



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.09.2024 Bulletin 2024/36

(51) International Patent Classification (IPC):
B44D 3/12 (2006.01)

(21) Application number: **24160892.6**

(52) Cooperative Patent Classification (CPC):
B44D 3/12; B44D 3/127

(22) Date of filing: **01.03.2024**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

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(30) Priority: **03.03.2023 NL 2034263**

(54) **CONTAINER AND METHOD FOR MANUFACTURING SUCH CONTAINER**

(57) The invention relates to a container (2) having a container body (3) comprising:

- a bottom wall (4);
- a side wall (6) having a first end (8) that is connected to the bottom wall and that extends from the first end to an opposite, second end (10);
- an edge portion at the second end of the side wall; and
- a rim (24) that extends from the edge portion; and

wherein the edge portion, when viewed from a central container axis, comprises an outwardly directed nose-shaped portion (12). The invention further relates to a container lid and a container assembly. The invention also relates to a method for manufacturing a container according to the invention, a method for manufacturing a container lid and a method for manufacturing a container assembly.

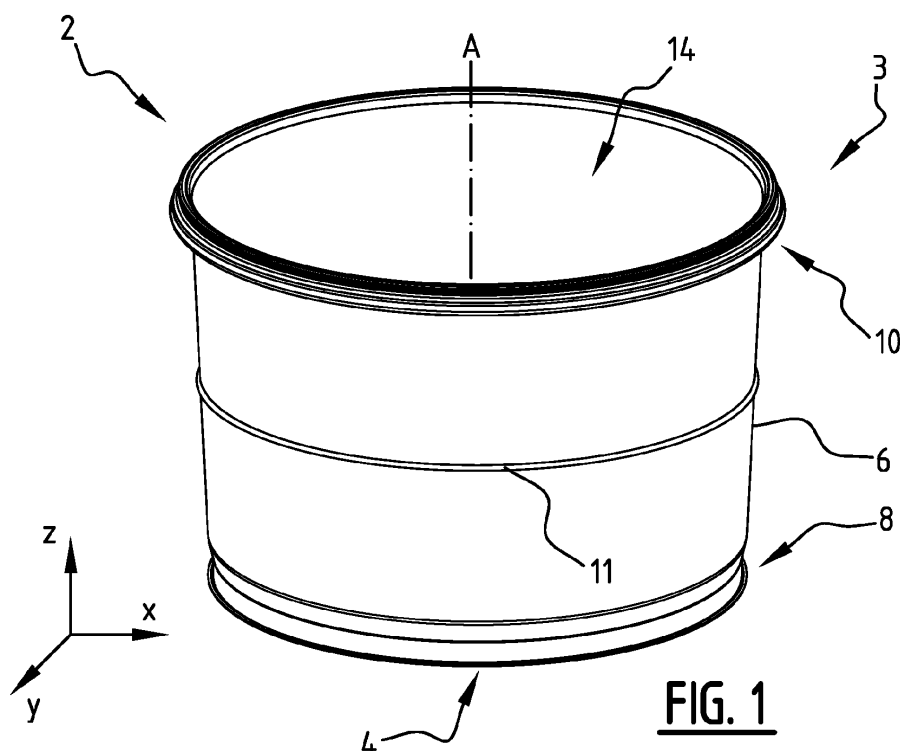


FIG. 1

Description

[0001] The invention relates to a container, in particular a paint container, and a method for manufacturing such a container. The container according to the invention is a container for holding paint, oils, resins, varnish or similar sorts of substances.

[0002] Containers for storing paint, which are also known as paint containers or paint pails, are known from practice. In general, such paint containers can be distinguished in two different types, which are plastic containers and metallic containers.

[0003] Metallic containers are mostly formed of sheet metal and include a bottom wall and a side wall extending from the bottom wall towards an edge portion that delineates an opening in the container. The edge portion is formed by a part of the side wall that is curled outwards to form a round edge on the top of the side wall. A lid, which is often a circular metallic lid, is placeable on the container to provide a sealing closure of the container.

[0004] Although this construction provides a resealable container, an associated disadvantage of the present container is that it does not sufficiently prevent accidental opening of the container. This may for example be caused by an accidental collision with another surface or container or by distortion of the container during transport.

