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(54) **TAMPER EVIDENT CONTAINER CLOSURE**

(57) A multifunction closure (1) is disclosed for the mouth of a vessel comprising a support body (3) adapted to be coupled with the mouth through holding means (5), and equipped with multi-layer sealing and barrier means (7), that, on one side, are operatively coupled with the closure (1) and, on another opposite side, are

adapted to be sealingly fixed onto the mouth; the multi-layer sealing and barrier means (7) are operatively connected to opening means (9) adapted to allow to have access inside said vessel by the simultaneous removal of the opening means (9) and the multilayer sealing and barrier means (7). The closure (1) is adapted to be coupled with various types of plug (18).

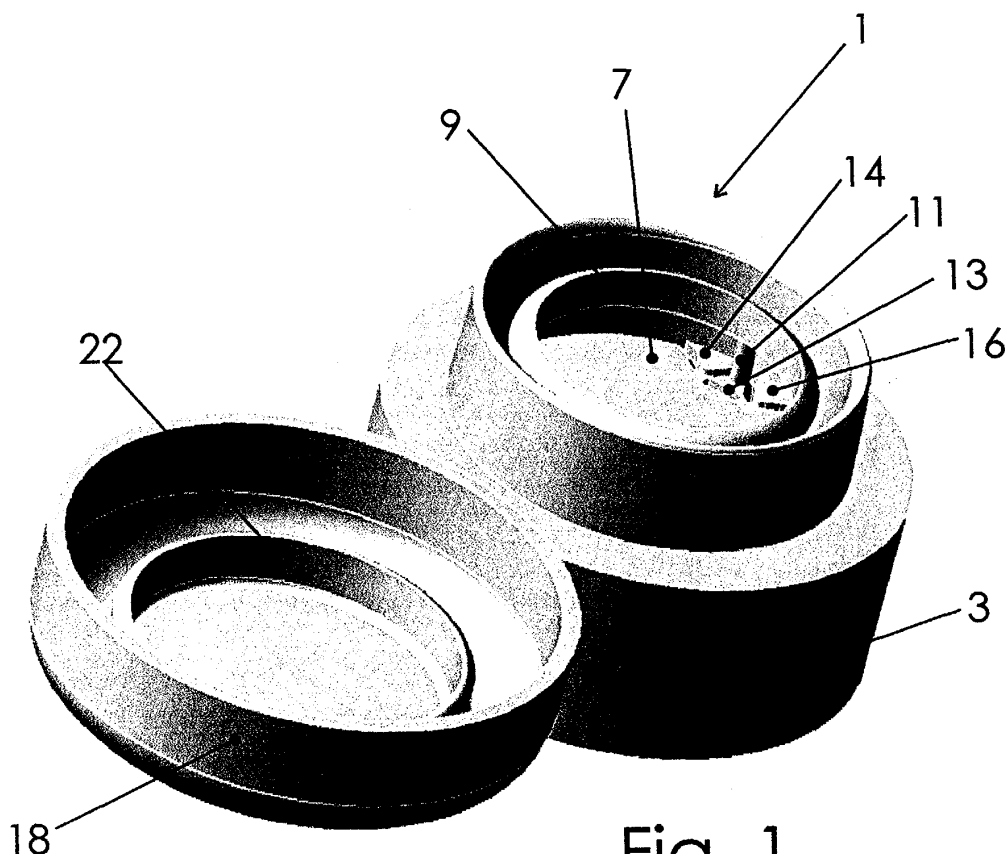


Fig. 1

EP 1 526 083 A1

Description

[0001] The present invention refers to a multifunction closure for vessels, adapted in particular to close the mouth of a vessel in order to provide such vessel with the functions of warranty seal and barrier against the entry and exit of substances.

[0002] Various types of closures for vessels are known in the art, in particular for beverages. One of the most advanced types of closure is the one providing a sort of "warranty seal" to the vessel contents: such closure is in fact equipped with a plastic sheet that is adapted to be removed through a ring connected thereto, to be extracted through the fingers of a hand. The closure is applied to the vessel mouth and a plug is screwed or placed thereon: the plug-closure-ring-sheet assembly is made of plastics, in a single body or with the plug separated from the closure. A user, after having unscrewed or removed the plug, grasps the ring with a finger and pulls it upwards, detaching from the closure both the ring and the sheet, thereby freeing the vessel mouth.

[0003] While such closure is useful to provide a warranty seal, since the whole assembly is made of plastics and placed onto a vessel, it is not able to simultaneously provide a sealing function for the vessel: this can cause, in time, the storage of the vessel contents to be compromised, that therefore must be consumed within a short time from their packaging.

