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(19) **United States**(12) **Patent Application Publication****Kneer et al.**(10) **Pub. No.: US 2022/0153484 A1**(43) **Pub. Date: May 19, 2022**(54) **STOPPER FOR A CONTAINER**(71) Applicant: **Gaplast GmbH**, Altenau (DE)(72) Inventors: **Roland Kneer**, Farchant (DE); **Stephan Kneer**, Farchant (DE)(21) Appl. No.: **17/522,032**(22) Filed: **Nov. 9, 2021**(30) **Foreign Application Priority Data**

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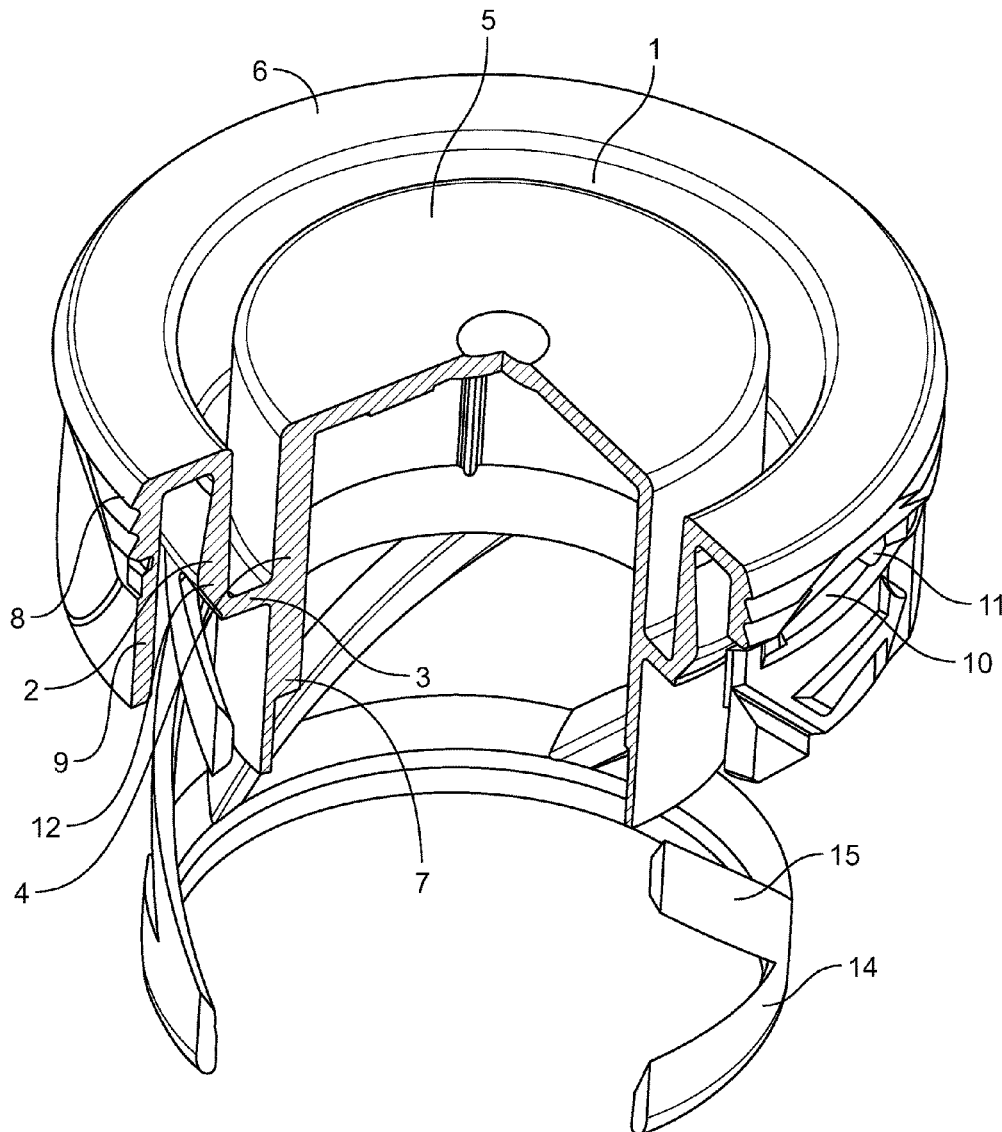
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(57)

ABSTRACT

A stopper for a container with a lid with a peripheral wall, which engages around the neck of the container and integrally formed on whose lower edge there is a peripheral security ring, which may be torn off, for tamper-evident security with inwardly directed locking formations, which, in the fastened position of the stopper, engage beneath an outwardly directed annular projection on the container, and with an olive provided with an outer, peripheral annular bead for gripping engagement in the container opening includes a circular, concentric recessed channel in the lid, which has a radially outer annular wall and a radially inner annular wall, which are connected together by a base wall, that the radially outward annular wall defines the olive and that formed directly above the locking formations there are openings, which pass through the security ring and which extend on both sides beyond the locking formations.



