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(54)

A CAP FOR A BOTTLE WITH A THREADED PORTION FOR SECURING THE CAP TO THE BOTTLE

(57) The disclosure relates to a cap (1) for a bottle (2), the cap (1) comprises a cap housing (10) which includes a cap portion (20), a band portion (40) connected to the cap portion via an intermediate portion (30). The intermediate portion comprises a plurality of elongated openings (32) that define at least two connecting portions (34) interconnecting the cap portion with the band portion. The band portion comprises at least one holding structure (42). The plurality of elongated openings is arranged to allow the cap portion to be removed from the opening of the bottle and to be positioned in an open position in which an edge structure (28) of the cap portion is forced towards the threaded portion of the bottle and engages with the at least one holding structure. The disclosure further relates to a method (100) for manufacturing a cap.

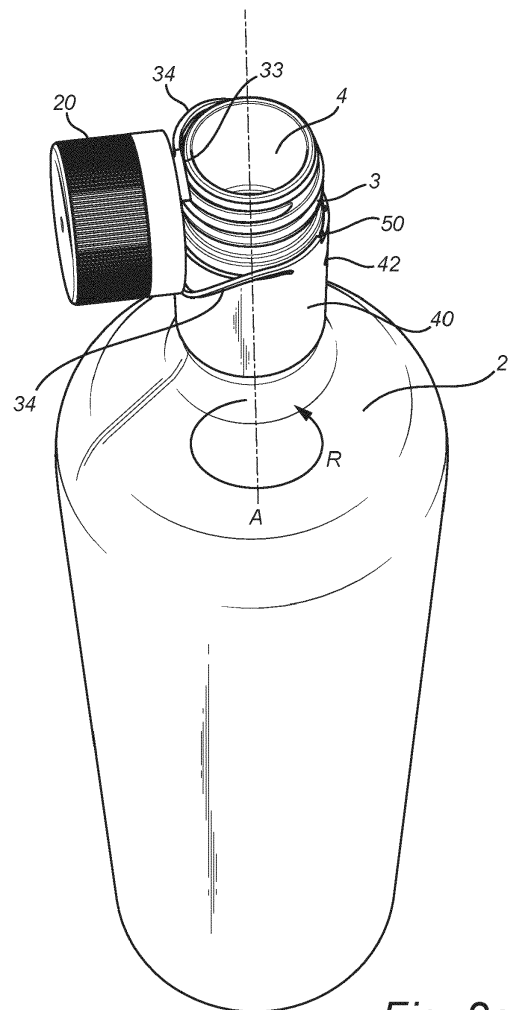


Fig. 2c

## Description

### Technical field

[0001] The present disclosure relates to a cap for a bottle with a threaded portion for securing the cap to the bottle to close an opening thereof. The present disclosure also relates to manufacturing such cap.

### Background

[0002] In general, bottles are used for storing liquid and a cap is used to close the opening of the bottle, a cap on a bottle serves several purposes. One of the primary reasons for having a cap is to create a seal that prevents liquids or other materials inside the bottle from spilling out. This is important for maintaining the freshness and integrity of the contents of the bottle. Additionally, a cap can also help to prevent contamination of the contents of the bottle. Caps can also be used to provide a means of opening and closing the bottle. Overall, the cap on a bottle serves to protect the contents of the bottle and make it easier to use. The cap can be removed from the bottle to allow contact with the liquid inside. The caps used today may easily be lost and misplaced or dropped such that they become contaminated, and the user do not want to reuse the cap. When the caps are lost, they may end up in the environment which results in pollution of the environment and may affect the wildlife. To reduce plastic litter, the industry has started to produce caps that are tethered to the bottle.

[0003] The tethered caps are connected to the bottle through a portion that connects the cap to the bottle also when the cap is removed from the opening. Thus, the risk that the cap is lost or thrown away is reduced. A problem with the tethered caps produced today is generally that they are not user-friendly compared to a conventional cap. The portion connecting the cap to the bottle result in complex designs and also in that the user needs to handle the cap when pouring the drink from the bottle. Thus, there is a need of a more user-friendly tethered cap.

### Summary

[0004] It is an object to mitigate, alleviate or eliminate one or more of the above-identified deficiencies in the art and disadvantages singly or in any combination and solve at least the above-mentioned disadvantage in the art.

[0005] To achieve at least one of the above objects, and also other objects that will be evident from the following description, a cap for a bottled defined in claim 1 is provided according to the present disclosure. Preferred variants of the cap will be evident from the dependent claims.

[0006] More specifically, according to a first aspect of the present disclosure, there is provided a cap for a bottle with a threaded portion for securing the cap to the bottle

to close an opening thereof. The cap comprises a cap housing which includes a cap portion having a closed end and an open end, said cap portion comprising a top structure at the closed end and a side wall extending from the top structure towards the open end, said side wall having a threaded portion on an inside surface for engagement with the threaded portion of the bottle, a band portion connected to the cap portion via an intermediate portion at the open end of the cap portion, wherein the intermediate portion comprises a plurality of elongated openings arranged circumferentially about the intermediate portion so as to define at least two connecting portions interconnecting the cap portion with the band portion, wherein each of the at least two connecting portions comprises a respective first end and a respective second end, and is connected to the cap portion at the first end and to the band portion at the second end, wherein the band portion comprises at least one holding structure at an outward facing surface thereof, wherein the plurality of elongated openings is structured and arranged to allow the cap portion to be unscrewed and removed from the opening of the bottle while being connected to the band portion via the at least two connecting portions and to be positioned in an open position in which an edge structure which is formed at the open end of the cap portion is forced towards the threaded portion of the bottle and engages with the at least one holding structure.

[0007] The open position at which the cap portion is forced towards the threaded portion of the bottle and engages with the at least one holding structure may be advantageous as it secures the cap towards the bottle. When pouring, a cap, that is not secured, needs to be held or in some way controlled by the user to make sure that the cap does not move and disrupt the flow of liquid. If this happens, the liquid may be spilled and thereafter it needs to be cleaned up. When the cap is secured against the bottle, impact between the pouring liquid and the cap is prevented. Therefore, spill of the liquid may be avoided, and the user may concentrate on the pouring of the liquid. Thus, the user-friendliness will be increased and hence also the user-experience will increase. If the cap obstructs the flow of liquid, it may cause a user to get upset, removing the cap with the connecting portions, and throwing it away. Therefore, the user-experience is of importance as the cap otherwise may end up in the nature. The connecting portions together with the improved user-experience may therefore reduce the risk of plastic litter.

[0008] The terminology "forced towards" as used herein should be understood as "forced against". This implies that the cap portion is forced by the connection portions against, and thereby into contact with, the threaded portion. In other words, the connection portions will force the cap portion against, and thereby in contact with, both the threaded portion and the at least one holding structure.

[0009] The holding structure may be advantageous as it provides stability to the cap in the open position. The holding structure provides an area for the edge structure

to grip and the risk of the cap disconnecting from the band portion may be reduced. The open position where the cap is held in place by the connecting portions and the holding structure may be advantageous as it may require no or very little extra material for producing the cap. The connecting portions are required to achieve a tethered cap and the holding structure may be formed in or by the existing material of the band portion. Thus, an economical-efficient and environmental-friendly cap may be produced.

**[0010]** The bottle has an extension in an axial direction. The bottle may be circular-symmetric about the axial direction but may alternatively be irregularly shaped. The bottle has a neck portion. The neck portion is arranged coaxially with the axial extension. A reference plane may be defined orthogonally to the axial direction. As seen when the cap is in a closed position on the bottle, the cap extends in the axial direction. The cap portion is connected to the intermediate portion in the axial direction and the intermediate portion is connected to the band portion in the axial direction. The intermediate portion comprises the elongated openings and the at least two connecting portions formed by the elongated openings.

