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(54) NECK AND CAP FOR A FOOD PACKAGE

(57) A neck (20) for a food package is disclosed. The neck (20) comprising a main body having an upper part (210) configured to be closed with a cap (30), a lower part configured to be attached to the food package and a neck wall extending between the upper part (210) and the lower part along a main axis (A) of the neck (20), the neck wall (230) having a wall thickness along a direction (R) transverse to the main axis (A), and a tether band holding portion configured to hold the cap (30) to the neck (20) via a tether band (330), wherein an outside surface of the neck wall is provided with cap parking protrusions (231), the cap parking protrusions (231) having an extension in the direction (R) transverse to the main axis (A) which is less than 50% of the wall thickness.

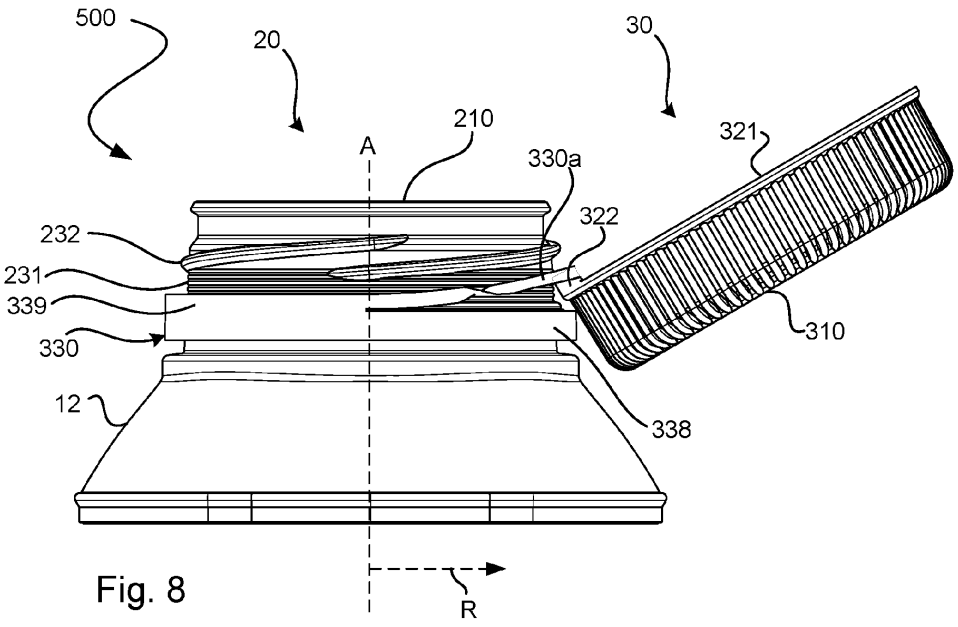

Fig. 8

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Description

Technical Field

[0001] The invention generally relates to a neck for a food package. The invention also relates to a cap configured to close an upper portion of a neck. The invention also relates to a neck and cap arrangement for closing a food package, and to a food package comprising the neck and cap arrangement.

Background Art

[0002] Many pourable food products, such as fruit juice, milk, tomato sauce, yoghurt, etc., are sold in food packages made of sterilized packaging material. This is well-known in the art. The food package may comprise an closure configured to close the food package. The closure may be formed as a resealable closure such that the food package may be open and closed several times. Moreover, it is well-known in the art to use a neck and cap arrangement as the closure. The food package and the neck of the neck and cap arrangement may be provided as one piece through molding or as two separate pieces which are molded together.

[0003] Even though neck and cap arrangements, and also the neck and the cap themselves, have been used in the food package industry by customers for decades, there is room for improvements. For instance, a challenge with today's neck and cap arrangement is to allow a tethered cap to be kept in place in relation to the food package, when the cap is in an open position, in an easy and efficient way.

[0004] For this reason, there is a demand for a neck and cap arrangement that is capable of keeping the cap in place when the cap is in the open position. There is also a demand for a neck and cap arrangement that is capable of opening and/or closing the food package in an easy and efficient way.

Summary

[0005] It is an object to at least partly overcome one or more of the above-identified limitations of the prior art. In particular, it is an object to provide a neck and cap arrangement that is capable of keeping the cap in place when the cap is in the open position. There is also a demand for a neck and cap arrangement that is capable of opening and/or closing the food package in an easy and efficient way.

[0006] According to a first aspect it is provided a neck for a food package, the neck comprising a main body having an upper part configured to be closed with a cap, a lower part configured to be attached to the food package and a neck wall extending between the upper part and the lower part along a main axis of the neck, the neck wall having a wall thickness along a direction transverse to the main axis, and a tether band holding portion configured to hold the cap to the neck via a tether band, wherein an outside surface of the neck wall is provided with cap parking protrusions, the cap parking protrusions having an extension in the direction transverse to the main axis which is less than 100% or the wall thickness, less than 75% or the wall thickness, or less than 50% of the wall thickness.

[0007] The cap parking protrusions may be ribs, and the extension in the direction transverse to the main axis may be a rib extension in the direction transverse to the main axis. Herein, "rib" should be understood as a "cap parking protrusion". In a similar manner, "rib extension" may be understood as "cap parking protrusion extension" and "rib thickness" as cap "parking protrusion thickness", and so on.

[0008] Extension in the direction transverse to the main axis may be understood as the distance by which the ribs protrude from the surface of the neck wall.

[0009] The neck wall may have a cylindrical shape. The direction transverse to the main axis is then the radial direction of the neck wall. The ribs may thus extend in the radial direction of the neck wall.

[0010] In this context, it is preferred, but not necessary, that the main body is a cylindrically shaped main body. At least if this is the case, the rib extension is the same as a radial extension as seen in the radial direction. It should be noted that the main body may be any geometrically shaped main body suitable for the food package.

[0011] The ribs may extend in a radial direction relative to the main axis to hold a lower edge of the cap in place. Thus, the ribs have a radial extension. It can also be said that the ribs protrude from the outside surface of the neck wall. It may also be said that the ribs protrude in the radial direction.

[0012] The ribs may extend in a longitudinal direction along the outside surface of the neck wall. The extension in the longitudinal direction may have a component that extends in a direction that is transverse to the main axis of the neck. The extension in the longitudinal direction may have a component that extends in a direction that is parallel to the main axis. This is the case, for example, when the ribs are slanted relative the main axis of the neck.

[0013] The neck may be made by using three dimensional, 3D, printing. This is advantageous in that it allows for the neck to be produced in an easy and efficient way. The neck may be attached to the food package by using an injection molding unit in which polythene is injected at high pressure on both sides of a food package sleeve. The neck may be attached to the food package using other suitable attachment solutions or units as well. The neck and the food package may be provided as one piece through molding, or as two separate pieces which are molded together.

[0014] When the main body is closed with the cap, the food package is closed and the cap is in a closed position. The closed position of the cap is for ensuring that the food product is kept in the food package. When the cap

is removed from the upper part of the main body, the food package is open and the cap is in an open position. The open position of the cap is for allowing the food product to be poured from the food package. The neck is advantageous in that it enables for, when the food package is closed with the cap, an easy and efficient opening of the food package by moving the cap from the closed position to the open position.

[0015] The tether band holding portion is advantageous in that it enables for the cap to be kept in position, via the tether band, when the cap is in the open position. The tether band holding portion is further advantageous in that it enables for the tether band to remain to the neck, when an attachment between the tether band and the cap is broken and the cap is moved to the open position.

[0016] In this context, the ribs should be interpreted as being small protrusion located at the outside surface of the neck wall. The term small should be interpreted as small in relation to the wall thickness along the direction transverse to the main axis.

[0017] The neck is advantageous in that it enables for the cap to be kept in place when the cap is in the open position. Hence, when the cap is in the open position, the lower edge of the cap is arranged between adjacent ribs such that the ribs keep the cap in place. This facilitates the provision of pouring the food product form the food package without having the cap in the way of the upper part through which the food product is poured from.

[0018] The neck is further advantageous in that it enables for a lower edge of the cap, when the cap is moved from the closed position to the open position, to come in contact with the ribs provided on the outside surface of the neck wall. When the lower edge of the cap comes in contact with the ribs, a sound may, and preferably is, provided. The sound indicates that the cap is moving from the closed position to the open position. When the sound stops, the cap may be, and preferably is, in the open position. The sound may be referred to as a confirmation sound indicating that the cap is in the open position and that the food product may be poured from the food package. This facilitates provision of an efficient and user-friendly opening of the food package in which a user may be informed when the cap is moving between the closed and open positions and when the cap is in the open position.

[0019] The neck is yet further advantageous in that it allows for a stable and materialefficient neck.

[0020] The ribs may be arranged with a center to center distance, along the main axis, of 0.4-0.8 mm. This is advantageous in that it enables for the cap to be arranged between adjacent ribs when the cap is in the open position. This is further advantageous in that it enables for the cap to be kept in place between the adjacent ribs in a way in which the ribs come in contact with the lower edge of the cap when the cap is in the open position. This is yet further advantageous in that it enables for the sound to be provided.

[0021] The ribs should preferably not be arranged too close to each other. In that way, the cap may not fit between adjacent ribs. Moreover, if the ribs are arranged too close to each other, the cap may not come in contact with the ribs such that the sound may be provided. Herein, "too close" should be interpreted as a center to center distance of less than 0.4 mm. The ribs should preferably not be arranged at a too great distance from each other. If the ribs are arranged at the too great distance from each other, the sound may not be provided and the cap, when in the open position, may not be kept in place by the ribs. Herein, "at too great distance from each other" should be interpreted as a center to center distance of more than 0.8 mm.

[0022] The rib extension may be 0.05-0.20 mm. This is advantageous in that it enables for the cap to be arranged between the adjacent ribs in an easy an efficient way. This is further advantageous in that it enables for the cap to be kept in place when the cap is in the open position. Hence, if the rib extension is too small, the cap may slide over the ribs instead of being kept in place between the ribs. Herein, "too small" should be interpreted as a rib extension smaller than 0.05 mm. If the rib extension is too great, it may be difficult to arrange the cap between the adjacent ribs in an easy and efficient way. Herein, "too great" should be interpreted as a rib extension greater than 0.20 mm.

[0023] The outside surface of the neck wall may be provided with at least three ribs. Preferably, the outside surface of the neck is provided with five ribs.

[0024] The ribs may be arranged in parallel to each other and extend around the circumference of the neck wall. This is advantageous in that it enables for the cap to be more easily arranged in the open position along the complete circumference of the neck. Hence, it enables for the food package to be open in an efficient but also flexible way.

[0025] The ribs may have a rib thickness of 0.20-0.50 mm in a direction being parallel to the main axis.