[0004] Other types of closure are also present in the art, always made of plastics, coupled with a sheet of aluminium that is sealingly placed on the vessel mouth. Such closures however are very uncomfortable to be opened by the user, that must first free the plug from the tightening means with which it is equipped, then unscrew the plug from the vessel, then remove the sheet of aluminium (such operation not being particularly easy since it is sealingly applied onto the vessel mouth) and screw again the plug. Such plugs are by the way equipped with a nozzle to reduce the delivery of liquid and such nozzle must be opened and closed (sometimes using the teeth) also in a difficult way such as to often cause physical problems for the user.

[0005] Object of the present invention is solving the above prior-art problems, by providing a multifunction closure realised in a single body, that can be easily applied and as well easily removed on and from the mouth onto which it is inserted, and that provides, to the vessel that it protects, both functions of warranty seal and of barrier against the entry and exit of substances.

[0006] The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a multifunction closure as claimed in Claim 1. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

[0007] The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed

drawings, in which:

- Figure 1 is a top perspective view of an embodiment of the multifunction closure of the present invention coupled with a plug separated therefrom;
- Figure 2 is a bottom perspective view of the closure and plug of Fig. 1;
- Figure 3 is a side sectional view of the closure and plug of Fig. 1;
- Figures 4 and 5 are parts of the detachment arrangement of the closure in Fig. 1;
- Figures 6 to 8 are perspective views of the main opening steps of the multifunction closure of the present invention connected to a plug of the "flip-top" type; and
- Figure 9 is a side sectional view of the closure of one of Fig. 6 to 8 in its opening phase.

[0008] With reference to the Figures, a preferred embodiment of the multifunction closure of the present invention is shown and described. It will be immediately obvious to the skilled people in the art that numerous variations and modifications (for example related to shape, sizes and parts with equivalent functionalities) could be made to the described closure without departing from the scope of the invention as claimed in the enclosed Claims.

[0009] With reference to Figures 1 to 5, a first preferred embodiment of the multifunction closure 1 of the present invention is described.

[0010] Such closure 1 is adapted to be applied to the mouth of a vessel (not shown) and comprises a support body 3 adapted to be coupled with the mouth through holding means 5. The closure is equipped in particular with multi-layer sealing and barrier means 7, which on one side are operatively coupled with the closure 1 and on another opposite side are adapted to be sealingly fixed onto the mouth. Moreover, the multi-layer sealing and barrier means 7 are operatively connected to opening means 9 adapted to allow to have access inside the vessel by the simultaneous removal of the opening means 9 and the multi-layer sealing and barrier means 7.

[0011] In particular, as shown, the multi-layer sealing and barrier means 7 are composed of at least one thin layer of polyethylene overlapped to at least one thin layer of aluminium in turn overlapped to at least one thin layer of polyethylene. These solution is the optimum one to allow the application, through the polyethylene (or any other equivalent material, for example PET), of the means 7 on one side onto the closure and on the other side onto the vessel.

[0012] For such purpose, the multi-layer sealing and barrier means 7 are operatively coupled with the closure 1 and with the opening means 9 through co-stamping (preferred solution), or through other techniques, such as for example thermal or magnetic induction welding, by using the layer of polyethylene as base.

[0013] Moreover, the multi-layer sealing and barrier means 7 are adapted to be sealingly fixed onto the vessel mouth through thermal or magnetic induction welding, always using the layer of polyethylene as base.

[0014] In order to facilitate their use by the end user, the opening means 9 are composed of at least one ring 9 made in co-stamping with the closure 1.

[0015] The ring 9 is equipped with a projection 11 adapted, when opening, to press against a small plate 13 connected to the multi-layer sealing and barrier means 7 and fixed between two bumps 14, 16 connected to the closure 1, in such a way as to detach the small plate 13 from the bumps 14, 16 in order to trigger the complete detachment of the multi-layer sealing and barrier means 7 from the closure 1.

[0016] In order to realise the warranty closure function, moreover, the holding means 5 are composed of at least one projecting annular crown adapted to abut against the mouth for the unmovable fixing of the closure 1 to the mouth.

[0017] Alternatively, the holding means 5 could be composed of threads (not shown) adapted to allow screwing the closure 1 onto threaded walls (not shown) with which the mouth is composed.

[0018] In order to complete the solution and to allow, in a known way, to close the vessel once having removed the warranty seal and the barrier, the closure 1 is adapted to be operatively coupled with cover means 18 placed above it to guarantee the covering of the vessel also after having removed the multi-layer sealing and barrier means 7.

[0019] In particular, the cover means 18 can be composed of a plug 18 adapted to be pressure-placed above the closure 1.

[0020] Alternatively, as better shown in Figures 6 to 9, the cover means 18 can be composed of a plug 18 of the "flip-top" type that is co-stamped and hingedly (in 20) connected to the closure 1 in order to be placed above and removed from the closure 1 without being detached therefrom.