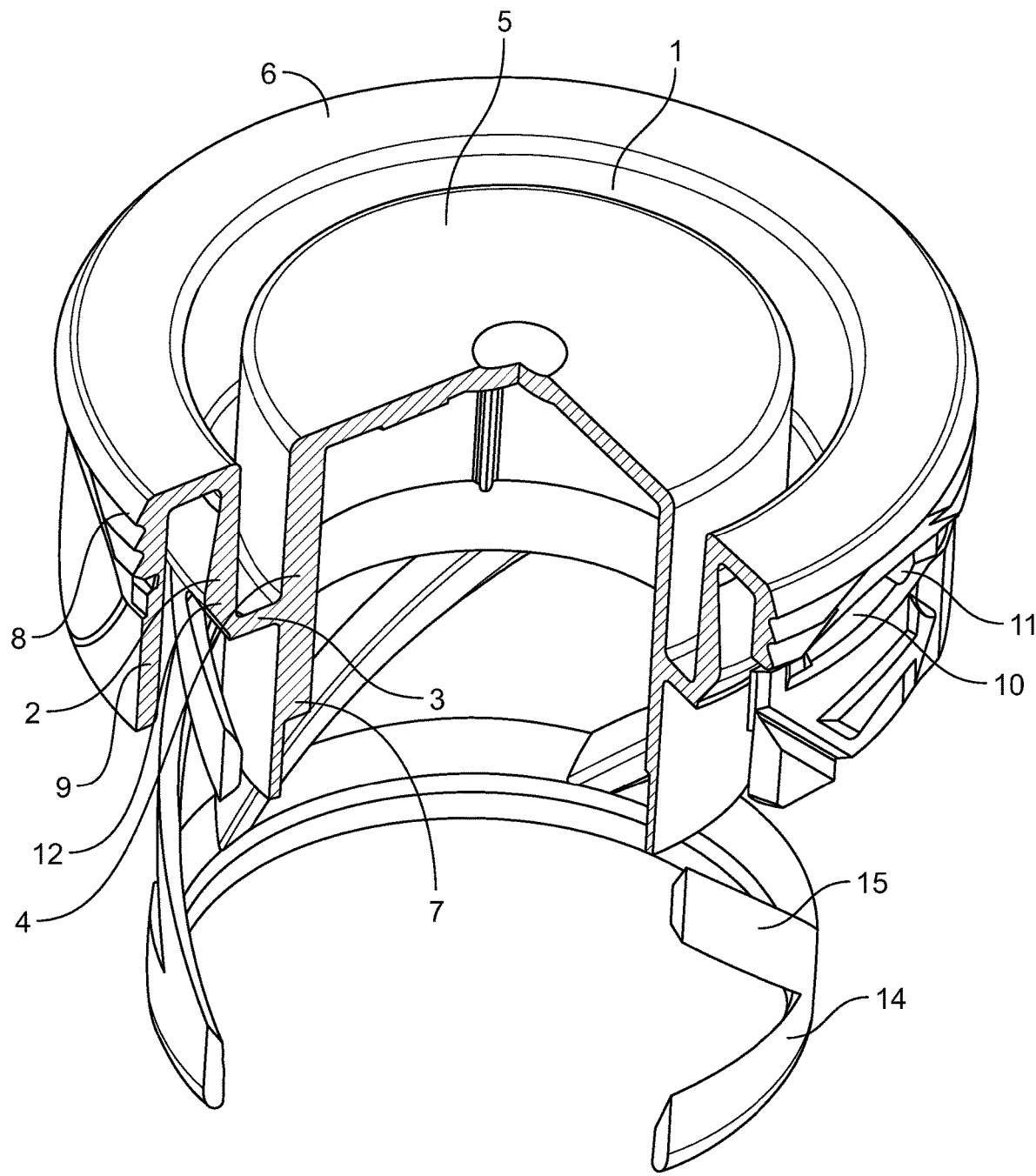


FIG. 1

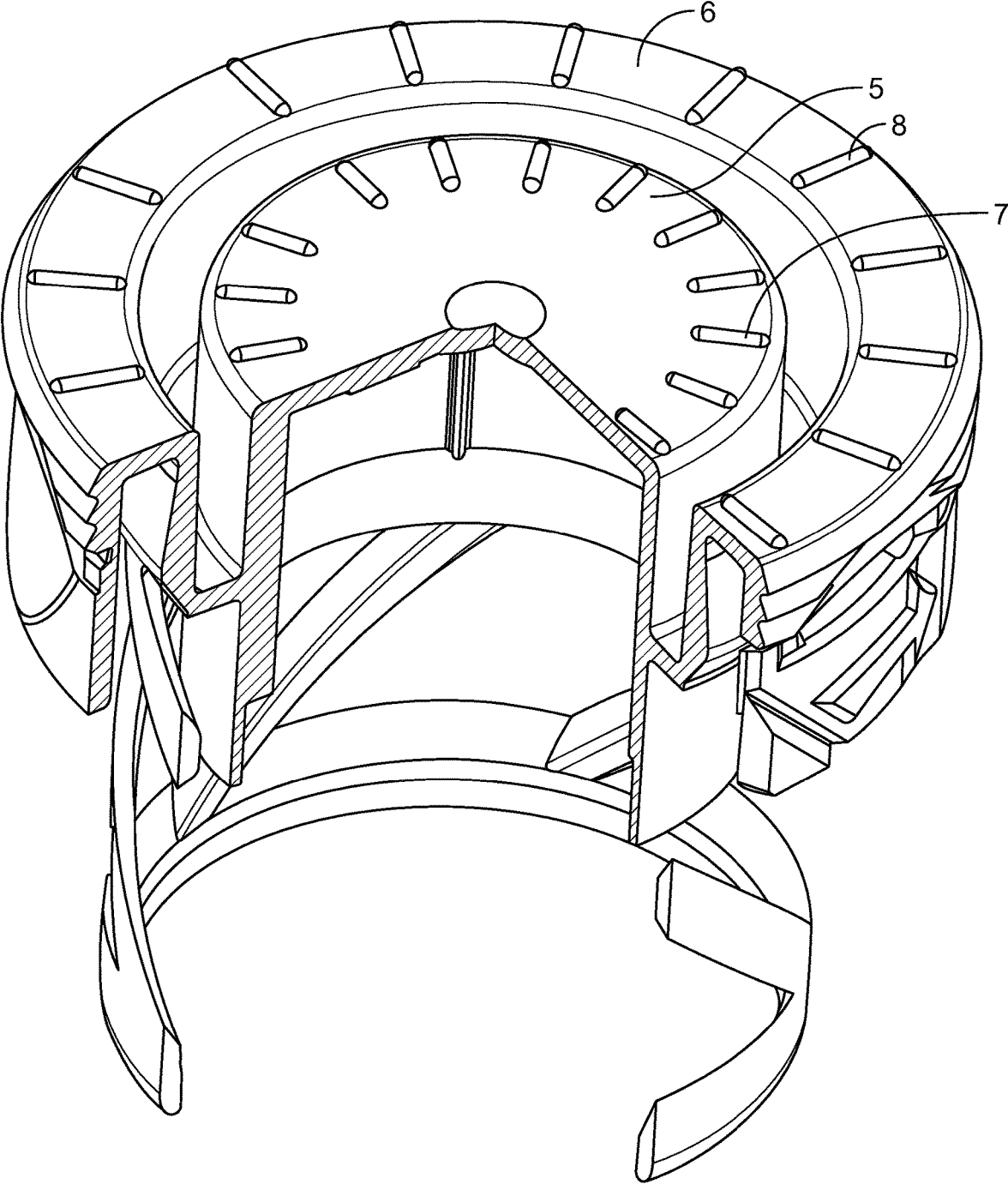


FIG. 2

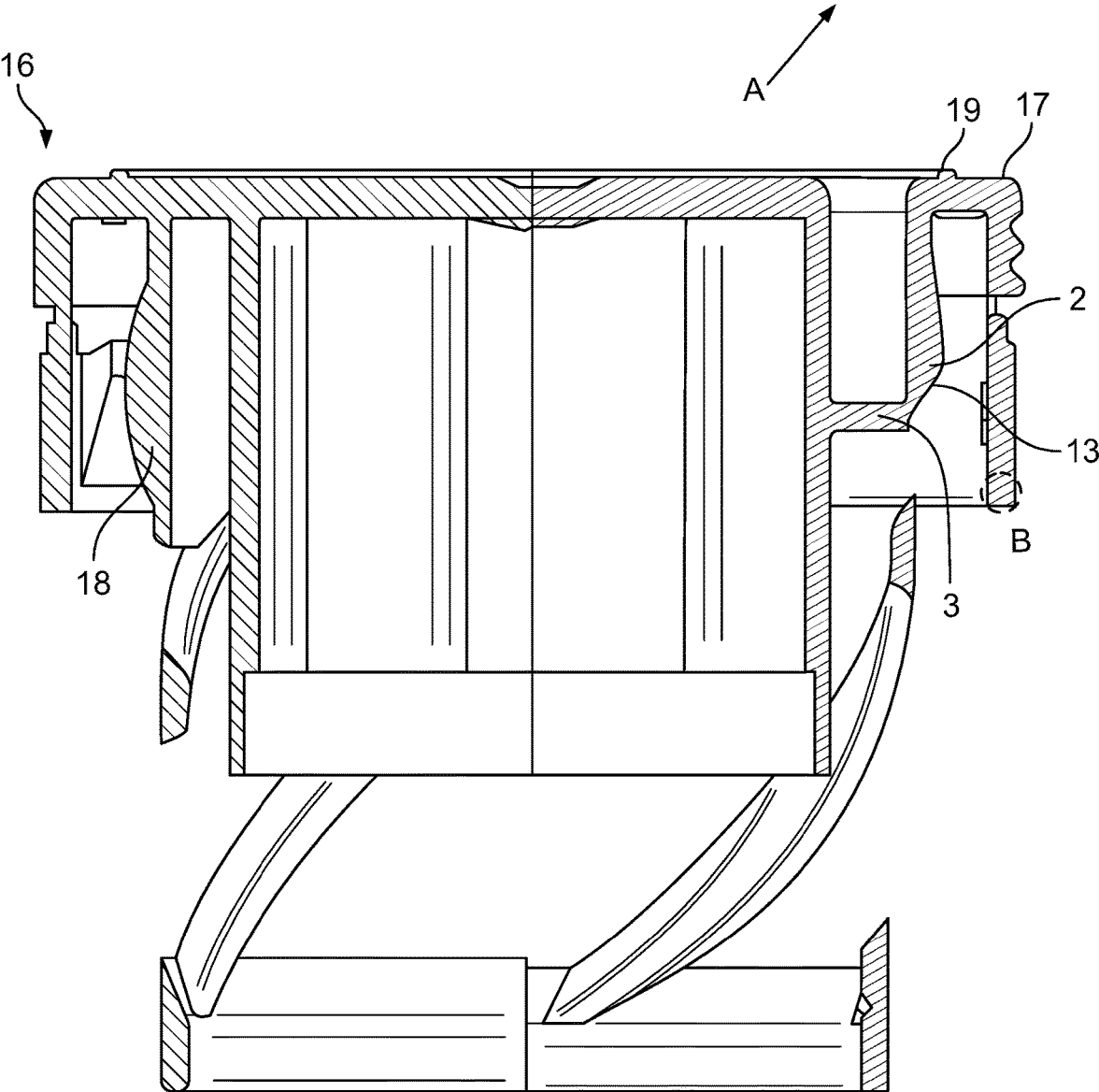


FIG. 3

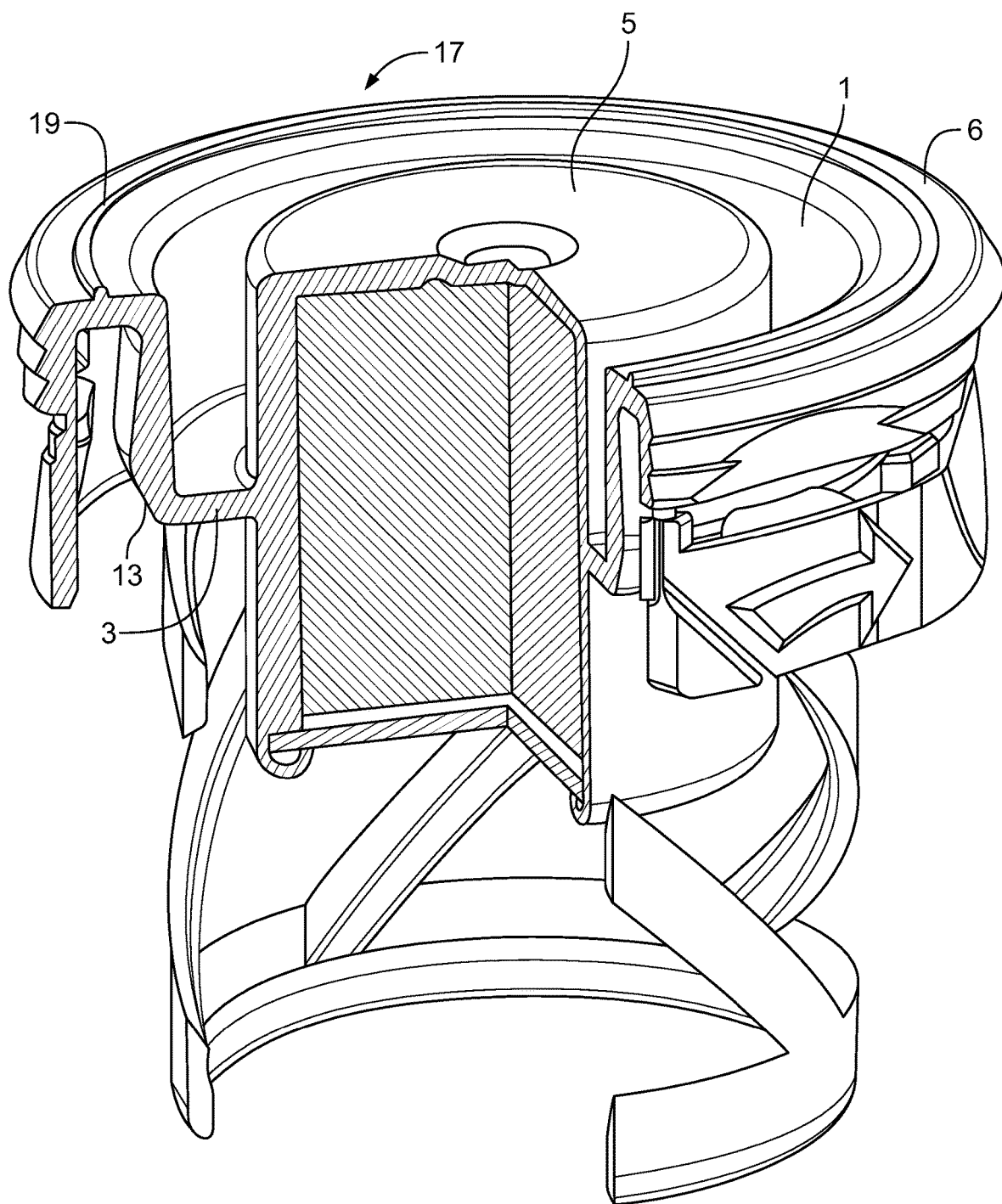


FIG. 4

STOPPER FOR A CONTAINER

PRIORITY CLAIM

[0001] The subject application claims convention priority to German patent application No. 10 2020 129 998.2 filed Nov. 13, 2020.

FIELD OF THE INVENTION

[0002] The invention relates to a stopper for a container with a lid with a peripheral wall engaging around the neck of the container, integrally formed on whose lower edge there is a peripheral security ring, which may be torn off, for tamper-evident security of the contents of the container with inwardly directed locking formations, which in the fastened position of the stopper engage beneath an outwardly directed annular projection on the container, and with an olive provided with an outer, peripheral annular bead for gripping engagement in the container opening.

BACKGROUND

[0003] Such stoppers are known and have proved to be satisfactory in many cases for tightly sealing the contents of the container with the aid of the olive, wherein the tamper-evident ring ensures that the contents of the container cannot be tampered with in an unauthorised manner. When a user wishes to remove the stopper from the container for the first time, he firstly tears the tamper-evident ring away from the lower edge of the peripheral wall engaging around the container, whereafter he can lever the stopper away from the neck of the container.

[0004] As a result of the unavoidable manufacturing tolerances, it can happen that the annular olive is situated in the neck of the container with such a tight force fit that a considerable force is necessary in order to separate the peripheral wall integrally formed on the lid and the olive from the neck of the container, which can be problematic e.g. for elderly users. The oblique “levering off” of the stopper is also made difficult by the rigid lid of the stopper.

