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(54) **A CAP CONSTRUCTION WITH A STORAGE SPACE AND A CONTAINER PROVIDED THEREWITH AS WELL AS A METHOD OF USING SAME**

(57) The invention relates to a cap construction (1) for a container, said cap construction comprising a storage space (7) for dispersing a prod-uct into said container, said cap construction comprising a screw cap (3) with a foil (5) for closing said storage space; wherein said cap construction furthermore comprises a support (2) structure which is embodied for on the one hand by means of mutual screw-thread coupling same in a rotatable manner with the screw cap and, on the other hand, coupling the cap construction with the container and which is provided with a cutting element (13) for cutting the foil. The cutting element cuts through the foil upon rotating the screw cap with respect to the support structure, with the proviso that the support structure comprises a stop means (21) for collecting the foil that was cut by said cutting element.

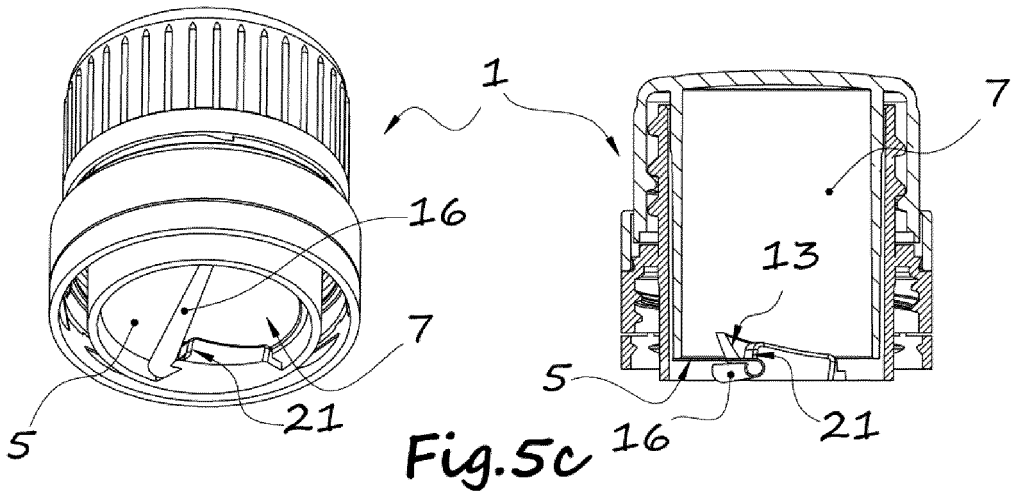


Fig.5c

EP 3 190 062 A1

Description

[0001] The present invention relates to a cap construction according to the preamble of claim 1. Furthermore, the invention relates to a container comprising such cap construction.

[0002] This cap construction is known in the art. Cap constructions like these are commonly used for closing a bottle or flask and may contain a product in the storage space (also referred to as additive), for example a powder or a liquid, that is to be added to the material contained in the bottle or flask before same is used or consumed. For example, additives that react with said materials in the container can be added shortly before use such that the additive's reactivity and effectiveness is retained. A known example are vitamins that commonly react with water such that the effectiveness is mainly lost shortly after adding vitamins to an aqueous solution when filling the bottle or flask in the factory.

[0003] The known cap constructions have the disadvantage that removal of the foil with which the said additives are stored in the storage space is commenced fairly untidy with the consequence that the foil is not removed well, leading to a relatively large amount of additives not being removed from the storage space, or that the foil is removed partly or even completely from the cap ending up in the material. Such provides danger to a user when consuming the said contents of the container. Also, the foil may obstruct the opening through which the contents should be removed from the container with the consequence that the contents may not be used or consumed at all.

[0004] Therefore, there is a need in the art for an improved cap construction for adding an additive to a material in a container. In the present description, the term "additive" is to be construed very broadly and comprises solid, liquid and gaseous substances. For example, the additive may be, without any limitation, a vitamin, a drug, a flavor or a fragrance.

[0005] The invention aims at providing an improved cap construction of the kind mentioned in the preamble.

[0006] The invention especially aims at providing a cap construction as mentioned in the preamble that ensures that all additive is removed from the storage space and added into the container.

[0007] The invention also aims at providing an improved cap construction that collects the part of the foil that was cut loose such that it cannot enter the container.

[0008] So as to obtain at least one of the above mentioned goals, according to a first embodiment the invention provides a cap construction comprising the features of claim 1. This cap construction has the advantage that the foil is collected in the stop means when cutting the foil for opening the storage space.

[0009] It has shown that the cap construction according to the present invention can be manufactured very simply and at low costs. Such synergetic combination of features was a surprise and great advantages.

[0010] According to a first aspect, the invention relates to a cap construction for a container, said cap construction comprising a storage space for dispersing a product into said container, said cap construction comprising a screw cap with a foil for closing said storage space; wherein said cap construction furthermore comprises a support structure which is embodied for on the one hand by means of mutual screw-thread coupling same in a rotatable manner with the screw cap and, on the other hand, coupling the cap construction with the container and which is provided with a cutting element for cutting the foil, and is characterized in that said cutting element cuts through the foil upon rotating the screw cap with respect to the support structure, furthermore with the proviso that the support structure comprises a stop means for collecting the foil that was cut by said cutting element.

[0011] The term "cap construction" is to be interpreted very broadly and comprises all kinds of closures of bottles, flasks, cans and all other kinds of containers that are closeable by means of movable or permanent closures. For example, the cap construction can be added to the container by means of a rotating movement or a click connection. The cap construction according to the present invention will comprise at least one rotating part for cutting the foil. The specific shape of the stop means ensures curling of the foil when mutually rotating the screw cap and the support structure with respect to each other.

