservoir, in direct contact with the product to be preserved.

[0035] An even more advantageous embodiment may provide that, from the head 20 of the cutter 2, internally to the cylindrical surface 21, an elongated element 50 protrudes, made of a thermoplastic material that absorbs moisture.

[0036] The elongated element can be configured to form a hollow space I between its surface and that part of the cylindrical surface 21 facing the elongated element 50.

[0037] The elongated element 50 may have a height H (fig.1) so as to be drowned in the product S, when the product is inside the reservoir.

[0038] Moreover, the elongated element 50, may be free from cavities where the product can be stuck.

[0039] Also in this case, the cutter and the elongated element can be made in one piece of moisture absorbing material.

[0040] The elongated element may preferably have a tapered shape, which facilitates the falling of the powder once the bottom 31 has been broken.

[0041] In particular, the elongated element 50 can have a conical or frustoconical configuration, or a pyramid or a truncated pyramid configuration, with a polygonal base (for example, square or hexagonal).

[0042] From the foregoing, it is clear that the cutter 2 and the elongated element 50 can be made in two different pieces (for example by co-moulding) or in one piece.

[0043] Specifically, in the configuration shown in figures 1 and 2, the cutter and the elongated element are in one piece of moisture absorbing material.

[0044] The configuration illustrated in figures 3 and 3A shows a cutter made entirely of moisture absorbing material, but without an elongated element 50.

[0045] The configuration shown in figures 4 and 4A shows the cutter in figure 3, where, at a smaller height position of the cylindrical surface 21, there is a notch 60 adapted to prevent a complete rupture of said breakable

wall 31. In this way, even if the cutter 2 is fully pressed, a complete rupture of the breakable surface is never achieved, thus preventing it from falling into the container. The notch 60 can be made on any cutter described in the present text, and also on already known cutters, also without moisture absorbing material.

[0046] The cutter in figure 5 is made by co-moulding. The head 20 of the cutter and the elongated element 50 are made of moisture absorbing material.

[0047] The cylindrical portion 21 is instead made of standard plastic material, which does not absorb moisture.

[0048] The configuration in figure 6, on the other hand, provides for a cutter in which the head 20 and the cylindrical portion 21 are made of conventional plastic material, whereas only elongated element 50 is made of a material that absorbs moisture.

[0049] As seen in figure 6, a part 50A of the elongated element 50 may protrude through an opening 90 so as to face the outer surface of the cutter. In the present text, outer surface of the cutter is the one external to the cavity defined by the cylindrical portion 21 (and by the elongated element, if present).

[0050] Such a cutter can be advantageously made by co-moulding.

[0051] Figure 7 and figure 7A show a cutter in which a part 21B of the cylindrical portion, the head 20 and the elongated element 50 are made of moisture absorbing material, whereas the remaining part 21A of the cylindrical portion 21 is made of conventional plastic material.

[0052] Basically, in such an embodiment, the portion 21A of the cylindrical portion is a vertical band (which may be even smaller than the one shown) of conventional plastic material. The moulding thereof (as well as of the other embodiments described in the present text) can be carried out by bi-injection.

[0053] Still another embodiment is shown in figures 8 and 8A. Such an embodiment differs from the one described above because also a part 20A of the head is made of conventional plastic material, while a part thereof (the 20B) is made of moisture absorbing plastic material.

[0054] In conclusion, it should be noted that the various embodiments of the cutter as described can be obtained by moulding or co-moulding (if the cutter is made of two different materials).

[0055] Of course in the present text, only some embodiments according to the present invention have been described, but others can be conceived using the same innovative concept.

[0056] Preferably, in the present text, 'conventional plastic material' of which the cutter is manufactured, refers to one or more of those selected from the following group: PE-PA-PP.

[0057] Furthermore, the body 3 can be made of one or more of the following plastic materials: PE-PP-SEBS.

[0058] The cap 40 on the other hand, which can be provided with a seal, may be made of one or more of the following plastic materials: PE-PP.

[0059] Last but not least, an absorbing polymer, preferably a water-absorbing or hygroscopic polymer which can be moulded with conventional techniques, can be used as thermoplastic material that absorbs moisture. The water-absorbing or hygroscopic polymer, at room temperature, is in the solid state and has physical characteristics comparable or similar to the conventional plastics with which the other parts of the cutter are made. For example, it can have a hardness comparable to (or even greater than) PE-PA-PP etc. in the same environmental conditions. The moisture absorbing polymer may be a plastic compound polymer.