[0021] Still more, the cover means 18 can be composed of a plug 18 adapted to be screwed onto the closure 1 through mutual threadings (not shown) obtained internally to the plug 18 and externally to the closure 1.

[0022] Still more, the cover means 18 can be composed of a plug 18 equipped with an internal circular crown 22 adapted to engage the closure 1, both with the plug 18 in its "flip-top" version, and with the plug 18 separated from the closure 1.

[0023] As regards the installation of the closure 1, once having realised it through co-stamping, etc. it is placed onto the vessel and then subjected to thermal welding to seal the layer 7 onto the mouth. Then, in order to open the closure, as can be seen in Figures 6 to 8, the plug 18 is removed and ring 9 and layer 7 are extracted, then using the plug 18 for closing again the vessel after its use.

Claims

1. Multifunction closure (1) for the mouth of a vessel comprising a support body (3) adapted to be coupled with the mouth through holding means (5), **characterised in that** it is equipped with multi-layer sealing and barrier means (7), said sealing and barrier means (7) on one side being operatively coupled with said closure (1) and on another opposite side being adapted to be sealingly fixed onto the mouth, said multi-layer sealing and barrier means (7) being operatively connected to opening means (9) adapted to allow to have access inside said vessel by the simultaneous removal of said opening means (9) and said multi-layer sealing and barrier means (7).
2. Multifunction closure (1) according to Claim 1, **characterised in that** said multi-layer sealing and barrier means (7) are composed of at least one thin layer of polyethylene overlapped to at least one thin layer of aluminium in turn overlapped to at least one thin layer of polyethylene or other material (ex. PET).
3. Multifunction closure (1) according to Claim 1, **characterised in that** said multi-layer sealing and barrier means (7) are operatively coupled with said closure (1) and with said opening means (9) through co-stamping.
4. Multifunction closure (1) according to Claim 1, **characterised in that** said multi-layer sealing and barrier means (7) are operatively coupled with said closure (1) and with said opening means (9) through thermal or magnetic induction welding.
5. Multifunction closure (1) according to Claim 1, **characterised in that** said multi-layer sealing and barrier means (7) are adapted to be sealingly fixed onto the vessel mouth through thermal or magnetic induction welding.
6. Multifunction closure (1) according to Claim 1, **characterised in that** said opening means (9) are composed of at least one ring made in co-stamping with said closure (1).
7. Multifunction closure (1) according to Claim 6, **characterised in that** the ring of said opening means (9) is equipped with a projection (11) adapted, when opening, to press against a small plate (13) connected to said multi-layer sealing and barrier means (7) and fixed between two bumps (14, 16) connected to said closure (1), in such a way as to detach said small plate (13) from said bumps (14, 16) in order to trigger the complete detachment of said multi-layer sealing and barrier means (7) from said

closure (1).

8. Multifunction closure (1) according to Claim 1, **characterised in that** said holding means (5) are composed of at least one projecting annular crown adapted to abut against the mouth for the unmovable fixing of the closure (1) to the mouth. 5
9. Multifunction closure (1) according to Claim 1, **characterised in that** said holding means (5) are composed of threads adapted to allow screwing the closure (1) onto threaded walls with which the mouth is composed. 10
10. Multifunction closure (1) according to Claim 1, **characterised in that** said closure (1) is adapted to be operatively coupled with cover means (18) placed above it to guarantee the covering of said vessel also after having removed said multi-layer sealing and barrier means (7). 15 20
11. Multifunction closure (1) according to Claim 10, **characterised in that** said cover means (18) are composed of a plug (18) adapted to be pressure-placed above said closure (1). 25
12. Multifunction closure (1) according to Claim 10, **characterised in that** said cover means (18) are composed of a plug (18) of the "flip-top" type that is co-stamped and hingedly (in 20) connected to said closure (1) in order to be placed above and removed from said closure (1) without being detached therefrom. 30
13. Multifunction closure (1) according to Claim 10, **characterised in that** said cover means (18) are composed of a plug (18) adapted to be screwed onto said closure (1) through mutual threadings obtained internally to said plug (18) and externally to said closure (1). 35 40
14. Multifunction closure (1) according to Claim 10, **characterised in that** the cover means (18) are composed of a plug (18) equipped with an internal circular crown (22) adapted to engage said closure (1). 45