[0005] Therefore, there is a need for an improved container that provides a decreased risk of accidental opening. The present invention is aimed at obviating or at least reducing the aforementioned problems by providing a container having a container body comprising:

- a bottom wall;
- a side wall having a first end that is connected to the bottom wall and that extends from the first end to an opposite, second end;
- an edge portion at the second end of the side wall; and
- a rim that extends from the edge portion; and

wherein the edge portion, when viewed from a central container axis, comprises an outwardly directed nose-shaped portion.

[0006] An advantage of the container according to the invention is that, by virtue of the nose-shaped edge portion, an increased holding force is provided to a lid that is placed on the container. During placement of the lid a closing force is exerted on the nose-shaped edge portion of the container and in particular on the apex thereof. In the container according to the invention this results in the nose-shaped edge portion being pressed slightly downwards and/or inwards during application of a container lid to the container.

[0007] After application of the lid, the nose-shaped portion returns to its original form and position, therewith exerting an outwardly directed force on the point of contact of the nose-shape outer edge with the lid. As a result,

the lid is subjected to an outwardly directed force at the point of contact with the lid (i.e. is pushed outward). In the closed position, the outer edge of the lid is at a lower position than the point of contact relative to the opening. As a result, the lid outer edge is positioned inwardly from the point of contact. This means that the container can only be opened if the lid outer edge is moved beyond the (outward) position of point of contact, which obviates accidental opening of the container.

[0008] The containers according to the prior art, which generally have a circular edge portion, is incapable of downward and/or inward bending. Therefore, the effect is not achievable with containers according to the prior art.

[0009] Another advantage is that, by virtue of the rim, the risk of accidental opening of the container according to the invention, especially due to hooking or collision with another container, is reduced even further. This is mainly due to the fact that another object or container that may collide or hook is deflected by the rim before the collision or hooking takes place.

[0010] A further advantage of the container according to the invention is that, due to the nose-shaped edge portion, it is easier to dispense or pour the (liquid) contents, such as paint, from the container. The nose-shaped edge portion provides a transition point at which the liquid, such as paint, more easily detaches during pouring than in existing containers. This is especially true since the existing containers provide a circular top edge, which increases adhesion of the paint to the edge due to the lack of a 'break-off point' formed by a relatively sharp or abrupt change in curvature as present in the paint pail according to the invention.

[0011] For completeness sake, it is noted that the outwardly directed nose-shaped portion as claimed includes that the apex of the nose-shaped part extends outwardly when viewed outwardly from a central axis of the container. It is noted that the nose-shape is particularly visible when the container edge portion is viewed in cross-sectional view.

[0012] In general, it is noted that for the purpose of this application, the term 'outwardly' is considered to be a radially outward direction from the central axis of the container. Similarly, the term 'inwardly' means directed towards the central axis of the container.

[0013] Furthermore, the term 'downwards' is, for the purpose of this application, considered to be a direction towards the bottom wall, whereas the term 'upwards' is, for the purpose of this application, considered to be a direction away from the bottom wall (and towards the opening of the container).

[0014] In an embodiment according to the invention, the nose-shaped portion, when viewed from a central axis outwardly, comprises:

- a first part that is outwardly curved and that has a first curvature; and
- a second part that is curved outwardly and down-

wardly and that has a second curvature;

wherein the first curvature and the second curvature are different.

[0015] The specific shape of the nose-shaped edge portion is, at least partially, provided by providing the first and second part of the nose-shaped portion with a curvature. The difference in curvature provides a more flexible edge portion having a nose-shape, thus allowing the abovementioned effect that the apex is, during closing, pressed downwardly and/or inwardly.

[0016] A further advantage of the container according to this embodiment is that, due to the different curvatures, any liquid remaining on the edge portion easily flows back into the container. This is especially true if the curvature of the first part is relatively large.

[0017] It is preferred that the first part, which extends from the second end of the side wall, has a curvature that is larger than the curvature of the second part. This will provide that the resistance against bending of the second part is larger than the resistance of the first part against bending. As a result, during a closing action, the first part of the nose-shaped portion will act as a bend spring allowing the nose-shaped portion to be pressed downward and/or inward.