Claims

1. A reservoir cap (1) configured to be coupled to a neck (4A) of a container (4) at its opening (5), comprising a body (3) having a cup-shaped portion (9) closed at its bottom by a breakable wall (31), the first body (3) comprising at least one sealing element (32) with said neck (4A), the cap also comprising a cutter (2) provided with a head (20) from which extends a cylindrical surface (21) which is internally hollow that, when coupled to the cup-shaped portion, forms together with at least a part of the cup-shaped portion (9) a reservoir (S) for said product (10), the cutter sliding in a sealed manner inside the cup-shaped portion (9) and comprising a cutting surface (24) of the breakable wall (31) formed at a free end (22) of the cylindrical surface, the cup-shaped portion (9) being configured so that, when the cap is placed on the container (4) and the product is in the reservoir (S), the cutter (2), pushed with force against the breakable wall (31), at least partially separates the breakable wall (31) from the cup-shaped portion (9) which causes the introduction of said product by fall into the container (4), **characterized in that** at least a part of the outer surface of the cutter (2) is made of said thermoplastic material that absorbs moisture.

2. Reservoir cap according to the preceding claim, wherein at least a part of the free end (22) of the cutter (2) is made of a thermoplastic material that absorbs moisture.

3. Reservoir cap according to the preceding claim, wherein the cutter (2) is entirely made of said thermoplastic material that absorbs moisture.

4. Reservoir cap according to one or more of the preceding claims, wherein, from the head (20) of the cutter (2), internally to the cylindrical surface (21), protrudes an elongated element (50) made of a thermoplastic material that absorbs moisture, the elongated element being configured so as to form a hollow space (I) between its surface and that part of the cylindrical surface (21) facing the elongated element

(50).

5. Reservoir cap according to the preceding claim wherein the elongated element (50) has tapered shape.

6. Reservoir cap according to one or more of the preceding claims wherein the elongated element (50) has a conical or frustroconical shape.

7. Reservoir cap according to claim 5, wherein the elongated element (50) has pyramid shape or a truncated pyramid shape, with polygonal base.

8. Reservoir cap according to one or more of the preceding claims, wherein the cutter (2) and the elongated element (50) are made in one piece.

9. Reservoir cap according to one or more of the preceding claims, wherein the free end (22) of the cutter (2) lies in a plane angled relative to a longitudinal axis (A) of the cutter, and/or wherein at a smaller height position of the cylindrical surface (21) there is a notch (60) adapted to prevent a complete rupture of said breakable wall (31).

10. Reservoir cap according to claim 1, wherein a screw mounted lid (40) is present, sealing means (70) being provided between the body and the lid adapted to prevent an air leakage between the body and the lid.

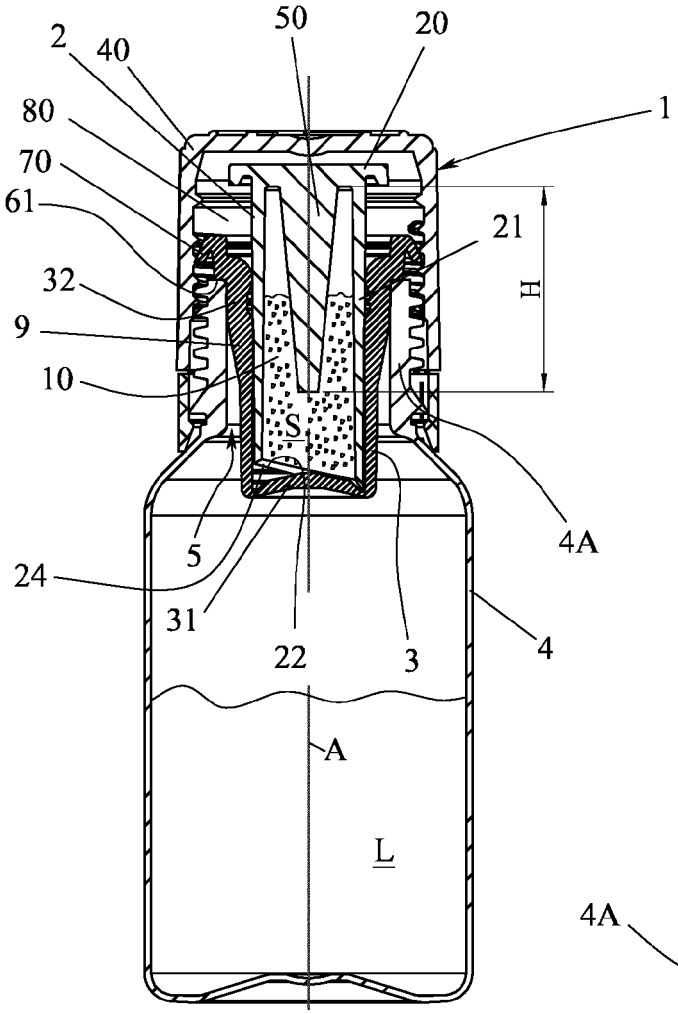
2
40
50
20
1
80
70
61
21
H
32
9
10
S
4A
5
24
31
22
3
4
A
L