[0012] The storage space has an edge to which the foil is connected. This connection my for example be obtained through heat sealing or through a pressure sensitive adhesive. A regular opening of the storage space is obtained when the rotating movement is made in a construction wherein the storage space has a substantially circular edge to which the foil is connected and wherein said cutting element is connected to the support structure for cutting the foil along said circular edge.

[0013] It has shown that said curling movement and the containment of the cut foil is optimally when the cutting element is positioned between the stop means and the edge. Probably due to the cutting element which is positioned relatively at the outside, and which travels a larger distance than the stop means that is positioned relatively further inside, the foil is effectively directed towards a position outwardly, i.e. towards the edge. Since the cutting element deforms the foil to some extent, especially because the stop means is positioned at an angle with respect to the cutting element, such curling effect is enhanced. By said curling of the foil the part that is cut is caught by the stop means yielding a compact and sturdy combination of cut foil.

[0014] A solid collection of the foil is also obtained when the cutting element and the stop means are positioned substantially adjacent. For example, they may be positioned substantially side by side, but optionally (in case of a screw cap with a diameter of minimally about 20 mm) an interspace of maximally two or three millimeters may be applied.

[0015] A compact construction is obtained when the storage space of the screw cap is received within the support structure.

[0016] As mentioned before, it is preferred that the screw cap and the support structure are embodied for a mutual relative displacement in a screw direction for cutting the foil. In such embodiment, an optimum collection of the cut foil is obtained when the stop means comprises a catch means with a recess, the access opening thereof being substantially directed into the screw direction of the support structure. The cut foil is collected in the recess such that upon further rotation of the screw cap and the support structure increasingly more foil is caught in said recess. Due to the rotating movement of both parts the foil, covering the storage space on its edge in a flat shape, will be curled. This furthermore ensures a solid collection of the foil that, as a consequence, will not hang from the edge loosely or may even be disrupted from said edge and fall in the container. Even when firmly shaking the container with its solid or liquid contents, the cut foil is firmly anchored to the cutting element and the stop means.

[0017] A simple connection of the cap construction with the container is preferably obtained when the support structure comprises inner screw-thread by means of which it is embodied for being coupled to outer screw-thread of the container. As a consequence, the complete construction may simply be coupled to the container. The screw cap and the support structure are provided with a containment connection at the end of their mutually co-operating screw-thread for mutually coupling the screw cap and the support structure. After the screw cap is screwed completely on the support structure, the containment connection will ensure that the screw cap cannot be removed independently, i.e. without the support structure, rotated backwards. Such coupling then is inseparably. However, the complete cap construction may be removed from the container by removing same by rotating back the screw-thread of the support structure. In that case, the contents of the storage space will have been released and mixed with the contents of the container.

[0018] In particular a cutting element has proven to be effective in cutting the foil such that a curling and collection action within said stop means is effectively obtained when the screw cap and the support structure are embodied for a mutual relative displacement into a screw direction for cutting the foil, wherein the cutting element has a cutting element protruding into the screw direction for cutting the foil.

[0019] Collection of the cut foil within the recess, such that it curls and crumples is obtained in a conceivable way when a line drawn through a center of rotation of the support structure and the protruding portion of the cutting element, intersects the stop means.

[0020] Finally, preferably the support structure by means of inner screw-thread is embodied for connection to outer screw-thread of the container and wherein the cutting element is positioned to be received within the container. Such yields a construction that is virtually not to be distinguished from a regular screw cap of a container. Acceptation by consumers therefore will be optimal.

[0021] According to a further aspect, the invention relates to a container with a cap construction according to the present invention as mentioned above.

[0022] According to a still further embodiment the invention relates to a method for dispersing a product, for example an additive, to a material that is contained in a container, for example an additive to a liquid. In the method according to the invention the cap construction is embodied for closing the container, wherein the cap construction has a storage space for said product and a screw cap with a foil for closing the storage space; wherein the cap construction furthermore has a support structure which on the one hand is embodied for rotatably connecting same with the screw cap by means of mutual screw-thread and, on the other hand, for coupling the cap construction with the container and which is provided with a cutting element for cutting the foil. The method is characterized in that it comprises the steps of: - rotating the screw cap with respect to the support structure in a first direction for cutting the foil, with the proviso that the support structure comprises a stop means for stopping and collecting the foil that is cut by said cutting element during said rotation movement; - dispersing said product into the container; and - mixing said product in a material in said container. Such provides a simple and secure method for mixing a product, for example an additive, into a liquid or another material. The advantages as obtained with the cap construction are obtained in a similar manner.

[0023] It is preferred that the method comprises the step of breaking a seal between the screw cap and the support structure when rotating the screw cap with respect to the support structure, preceding the step of cutting the foil. Thus, it is immediately visually clear that the foil has been cut, which means that he product has already been dispersed.

[0024] According to a further preferred embodiment, the method comprises the steps of: - connecting the screw cap to the support structure upon cutting the foil; and - removing the combination of the screw cap and the support structure from the container, preferably by rotating the combination of the screw cap and the support structure from the container, preferably by unscrewing the combination of screw cap and support structure from the container. Then, a single cap construction may provide for cutting the foil and removing the cap construction from the container. There will be no separate, loose parts rendering the method "fool proof" and increasing the usability of the product.