[0018] It is noted that, for the purpose of this application, the terms 'curvature' and 'radius of curvature' are used interchangeably. In other words, the curvature of the first part also includes the first radius of curvature of the first part and the curvature of the second part also includes the second radius of curvature of the second part. Similarly, a difference in curvature is thus to be understood as a difference in the radius of curvature.

[0019] It is furthermore noted that the difference in radius of curvature between the first radius and the second radius also includes that the first and/or the second radius is an average radius over a predetermined distance. In other words, the first and/or the second radius may also be an average radius of a number of slightly varying radii that together form the first and/or the second radius.

[0020] In an embodiment according to the invention, the first (radius of) curvature is larger than the second (radius of) curvature.

[0021] An advantage of this embodiment is that the resistance against bending of the second part is larger than the resistance of the first part against bending. As a result, during a closing action, the first part of the nose-shaped portion will primarily act as a bend spring allowing the nose-shaped portion to be pressed downward and/or inward, whereas the second part provides rigidity.

[0022] In an embodiment according to the invention, the first part may have a radius of curvature in the range of 1.4 to 10.0, more preferably in the range of 2.1 to 9.3, even more preferably in the range of 2.8 to 8.6, and most preferably in the range of 3.3 to 7.4.

[0023] In an embodiment according to the invention, the second part may have a radius of curvature in the range of 0.3 to 4.9, more preferably in the range of 0.7

to 4.2, even more preferably in the range of 1.1 to 3.5 and most preferably in the range of 1.4 to 2.8.

[0024] In an embodiment according to the invention, the nose-shaped portion, when viewed from a central axis outwardly, comprises a third part that is curved inwardly and downwardly, wherein the third part preferably emanates in a groove portion.

[0025] The specific shape of the nose-shaped edge portion may, at least partially, be provided by virtue of the inwardly and downwardly curved third part. Furthermore, the third part contributes to the rigidity of the apex of the nose-shaped part.

[0026] In general, it is noted that the nose-shape portion is formed by the combination of the first, second and third part. These parts together also form the edge portion.

[0027] In an embodiment according to the invention, the container body further comprises a groove portion that extends downwardly from the edge portion.

[0028] The groove portion further extends over its length around the circumference of the container body. It is noted that the groove, for the purpose of this application, is a part that is (inwardly) depressed relative to the edge portion and the rim and thus forms a groove, furrow or indentation.

[0029] An advantage of the groove portion is that it provides a transition region between the nose-shaped edge portion and the rim. As a result, a lid will, when pressed to the closed position, not be in contact with the rim. It is noted that the phrase 'groove portion' is, for the purpose of this application, synonymous with the phrase 'transition region' and these phrases can be used interchangeably.

[0030] Another advantage of providing a groove portion is that it allows a tool, for example a screw driver or other opening tool, to be positioned therein to open the container. The groove provides a fixation point for the tool, after which an upwards opening force can be exerted on the lid. It is noted that the downwards direction is a direction viewed from opening towards the bottom wall.

[0031] In an embodiment according to the invention, the rim comprises a first curved rim part that extends downwardly and outwardly from the edge portion. Alternatively, the rim comprises a first curved rim part that extends downwardly and outwardly from the groove portion.

[0032] An advantage of an downwardly and outwardly extending rim is that accidental opening of the container, for example by hooking or colliding, is substantially prevented. This risk is especially present when the containers are stored close to each other and/or are stacked on top of each other, such as during transport. The rim according to this embodiment, due to its outwardly and downwardly profile, provides a barrier against collision and/or hooking.

[0033] Another advantage is that the rim according to this embodiment provides additional strength to the container. This makes it possible to have a side wall with a

reduced thickness.

[0034] A further advantage is that the rim, due to its shape, is highly resistant to (permanent) deformation. This is mainly due to the fact that elastic deformation is increased by the specific shape. Therewith, this embodiment results in a strong and highly resilient container.

[0035] It is noted that the first curved rim part may have a curvature or radius of curvature that may be a single radius of curvature or may be a composite curve having a number of different radii that together define an average radius of curvature. In other words, the single of curvature may include a plurality of different radii of curvatures that are taken together in a single radius of curvature.