**[0011]** When the cap is unscrewed and removed from the opening of the bottle, the connecting portions connects the cap portion to the band portion such that no portions of the cap is lost. When the cap is unscrewed from the bottle, the connecting portions will allow an increase of distance between the band portion and the cap portion. The open end of the cap portion and the first ends of the connecting portions will form the edge structure. The edge structure may be irregular if the first end of connecting portion protrudes or if the elongated openings have an irregular shape toward the cap portion.

**[0012]** The plurality of elongated openings may be structured and arranged such that each of the at least two connecting portions extends, from the first end to the second end, along a common rotational direction about the circumference of the intermediate portion.

**[0013]** It may be advantageous that the at least two connecting portions extends from the first to the second end along a common rotational direction as the at least two connecting portions will co-operate to hold the cap portion in the open position. One of the connecting portions will force the cap portion toward the bottle and another of the connecting portions will pull the cap portion downwards. Therefore, the stability in the open position is further enhanced.

**[0014]** The common rotational direction as seen in the closed position is defined in relation to the axial direction.

**[0015]** This implies that the first end and the second end may be arranged at different angular portions about the circumference of the intermediate portion. In other words, for each connecting portion, the first end may be arranged, as seen along an axial direction of the cap, in a nonalignment with the second end. However, it is also conceivable that the first end and the second end are arranged at the same angular position about the circum-

ference of the intermediate intersection portion. In other words, for each connecting portion, the first end may be arranged, as seen along an axial direction of the cap, in alignment with the second end. For such embodiments, the connecting portion may extend a whole revolution, i.e. 360 degrees, about the circumference of the intermediate portion. In some cases, the connecting portion may extend for more than one revolution. In other words, the connecting portion may be offset in the axial direction during the revolutions such that the length of the connecting portion is longer than the circumference of the intermediate portion.

**[0016]** The plurality of elongated openings may be structured and arranged such that the two or more connecting portions are two connecting portions and such that the respective first ends of the two connecting portions are arranged substantially opposite to each other.

**[0017]** The first ends of the two connecting portions arranged substantially opposite to each other may be advantageous as it facilitates the movement where the cap portion is moved toward the open position. The opposite positions of the first ends allows the cap portion to be easily moved to the open position. Furthermore, with the two connecting portions arranged substantially opposite to each other, the stability in the open position may be further increased.

**[0018]** This implies that the first ends may be arranged at angular positions substantially 180 degrees from each other. In other words, the plurality of elongated openings may be structured and arranged such that the two or more connecting portions are two connecting portions and such that the respective first ends of the two connecting portions are arranged at angular positions substantially 180 degrees from each other as seen in an axial direction A of the cap. The position of the second ends of the two connecting portions may alternatively be arranged at angular positions different from 180 degrees. This may be advantageous as it allows adapting the length of the connecting portions.

**[0019]** The plurality of elongated openings may be structured and arranged such that the two or more connecting portions are two connecting portions, wherein the at least one holding structure may be two holding structures, and wherein the two holding structures are arranged, such that one of the two holding structures, when in the open position, engages with the first end of one of the two connecting portions.

**[0020]** It may be advantageous to arrange the holding structures such that the first end engages with the holding structure, as it provides a firmer engagement between the cap portion and the band portion. The first end of the connecting portion may protrude from the edge structure and may therefore be easier to connect to the holding structure. Furthermore, with two holding structures and two connecting portions the cap may be structured to allow the open position to be achieved in two different directions.

**[0021]** The plurality of elongated openings may be two

elongated openings arranged opposite to each other about the circumference of the intermediate portion, wherein each of the two elongated openings may have a first portion arranged horizontally along an intersection between the intermediate portion and the cap portion and a second portion arranged horizontally along an intersection between the intermediate portion and the band portion, wherein the first and second portion may be interconnected by a bridge portion, and wherein the first portion of each of the two elongated openings partly overlaps with a second portion of another one of the two elongated openings.

**[0022]** It may be advantageous to have two elongated openings as a less complex cap may be achieved. With two elongated openings, the cap may be easier to manufacture. The overlap of the first portion of each elongated opening by the second portion of the other elongated opening may not be made directly on top of each other. The overlap may be only in part, i.e. with an overlap angularly and a displacement between the first portion of one connecting portion and the second portion of the other connecting portion in the axial direction. With such an overlap it may be possible to obtain two connecting portions with only two elongated openings. In other words, the overlap should be seen as where a first portion of one connecting portion and the second portion of the other connecting portion is located at the same angular position of the intermediate portion but with different axial position. There is no physical overlap of the first portion and the second portion.

**[0023]** With "arranged horizontally" is here described for a situation where the bottle is positioned in a standing upright position, e.g., on a table. Thus, a horizontal arrangement will be in a plane being transverse to a symmetry axis, or axial direction of the cap 1.

**[0024]** The first portion of the elongated openings intersects the cap portion and the intermediate portion. Therefore, the shape of the first portion of the elongated openings and the first end of each connecting portions may define the edge structure of the cap portion.

**[0025]** The plurality of elongated openings may be structured and arranged such that a length of each connecting portion is larger than a distance between the open end of the cap portion and an inner surface of the cap portion at the closed end.

**[0026]** It may be advantageous with the length of each connecting portion being larger than the distance between the open end of the cap portion and the inner surface of the cap portion as it may allow a smooth removal of the cap from the bottle.

**[0027]** Each of the plurality of elongated openings have opposite elongated side walls which are at least partially interconnected with each other.

**[0028]** It may be advantageous to partly interconnect the side walls of the elongated openings to each other to provide a warranty if the cap has been open before. This is a safety feature to ensure the customer that the liquid in the bottle has not been manipulated. The inter-

connection may be a thin layer of material bridging the gap between the two side walls for the full length of the elongated opening or only partly. The interconnection should be breakable when unscrewing the cap for the first time.

**[0029]** The opposite elongated side walls of each of the plurality of elongated openings may be partially interconnected to each other by a plurality of tamper pins.

**[0030]** It may be advantageous to use a plurality of tamper pins as they are a well-known method for warranty that the cap has not been opened. Tamper pins are easy to structure such that they are breakable. The plurality of tamper pins may be arranged between the first end of the connecting portions and the band portion and between the second end of the connecting portions and the cap portion. The tamper pins extend substantially in the axial direction.

**[0031]** It should be understood that in the context of the present disclosure, the tamper pins should not be interpreted as dividing the elongated openings into two or more separate elongated openings. The same elongated opening extends on both sides of each tamper pin. The plurality of tamper pins only connects the opposite elongated side walls of the elongated openings with each other.

**[0032]** The at least one holding structure may be a recess or a protrusion.

**[0033]** It may be advantageous to have a recess or a protrusion as holding structure as these are structures that are easy to implement in the band portion and only marginally aggravating the manufacturing process. The holding structures may be recesses that extends partly into the material of the band portion. In other words, the holding structures may not be through-going recesses, i.e. through-openings. However, the holding structures may alternatively be through-going recesses, or through-openings.

**[0034]** The cap may have a diameter that is smaller than a distance between the holding structure and the top structure when the cap portion is screwed to the bottle.

**[0035]** It may be advantageous with a smaller diameter of the cap than the distance between the holding structure at the band portion and the top structure of the cap portion, as it ensures that the full cap may be removed from the opening of the bottle when in the open position.

**[0036]** The cap housing may be integrally formed by a single material.

**[0037]** It may be advantageous to integrally form the cap housing from a single material as it may improve the manufacturing process compared to a cap housing of more than one material.

**[0038]** This implies that the cap portion is integrally formed with the intermediate portion, and that the intermediate portion is integrally formed with the tamper band portion. This further implies that the cap housing may be a one-piece element. Even for embodiments having a cap housing being a one-piece element, the cap as such

may comprise more than one element. As readily appreciated by the person skilled in the art, caps typically have a sealing element to seal the cap to the bottle.