[0025] Hereafter, the invention will be explained with reference to drawing. The drawing shows in:

Fig. 1 - 4 a cap according to the invention in a per-

spective and exploded view,
Fig. 5 an explanation of how the cap according to the invention works in three steps,
Fig. 6 a view of a closure of the screw cap and the support structure,
Fig. 7 and 8 the construction of the cutting element and the stop means,
Fig. 9 how the screw cap is received in the support structure and how it works,
Fig. 10 - 12 a series of side views and sectional views of embodiments of the cap construction according to the invention, and
Fig. 13 and 14 side views of two embodiments of the cap construction according to the invention.

[0026] In the drawing, the same and similar parts are denoted by the same reference numerals. However, for ease of understanding the figures, not all parts that are required for a practical embodiment are shown.

[0027] Fig. 1 shows a top view of a cap construction 1 according to the invention in perspective, whereas Fig. 2 shows the cap construction 1 in perspective view from below. The cap construction 1 is comprised of a support structure 2 and a screw cap 3. The support structure comprises screw-thread 4 for connecting same to a container, for example a bottle. In Fig. 3 the cap construction 1 is shown in a perspective explosion view from above wherein the individual support structure 2 and screw cap 3 are clearly visible. Furthermore, Fig. 3 shows a foil 5, said foil 5 being connected to an edge 6 of said screw cap 3 such that a confined space is obtained in said screw cap 3 by closing a hollow space 7. Said hollow space 7 is obtained within an inner cap wall 8, which can be received in the support structure 2, this situation being shown in Fig. 1 and Fig. 2. To that end, the support structure 2 comprises a hollow space 9 extending through the full longitudinal length of the support structure 2. This hollow space 9 is defined by an inner collar wall 10 (also identified by inner support structure wall 10).

[0028] The screw cap 3 is provided with a tamper guard 12 such that in a first positioning of screw cap 3 on support structure 2 the foil 5 that is connected to the screw cap 3 is positioned at a distance from the bottom edge 11 of the support structure 2. The tamper guard 12 may be removed, pushed away or punctured, such that the screw cap 3 can be screwed further on support structure 2 such that foil 5 may be displaced towards the bottom edge 11 by means of a rotating movement.

[0029] Fig. 2 and Fig. 4 show a cutting element 13 cutting the foil when the screw cap 3 is screwed fully on the support structure 2. To that end, the screw cap 3 and the support structure 2 have mutually cooperating screw-thread 14, 15.

[0030] In Fig. 5A, 5B and 5C show threes subsequent stages, both in perspective bottom view and in sectional side view, of the screw cap 3 being screwed on the support structure 2. In Fig. 5A a stage is shown according to Fig. 2. Here, the cutting element 13 is positioned at a distance from foil 5. In Fig. 5B the screw cap 3 is screwed over such distance, that the cutting element 13 just cuts a first portion of foil 5. Fig. 5C finally shows a situation wherein foil 5 is partly curled 16. As a consequence, an additive contained in the storage space 7 can be removed from screw cap 3 through the opening that has been made in foil 5. Since the cap construction 1 will be positioned on a container, for example a flask or a bottle, the additive will be mixed with the material contained in the container.

[0031] In the perspective view according to Fig. 5B and Fig. 5C it is shown that the tamper guard 12 has been removed, whereas in the sectional view said tamper guard has been shown. The reason for this is that in the perspective view it is clearly visible that the screw cap is moved downwards when the said guard is not shown. In practice, the tamper evident band may remain on the structure as shown in the sectional views. An alternative embodiment applies a removable temper evident band.

[0032] Fig. 6 shows a perspective view of the cap construction 1 with a partly cut out section. In this figure, it can be seen that the support structure 2 and the screw cap 3 comprise mutually cooperating closure cams 17, 18 that run on each other when screwing the screw cap 3 on the support structure 2 and lock the support structure 2 with respect to the screw cap 3. Said both parts then cannot be separated from each other and form a single part. An advantage thereof is that the screw cap 3 as such cannot be removed from the container, but only in combination with the support structure 2. The support structure 2 is not provided with a grip enhancing surface, whereas the screw cap 3 is, with the consequence that the support structure 2 may not be removed from the container. Only after cutting the foil 5 the complete cap construction 1 may be removed from the container.

[0033] Fig. 7 shows a preferred embodiment of the cutting element 13. As shown, the cutting element 13 is connected to the wall 10 of the support structure. The chisel-shaped end 19 is positioned at a distance 20 from the wall 10. Thus, the end of the wall 8 o the screw cap 3 may be inserted in between the cutting element 13 and the wall 10.

[0034] When the cutting element 13 cuts the foil 5, part of the foil 5 that is positioned at a larger distance from edge 6 than the position where cutting element 13 cuts foil 5, will be caught by stop means 21. Therefore, the foil 5 will be guided along the surface of stop means 21 and it will curl. This is clearly shown in Fig. 5C.

[0035] The cutting element 13 may be positioned at an angle of for example 20° with respect to the center line of the support structure 2, whereas the stop means has an angle of 45° with respect to the center line. The angle B of the cutting element is preferably in the range of from 10° to 60°, whereas the angle C of the stop means is preferably in the range of from 10° to 135°.

[0036] Fig. 8 furthermore shows that the end 22 of cutting element 13 can be embodied slightly obliquely, such that a minor cutting action through the foil 5 is obtained,

in addition to a pushing movement against the foil 5. This angle may, with respect to the tangent through the center line of the support structure 2, amount to about 10° to 60°. In the figure, the angle is about 20°.