FIG.1

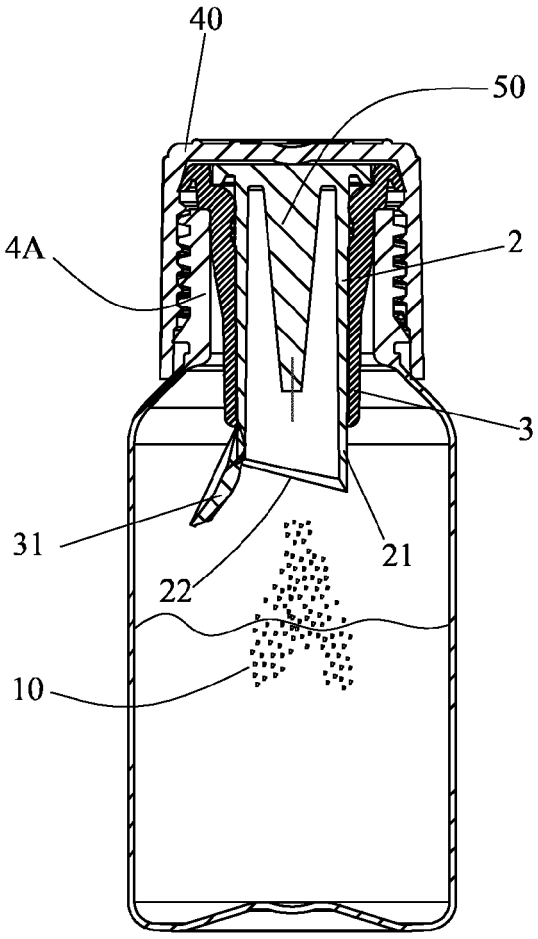
40
50
4A
2
3
31
21
22
10

FIG.2

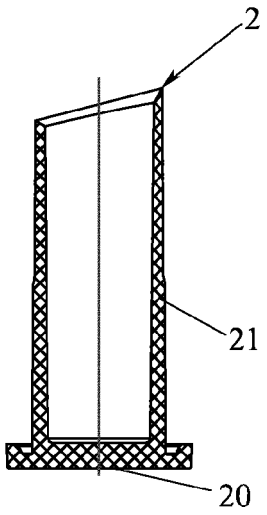

FIG.3

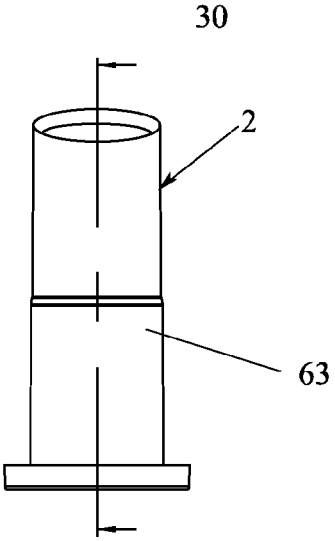

FIG.3A

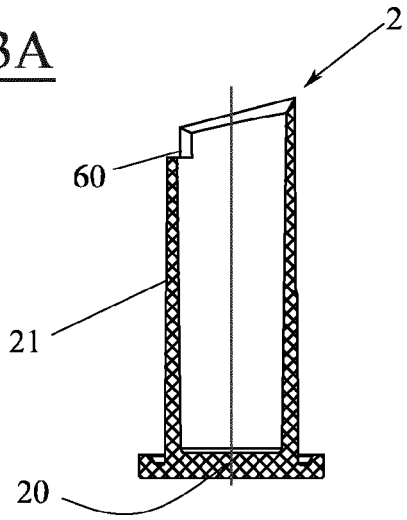

FIG.4

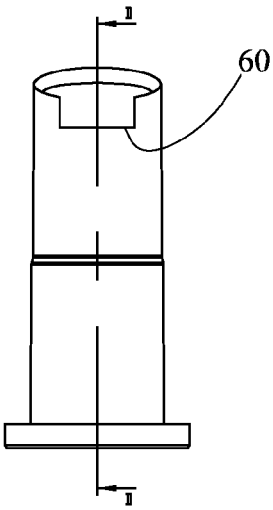

FIG.4A

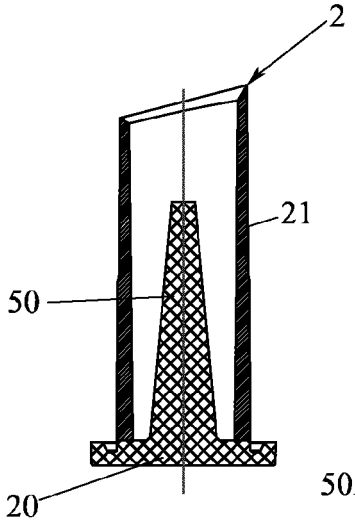

FIG.5

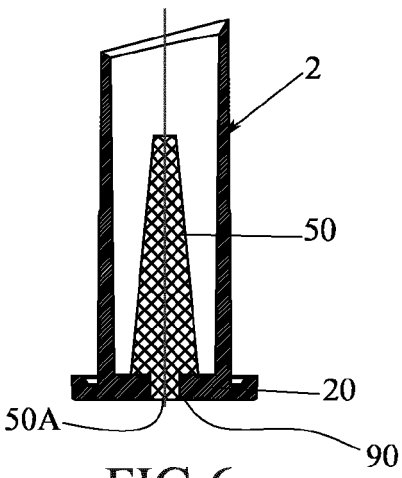

FIG.6

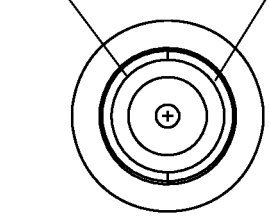

FIG.7

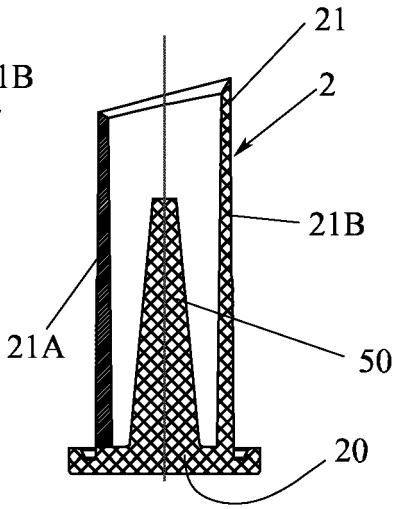