**[0039]** The cap housing may be made of a flexible material such as plastic.

**[0040]** Plastic may be advantageous as material for the cap housing as it is flexible and suitable for use in combination with liquid.

**[0041]** The band portion may have at least one protrusion on an inner surface thereof which at least one protrusion is configured to engage with a blocking protrusion of the bottle when positioned thereon so as to prevent the band portion from leaving the bottle.

**[0042]** The band portion is prevented from leaving the bottle to keep the cap portion connected to the bottle also after the cap has been open. In the closed position, the threads keep the cap connected to the bottle. However, in the open position the band portion is connecting the cap portion to the bottle via the connecting portions. It may be advantageous to prevent the band portion from leaving the bottle as it reduces the risk that the cap leaves the bottle and end up in the nature. Thus, plastic litter may be further reduced.

**[0043]** The at least one protrusion prevents the band portion from moving in the axial direction. However, as readily appreciated by the person skilled in the art, the band portion may still be able to rotate around the axial direction.

**[0044]** Each of the at least one holding structure may have a surface geometry which is complementary to a surface geometry of the edge structure.

**[0045]** It may be advantageous if the holding structure have a surface geometry that complements the surface geometry of the edge structure. With such surface geometry the stability of the cap in the open position may be further increased. The customer may also easily see where the cap should be arranged in the open position, which further increases the user-friendliness. As an example, the holding structure may be shaped as a curve with the same radius as the cap portion.

**[0046]** The holding structure may extend tangentially about the circumference of the tamper band portion.

**[0047]** The elongated openings may have a first end that bends away from the cap portion.

**[0048]** The first end bending away from the cap portion may be advantageous as it may provide a smoother transition between the band portion and the intermediate portion. By bending the first end the connecting portions may have an increased strength.

**[0049]** According to a second aspect there is provided a bottle with a cap according to the first aspect, wherein the bottle has a bottle neck with a height larger than the diameter of the cap.

**[0050]** It may be advantageous with a bottle neck that has a height larger than the diameter of the cap as it allows the full cap to be situated on the bottle neck in the open position. It may further allow that the diameter of the band portion is uniform over its full axial extension.

**[0051]** According to a third aspect there is provided a method for manufacturing a cap according to the first aspect, wherein the method comprises manufacturing a cap housing at least in part by a moulding process.

**[0052]** The moulding process may be an injection moulding process. Alternatively, the moulding process may be a compression moulding process. Manufacturing the cap housing at least in part by a moulding process implies that some parts of the manufacturing of the cap housing may not be manufactured by a moulding process. For example, the plurality of elongated openings may be manufactured by another process, such as cutting or stamping, after a moulding process. The method may alternatively comprise manufacturing the cap housing entirely by a moulding process.

**[0053]** It may be advantageous to use a moulding process as it is efficient and offers high repeatability and reliance.

**[0054]** Effects and features of the second and third aspect are largely analogous to those described above in connection with the first aspect. Embodiments mentioned in relation to the first aspect are largely compatible with the second aspect and third aspects. It is further noted that the inventive concepts relate to all possible combinations of features unless explicitly stated otherwise.

**[0055]** A further scope of applicability of the present disclosure will become apparent from the detailed description given below. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the disclosure, are given by way of illustration only, since various changes and modifications within the scope of the disclosure will become apparent to those skilled in the art from this detailed description.

**[0056]** Hence, it is to be understood that the present disclosure is not limited to the particular component parts of the device described or steps of the methods described as such device and method may vary. It is also to be understood that the terminology used herein is for purpose of describing particular embodiments only, and is not intended to be limiting.

## Brief description of the Drawings

**[0057]** The present disclosure will by way of example be described in more detail with reference to the appended drawings, which show example embodiments of the disclosure.

Fig. 1a illustrates a side view of a cap according to an example embodiment of the disclosure when a cap portion of the cap is in the closed position such that first end of a first connecting portion and second end of a second connecting portion is front facing.

Fig. 1b illustrates a second side view of the cap of Fig. 1a when the cap portion is in the closed position.

- tion and where the cap is rotated 90 degree in relation to the first side view of Fig. 1a such that an overlap of the first portion and the second portion is front facing.
- Fig. 1c illustrates a perspective view of an intermediate portion and a band portion of the cap of Fig. 1a.
- Fig. 2a illustrates a first side view of the cap of Fig. 1a when the cap is in the open position.
- Fig. 2b illustrates a second side view, 180 degree rotated in relation to the first side view of Fig. 2a, when the cap is in the open position and positioned on a bottle.
- Fig. 2c illustrates a perspective view of the cap of Fig. 2a when the cap portion is in the open position on the bottle.
- Fig. 3 illustrates a flow chart for a method for manufacturing a cap.

### Detailed description

**[0058]** The present disclosure will now be described more fully hereinafter with reference to the accompanying drawings, in which currently preferred embodiments of the disclosure are shown. This disclosure may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness, and fully convey the scope of the disclosure to the skilled person.

**[0059]** Turning to Fig. 1a, and 1b, where two different side views of a cap 1 is illustrated. The cap 1 comprises a cap housing 10 which includes a cap portion 20, an intermediate portion 30 and a band portion 40. The cap portion 20 has a closed end 21 and an open end 23. The cap portion 20 comprises a top portion 22 and a sidewall 24 connected to each other at the closed end 21. The sidewall 24 extends from the closed end 21 to the open end 23. The sidewall 24 in Fig. 1a-1b is cylindrical and has a threaded portion (not shown) on an inside surface for engagement with a threaded portion 3 of a bottle 2, which may be seen in Fig. 2b and 2c. To enhance the grip of the cap 1, the cylindrical sidewall 24 is provided with a grip structure 26.

**[0060]** The band portion 40 is connected to the cap portion 20 via the intermediate portion 30 at the open end 23 of the cap portion 20. To connect the cap portion 20 to the band portion 40, the intermediate portion 30 comprises two elongated openings 32 arranged opposite to each other about the circumference of the intermediate portion 30. Each of the two elongated openings 32 may have a first portion 36 that is arranged horizontally along an intersection between the intermediate portion 30 and the cap portion 20 and a second portion 38 that is arranged horizontally along an intersection between the intermediate portion 30 and the band portion 40. With "arranged horizontally" is here described for a situation where the bottle is positioned in a standing upright posi-

tion, e.g., on a table. Thus, a horizontal arrangement will be in a plane being transverse to a symmetry axis, or axial direction A of the cap 1. The first portion 36 and second portion 38 are interconnected by a bridge portion 37. In the example embodiment, a first end 31 of each second portion 38 is bent in the axial direction A away from the cap portion 20. In other embodiments, the first end 31 may be straight. The first portion 36 of each of the two elongated openings 32 partly overlaps with a second portion 38 of the other one of the two elongated openings 32. The overlap is best illustrated in Fig. 1b. The first portion 36 extends in a first plane P1 which is transverse to the axial direction A, and the second portion 38 extends in a second plane P2 which is spaced from the first plane P1 and transverse to the axial direction A. The first plane P1 and the second plane P2 are illustrated in Fig. 1c. The bridge portion 37 extends between the first 36 and second 38 portions such that it interconnects the first P1 and second P2 planes. In the example embodiment, the bridge portion 37 extends substantially orthogonally to the first P1 and second P2 planes, respectively, but in alternative example embodiments, the bridge portion 37 may form an oblique angle with the first P1 and second P2 planes, respectively. In other words, the overlap of the first portion 36 of each elongated opening 32 by the second portion 38 of the other elongated opening 32 is not made directly on top of each other. Thus, the first portion 36 of each elongated opening 32 may only partially overlap with the second portion 38 of the other elongated opening 32. The axial direction A defines the extension of the bottle 2 or the extension of the cap 1 when mounted on the bottle in a closed position, and also defined the symmetry axis of the substantially cylindrical geometry of the cap 1.