[0037] Fig. 9A, 9B and 9C shows three stages of screwing the screw cap 3 and the support structure 2. The foil 5 is connected a little bit eccentrically with respect to the edge 6, which may occur in practice unintentionally, such that when inserting the screw cap the protruding portion 23 of foil 5 may be caught in between the wall 8 and the wall 10. The ribs 24 at wall 8 do not extend to the edge 6, such that the foil may be received said walls without any detrimental effect. The ribs ensure that the cylindrical wall (8) is positioned cylindrically within the cylindrical wall (10) of the support structure (2). A concentric fitting of said both parts is an advantage for yielding an optimum cutting and curling of foil 5.

[0038] Fig. 10, 11 and 12 show three embodiments of cutting element 13 for use in the cap construction 1 according to the invention. Fig. 10 shows an embodiment wherein the cutting element 13 itself is used as a stop means 21 and wherein angle C is about 0°. The foil thus is stopped by means of said stop means. In Fig. 11 the angle C of stop means 21 is about 45° providing a curling action of cut foil 5. Fig. 12 finally shows a shape of stop means 21 wherein angle C is even larger than 90°, to wit about 110°, providing an excellent curling and crushing of said foil. Especially, an angle of 90° or more has shown to be very effective, although angles in the rage of from 0° to 90° have shown to be affective.

[0039] Finally, Fig. 13 and Fig. 14 show a reinforced embodiment of the cap construction 1 according to the invention. Here, stop means 21 is connected to wall 10 of support structure 2 by means of a bridge 25. This provides an additional firmness to cutting element 13 and stop means 21 and en reduces the risk of degradation of these parts. Especially a chisel-shaped end 19 might induce injuries when becoming detached from the structure.

[0040] The invention is not limited to the embodiments mentioned above and as shown in the drawing. The invention is limited by the appending claims only.

[0041] The invention also relates to any combination of features that have been mentioned here independently of each other.

Claims

1. A cap construction for a container, said cap construction comprising a storage space for dispersing a product into said container, said cap construction comprising a screw cap with a foil for closing said storage space;
   wherein said cap construction furthermore comprises a support structure which is embodied for on the one hand by means of mutual screw-thread coupling same in a rotatable manner with the screw cap and, on the other hand, coupling the cap construction with the container and which is provided with a cutting element for cutting the foil, **characterized in that** said cutting element cuts through the foil upon rotating the screw cap with respect to the support structure, furthermore with the proviso that the support structure comprises a stop means for collecting the foil that was cut by said cutting element.

2. A cap construction according to claim 1, wherein the storage space has a substantially circular edge to which the foil is connected and wherein said cutting element is connected to the support structure for cutting the foil along said circular edge.

3. A cap construction according to claim 2, wherein the cutting element is positioned between the stop means and the edge.

4. A cap construction according to any of claims 1 to 3, wherein the cutting element and the stop means are positioned substantially adjacent.

5. A cap construction according to claim 1, wherein the storage space of the screw cap is received within the support structure.

6. A cap construction according to claim 1, wherein the screw cap and the support structure are embodied for a mutual relative displacement in a screw direction for cutting the foil, wherein the stop means comprises a catch means with a recess, the access opening thereof being substantially directed into the screw direction of the support structure.

7. A cap construction according to claim 1, wherein the support structure comprises inner screw-thread by means of which it is embodied for being coupled to outer screw-thread of the container and wherein the screw cap and the support structure are provided with a containment connection at the end of their mutually cooperating screw-thread for mutually coupling the screw cap and the support structure.

8. A cap construction according to any of the preceding claims, wherein the screw cap and the support structure are embodied for a mutual relative displacement into a screw direction for cutting the foil, wherein the cutting element has a cutting element protruding into the screw direction for cutting the foil.

9. A cap construction according to claim 8, wherein a line drawn through a center of rotation of the support structure and the protruding portion of the cutting element, intersects the stop means.

10. A cap construction according to claim 1, wherein the support structure by means of inner screw-thread is

embodied for connection to outer screw-thread of the container and wherein the cutting element is positioned to be received within the container.

11. A method for dispersing a product from a storage space in a cap construction into a container, said cap construction being embodied for closing the container, wherein the cap construction has a storage space for said product and a screw cap with a foil for closing the storage space;
Wherein the cap construction furthermore has a support structure which on the one hand is embodied for rotatably connecting same with the screw cap by means of mutual screw-thread and, on the other hand, for coupling the cap construction with the container and which is provided with a cutting element for cutting the foil, **characterized in that** the method comprises the steps of: - rotating the screw cap with respect to the support structure in a first direction for cutting the foil, with the proviso that the support structure comprises a stop means for stopping and collecting the foil that is cut by said cutting element during said rotation movement; - dispersing said product into the container; and - mixing said product in a material in said container.

12. A method according to claim 11, comprising the step of breaking a seal between the screw cap and the support structure when rotating the screw cap with respect to the support structure, preceding the step of cutting the foil.

13. A method according to claim 11 or 12, further comprising the steps of: - connecting the screw cap to the support structure upon cutting the foil; and - removing the combination of the screw cap and the support structure from the container, preferably by rotating the combination of the screw cap and the support structure from the container.