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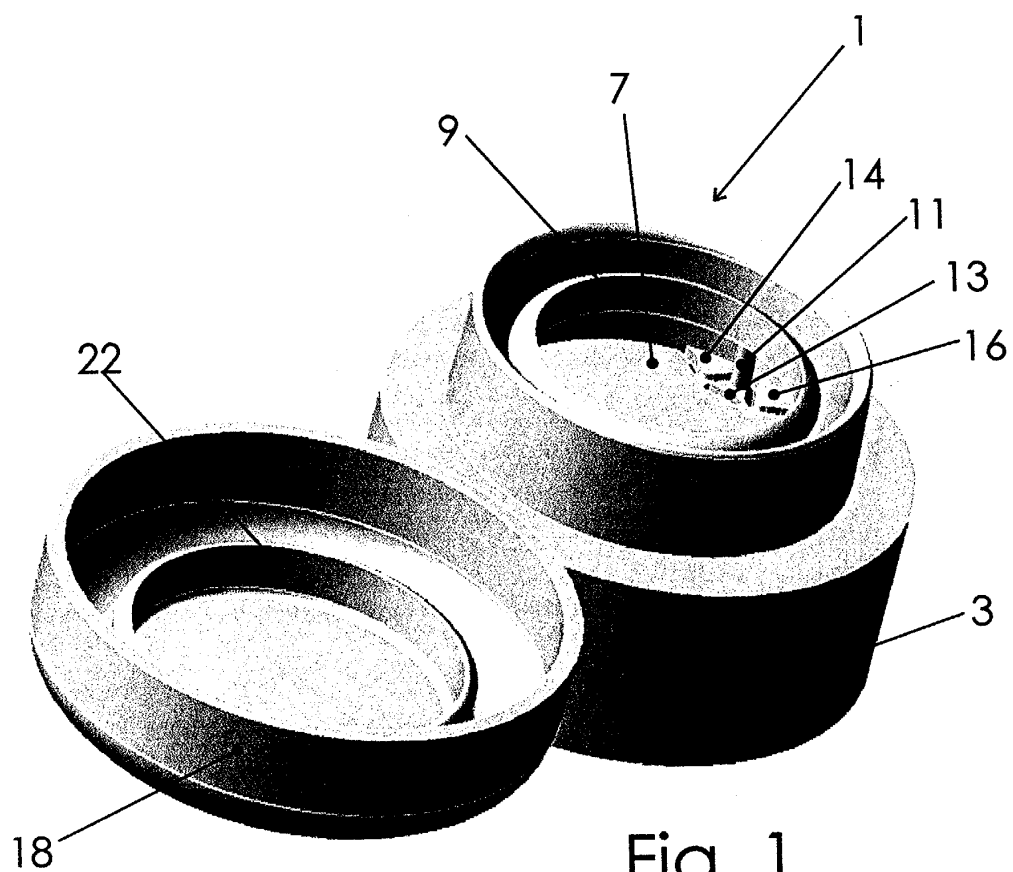