[0036] It is furthermore noted that the curvature is preferably chosen such that at least the part of first curved rim part that is adjacent the groove or the edge portion is positioned under angle β with central axis A of the container. Angle β for example be in the range of 30° to 60° or may for example be 45°. Other values for angle β may however also be possible.

[0037] An advantage of providing a curvature, especially with an upper part having an angle β , is that a tool for opening or releasing a lid can be applied in an easy and effective manner. This is especially true in combination with the nose-shaped edge portion, since it increases leverage on a lid positioned on the container. This allows a lid to be removed from the container more easily.

[0038] It is noted that this particular embodiment may also be applied in known containers that are not provided with the nose-shaped edge portion. As such, the rim may be considered to be a separate invention directed to preventing accidental opening of a container due to hooking and/or collision.

[0039] In an embodiment according to the invention, the rim comprises a second curved rim part that extends from the first rim part in an inwardly and at least partially upwardly curve.

[0040] An advantage of providing the second curved rim part is that it increases the bend spring resilience of the rim and therefore provides an even further improved collision resistance.

[0041] Another advantage is that the second curved rim part also increases the strength of the container, allowing an even further reduced wall thickness of the container. As a result, the costs of a container and the environmental impact thereof can be reduced even further.

[0042] It is noted that this particular embodiment may also be applied in known containers that are not provided with the nose-shaped edge portion. As such, the rim may be considered to be a separate invention directed to preventing accidental opening of a container due to hooking and/or collision.

[0043] In an embodiment according to the invention, the rim comprises a second rim part that extends substantially straight downwardly from the first rim part.

[0044] An advantage of this embodiment is that the straight rim part allows the handle to be positioned therein. This obviates the need for special 'ears' on the side

wall of the container to which the handle is connected. As a result, the risk of oxidation on the (often welded) connection between the ears and the side wall is obviated. It also reduces the manufacturing costs and time due to the fact that the step of providing and connecting ears is obviated.

[0045] Another advantage is that the second curved rim part also increases the strength of the container, allowing an even further reduced wall thickness of the container. As a result, the costs of a container and the environmental impact thereof can be reduced even further.

[0046] It is noted that this particular embodiment may also be applied in existing containers that are not provided with the nose-shaped edge portion. As such, the rim may be considered to be a separate invention directed to preventing accidental opening of a container due to hooking and/or collision that can be applied separately from the nose-shaped edge portion. It is noted that this embodiment, even if considered a separate invention, may still be combined with other embodiments described herein.

[0047] In an embodiment according to the invention, the side wall and the edge portion, and optionally the rim and/or the groove portion, are manufactured from a single piece of material.

[0048] An advantage of providing one or more of the abovementioned parts from a single piece of material is that it provides a more efficient and cost-effective manufacturing.

[0049] Another advantage is that the need for connections, such as welds or other connections, is obviated. This increases strength and reduces the risk of failure of the container. In addition, if the container is manufactured from a metallic material, it also reduces the risk of oxidation, which in existing containers may occur at the connection points.

[0050] In an embodiment according to the invention, the container body has a cylindrical or frustoconical shape.

[0051] An advantage of the abovementioned shape is that the containers are nestable when empty. This reduces the cost and environmental impact of transportation of the containers. In addition, the containers, when filled, can be easily stacked upon each other.

[0052] Another advantage is that these shapes have a relatively high strength compared to other shapes, such as cubes or crate-like (rectangular) structures.

[0053] In an embodiment according to the invention, the container is manufactured from a metallic material.

[0054] An advantage of metallic material, especially sheet metal, is that is substantially endlessly recyclable and thus has a relatively low environmental impact, especially compared to plastics.

[0055] Another advantage of metallic material is that, especially compared to plastics, has a high strength. As a result, a lower amount of material is required for manufacturing the container according to the invention.

[0056] In an embodiment according to the invention,

the metallic material may comprise one or more of sheet metal, steel, preferably stainless steel, aluminum, coated steel, coated aluminum, a laminate comprising metal or a composite comprising metal.

[0057] The metallic material may be a metal or a combination of different metals. However, it may be advantageous to provide a combination of a metal and another material to provide characteristics that are useful for specific substances to be stored in the container.