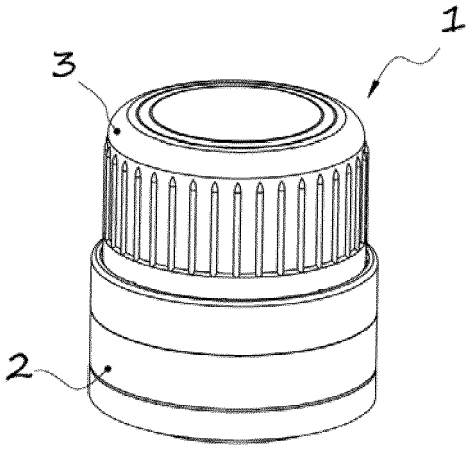


Fig.1

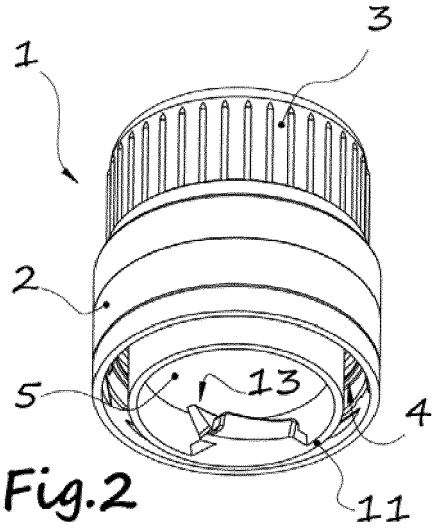


Fig.2

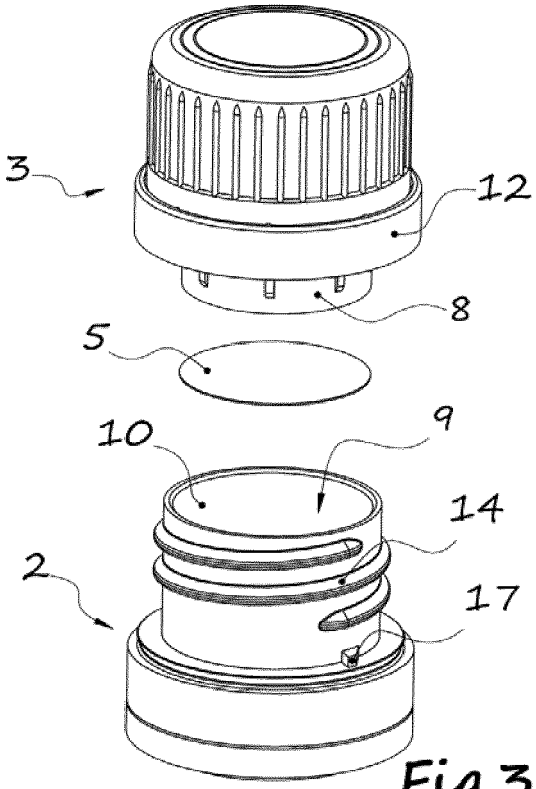


Fig.3

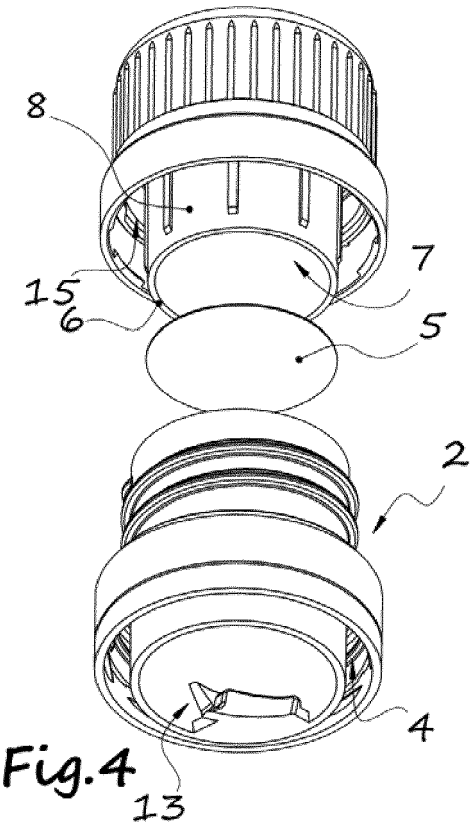