Fig. 1

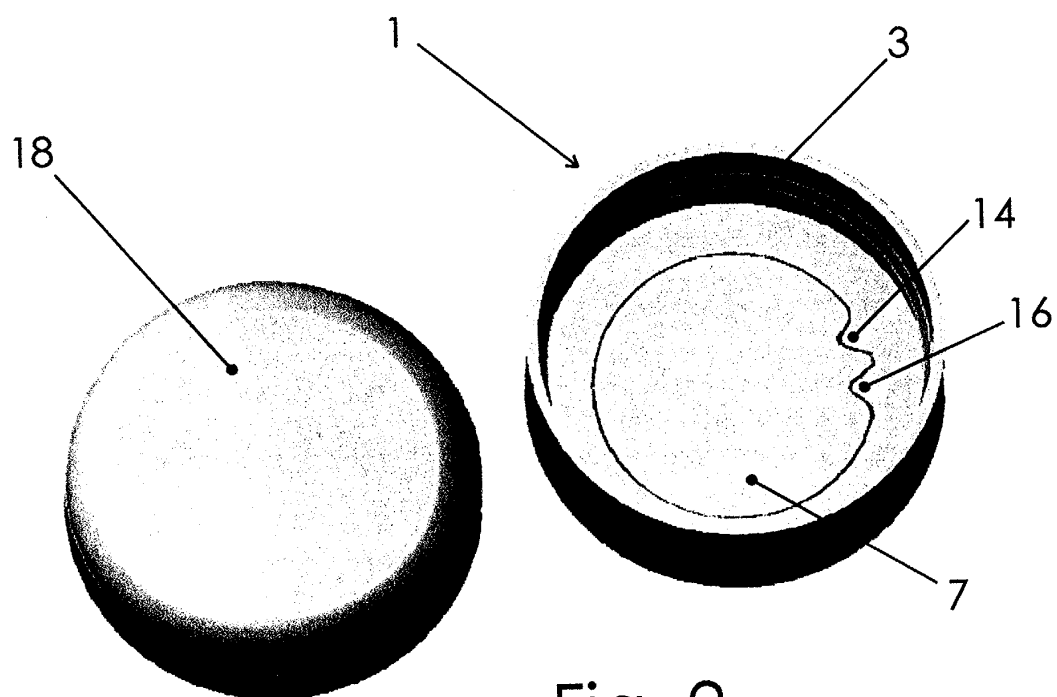


Fig. 2

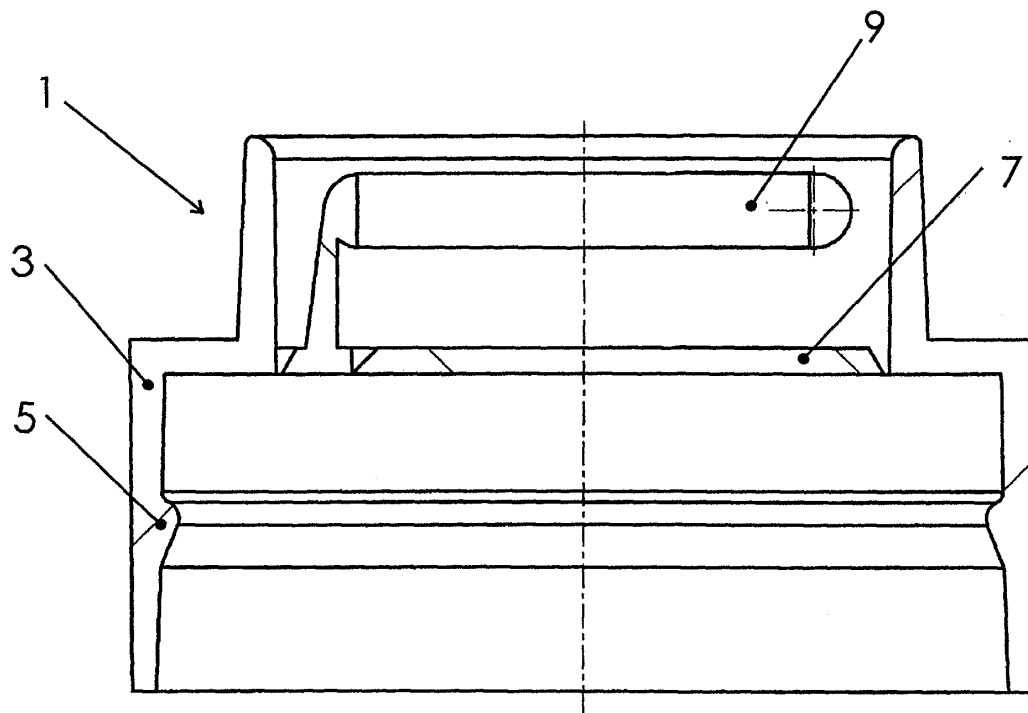
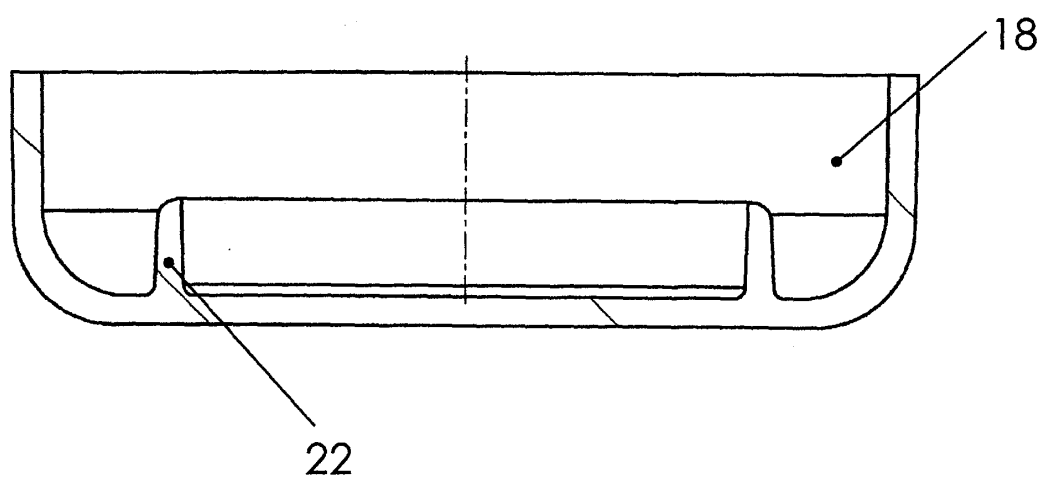