**[0061]** The two elongate openings 32 define two connecting portions 34 which each interconnects the cap portion 20 with the band portion 40. The aforementioned overlap should be seen as where a first portion 36 of one connecting portion 32 and a second portion 38 of the other connecting portion 32 is located at the same angular position, as seen in relation to the axial direction A, of the intermediate portion 30 but with different axial positions. There is thus no physical overlap of the first portion 36 and the second portion 38. The interconnection is made by each of the two connecting portions 34 having a respective first end 33 that is connected to the cap portion 20 and a respective second end 35 that is connected to the band portion 40. Thereby, the cap portion 20 and the band portion 40 are connected to each other. Although the present example embodiment discloses two elongate openings defining two connecting portions, it is also conceivable with more than two elongate openings defining two or more connecting portions.

**[0062]** The two elongated openings 32 are structured such that the respective first ends 33 of the two connecting portions 34 are arranged substantially opposite to each other. This implies that the first ends 33 are arranged at angular positions substantially 180 degrees

from each other, as seen in relation to the axial direction A. In the figures, the second ends 35 are also positioned substantially opposite to each other. However, the position of the second ends of the two connecting portions may alternatively be arranged at angular positions different from 180 degrees. This may be advantageous as it allows adapting the length of the connecting portions 34. The connecting portion 34 may extend substantially a whole revolution, i.e. 360 degrees, about the circumference of the intermediate portion 30. In other example embodiments, the connecting portion 34 may extend for more than one revolution. In other words, the connecting portion 34 may be offset in the axial direction A during the revolutions such that the length of the connecting portions 34 are longer than the circumference of the intermediate portion 30.

**[0063]** The two elongated openings 32 are structured such that the two connecting portion 34 extends along a common rotational direction R about the circumference of the intermediate portion 30. The common rotational direction as seen in the closed position is defined in relation to the axial direction A.

**[0064]** To provide a warranty to the customer that the cap 1 of the bottle 2 has not been open before, each of the two elongated openings 32 may have opposite elongated side walls 39a, 39b that are partially interconnected with each other by a plurality of tamper pins 50. The tamper pins 50 are structured such that they are breakable and may be ripped off when the cap 1 is unscrewed from the bottle 2 for the first time. The plurality of tamper pins 50 are arranged between the first end 33 of the connecting portions 34 and the band portion 40, and between the second end 35 of the connecting portions 34 and the cap portion 20, respectively. The tamper pins 50 extend substantially in the axial direction A. As used herein, the term "elongated opening" defines the whole length of the opening irrespective of the presence of tamper pins 50. Thus, the tamper pins 50 should not be construed as dividing the elongated openings 32 into separate elongated openings. The same elongated opening 32 extends on both sides of each tamper pin 50. The plurality of tamper pins 50 only connects the opposite elongated side walls 39a, 39b of the elongated openings 32 with each other.

**[0065]** The band portion 40 comprises two holding structures 42 at an outward facing surface 41 of the band portion 40. The holding structures 42 are in the example embodiment recesses 42 but could in other embodiments be shaped differently, such as e.g. protrusions. Each of the holding structures 42 has a surface geometry which is complementary to a surface geometry of an edge structure 28 at the open end 23 of the cap portion 20. The two holding structures 42 are positioned opposite to each other and in alignment with the first end 33 of each connecting portion 32. The holding structures 42 are shaped as a curve with the same radius as the cap portion 20, the holding structures 42 thereby complementing the edge structure 28 of the cap portion 20. The holding structures

42 in the example embodiment are recesses that extends partly into the material of the band portion 40. In other words, the holding structures 42 of the example embodiment are not through-going. However, in other embodiments the holding structures 42 may be through-going recesses, or through-openings.

**[0066]** For the example embodiment of Fig. 1a-1b, the cap housing 10 is integrally formed by a single material, wherein the material is plastic.

**[0067]** Turning to Fig. 1c, parts of the cap portion 20 is removed to better illustrate the intermediate portion 30. As can be seen the intermediate portion 30 have two elongated openings 32 that each have the first portion 36, the second portion 38 and the bridge portion 37 as earlier discussed in connection to Fig. 1a and Fig. 1b. The bridge portion 37 divides the two connecting portions 34 off such that each connecting portions 34 is provided between the two elongated openings 32. The bridge portion 37 have the first end 33 of one connecting portion 34 on one side, and the second end 35 of the other connecting portion 34 at the other side.

**[0068]** Turning to Fig. 2a-2c, the cap 1, from Fig. 1a-1c, is illustrated in an open position. In Fig. 2a the cap 1 is illustrated without the bottle 2, while in Fig. 2b-2c the cap is illustrated with the bottle 2.

**[0069]** The two elongated openings 32 are structured and arranged to allow the cap portion 20 to be unscrewed and removed from the opening 4 of the bottle 2 while being connected to the band portion 40 via the two connecting portions 34 and to be positioned in the open position in which the edge structure 28, which is formed at the open end 23 of the cap portion 20, is forced towards the threaded portion 3 of the bottle 2 and engages with a holding structure 42. The edge structure 28 is, for the present example embodiment, defined by the first portion 36 of the elongated openings 32, where the cap portion 20 and the intermediate portion 30 intersects, and the first end 33 of each connecting portion 32. As the holding structure 42 have a surface geometry that complements the surface geometry of the edge structure 28 the stability of the connection is improved. The holding structure 42 provides an area for the edge structure 28 to grip and the risk of the cap portion 20 disconnecting from the band portion 40 is reduced. In the open position the cap 1 is forced towards and into engagement with the threaded portion 3 of the bottle 2 and also engages with the at least one holding structure 42 securing the cap 1 towards the bottle 2. In Fig. 2c it is illustrated how the first end 33 of the connecting portion 34 is connected in the holding structure 42 and the first end 33 of the other connecting portion 34 is forced toward the threaded portion 3 of the bottle 2. When the cap portion 20 is secured against the bottle 2, impact between the pouring liquid and the cap 1 is prevented.

**[0070]** When the cap portion 20 is unscrewed and removed from the opening 4 of the bottle 2, the connecting portions 34 connects the cap portion 20 to the band portion 40 such that all parts of the cap 1 are still connected

to the bottle 2. When the cap 1 is unscrewed, the connecting portions 34 will allow an increase of a distance between the band portion 40 and the cap portion 20, which allows the user to lift the cap portion 20 off the opening 4. The elongated openings 32 are designed such that the length of the connecting portions 34 are larger than a distance between the open end 23 of the cap portion 20 and the inner surface of the cap portion 20 at the closed end 21 to allow a smooth removal of the cap portion 20.

**[0071]** The two connecting portions 34 extends from the first end 33 to the second 35 end along a common rotational direction as the two connecting portions 34 will co-operate to hold the cap portion 20 in the open position. As can be seen in especially Fig. 2a and Fig. 2c, the first end 33 of one connecting portion 34 will be connected to the holding structure 42 and this connecting portion 34 will subject at least a force toward the holding structure 42, thereby keeping the first end 33 pushed into the holding structure 42. The other connection portion 34 will follow it first end 33 up to the threaded portion 3 of the bottle 2 and exert at least a force downwards on the cap portion 20.

**[0072]** In Fig. 2b the diameter D of the closed end 21 of the cap portion 20 is smaller than the distance d1 from the holding structure 42 to the top structure 22 when the cap portion 20 is in the closed position. The bottle 2 has a bottle neck 5 that has a height H that is larger than the diameter D of the cap portion 20.