[0005] Since the stopper is a mass produced item, its manufacturing costs should be as low as possible, whereby the amount of the plastic material which is used is an important cost factor.

SUMMARY OF THE INVENTION

[0006] It is the object of the present invention to provide a stopper for a container, which reliably seals the contents of the container and also can be more easily removed with a tight force fit of the olive in the container than is the case with the previously usual stoppers. The stopper is also to be manufacturable with less plastic material.

[0007] This object is solved in accordance with the invention by the features of claim 1.

[0008] Advantageous embodiments of the invention are characterised in the dependent claims.

[0009] The invention provides that formed in the circular lid of the stopper there is a circular, concentric recessed channel, which has a radially outer annular wall and a radially inner annular wall, which are connected together by a base wall. The outer annular wall and the radially inner annular wall preferably extend parallel to one another and at right angles to the central, circular lid region and the outer,

annular lid region, on which they are integrally formed. The recessed channel thus has preferably a U-shape in cross-section.

[0010] The invention further provides that the radially outer annular wall defines the olive, which has the peripheral annular bead on its outer side, which causes the gripping engagement in the neck of the container.

[0011] Since the annular olive is connected at its lower end to the base wall of the recessed channel, which braces the olive against the action of the lateral forces when it is grippingly engaged in the container neck, the olive can be of shorter construction in comparison to the conventional stoppers, whereby the amount of the plastic material used for the stopper can be reduced. Furthermore, the wall thickness of the olive which is thus braced can also be reduced.

[0012] The recessed channel additionally facilitates the levering away of the stopper from the container neck in that when sliding back the stopper from the container throat the recessed channel can be compressed a little, whereby the removal of the stopper from the container neck is facilitated.

[0013] The invention additionally provides that directly above the locking formations openings are formed which pass through the security ring and which extend on both sides beyond the locking formations. These openings are produced by lateral sliders in the injection moulding tool, which, together with an inner contoured sleeve, form the locking formations, as is described in connection with a conventional stopper with a closed lid in DE 42 36 741 C1. It is ensured by these lateral openings that no foreign materials can get into the vicinity of the container opening from the exterior, as would be the case if the locking formations were formed by plunger cores, which were guided through openings in the lid portion. Due to these openings in the outer, annular lid region, the levering away of the stopper would otherwise be made more difficult since the outer, annular lid region would not have the necessary stiffness.

[0014] It is also proposed with great advantage that the radially inner annular wall is extended beyond the base wall and defines the peripheral wall defines a desiccant chamber. Furthermore, the stopper conveniently includes a spiral retainer, the elastic spiral webs of which, which end in a cover ring, can be integrally formed on the recessed channel.

[0015] The recessed channel is integrally formed on the central, circular lid region and the outer, annular lid region, wherein the lower end region of the radially outer annular wall defining the olive can be linearly bevelled in order to facilitate its demoulding during manufacture of the stopper. This bevel serves at the same also as an insertion aid when automatically plugging the closure onto the tube. The levering away of the stopper is also facilitated thereby.

[0016] In order to increase the stiffness of the stopper, it is proposed with advantage that the upper side of the circular lid region and/or of the annular lid region is provided with upwardly projecting ribs.

[0017] It is also proposed with great advantage that the olive ring has a ribbed wall surface on its inner side, which is defined by a plurality of grooves in the wall of the olive extending in the axial direction of the stopper. The grooves can have a constant depth of about 10% to about 50% of the minimum wall thickness of the olive ring, whereby the suitable value depends on the plastic material that is used and the geometry of the ribbing. The webs of the ribbing preferably have a domed cross-sectional shape.

[0018] Tests with such a ribbed olive have shown that the pressure produced by the olive and thus the sealing integrity of the contents of the container is only insignificantly reduced whilst the ribbing significantly facilitates the levering away of the stopper from the neck of the container. Thus even users with low power in their hands can manage better with the stopper.

[0019] The peripheral wall of the stopper and the security ring are connected together at positions situated between the locking formations with short webs, which can be easily torn away.