[0026] The outside surface of the neck wall may be provided with external threads for engaging the cap, wherein the ribs may be arranged between the external threads. The ribs may be arranged, as seen in a direction transverse to the main axis, between the external threads. The ribs may be arranged, as seen in a direction parallel to the main axis, between the external threads.

[0027] The external threads are typically designed as a twisted screw arranged on the outside surface of the neck wall. The external threads are advantageous in that they enables for receiving the cap, preferably comprising internal threads, in an easy way. Preferably, the external threads of the neck is engaging the internal threads of the cap such that the cap is kept in place when the cap is in the closed state. The external threads are further advantageous in that they enable the cap to be sealed to the neck, when the cap is in the closed position.

[0028] The external threads may have an external thread extension in the direction transverse to the main axis, wherein the rib extension may be less than 50% of

the external thread extension.

[0029] As said above, it is preferred, but not necessary, that the main body is the cylindrically shaped main body. At least if this is the case, the external thread extension is the same as the radial extension as seen in the radial direction. By having the rib extension being smaller than the external thread extension provides for that the ribs are not interfere the external threads and vice-versa. It should be noted that the purpose of the ribs is, as said above, to enable for the cap to be kept in place when the cap is in the open position and to enable for the sound to be provided when the cap is moved from the closed position to the open position. The purpose of the external threads is, as said above, to keep the cap in place when in the closed position.

[0030] The tether band holding portion may have a form of a flange extending around the main body, wherein the ribs may be arranged between the flange and the upper part of the main body, as seen along the main axis.

[0031] The external threads may also be arranged between the flange and the upper part of the main body, as seen along the main axis.

[0032] The flange may have a flange extension in the direction transverse to the main axis, wherein the rib extension may be less than 25% of the flange extension.

[0033] As said above, it is preferred, but not necessary, that the main body is the cylindrically shaped main body. At least if this is the case, the flange extension is the same as the radial extension as seen in the radial direction. By having the rib extension being smaller than the flange extension provides for that the ribs are not interfere the flange and vice-versa.

[0034] According to a second aspect it is provided a neck and cap arrangement for closing a food package, the neck and cap arrangement comprising a neck according to the first aspect, and a cap configured to be arranged on the neck, the cap comprising a top configured to close the upper part of the neck, a cap wall extending from the top, and a tether band configured to connect the cap to the tether band holding portion of the neck such that the cap is secured to the neck when the cap is in an open position, wherein the tether band is configured to pull a lower edge of the cap wall into contact with the ribs of the neck wall when the cap is in the open position.

[0035] In this context, the lower edge of the cap wall is defined as being a part of the cap wall. It should be noted that the lower edge could also be seen as an extension of the tether band which remains part of the cap after opening. The lower edge is configured to be arranged between adjacent ribs, as discussed above, in order to keep the cap in place when the cap is in the open position. Hence, the neck and cap arrangement is advantageous in that it allows for the cap to be kept in place in relation to the neck, when the cap is in the open position.

[0036] This is further advantageous in that it allows for closing a food package in an easy and efficient way. This is yet further advantageous in that it allows for an easy and efficient opening of the food package.

[0037] The tether band may be configured to pull the lower edge of the cap wall into contact with the ribs when the cap is moved from the closed position to the open position. This facilitates that the lower edge of the cap is in contact with the ribs such that the sound as discussed above is provided, when the cap is moved from the closed position to the open position.

[0038] Having the tether band being able to pull the lower edge of the cap wall into contact with the ribs facilitates for the cap to be arranged in a desired position, namely, between adjacent ribs, when the cap is in the open position. Hence, the tether band is advantageous in that it allows to control movements and positionings of the cap in an easy and efficient way.

[0039] In addition, effects and features of the second aspect are largely analogous to those described above in connection with the first aspect. However, the neck is advantageous in that it enables for effects and features when the cap is introduced. The neck and cap arrangement is advantageous in that it allows for theses effect and features to occur.

[0040] The tether band may comprise a first tethered band portion and a second tethered band portion which may extend from the lower edge of the cap wall, on opposite sides of the lower edge and towards the tether band holding portion.

[0041] This is advantageous in that it allows the tether band to be connected to the tether band holding portion of the neck, at opposite sides of the neck. Thus, the cap is kept in place, in relation to the neck, in an easy and efficient way, when the cap is in the open position.

[0042] This is further advantageous in that the tether band portions may be configured to pull the lower edge of the cap wall into contact with the ribs such that the cap is pulled towards the neck thereby kept in place when the cap is in the open position.

[0043] The tether band may comprise a ring-shaped section that may be connected to the tether band holding portion.

[0044] The ring-shaped section may form a so called tamper-evidence ring of the cap indicating if the cap has been open before.

[0045] According to a third aspect it is provided a cap configured to close a neck for a food package, the cap comprising a top configured to close an upper part of the neck, a cap wall extending from the top and having a cap end edge located opposite the top, a tether band having a top edge attached to the cap end edge and being configured to connect the cap to a tether band holding portion of the neck for securing the cap to the neck when the attachment of the tether band to the cap end edge is broken, the tether band having a bottom edge located opposite the top edge, a first cut located between the cap end edge and the top edge of the tether band, the first cut separating the cap end edge from the tether band along at least 270° of a circumference of the tether band,

and a second cut located between at least a portion of the first cut and the bottom edge of the tether band, the second cut cutting though the tether band along 90°-270° of a circumference of the tether band.

[0046] The cap is preferably injection molded integrally with the tether band, which is coaxially connected to the cap itself by means of a plurality of breakable bridges, e.g. the first and second cuts, and which is destined to remain fitted to the neck once the bridges are broken and the cap in unscrewed. Thus, when the attachment of the tether band to the cap end edge is broken, the plurality of breakable bridges is broken.

[0047] The first cut may be defined as a first tamper-evidence means located between the cap end edge and the top edge of the tether band by means of at least one breakable bridge. The at least one breakable bridge is configured to break during a movement of the cap. Thus, the at least one breakable bridge is configured to break when the cap is moving from the closed position for a first time. This is advantageous in that it allows for the cap to indicate if the cap has been open before.

[0048] The second cut may be defined as a second tamper-evidence means located between at least a portion of the firs cut and the bottom edge of the tether band by means of at least one breakable bridge. The at least one breakable bridge is configured to break during a movement of the cap. Thus, the at least one breakable bridge is configured to break when the cap is moving from the closed position for the first time. The second cut is for forming the first tethered band portion and the second tethered band portion as introduced above.

[0049] The tamper-evidence means are defined as a tamper resistant or tamper evident function to the cap. The tamper-evidence means are advantageous in that they indicate if the food package has been opened before. Thus, in order to be able to open the food package, the first and second cuts of the tether band have to be broken. If the cuts are broken, they indicate that the food package has been open before. Thus, the tether band is further advantageous in that it facilitates a security mechanism indicating if the food package has been open before. Hence, the tether band has tether band functions and tamper-evidence functions. The tether band is a tether band and a tamper-evidence band.

[0050] According to a fourth aspect it is provided a food package for holding a food product, the food package comprising a neck and cap arrangement according to the second aspect, and a carton-based body for holding the food product and to which the neck and cap arrangement is attached for closing the food package.

[0051] Effects and features of the second, third and fourth aspects are largely analogous to those described above in connection with the first aspect.

[0052] Still other objectives, features, aspects and advantages will appear from the following detailed description as well as from the drawings.

Brief Description of the Drawings

[0053] Embodiments will now be described, by way of example, with reference to the accompanying schematic drawings, in which

Fig. 1 is a schematic view of a food package having a cap and neck arrangement.
Fig. 2 is a schematic side view of a neck for a food package.
Fig. 3 is a cross-sectional view of the neck as shown in Fig. 2.
Fig. 4 illustrates the neck as shown in Fig. 3 in further detail.
Fig. 5 is a schematic side view of a neck and cap arrangement for a food package, wherein the cap is in a closed position.
Fig. 6 is a cross-sectional view of the neck as shown in Fig. 5.
Fig. 7 is a schematic back view of the neck and cap arrangement as shown in Figs 5-6.
Fig. 8 is a schematic side view of the neck and cap arrangement, wherein the cap is in an open position.
Fig. 9 is a cross-sectional view of the neck and cap arrangement as shown in Fig. 8.
Fig. 10 is a schematic side view of the neck and cap arrangement as shown in Fig. 8, where the cap has been removed.
Fig. 11 is a perspective view of the neck and cap arrangement.
Fig. 12 is a schematic view of a variant of the neck and cap arrangement.
Fig. 13-16 are schematic views of a variants of cap parking protrusions arranged on a neck.

Detailed description

[0054] With reference to figure 1, a food package 10 for holding a food product is illustrated by way of example. The food package 10 has a shape of a bottle formed by a carton-based body 11, which is preferably made of a carton-based laminate, and a top portion 12. The carton-based body 11 is for holding the food product. The top portion 12 may, as shown in figure 1, comprise a shoulder section 13. The food package 10 also comprises a neck 20. The neck 20 may be integrally formed with the top portion 12, such that the entire top portion 12, including the neck 20, may be provided as one piece through molding or as two separate pieces which are molded together. The neck 20 is discussed in further detail in connection with figures 2-4. The food package 10 further comprises a cap 30 being arranged onto the neck 20 for closing the food package 10. The neck 20 and the cap 30 form a neck and cap arrangement 500 for closing the food package 10. The neck and cap arrangement is discussed in further detail in connection with figures 5-12.

[0055] With reference to figures 2-4, the neck 20 as introduced in connection with figure 1, is illustrated in

further detail. In figures 2-3, the neck 20 is attached to the top portion 12 of the food package 10. Figure 2 illustrates a side view of the neck 20. Figure 3 illustrates a cross-sectional view of the neck 20 as shown in figure 2. Figure 4 illustrates the neck 20 in further detail.

[0056] The neck 20 comprises a main body 200. The main body 200 comprises an upper part 210 and a lower part 220. The lower part 220 is attached to the top portion 12 of the food package 10. The upper part 210 is formed as a spout providing for that the food product may be poured from the food package in an easy and controllable way.

[0057] The main body 200 further comprises a neck wall 230 which extends between the upper part 210 and the lower part 220 along a main axis A. As best illustrated in figure 4, the neck wall 230 has a wall thickness WT along a direction R transverse to the main axis A. The wall thickness is 0.55 mm. Other thicknesses such as 0.25-1.0 mm, preferably 0.4-0.6 mm, may be used to advantage.

[0058] The neck wall 230 comprises an outside surface 235 and an inside surface 236 (see figure 11). The outside surface 235 of the neck wall 230 is provided with cap parking protrusions 231. In the illustrated embodiment the cap parking protrusions 231 have the form of elongated ribs 231. In figure 4, the outside surface 235 of the neck wall 230 is provided with five ribs 231. The outside surface 235 is preferably arranged with at least three ribs 231.