Fig.4

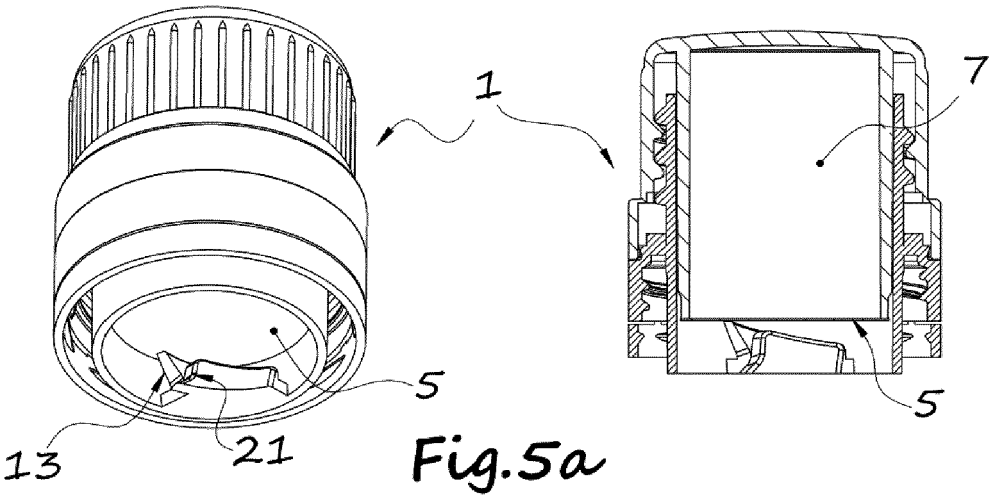


Fig.5a

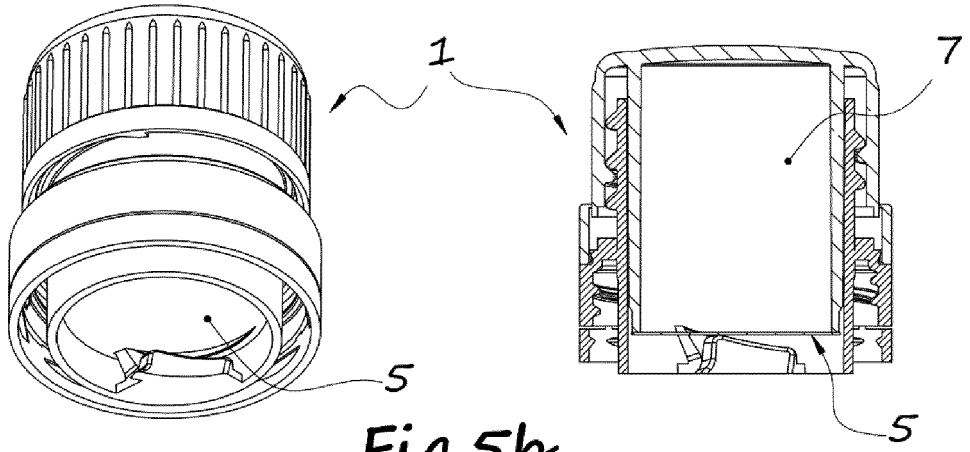


Fig.5b

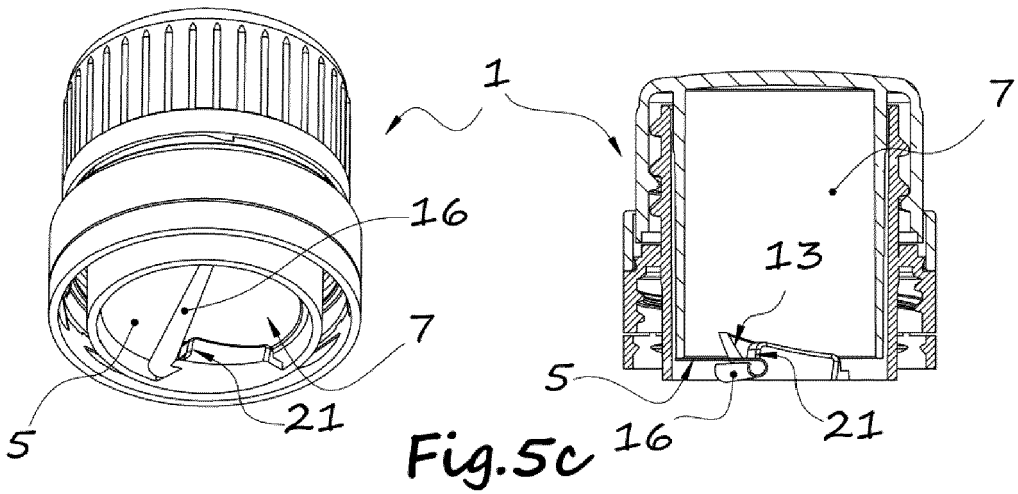
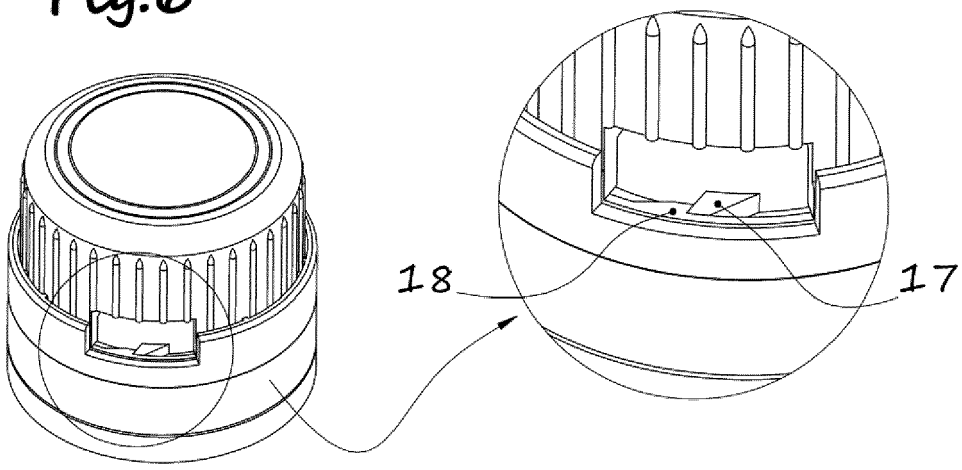