Fig. 3



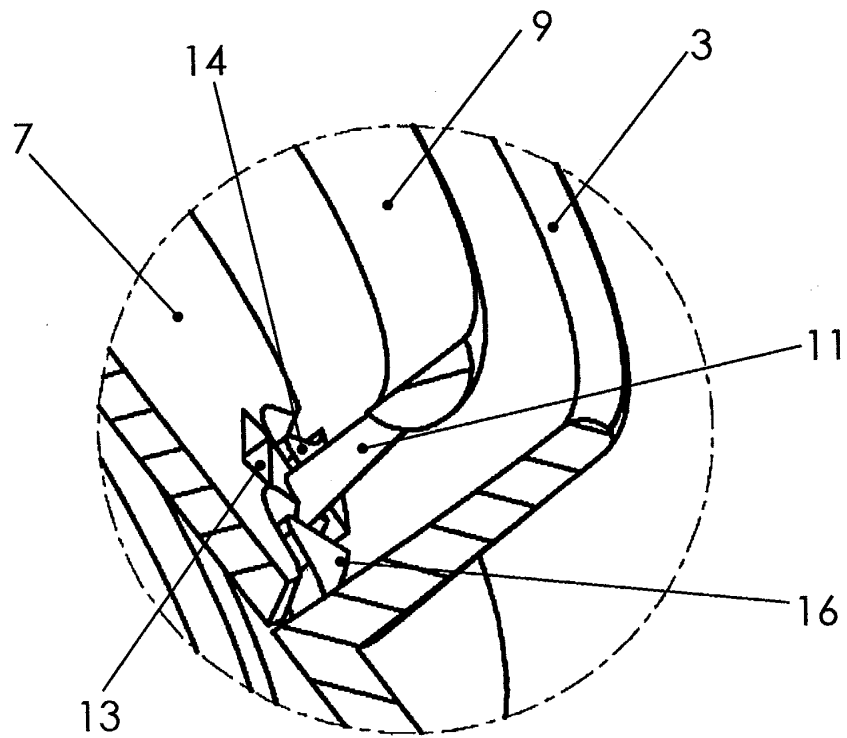


Fig. 4

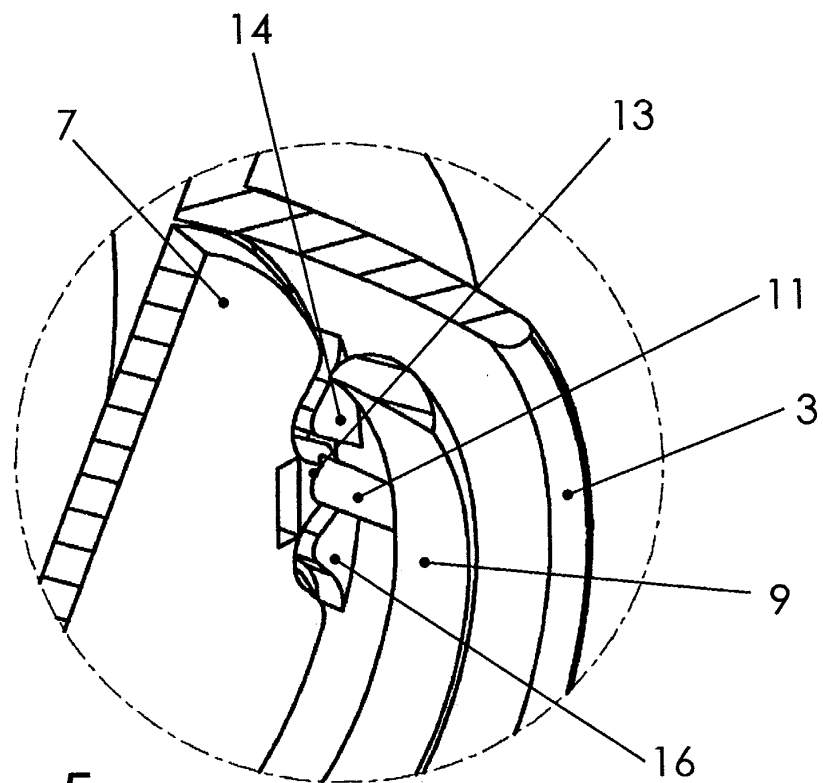
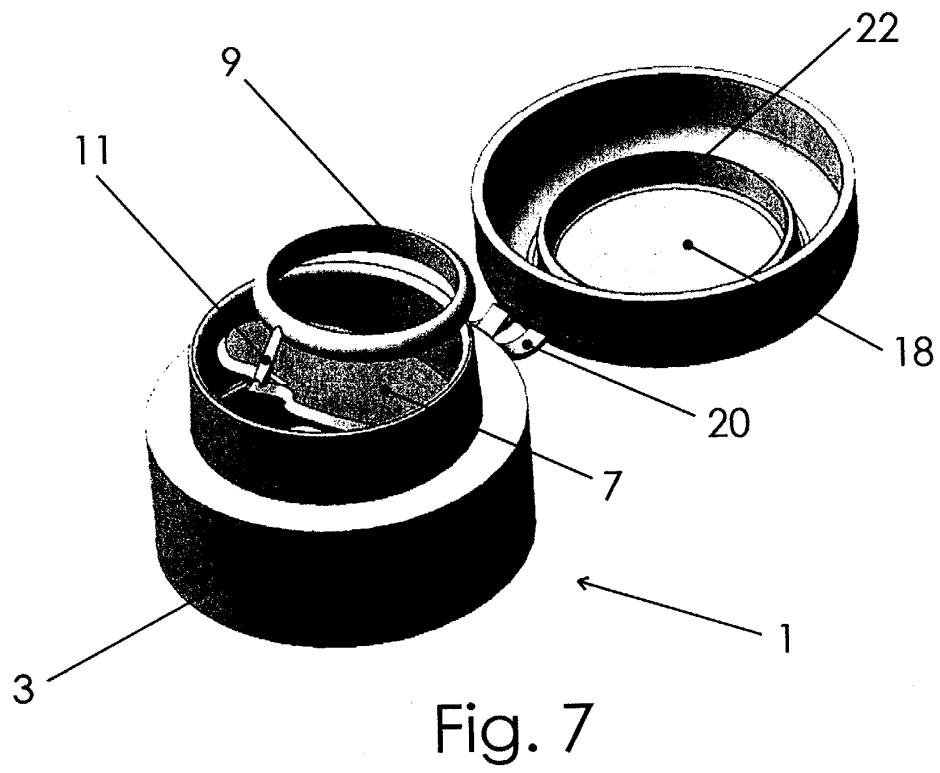
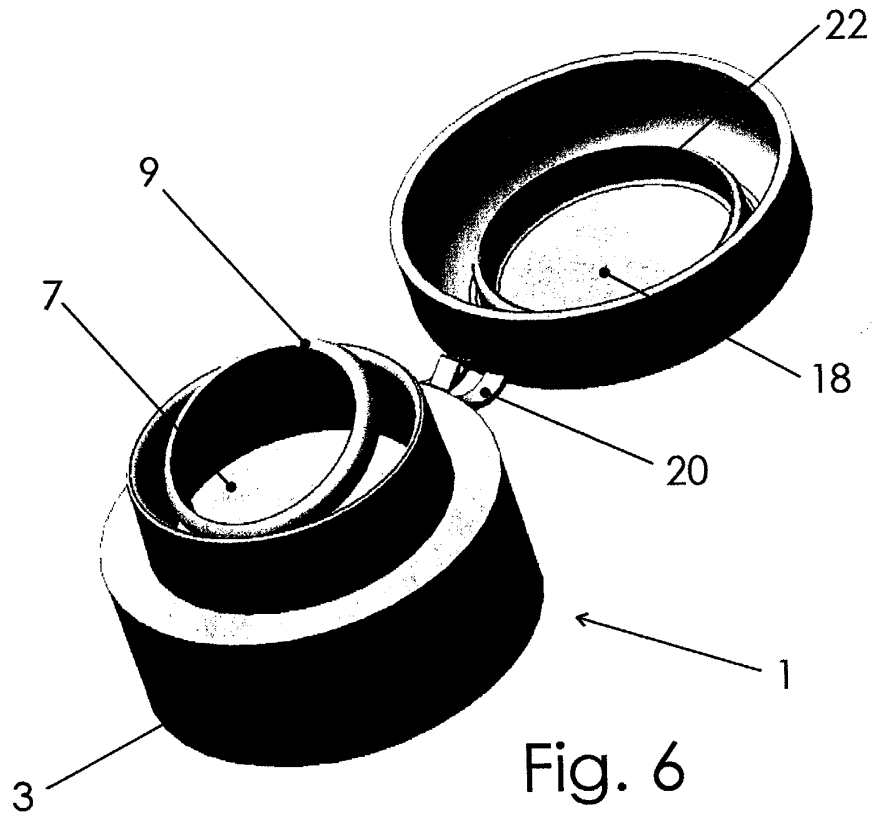