[0059] As best illustrated in figure 4, each rib 231 has a rib extension RE in the direction R transverse to the main axis A. Preferably, the ribs 231 have a similar rib extension RE. The rib extension RE is less than 20% of the wall extension WE. Other rib extensions RE such as a rib extension RE less than 50%, preferably less than 30%, of the wall extension WE may be used to advantage. The rib extension RE is 0.1 mm. Other rib extensions RE such as a rib extension of 0.05-0.20 mm, more preferably 0.08-0.12 mm, may be used to advantage. Each rib 231 has a rib thickness RT in a direction D being parallel to the main axis A. Preferably, the ribs 231 have a similar rib thickness TE. The rib thickness RE is 0.34 mm. Other rib thicknesses RT such as a rib thickness of 0.20-0.50 mm, more preferably 0.30-0.40 mm, may be used to advantage. The ribs are separated by a rib distance RD. The rib distance RD is 0.3 mm. Other rib distances such as a rib distance of 0.1-0.5 mm may be used to advantage.

[0060] The ribs 231 are arranged with a center to center distance CD, along the main axis A of 0.6 mm. Other distances such as a center to center distance CD of 0.4-0.8 mm may be used to advantage.

[0061] Referring back to figure 2, the ribs 231 are arranged in parallel to each other. The ribs 231 extends around the circumference of the neck wall 230. The ribs 231 extend in the direction R transverse to the main axis A.

[0062] The outside surface 235 of the neck wall 230 is further provided with external threads 232. The external threads 232 are for engaging the cap 30, when the cap 30 is in a closed position. This is further illustrated in connection with figures 5-7.

[0063] As best illustrated in figure 4, the external threads 232 have an external thread extension ETE in the direction R transverse to the main axis A. The external thread extension ETE is 0.55 mm. Other extensions such as an external thread extension ETE of 0.35-0.75 mm may be used to advantage. The rib extension RE is less than 10% of the external thread extension ETE in the direction R transverse to the main axis A. Other rib extensions RE such as a rib extension less than 50%, preferably less than 15%, of the external thread extension ETE may be used to advantage. The external threads 232 have an external thread thickness ETT in the direction D being parallel to the main axis A. The external thread thickness is about 0.8-0.9 mm.

[0064] Referring back to figures 2 and 3, the outside surface 235 of the neck wall 230 is further provided with a tether band holding portion 233. The tether band holding portion 233 is configured to hold the cap to the neck 30 via a tether band 331 which is discussed in further detail in connection with figures 5-11. The tether band holding portion 233 has a form of a flange. The flange extends around the main body 200. The ribs 231 are arranged between the flange and the upper part of the main body 200 as seen along the main axis A. The external threads 232 are arranged between the flange and the upper part 210 of the main body 200 as seen along the main axis A. The flange has a flange extension FE in the direction R transverse to the main axis A. The flange extension FE is 0.4 mm. Other extensions such as a flange extension FE of 0.2-0.6 mm may be used to advantage. The rib extension RE is less than 10% of the flange extension in the direction R transverse to the main axis A. Other rib extensions RE such as a rib extension less than 50%, preferably less than 25%, of the flange extension FE may be used to advantage. The flange has an flange thickness FT in the direction D being parallel to the main axis A. The flange thickness is about 0.8-0.9 mm.

[0065] With reference to figures 5-11, a neck and cap arrangement 500 is illustrated by way of example. The neck and cap arrangement 500 comprises the neck 20 as discussed in connection with figures 2-4 and the cap 30 as introduced in connection with figure 1.

[0066] With reference to figures 5-7, the cap 30 is in a closed position, closing the upper part 210 of the neck 20 of the food package. When the cap 30 is in the closed position, the cap 30 is arranged on the main body 200 and closing the upper part 210 of the main body 200. Figure 5 illustrates a side view of the neck and cap arrangement 500. Figure 6 illustrates a cross-sectional view of the neck and cap arrangement 500. Figure 7 illustrates a back view of the neck and cap arrangement 500. With reference to figures 8-11, the cap 30 is in an open position. When the cap 30 is in the open position,

the cap 30 is removed from the upper part 210 of the main body 200. The open position of the cap 30 is for allowing the food product to be poured from the food package 10. Figure 8 is a schematic side view of the neck and cap arrangement 500. Figure 9 is a cross-sectional view of the neck and cap arrangement 500. Figure 10 is a side view of the neck and cap arrangement 500 as shown in figure 8, wherein the cap 30 has been removed. Figure 11 is a perspective view of the neck and cap arrangement 500.

[0067] The cap 30 comprises a top 310 and a cap wall 320. The top 310 is configured to close the upper part 210 of the neck 20. The cap wall 320 extends from the top 310 along the main axis A. When the cap 30 is closing the neck 20, the cap wall 320 surrounds the neck wall 230. The cap wall 320 has a cap end edge 321 located opposite the top 310. The cap wall 320 further comprises a lower edge 322 forming a part of the cap end edge 321. The lower edge 322 is configured to be in contact with the ribs 231 when the cap 30 is in the open position, as best illustrated in figures 8-11. The lower edge is arranged between adjacent ribs 231 in order to keep the cap 30 in place in relation to the neck 20 when the cap 30 in in the open position.

[0068] The cap 30 further comprises a tether band 330. The tether band 330 is configured to connect the cap 30 to the tether band holding portion 233, as best illustrated in figure 9. This facilitates that the cap 30 is secured to the neck 20 when the cap 30 is in the open position as illustrated in figures 8-11. The tether band 330 has a top edge 331a and a bottom edge 331b. The top edge 331a is attached to the cap end edge 321. The bottom edge 331b is located opposite the top edge 331a as seen along the main axis A. The tether band 330 is configured to secure the cap 30 to the neck 20 when at least a part of the attachment of the tether band 330 to the cap edge end 321 is broken. The tether band 330 is further configured to pull the lower edge 322 of the cap wall 320 into contact with the ribs 231 of the neck wall 230 when the cap 30 is in the open position, as illustrated in figures 8-10.

[0069] The cap 30 further comprises a first cut 334. The first cut 334 is located between the cap end edge 321 and the top edge 331a of the tether band 330. The first cut 334 forming a part of the attachment between the cap end edge 321 and the top edge 331a. The first cut 334 extends along at least 270 degrees of a circumference of the tether band 330. The cap 30 further comprises a non-cut part 335 located between the cap end edge 321 and the top edge 331a of the tether band 330. The non-cut part 335 is located along the circumference of the tether band 330 wherein the first cut 334 is not located. The non-cut part 335 is located at the lower edge 322 of the cap 30. Thus, the first cut 334 extends from a first side of the lower edge 322, along the circumference of the tether band 330, to a second, opposite, side of the lower edge 322. Hence, the first cut 334 and the non-cut part 335 together extend around the complete circumference of the cap 30. As best illustrated in figures 8-10, when the cap 30 is in the open position, the first cut 334 separating the cap end edge 321 from the tether band 330 along at least 270 degrees of the circumference of the tether band 330. The first cut 334 of the cap 30 is made by one of more breakable bridges configured to break and thereby separate the cap end edge 321 and the top edge 331a when the cap 30 is moved into the open position. The first cut 334 forms a tamper-evidence means of the tether band 330 indicating if the cap 30 has been open before, i.e. if the first cut 334 is broken.

[0070] The cap 30 further comprises a second cut 336. The second cut 336 is located between at least a portion of the first cut 334 and the bottom edge 331b of the tether band 330. The second cut 336 extends along 90-270 degrees, preferably 180 degrees as illustrated in figures 8-11, of the circumference of the cap 30. The cap 30 further comprises a non-cut part 337 located between at least a portion of the first cut 334 and the bottom edge 331b of the tether band 330. The non-cut part 337 is located along the circumference of the tether band 330 wherein the second cut 336 is not located. Hence, the second cut 336 and the non-cut part 337 together extend around the complete circumference of the cap 30.The second cut 335 forms a further tamper-evidence means of the tether band 330 similar to the tamper-evidence means as discussed in connection with the first cut 334.

[0071] The second cut 336 forming a first tether band portion 330a and a second tether band portion 330b of the tether band 330. As best illustrated in figures 8-11, when the cap 30 is in the open position, the second cut 336 is separating the first and second tether band portions 330a, 330b from a ring-shaped section 338 of the tether band 330. The ring-shaped section 338 is connected to the tether band holding portion 233 configured to keep the cap 30 in place when the cap 30 is in the open position. Hence, when the cap 30 is in the open position, the second cut 336 is configured to separate at least the portion of the first cut 334 and the bottom edge 331b of the tether band 330, thereby the tether band portions 330a, 330b are separated from the ring-shaped section 338. With reference to figure 10, the tether band portions 330a, 330b and the ring-shaped section 338 are separated by an angle α between 0-30 degrees. In addition to the angle α, figure 10 illustrates the similar features as disclosed in figure 8, except the cap 30 which is excluded in figure 10 in order to being able to indicate the angle α in an illustrative way. When the cap 30 is in the open position, the first and second tether band portions 330a, 330b are twisted in order to arrange the cap 30 between the adjacent ribs 231.

[0072] The first and second tether band portions 330a, 330b extends from the lower edge 322 of the cap wall 320.

[0073] The tether band 330 further comprises a further portion 339 extending from the respective tether band portion 330a, 330b, as seen in the direction R transverse to the main axis A, along the circumference of the cap 30 where the tether band portions 330a, 330b are not

located.

[0074] The first and second tether band portions 330a, 330b are connected to and extend, as seen along the direction R transverse to the main axis A when the cap is in the closed position, on opposite sides of the lower edge 322 to opposite sides of the further portion 339 of the tether band 330.

[0075] The tether band portions 330a, 330b are connected to, at a first side, the ring-shaped section via the second cut 336. The tether band portions 330a, 330b are connected to, at a second side, the cap 30 via the first cut 334. The second side is opposite the first side as seen along the main axis A.

[0076] Hence, the first and second tether band portions 330a, 330b, the ring-shaped section 338 and the further portion 339 forms the tether band 330.

[0077] Preferably, the cap is injection molded integrally with the tether band, which is coaxially connected to the cap itself by means of a plurality of breakable bridges, e.g. the first and second cuts. The first and second cuts 334, 336 may be formed by a knife configured to form the breakable bridges.

[0078] With reference to figure 11, further to what have been discussed above, the cap 30 of the neck and cap arrangement 500 further comprises internal threads 323. The internal threads 323 are configured to engage the external threads 232 of the neck 20 when the cap 30 is in the closed position.

[0079] With reference to figure 12, a variant of a neck and cap arrangement 1200 is illustrated by way of example. The neck and cap arrangement 1200 is for closing a food package 10'. The neck and cap arrangement 1200 comprises a neck 20' and a cap 30'. The neck 20' may be similar as the neck 20 discussed in connection with figures 2-4 above. The cap 30' may have similar features as the cap 30 discussed in connected with figures 5-11 above but is a flip type cap instead of e.g. a screw cap.