Fig.5c

Fig.6



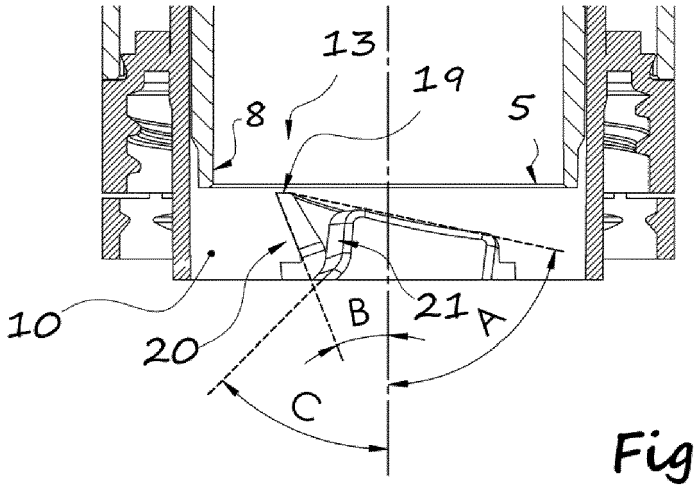


Fig.7

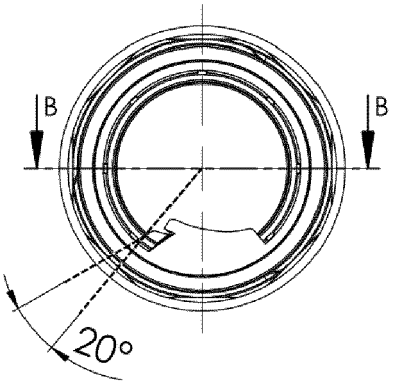


Fig.8

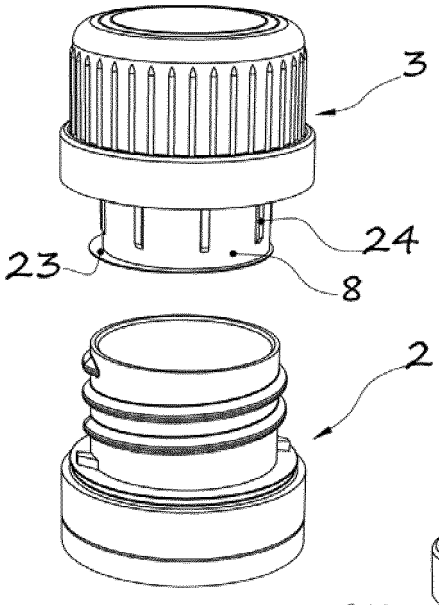


Fig.9a

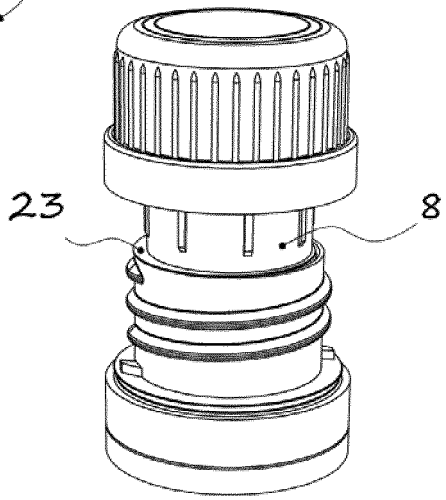


Fig.9b

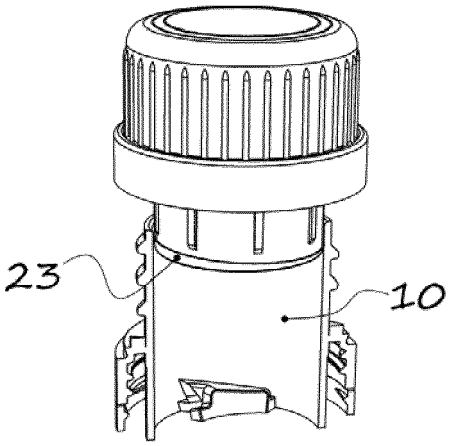
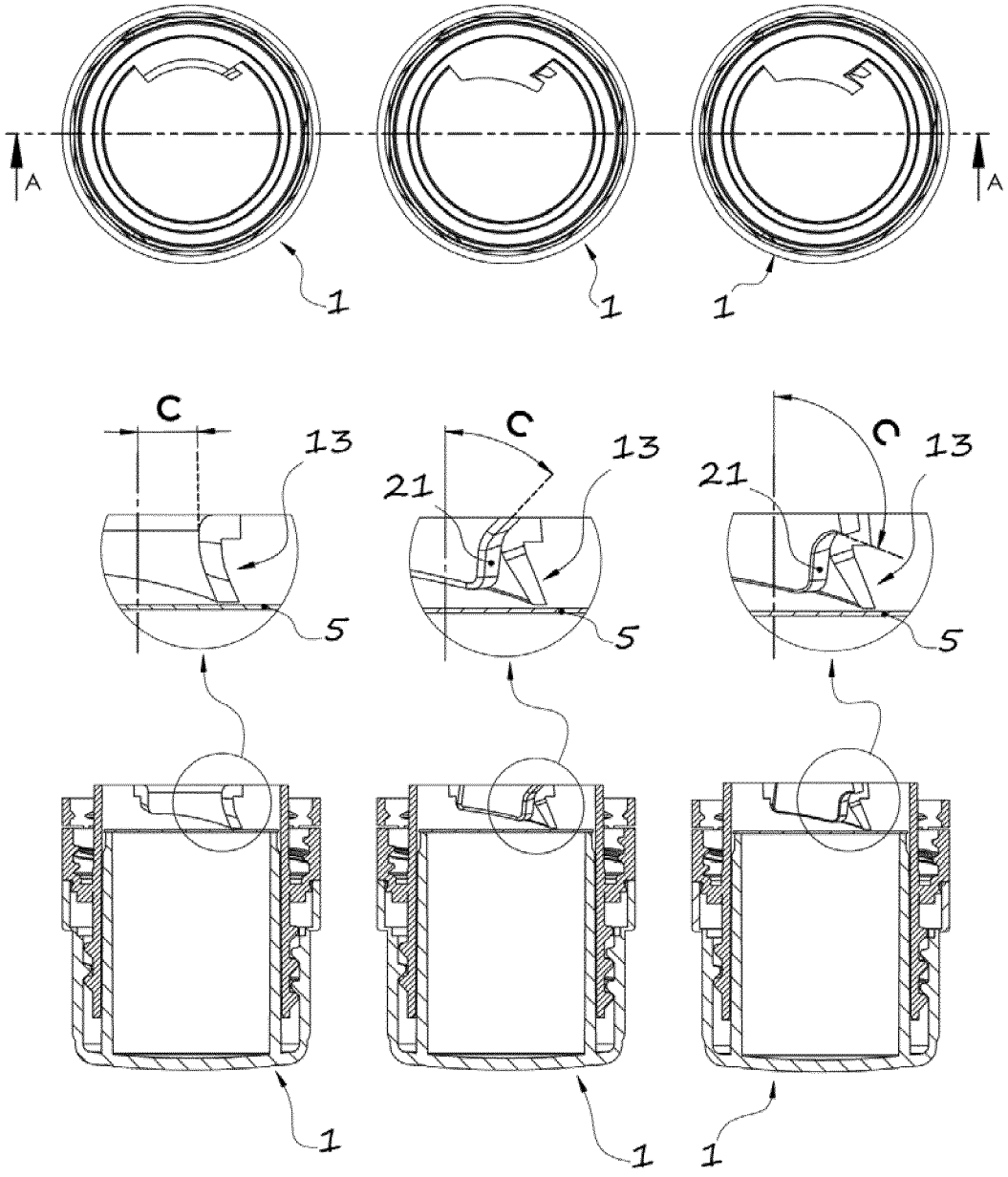