[0020] Further details of the invention will be apparent from the following description and with reference to the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. 1 is a perspective view of a partly cutaway embodiment of the invention;

[0022] FIG. 2 shows another embodiment of the invention, reinforced by webs;

[0023] FIG. 3 shows a comparison of a conventional stopper in the left-hand side of the figure, and a stopper in accordance with the invention in the right-hand half of the figure and;

[0024] FIG. 4 is a perspective view of the stopper in accordance with the invention shown in FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

[0025] FIG. 1 shows an embodiment of the stopper in accordance with the invention, formed in the circular lid of which there is a concentric recessed channel 1, which includes a radially outer annular wall 2, a base wall 3 and an inner annular wall 4. The recessed channel 1 has a U-shape in cross-section and is integrally formed on a central, circular lid region 5 and an outer, annular lid region 6. The radially inner annular wall 4 is extended beyond the base wall 3 and defines together with the annular wall 4 the peripheral wall 7 of a desiccant chamber.

[0026] Connected to the annular lid region 6 there is a peripheral wall 8, which is bent away at right angles and integrally formed on whose lower edge there is a security ring 9, which may be torn away, for tamper-evident security of the contents of the container, which is connected with inwardly directed locking formations 10. Situated above the locking formations 10 there are openings 11 which pass through the security ring 9.

[0027] The radially outer annular wall 2 of the recess channel 1 is constructed as an olive in that it is provided with an outer, circumferential annular bead 12 for gripping engagement in the opening of a container, which is not shown. The lower end region 13 of the olive extends linearly obliquely inwardly.

[0028] A spiral retainer 14 is formed integrally with its elastic spiral-shaped webs 15 on the base wall 3 of the recess channel 1.

[0029] FIG. 2 shows a stopper which is identical except webs 7, 8 extending in the radial direction are formed on the upper side of the central lid region 5 and on the upper side of the annular lid region 6, which increase the stiffness of the

two lid regions. The protruding webs 7 and 8 are in each case uniformly spaced from one another and distributed over the entire periphery of the lid region 5, 6.

[0030] FIG. 3 shows a combination of a conventional stopper 16 in the left-hand half of the figure and the stopper 17 in accordance with the invention in the right-hand half of the figure. It may be seen from this comparison that the olive 2 is considerably shorter in the stopper 17 in accordance with the invention than the olive 18 of the conventional stopper 16, which is possible due to the fact that the olive 2 is held and braced by the base wall 3. As a result of this bracing, the olive 2 develops the same pressure as the longer olive 18, whereby additionally the levering away from a container is considerably facilitated due to the shorter dimension. As can be further seen in FIG. 4, the oblique surface 13 at the lower end of the olive 2 also contributes to this. Formed on the upper side of the annular lid region 6 is an annular rib 19.

[0031] Ribbing can be formed on the radially inner surface of the olive 2. This ribbing, which consists of grooves situated closely together and projections between them of rounded cross-section, facilitates the levering away of the stopper in accordance with the invention, whereby at the same time the pressure of the olive necessary for the sealing of the contents of the container is maintained.

1. A stopper for a container with a lid with a peripheral wall, which engages around the neck of the container and integrally formed on whose lower edge there is a peripheral security ring, which may be torn off, for tamper-evident security of the contents of the container with inwardly directed locking formations, which, in the fastened position of the stopper, engage beneath an outwardly directed annular projection on the container, and with an olive, which is provided with an outer peripheral annular bead, for gripping engagement in the container opening, the stopper comprising a circular, concentric recessed channel in the lid, which has a radially outer annular wall and a radially inner annular wall, which are connected together by a base wall, that the recessed channel is integrally formed on the central circular lid region and the outer annular lid region, that the radially outer annular wall defines the olive and that the upper side of the annular lid region is provided with at least one upwardly projecting rib.

2. A stopper as claimed in claim 1, wherein the radially inner annular wall is extended beyond the base wall and defines the peripheral wall of a desiccant chamber.

3. A stopper as claimed in claim 1, wherein a lower end region of the olive is bevelled linearly.

4. A stopper as claimed in claim 1, wherein the olive has a ribbed wall surface on its inner side, which is defined by a plurality of grooves in the wall of the olive extending in the longitudinal direction of the olive.

5. A stopper as claimed in claim 4, wherein the grooves have a generally constant depth of 10% to 50% of the minimum wall thickness of the olive.

6. A stopper as claimed in claim 4, wherein the webs between the grooves have a domed cross-sectional shape.

7. A stopper as claimed in claim 1, wherein a spiral retaining device is integrally formed on the base wall of the recessed channel.

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