[0080] The neck 20' comprises a main body 200'. The main body 200' has an upper part 210' and a lower part 220'. The upper part 210' is configured to be closed with the cap 30'. The lower part 220' is configured to be attached to the food package 10'.

[0081] The neck 20' further comprises a neck wall 230' extending between the upper part 210' and the lower part 220' along a main axis A. The neck wall 230' comprises a tether band holding portion 233' configured to hold the cap 30' to the neck 20' via a tether band 330'. The neck wall 230' having an outside surface 235' and an inside surface (not illustrated). The outside surface 235' is provided with ribs 231'.

[0082] Although not illustrated, the neck wall 230' has a wall thickness WT along a direction transverse to the main axis A. The ribs 231' have an extension in a direction R transverse to the main axis A. The rib extension RE is preferably less than 50% of the wall thickness WT. The wall thickness WT and the rib extension RE are similar to the wall thickness WT and rib extension RE as discussed in connection with figure 4.

[0083] The cap 30' comprises a top 310' and a cap wall 320'. The top 310' is configured to close the upper part 210' of the neck 20'. The cap wall 320' extends from the top 310' along the main axis A.

[0084] The cap 30' further comprises a tether band 330'. The tether band 330' is configured to connect the cap 30' to the tether band holding portion 233' of the neck 20'. Thereby, the cap 30' is secured to the neck 20' when the cap 30' is in an open position as illustrated in figure 12. The tether band 330' is further configured to pull a lower edge 322' of the cap wall 320' into contact with the ribs 231 of the neck wall 230' when the cap 30' is in the open position. Thereby, the cap 30' is kept in place when in the open position.

[0085] In addition to what is discussed in connection with and illustrated in figure 12, the neck and cap arrangement 1200 as shown in figure 12 may comprises the similar features and effects as discussed in connection with figures 2-11 above.

[0086] The ribs 231 must not extend around the entire circumference of the neck 20. It suffice if they extend with a small angle, e.g. about 15° of the circumference of the neck. In this case, in order to maintain the cap 30 in an open position, a user might have to rotate that cap 30 such that it is positioned with its lower edge 322 in contact with the ribs 231.

[0087] The ribs 231 may be located above band holding portion 233 and below an uppermost part of the threads 232.

[0088] With reference to figure 13, a variant of cap parking protrusions 2311, herein referred to as ribs 2311, are illustrated by way of example. The ribs 2311 extend in a longitudinal direction along the outside surface of the neck wall, just like the previously described ribs. The extension in the longitudinal direction has a component that extends in a direction H that is transverse to the main axis A of the neck. The extension in the longitudinal direction has also a component that extends in a direction V that is parallel to the main axis A. This means that the ribs 2311 may be, as illustrated, slanted relative the main axis A of the neck. Even though the ribs 2311 are slanted, tests have shown that they can be used for holding a cap in the open position. The ribs 231, 231' of the previous figures extend only with a component in the direction H that is transverse to the main axis A of the neck. This is the only difference between the ribs in the previous figures and the ribs 2311 of figure 13.

[0089] When the neck 20 is arranged upright, then the main axis A is parallel to the vertical direction. The ribs 231 of figure 2 are then protruding out from the neck 20, in the horizontal direction, and have a longitudinal extension that is parallel to the horizontal direction. The ribs 2311 of figure 13 are also protruding out from the neck 20, in the horizontal direction, and have an extension with one component that is parallel to the horizontal and another component that is parallel to the vertical direction, i.e. the ribs 2311 are slanted relative the horizontal direction.

[0090] Some ribs may be slanted while others may be transverse to the main axis A. Some or all ribs may be parallel to each other.

[0091] With reference to figure 14, a variant of cap parking protrusions 2312 is illustrated by way of example. The cap parking protrusions 2312 have the form of broken ribs, where sections of the ribs extend along the outside surface 235 of the neck wall. Figure 15 shows a similar variant, where the ribs 2313 are broken at such close intervals that the ribs 2313 are made up of dot-shaped sections.

[0092] With reference to figure 16, another variant of cap parking protrusions 2314 is illustrated. Here the cap parking protrusions 2314 are individual protrusions that extend along the outside surface 235 of the neck wall. These protrusions 2314 have the same extension in the direction transverse to the main axis as the other embodiments of cap parking protrusions. The cap parking protrusions 2314 cover the same area as the other variants of protrusions and are so closely arranged that the lower edge 322 of the cap 30 come in contact with the ribs protrusions 2314, such that it may be efficiently parked.

[0093] Basically, any protrusions capable of accomplishing sufficient friction for the lower edge of the cap can be used, where the friction ensures that the lower edge of the cap does not slide relative the neck when the cap is in the open position.

[0094] Herein, "cap parking protrusions" may be understood as areas on the neck wall that extends in the direction transverse to the main axis, above (further out from) those areas of the neck wall that are directly adjacent to the cap parking protrusions. Thus, the cap parking protrusions may be formed by arranging indentations or grooves in the neck wall, where the hills adjacent to the indentations or grooves form the cap parking protrusions.

[0095] All ribs described herein may have the same extension in the direction transverse to the main axis. They may all extend around the circumference of the neck wall, have the same thickness, extend in a longitudinal direction along the outside surface of the neck wall, have extension components both transverse and parallel to the main axis of the neck, and may be located at the same position(s) on the neck. They thus share the same features and may be combined with each other. Basically, the only difference between the different cap parking protrusions is the specific shape they have on the neck, as illustrated e.g. in figures 2 and 13 to 15.

[0096] One, some or all of the parking protrusions described above is, in an embodiment, not a thread, not a tamper band holding portion, and/or not a tether band holding portion.

[0097] From the description above follows that, although various embodiments of the invention have been described and shown, the invention is not restricted thereto, but may also be embodied in other ways within the scope of the subject-matter defined in the following claims.

Claims

1. A neck (20) for a food package (10), the neck (20) comprising

   a main body (200) having an upper part (210) configured to be closed with a cap (30), a lower part (220) configured to be attached to the food package (10), and a neck wall (230) extending between the upper part (210) and the lower part (220) along a main axis (A) of the neck (20), the neck wall (230) having a wall thickness (WT) along a direction (R) transverse to the main axis (A), and a tether band holding portion (233) configured to hold the cap (30) to the neck (20) via a tether band (330), wherein
   an outside surface (235) of the neck wall (230) is provided with cap parking protrusions (231), the cap parking protrusions (231) having an extension (RE) in the direction (R) transverse to the main axis (A) which is less than 50% of the wall thickness (WT).

2. The neck (20) according to claim 1, wherein the cap parking protrusions (231) are arranged with a center to center distance (CD), along the main axis (A), of 0.4-0.8 mm.

3. The neck (20) according to claim 1 or 2, wherein the extension (RE) of the cap parking protrusions (231) is 0.05-0.6 mm, 0.05-0.4 mm or 0.05-0.20 mm.

4. The neck (20) according to any one of the preceding claims, wherein the outside surface (235) of the neck wall (230) is provided with at least three cap parking protrusions (231).

5. The neck (20) according to any one of the preceding claims, wherein the cap parking protrusions (231) extend around the circumference of the neck wall (230).

6. The neck (20) according to any one of the preceding claims, wherein the cap parking protrusions (231) have a thickness (RT) of 0.20-0.50 mm in a direction (D) being parallel to the main axis (A).

7. The neck (20) according to any one of the preceding claims, wherein the outside surface (235) of the neck wall (230) is provided with external threads (232) for engaging the cap (30), wherein the cap parking protrusions (231) are arranged between the external threads (232).

8. The neck (20) according to claim 7, wherein the external threads (232) have an external thread extension (ETE) in the direction (R) transverse to the main axis (A), wherein the extension (RE) of the cap park-

ing protrusions (231) is less than 50% of the external thread extension (ETE).

9. The neck (20) according to any one of the preceding claims, wherein the tether band holding portion (233) has a form of a flange (233) extending around the main body (200), wherein the cap parking protrusions (231) are arranged between the flange (233) and the upper part (210) of the main body (200), as seen along the main axis (A).

10. The neck (20) according to claim 9, wherein the flange (233) has a flange extension (FE) in the direction (R) transverse to the main axis (A), wherein the extension (RE) is less than 25% of the flange extension (FE).

11. A neck and cap arrangement (500) for closing a food package (10), the neck and cap arrangement (500) comprising

a neck (20) according to any one of the preceding claims, and
a cap (30) configured to be arranged on the neck (20), the cap (30) comprising a top (310) configured to close the upper part (210) of the neck (20), a cap wall (320) extending from the top (310), and a tether band (330) configured to connect the cap (30) to the tether band holding portion (233) of the neck (20) such that the cap (30) is secured to the neck (20) when the cap (30) is in an open position, wherein
the tether band (330) is configured to pull a lower edge (322) of the cap wall (320) into contact with the cap parking protrusions (231) of the neck wall (230) when the cap (30) is in the open position.

12. The neck and cap arrangement (500) according to claim 11, wherein the tether band (330) comprises a first tethered band portion (330a) and a second tethered band portion (330b) which extend from the lower edge (322) of the cap wall (320), on opposite sides of the lower edge (322) and towards the tether band holding portion (233).

13. The neck and cap arrangement (500) according to claim 11 or 12,
wherein the tether band (330) comprises a ring-shaped section (338) that is connected to the tether band holding portion (233).

14. A cap (30) configured to close a neck (20) according to any one of claims 1-10, the cap (30) comprising

a top (310) configured to close an upper part (210) of the neck (20),
a cap wall (320) extending from the top (310) and having a cap end edge (321) located opposite the top (310),
a tether band (330) having a top edge (331a) attached to the cap end edge (321) and being configured to connect the cap (30) to a tether band holding portion (233) of the neck (20) for securing the cap (30) to the neck (20) when the attachment of the tether band (330) to the cap end edge (321) is broken (30), the tether band (330) having a bottom edge (331b) located opposite the top edge (331a),
a first cut (334) located between the cap end edge (321) and the top edge (331a) of the tether band (330), the first cut (334) separating the cap end edge (321) from the tether band (330) along at least 270° of a circumference of the tether band (330), and
a second cut (336) located between at least a portion of the first cut (334) and the bottom edge (331b) of the tether band (330), the second cut (336) cutting though the tether band (330) along 90°-270° of a circumference of the tether band (330).

15. A food package (10) for holding a food product, the food package (10) comprising

a neck and cap arrangement (500) according to any one of claims 11-13, and
a carton-based body (11) for holding the food product and to which the neck and cap arrangement (500) is attached for closing the food package (10).