**[0073]** To prevent the band portion 40 from leaving the bottle 2 and thereby keeping the cap portion 20 still connected to the bottle 2 also after the cap portion 20 has been disengaged from the bottle 2, the band portion 40 is provided with protrusions 44 on an inner surface 41. The protrusions 44 is illustrated in Fig. 1c. The protrusions 44 of the band portions 40 engages blocking protrusion(s) (not shown) of the bottle 2 that is arranged on the bottle and on both axial sides of the protrusions 44. Thereby, the band portion 40 is prevented from moving in the axial direction A. However, as readily appreciated by the person skilled in the art, the band portion 40 may still be able to rotate around the axial direction A.

**[0074]** Turning to Fig. 3, a method 100 for manufacturing a cap 1 is illustrated. The method 100 comprises manufacturing 110 a cap housing 10 at least in part by a moulding process.

**[0075]** The moulding process may be an injection moulding process. Alternatively, the moulding process may be a compression moulding process. Manufacturing the cap housing 10 at least in part by a moulding process implies that some parts of the manufacturing of the cap housing may not be manufactured by a moulding process. For example, the plurality of elongated openings 32 may be manufactured by another process, such as cutting or stamping, as a subsequent step performed after the moulding process. The method may alternatively comprise manufacturing the cap housing entirely by a moulding process.

**[0076]** The person skilled in the art realizes that the present disclosure by no means is limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims.

**[0077]** For example, the cap may be manufactured in other processes, the cap may have more than two connecting portions or elongated openings.

**[0078]** Additionally, variations to the disclosed embodiments can be understood and effected by the skilled person in practicing the claimed disclosure, from a study of the drawings, the disclosure, and the appended claims.

## Claims

1. A cap (1) for a bottle (2) with a threaded portion (3) for securing the cap (1) to the bottle (2) to close an opening (4) thereof, the cap (1) comprising:  
A cap housing (10) which includes:

a cap portion (20) having a closed end (21) and an open end (23), said cap portion (20) comprising a top structure (22) at the closed end and a sidewall (24) extending from the top structure (22) towards the open end (23), said sidewall (24) having a threaded portion on an inside surface for engagement with the threaded portion (3) of the bottle (2),

a band portion (40) connected to the cap portion (20) via an intermediate portion (30) at the open end (23) of the cap portion (20),

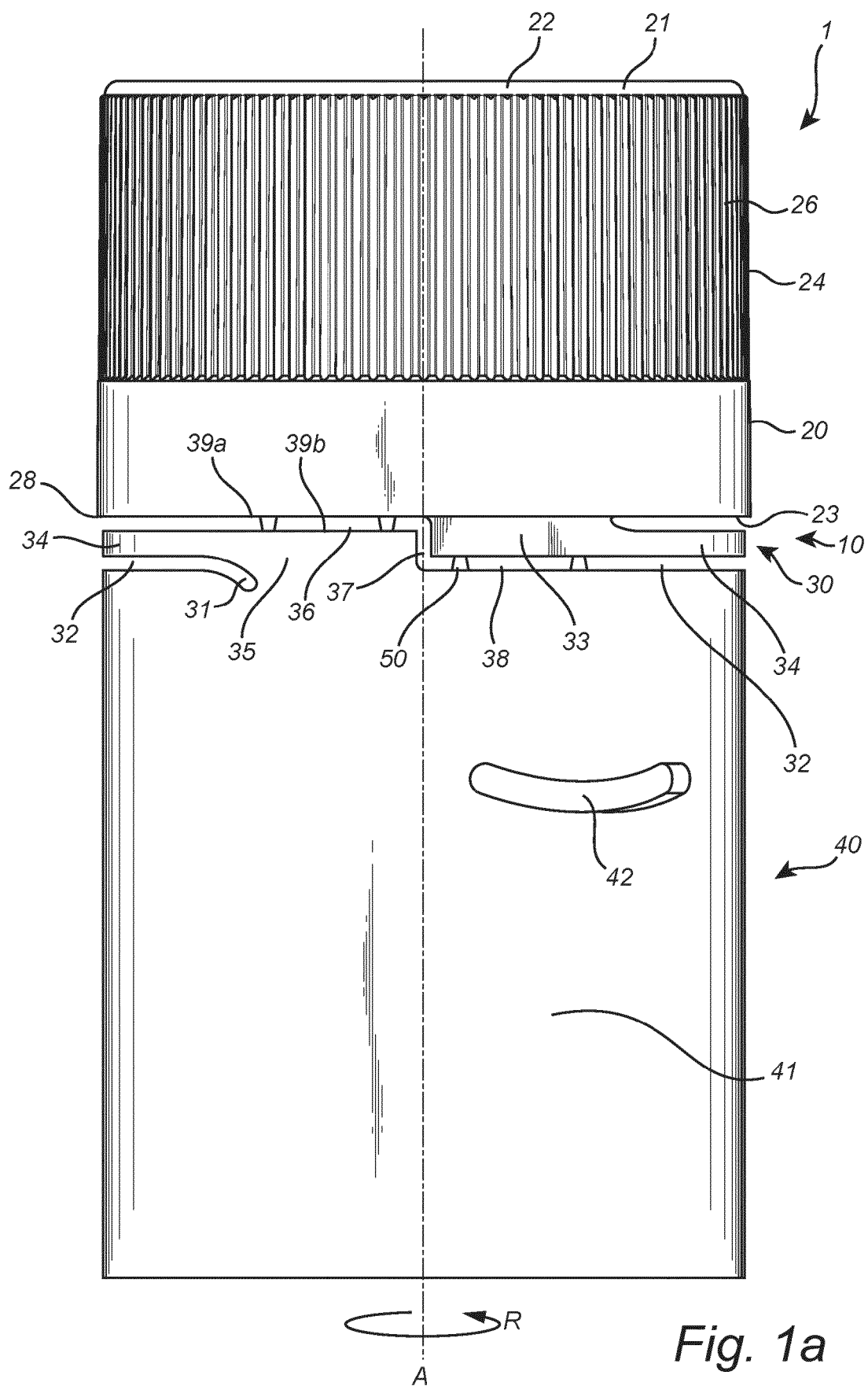
wherein the intermediate portion (30) comprises a plurality of elongated openings (32) arranged circumferentially about the intermediate portion (30) so as to define at least two connecting portions (34) interconnecting the cap portion (20) with the band portion (40),