FIG.7A

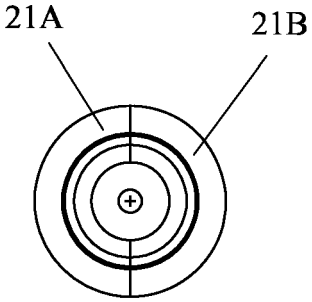

FIG.8

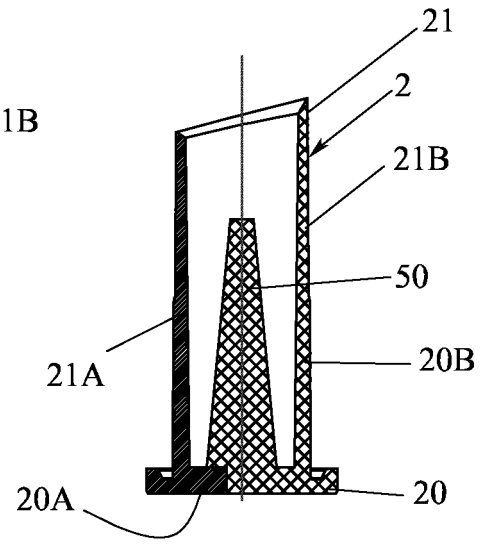

FIG.8A

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 2698

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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	4 June 2018	Sundell, Olli

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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

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