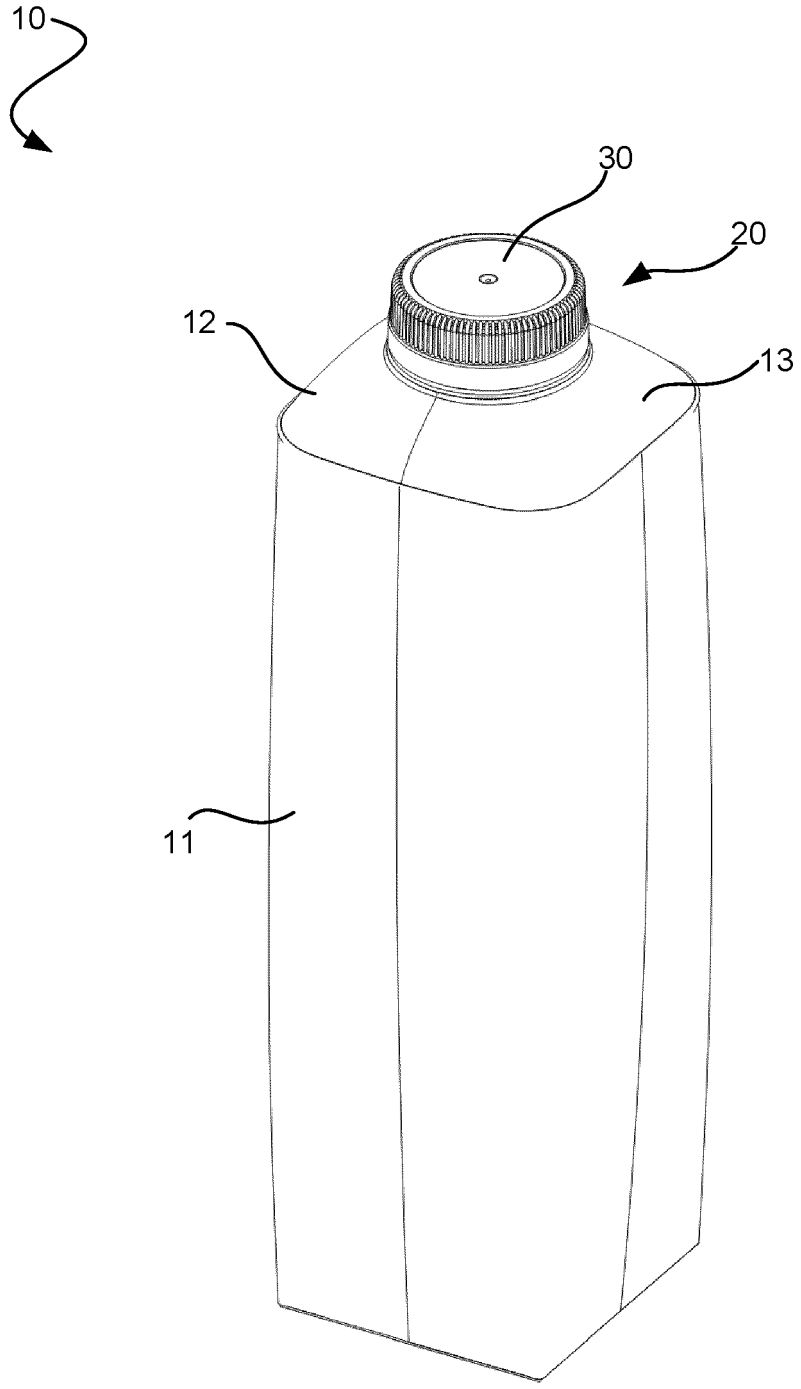
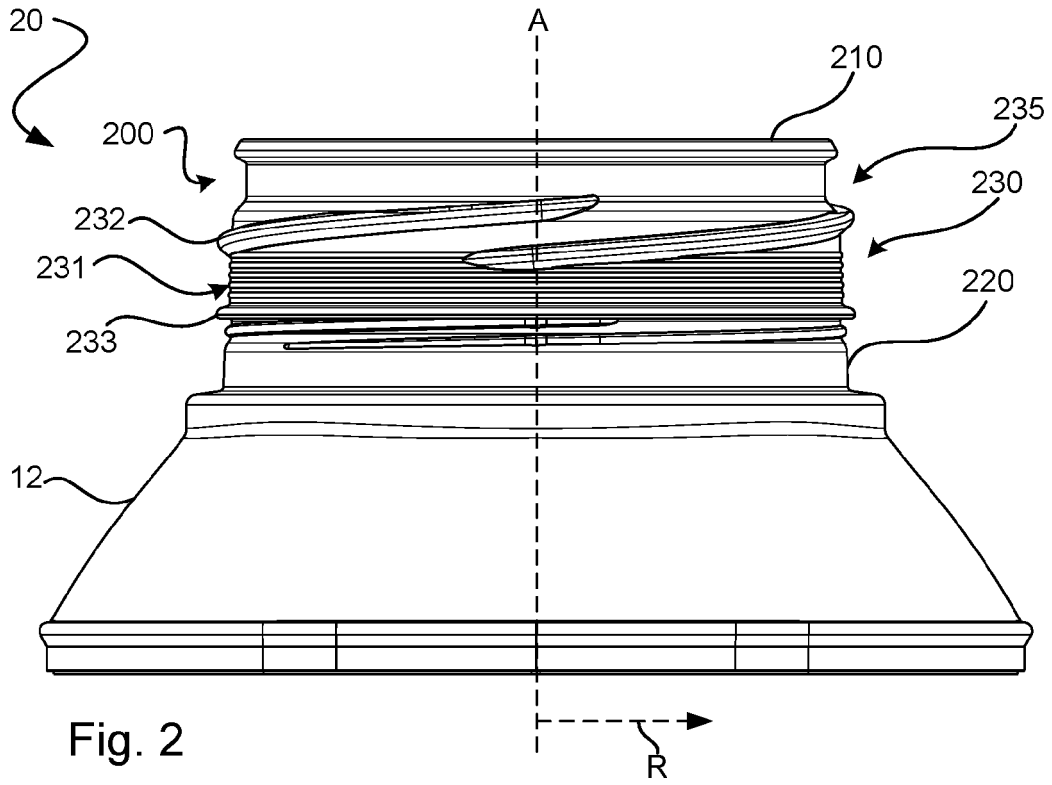


Fig. 1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235
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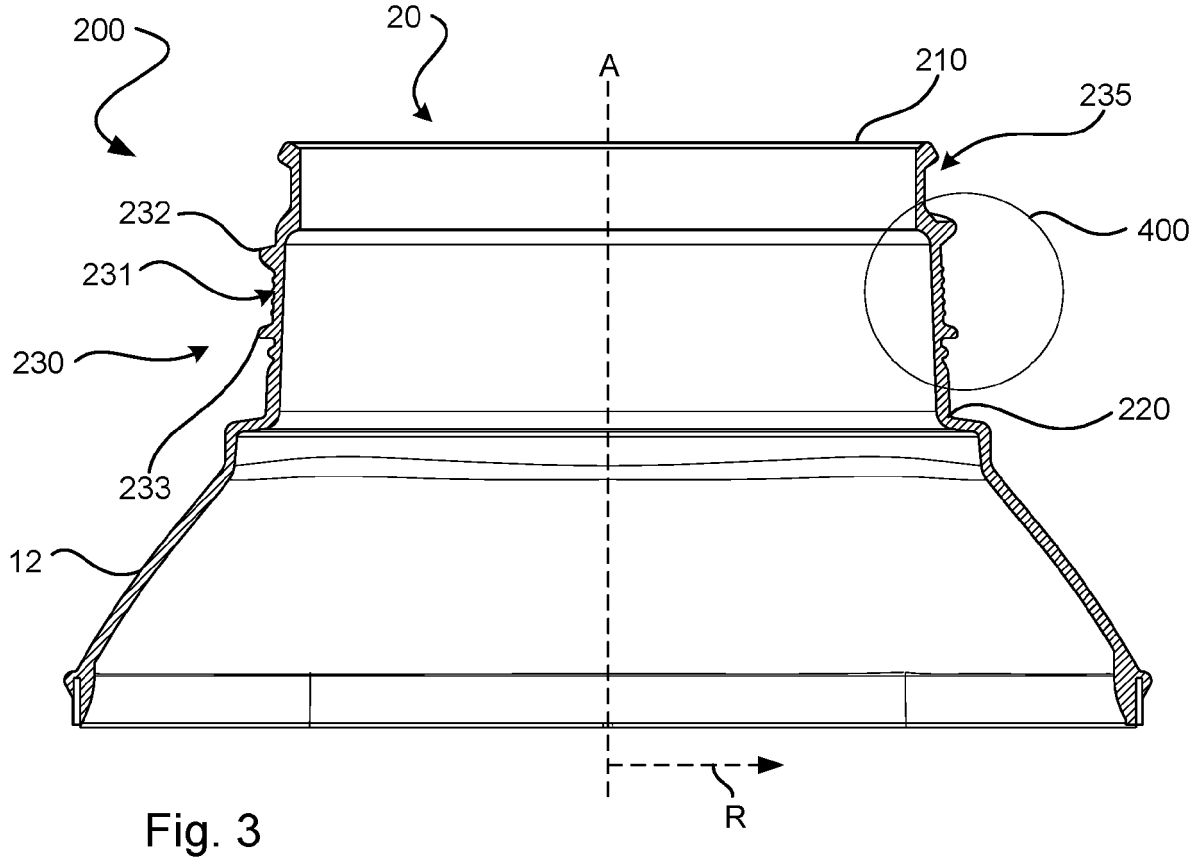
233
12
R