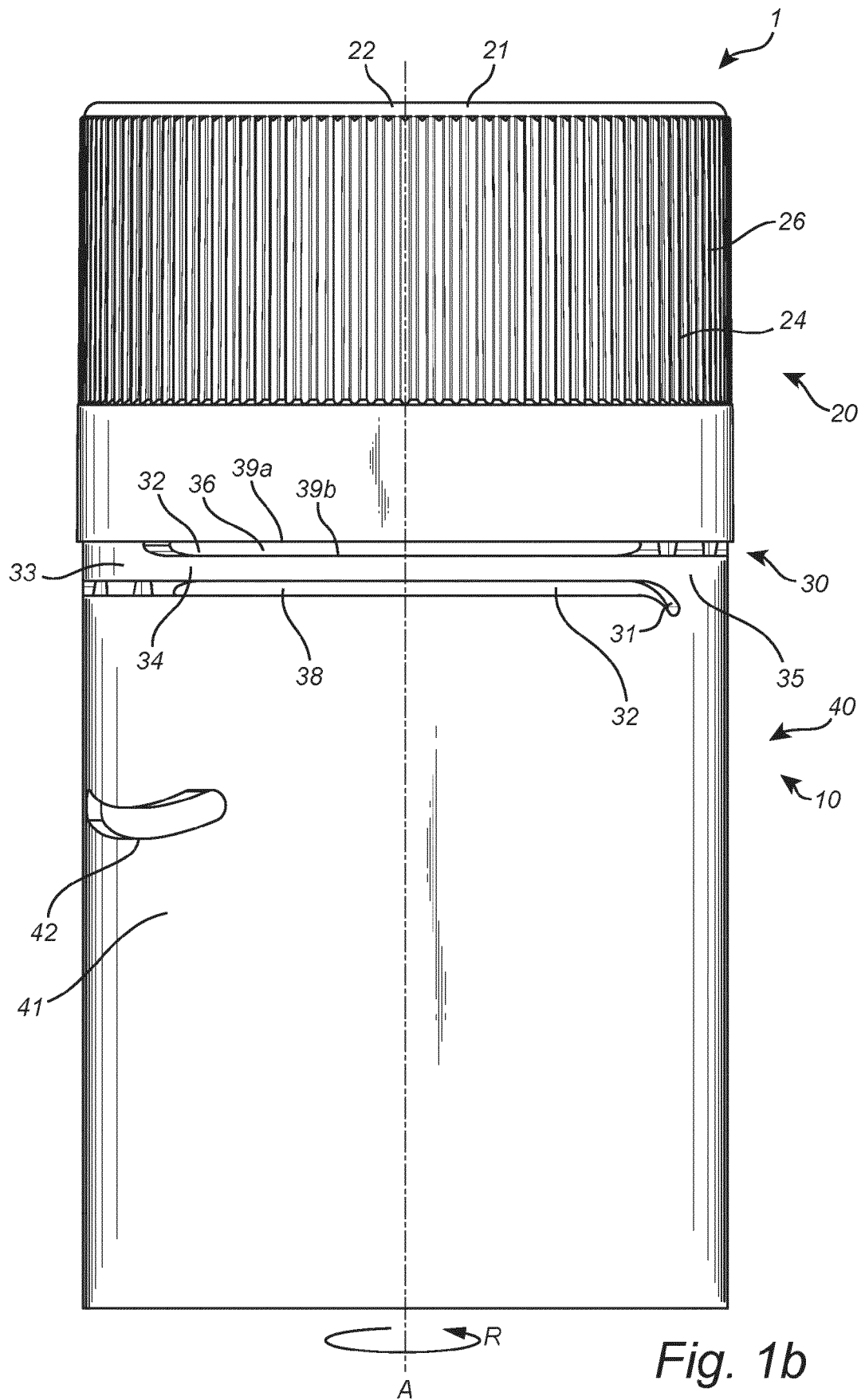
wherein each of the at least two connecting portions (34) comprises a respective first end (33) and a respective second end (35), and is connected to the cap portion (20) at the first end (33) and to the band portion (40) at the second end (35),

wherein the band portion (40) comprises at least one holding structure (42) at an outward facing surface (41) thereof,

wherein the plurality of elongated openings (32) is structured and arranged to allow the cap portion (20) to be unscrewed and removed from the opening (4) of the bottle (2) while being connected to the band portion (40) via the at least two connecting portions (34) and to be positioned in an open position in which an edge structure (28) which is formed at the open end (23) of the cap portion (20) is forced towards the threaded portion (3) of the bottle (2) and engages with the at least one holding structure (42).

2. The cap (1) according to claim 1, wherein the plurality of elongated openings (32) is structured and arranged such that each of the at least two connecting portions (34) extends, from the first end (33) to the second end (35), along a common rotational direction about the circumference of the intermediate portion (30).
  3. The cap (1) according to claim 1 or 2, wherein the plurality of elongated openings (32) is structured and arranged such that the two or more connecting portions (34) are two connecting portions and such that the respective first ends (33) of the two connecting portions (34) are arranged at angular positions substantially 180 degrees from each other, as seen in relation to an axial direction (A) of the cap (1).
  4. The cap (1) according to any one of the preceding claims, wherein the plurality of elongated openings (32) is structured and arranged such that the two or more connecting portions (34) are two connecting portions, wherein the at least one holding structure (42) is two holding structures, and wherein the two holding structures (42) are arranged, such that one of the holding structures, when in the open position, engages with the first end (33) of one of the two connecting portions (34).
  5. The cap (1) according to claim 3 or 4, wherein the plurality of elongated openings (32) is two elongated openings arranged opposite to each other about the circumference of the intermediate portion (30),
    - wherein each of the two elongated openings (32) has a first portion (36) arranged horizontally along an intersection between the intermediate portion (30) and the cap portion (20) and a second portion (38) arranged horizontally along an intersection between the intermediate portion (30) and the band portion (40), wherein the first (36) and second (38) portion are interconnected by a bridge portion (37), and
    - wherein the first portion (36) of each of the two elongated openings (32) partly overlaps with a second portion (38) of another one of the two elongated openings (32).
  6. The cap (1) according to any one of the preceding claims, wherein the plurality of elongated openings (32) is structured and arranged such that a length of each connecting portion (34) is larger than a distance between the open end (23) of the cap portion (20) and an inner surface of the cap portion (20) at the closed end (21).
  7. The cap (1) according to any one of the preceding claims, wherein each of the plurality of elongated openings (32) have opposite elongated side walls (39a, 39b) which are at least partially interconnected with each other.
  8. The cap (1) according to claim 7, wherein the opposite elongated side walls (39a, 39b) of each of the plurality of elongated openings (32) are partially interconnected to each other by a plurality of tamper pins (50).
  9. The cap (1) according to any one of the preceding claims, wherein the at least one holding structure (42) is a recess or a protrusion.
  10. The cap (1) according to any one of the preceding claims, wherein the cap (1) has a diameter that is smaller than a distance between the holding structure (42) and the top structure (22) when the cap portion (20) is screwed to the bottle (2).
  11. The cap (1) according to any one of the preceding claims, wherein the cap housing (10) is integrally formed by a single material.
  12. The cap (1) according to any one of the preceding claims, wherein the cap housing (10) is made of a flexible material such as plastic.
  13. The cap (1) according to any one of the preceding claims, wherein the band portion (40) has at least one protrusion (44) on an inner surface (41) thereof which at least one protrusion (44) is configured to engage with a blocking protrusion (6) of the bottle (2) when positioned thereon so as to prevent the band portion (40) from leaving the bottle (2).
  14. The cap (1) according to any one of the preceding claims, wherein each of the at least one holding structure (42) has a surface geometry which is complementary to a surface geometry of the edge structure (28).
  15. A bottle (2) with a cap (1) according to any one of the preceding claims, wherein the bottle (2) has a bottle neck (8) with a height larger than the diameter of the cap (1).
  16. A method (100) for manufacturing a cap (1) according to any one of the claims 1 to 14, wherein the method (100) comprises manufacturing (110) a cap housing (10) at least in part by a moulding process.