Fig.9c

Fig.10 Fig.11 Fig.12



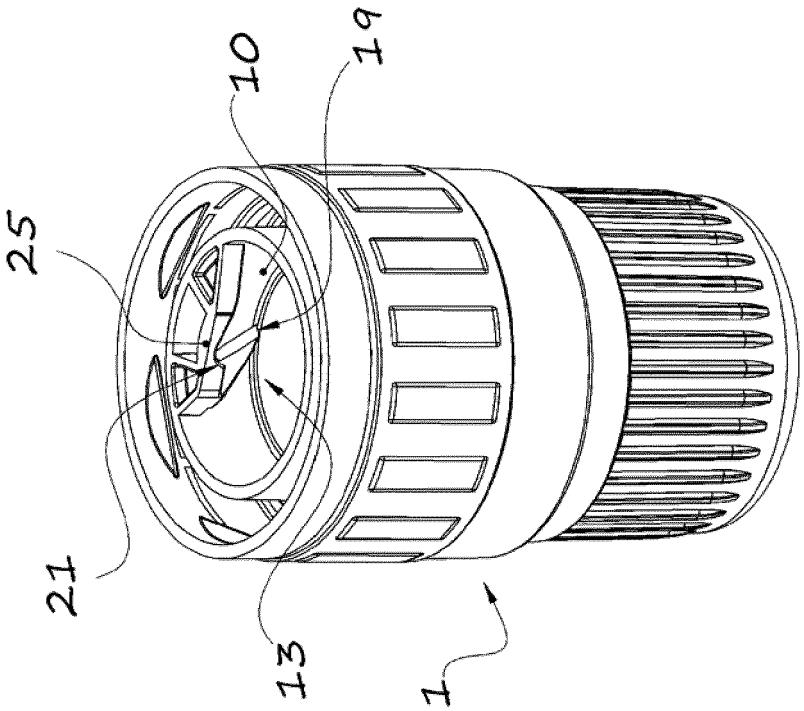


Fig.14

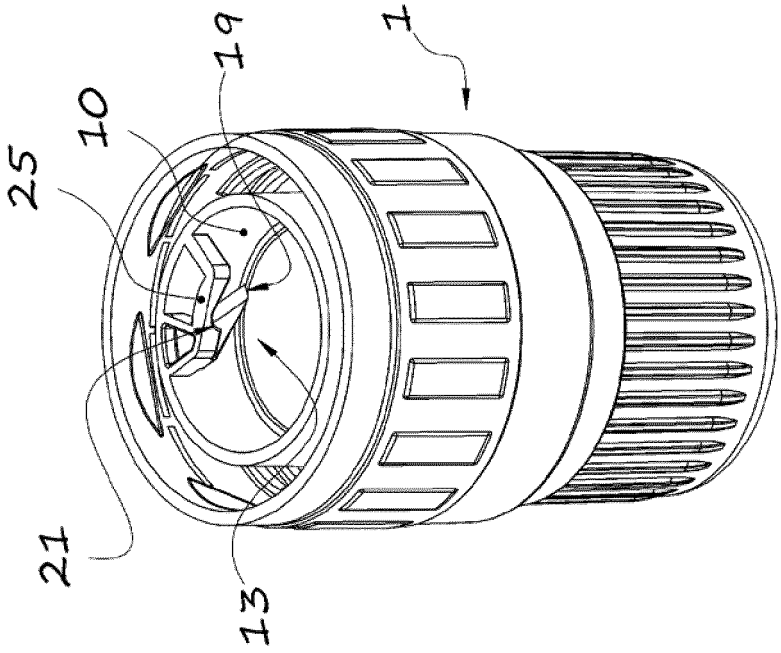


Fig.13

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 0384

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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B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 June 2016	Sundell, Olli

CATEGORY OF CITED DOCUMENTS

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