Fig. 2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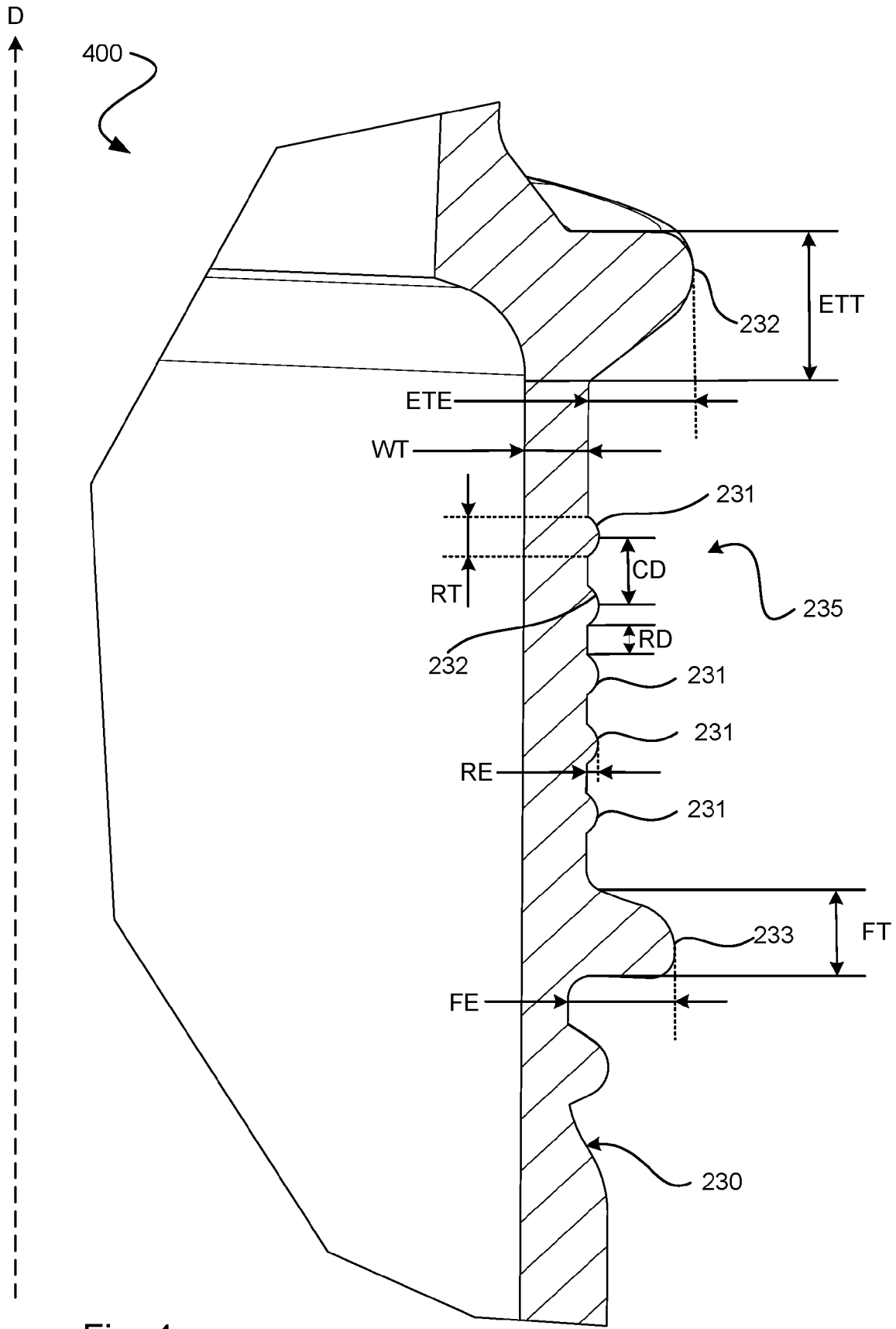
231
230
220
233
12
R

Fig. 3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ETE
WT
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CD
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RD
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RE
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FT
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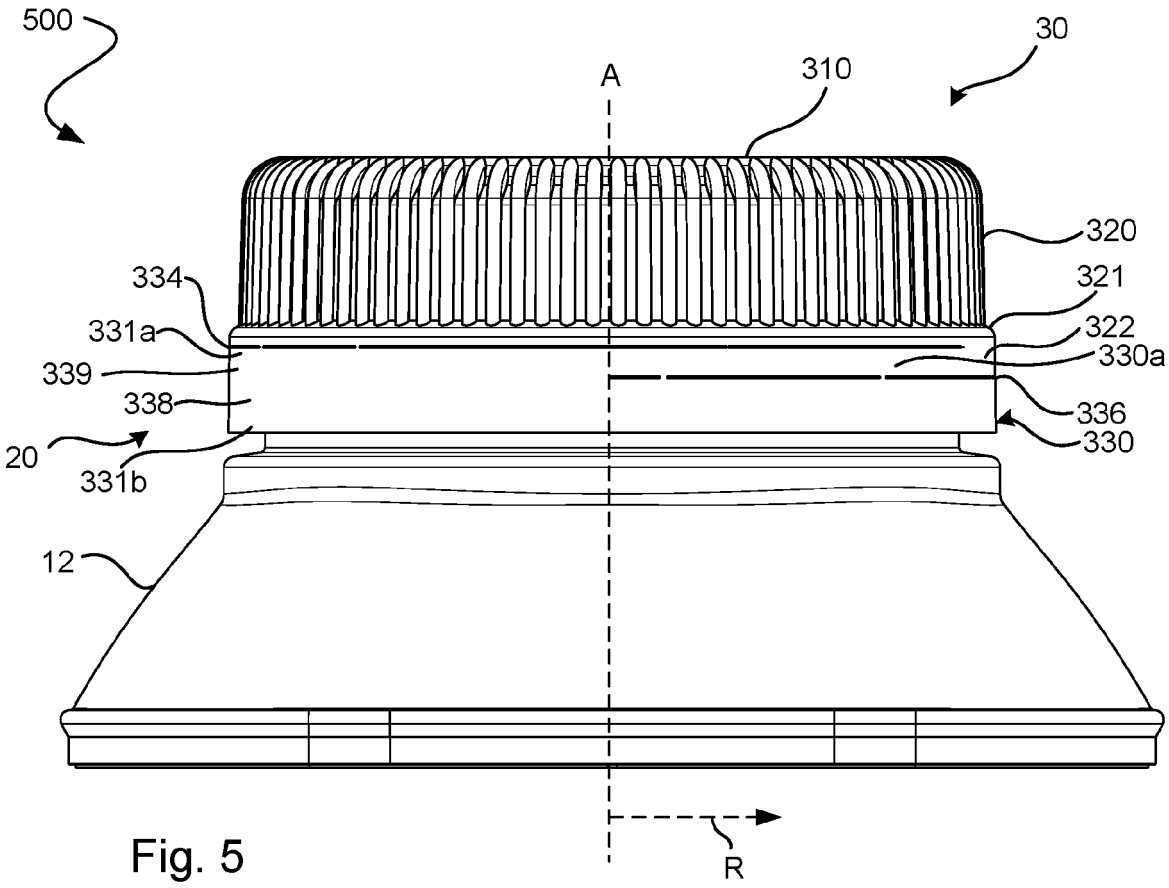
FE
230

Fig. 4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331b
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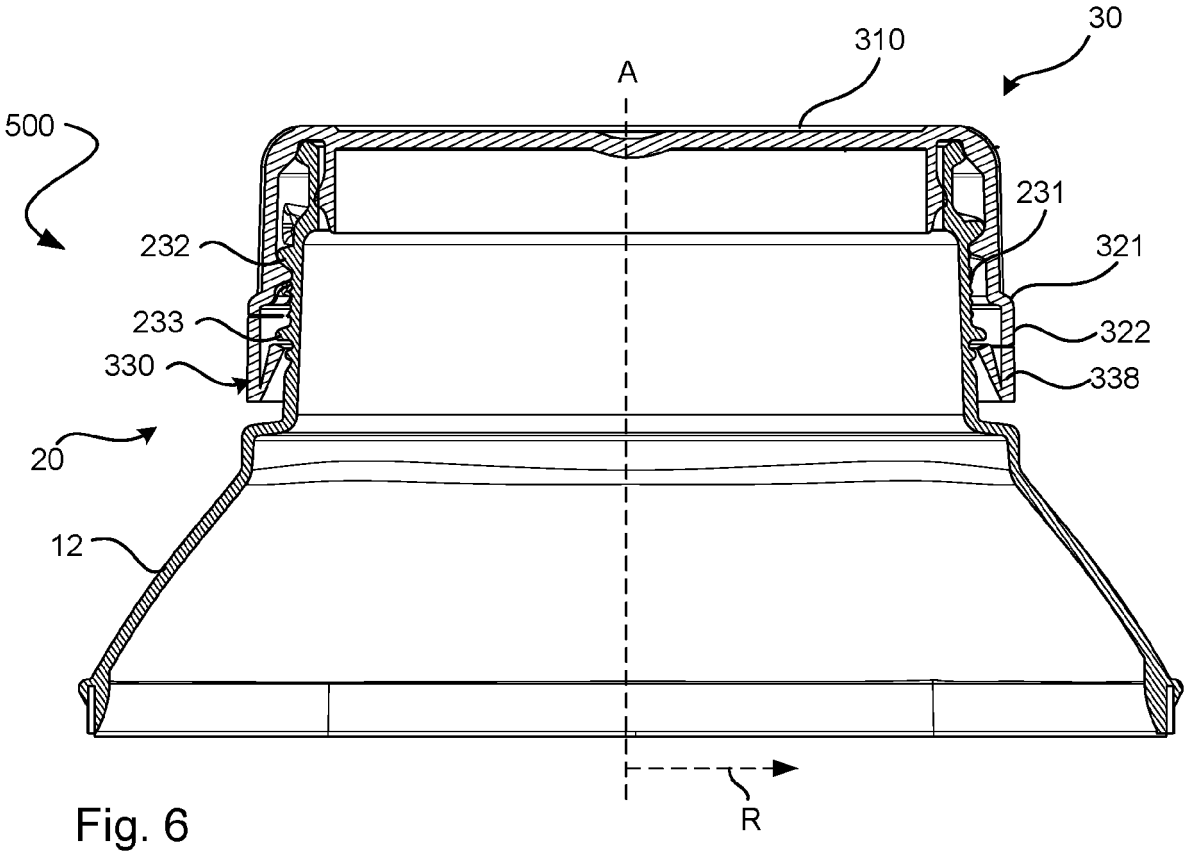
R