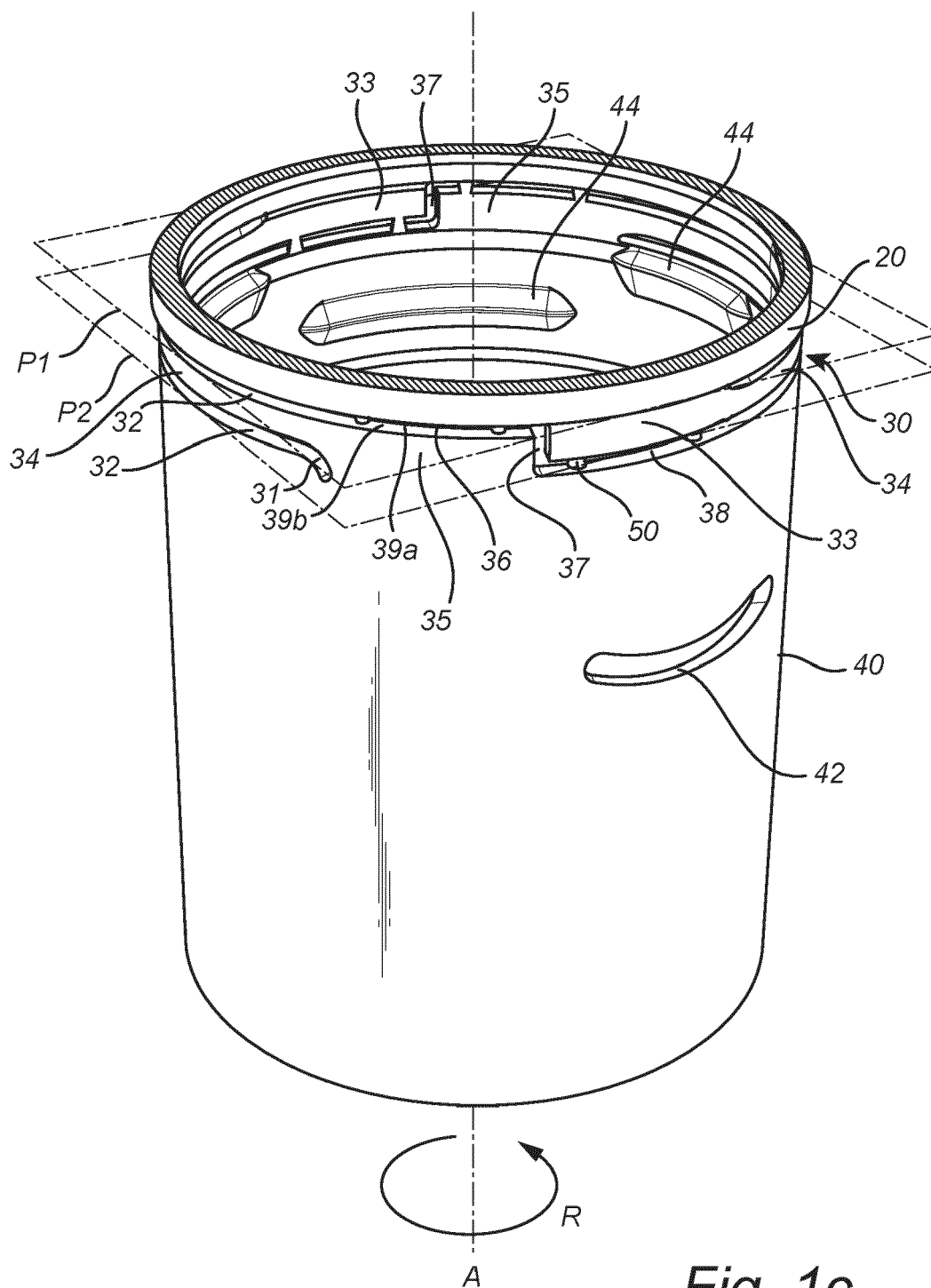


Fig. 1c

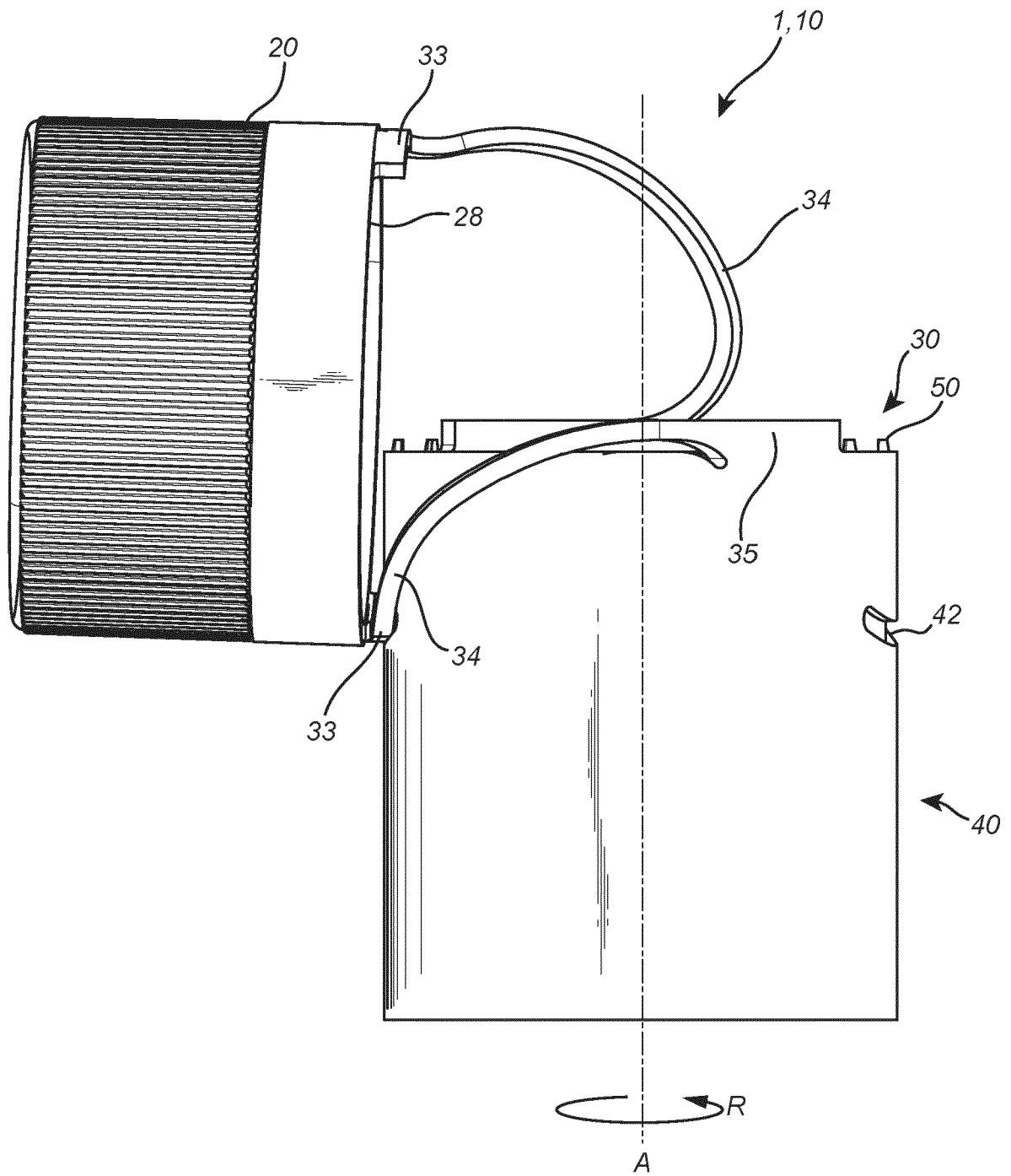
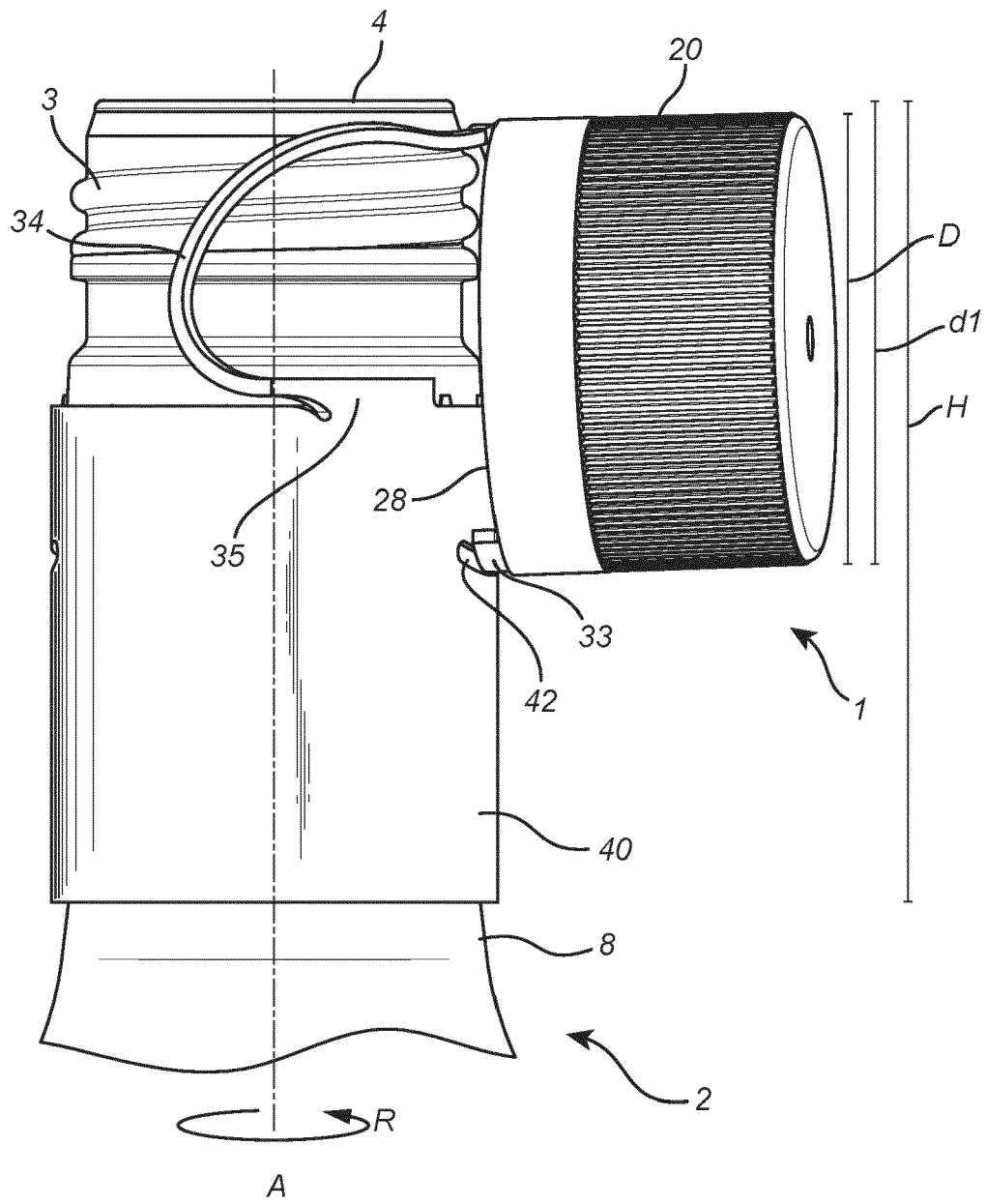
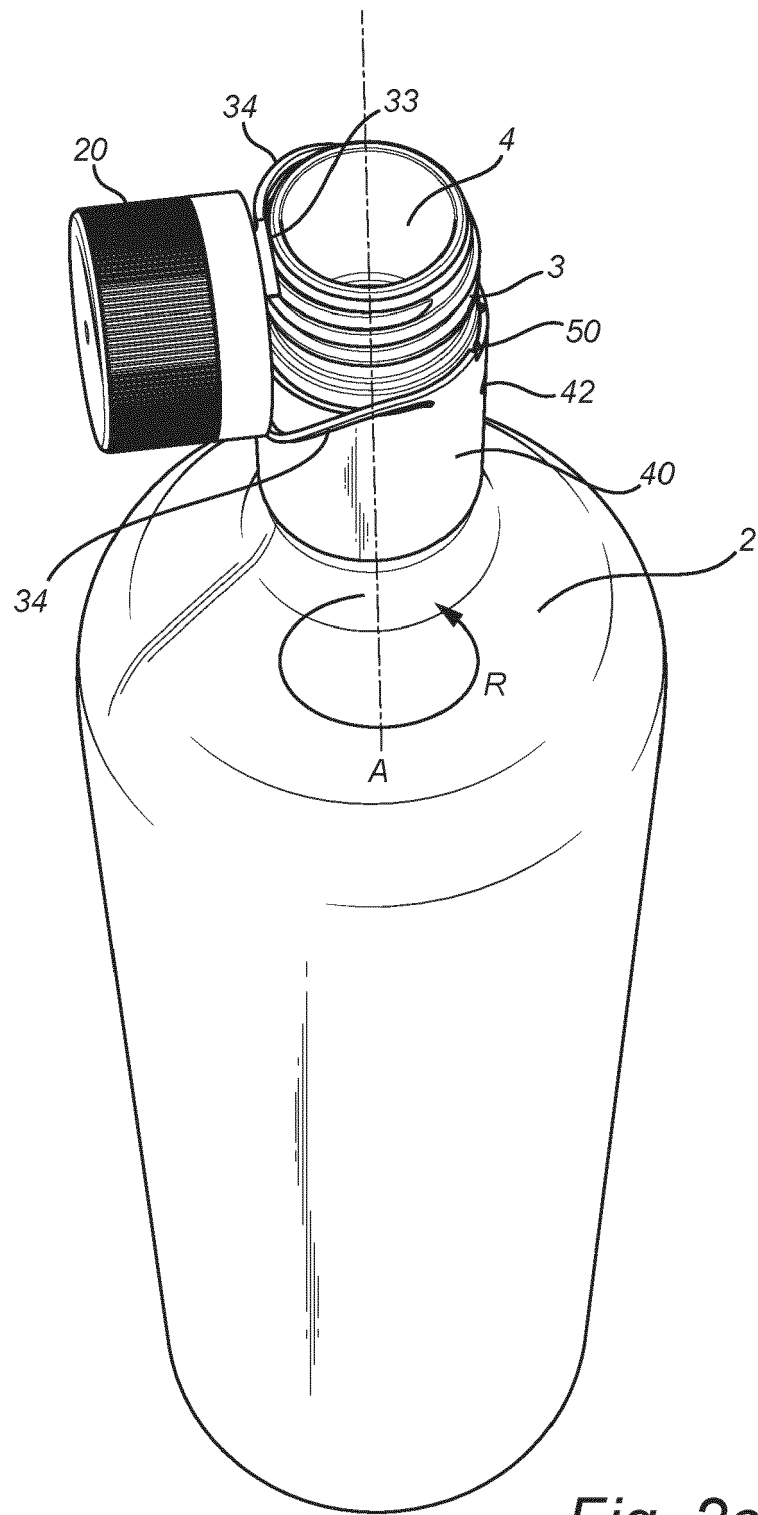
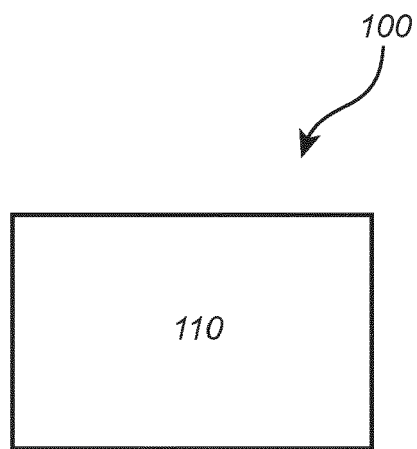


Fig. 2a





*Fig. 2c*



*Fig. 3*



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                |                                                                                                                                                                                                                                                                                       |                                         |
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| Y                                                                                                                                                                                                                                                      | * page 3, lines 1-27 *                                                                         | 2, 3                                                                                                                                                                                                                                                                                  |                                         |
| A                                                                                                                                                                                                                                                      | * page 11, line 24 - page 12, line 14;<br>figures 12, 17, 18 *<br>* page 14, lines 4-14 *      | 4, 5, 10                                                                                                                                                                                                                                                                              |                                         |
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| The present search report has been drawn up for all claims                                                                                                                                                                                             |                                                                                                |                                                                                                                                                                                                                                                                                       |                                         |
| Place of search<br><b>The Hague</b>                                                                                                                                                                                                                    |                                                                                                | Date of completion of the search<br><b>17 April 2024</b>                                                                                                                                                                                                                              | Examiner<br><b>Serrano Galarraga, J</b> |
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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