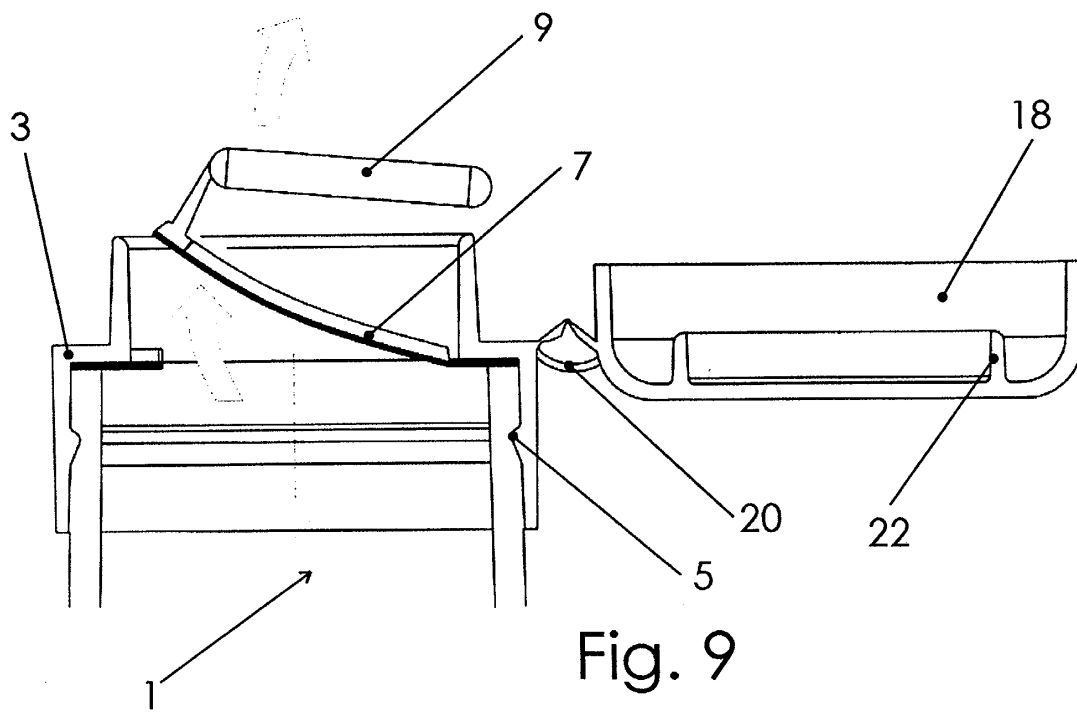
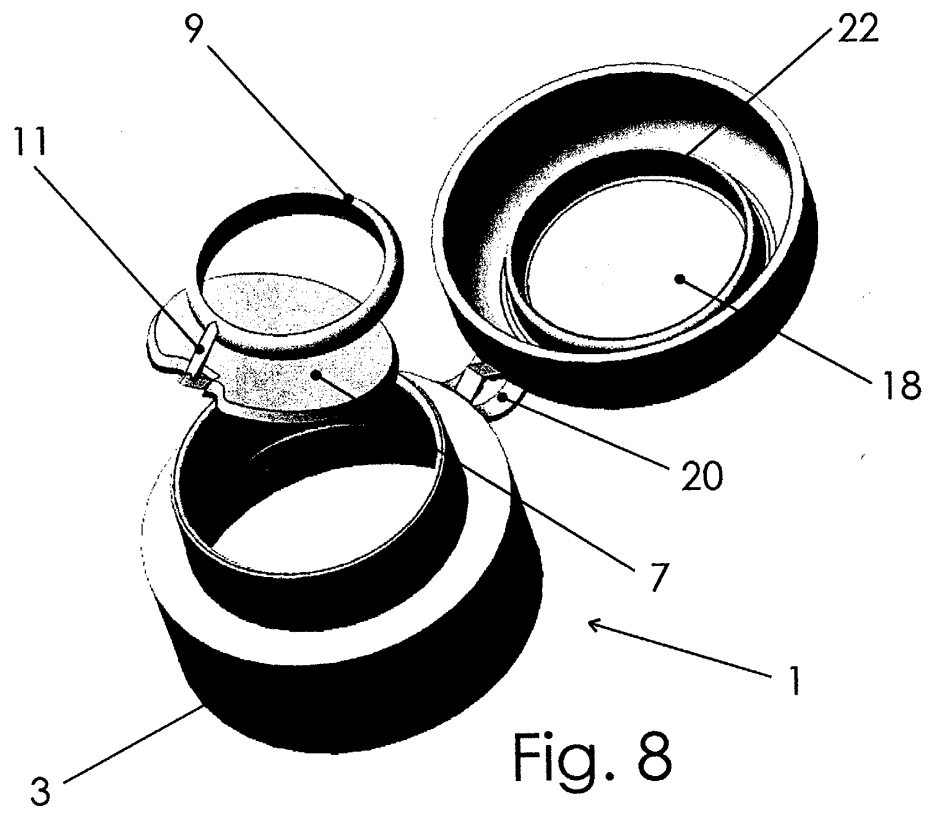


Fig. 5







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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5675

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 29 March 2004	Examiner Vesterholm, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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