Fig. 5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20
12
R

Fig. 6

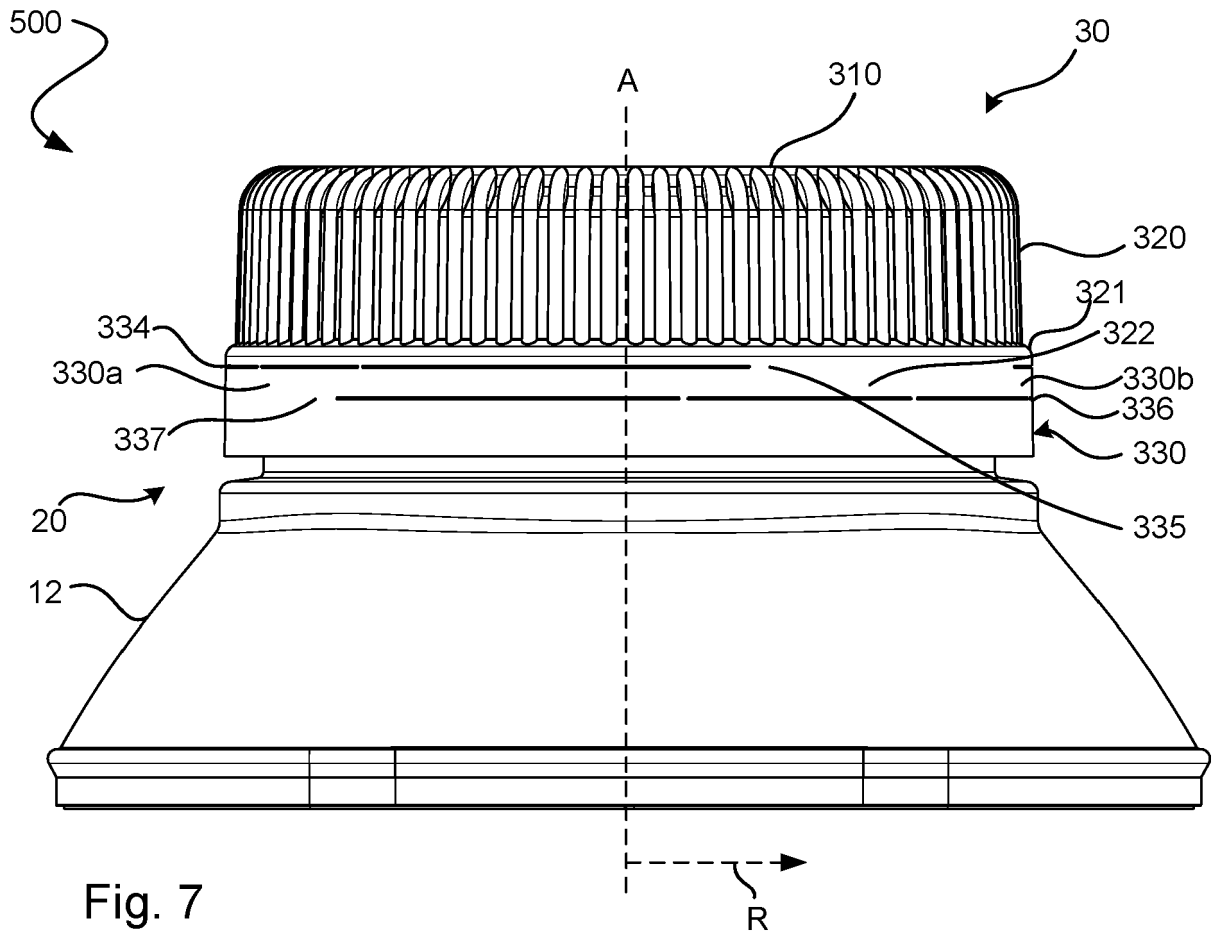
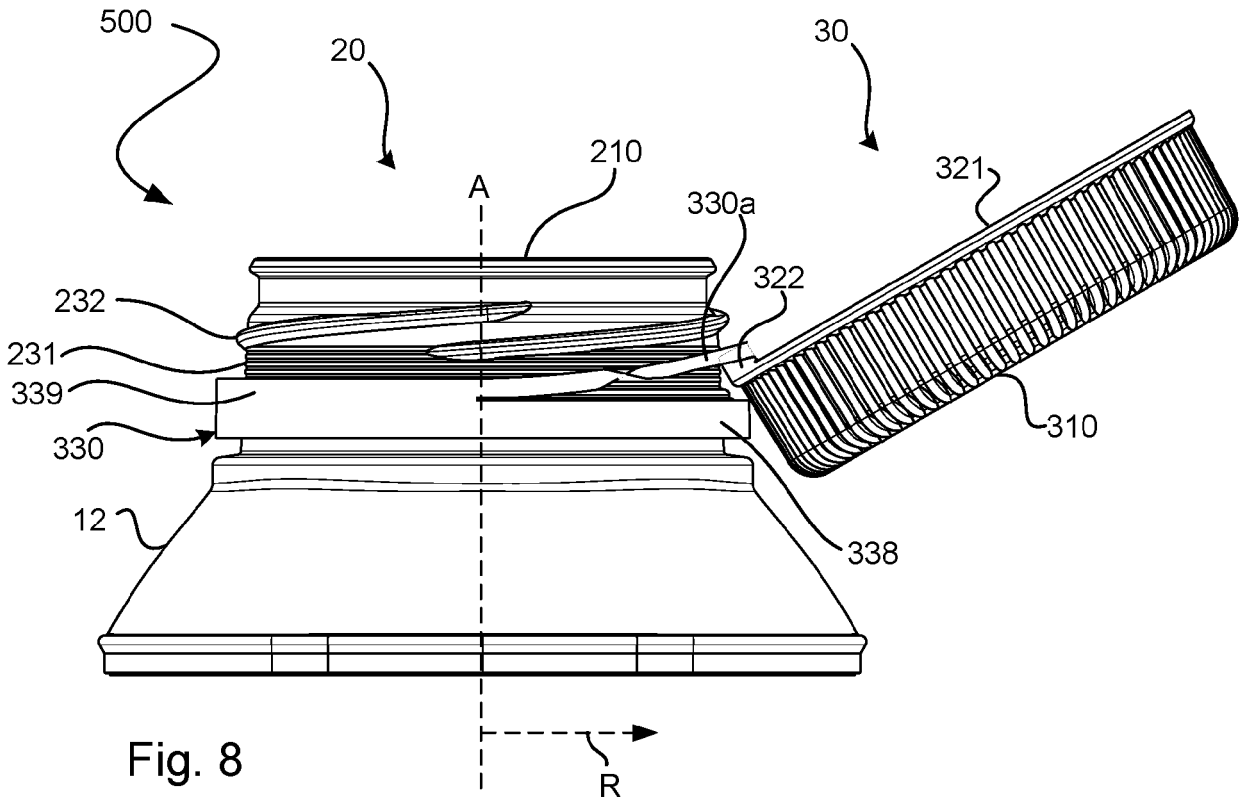


Fig. 7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330a
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232
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339
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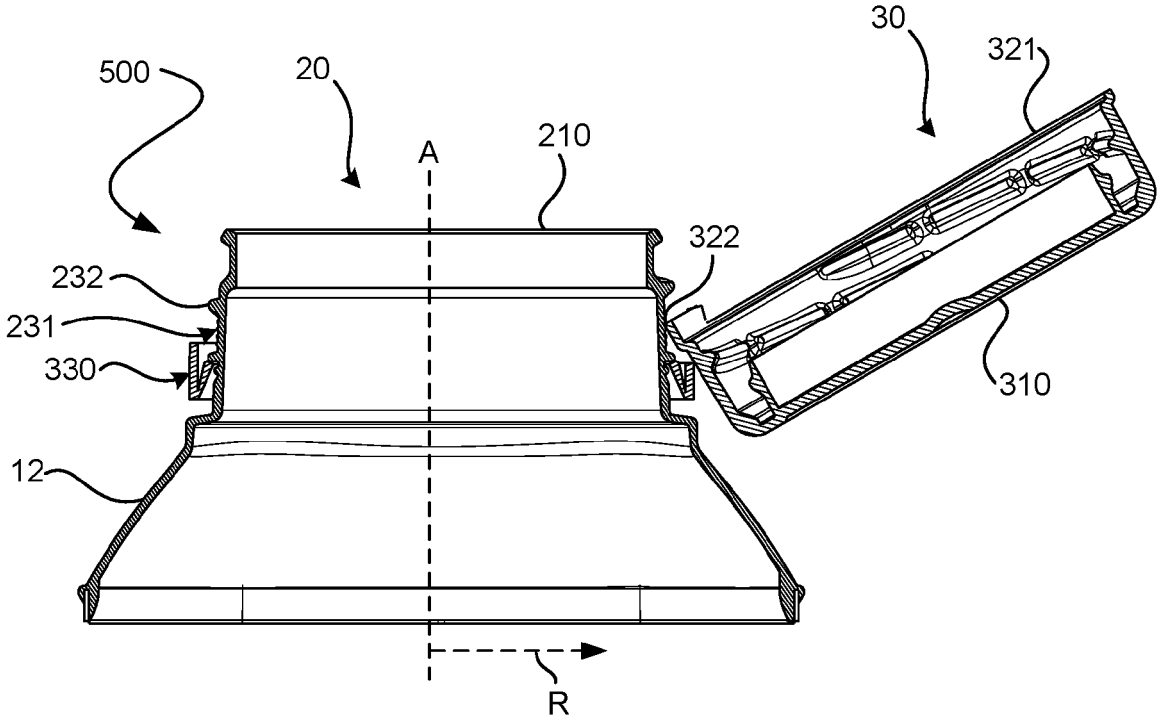
310
12
338
R

Fig. 8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322
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231
330
310
12
R

Fig. 9

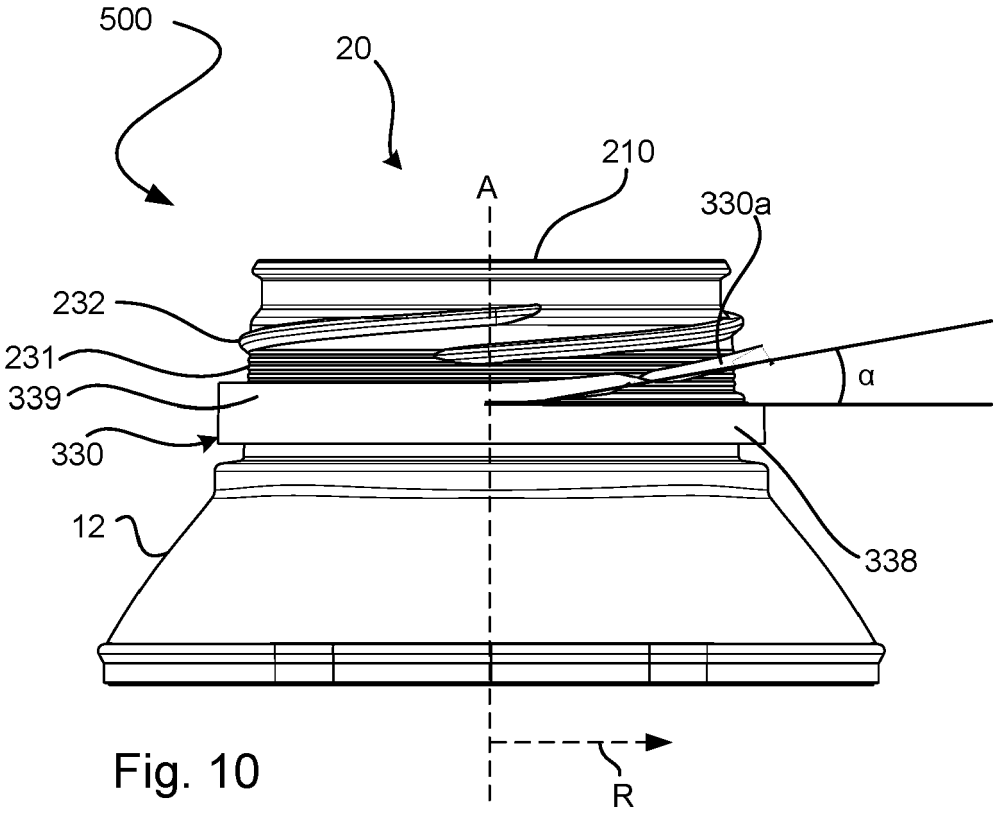

Fig. 10

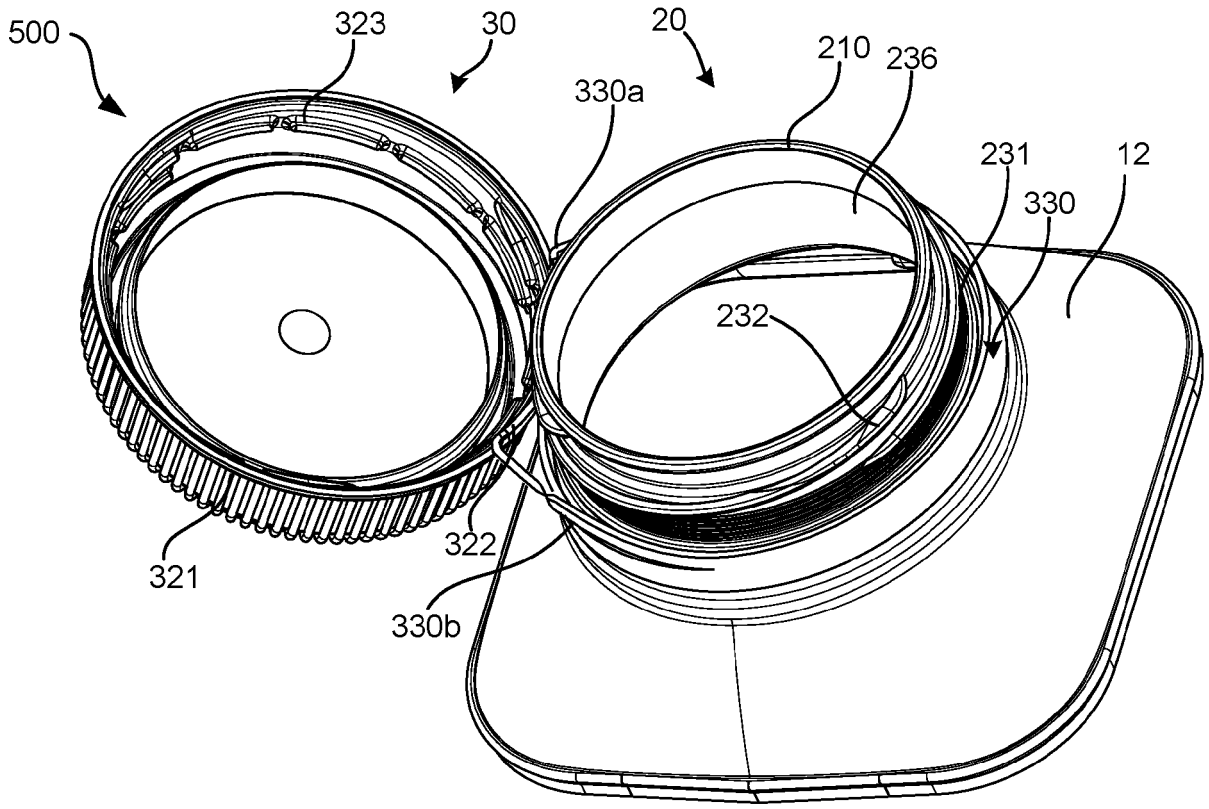

Fig. 11

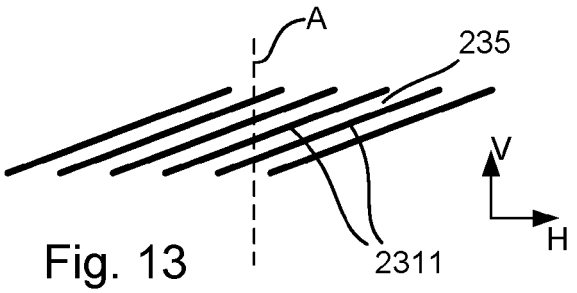

Fig. 13

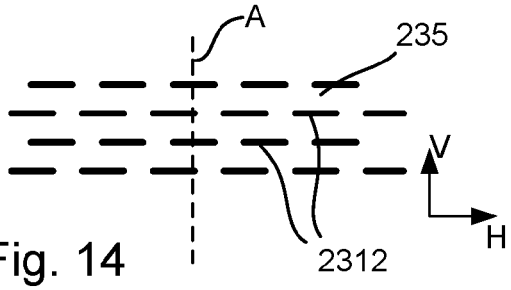

Fig. 14

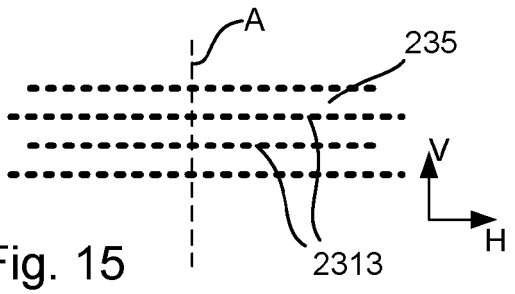

Fig. 15

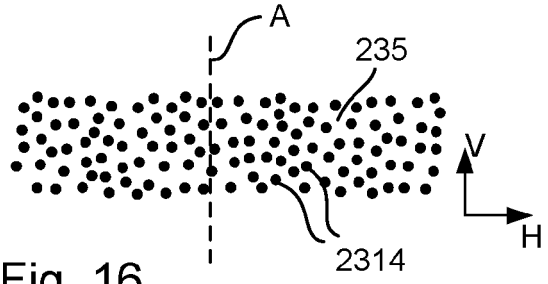

Fig. 16

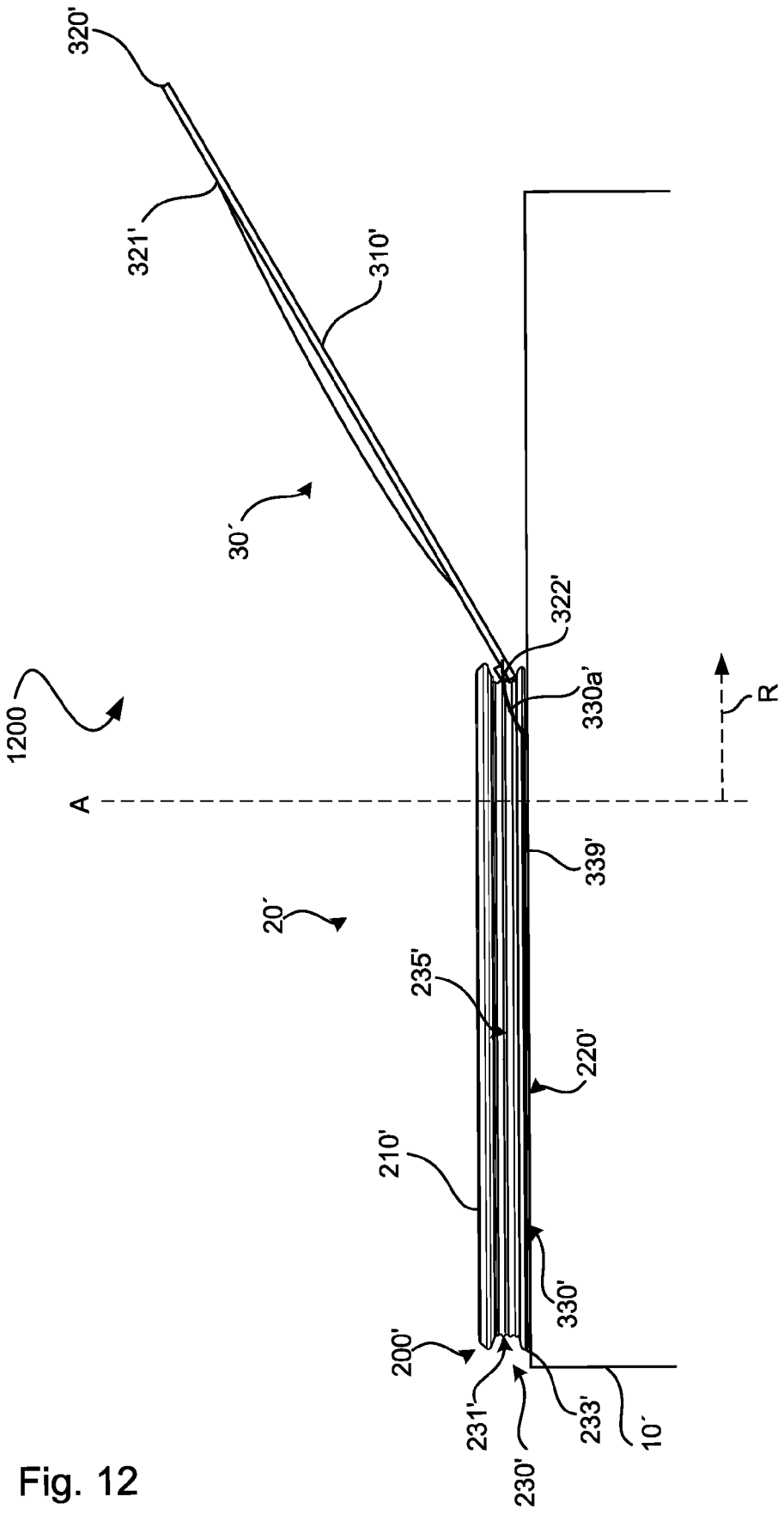
320'
321'
310'
30´
322'
330a'
1200
A
R
339'
20´
235'
220'
210'
330'
200'
231'
233'
10´
230'

Fig. 12

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 22 21 7373

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2018 128886 A1 (BERICAP GMBH & CO KG [DE]) 2 July 2020 (2020-07-02)	14	INV. B65D1/02
A	* paragraph [0073]; claims 3, 4; figures 1-4, 7, 8B *	1-13,15	B65D55/16 B65D41/34
A	KR 200 459 770 Y1 (KIM Y H) 13 April 2012 (2012-04-13) * figure 3 *	1-15	
A	CN 113 646 235 A (ALPLA WERKE ALWIN LEHNER GMBH & CO KG) 12 November 2021 (2021-11-12) * figures 7,8 *	1-15	
A	US 6 474 491 B1 (BENOIT-GONIN CLAUDE [FR] ET AL) 5 November 2002 (2002-11-05) * figure 8 *	1-15	
A	WO 2020/182852 A1 (ALPLA WERKE ALWIN LEHNER GMBH & CO KG [AT]) 17 September 2020 (2020-09-17) * figures 1-14 *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 May 2023	Tzianetopoulou, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 21 7373

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-05-2023

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