[0058] An advantage of a coating is that it can be easily applied to add specific characteristics to the container, such as surface protection against deterioration and/or corrosion. The coating may be a coating from a metal or may be a polymeric coating, such as a polypropylene (PP) or a polyethylene terephthalate (PET) coating. The coating may also be an organic coating, for example an epoxy or organosol coating.

[0059] In respect of the invention, a laminate is considered to be a structure at least comprising a metal layer and a second layer. The second layer may be any material suitable to achieve a desired effect, including a plastic, a metal or another material. An advantage of a laminate that is does not require lacquering and that it reduces the amount of solvent emissions.

[0060] A composite may be a mixture of a metal and another material, which may be a metal or another material.

[0061] In an embodiment according to the invention, the side wall comprises one or more circumferential bead that is positioned at a predetermined distance from the rim.

[0062] An advantage of providing at least one circumferential bead on the side wall is that it provides additional strength to the container without increasing the need for material.

[0063] Depending on the position of the at least one bead, it also may provide a (further) additional barrier against accidental opening due to collision or hooking.

[0064] The bead is positioned between the rim and the bottom wall and is positioned at a predetermined distance from the rim. It is preferred that the bead is positioned in the upper half of the side wall, and more preferably in the upper third part of the side wall.

[0065] An advantage of providing the at least one circumferential bead in the upper third part of the side wall is that it provides an additional barrier against accidental hooking or collision.

[0066] In an embodiment according to the invention, the container body comprises a handle, wherein the container body further comprises two ears that are connected to the side wall on opposite sides of the container and wherein the handle is connected, preferably rotatably connected, to the ears, or the handle is connected, preferably rotatably connected, to the straight rim part.

[0067] An advantage of a handle is that, especially with larger containers, the handle allows the container to be transported in a more efficient manner. The handle may be rotatably connected or provided to the container by

means of ears that are connected to the side wall. Such ears are also often also called welding ears. In this case, the ears are connected to the side wall, for example by means of welding, and the handle is rotatably provided in the ears.

[0068] Alternatively, the handle may be rotatably connected to the straight rim part. In this case, the straight rim part is provided with openings that are provided on opposite sides of the container in which the handle is rotatably provided. This embodiment has the advantage that it obviates the risk of damage to the side wall, because need to attach ears to the side wall is obviated. It is noted that this particular embodiment may also be applied in existing containers that are not provided with the nose-shaped edge portion.

[0069] In an embodiment according to the invention, the handle comprises outer ends, and wherein each of the outer ends is connected to an associated ear.

[0070] In an embodiment according to the invention, the handle comprises outer ends, each of the outer ends is positioned on an inner side of the rim that faces the side wall and wherein the handle extends through holes in the straight rim part.

[0071] It is noted that the embodiments that are specifically directed to the structure of the rim may also be applied in existing containers to improve the resiliency of such containers against accidental opening by means of collision or hooking.

[0072] The invention further relates to a container lid comprising a central lid portion and an edge portion, wherein the edge portion, when viewed from a central lid axis, comprises an outwardly curved part that is adapted to engage with a nose-shaped rim of a container to form a sealing connection therewith.

[0073] An advantage of the lid according to the invention is that the outwardly curved part is configured to provide a sealing engagement with the container according to the invention.

[0074] It is noted that the outwardly curved part mentioned above may, in case the lid comprises multiple outwardly curved parts, be mentioned as a first outwardly curved part.

[0075] In an embodiment of the container lid according to the invention, the curved part comprises a first curved subpart extending outwardly and upwardly and having a first curvature, a second curved subpart extending outwardly and downwardly and having a second curvature, and wherein the first and the second curvature are different from each other.

[0076] An advantage of this embodiment is that the curved part of the lid outer edge portion may have a shape that is similar to the nose-shape of the associated container. This provides an even more effective sealing between the lid and the container.

[0077] It is preferred that in this embodiment the first and the second curvature are substantially equal to the first and the second curvature of an associated container.

[0078] It is noted that, for the purpose of this applica-

tion, the terms 'curvature' and 'radius of curvature' are used interchangeably. In other words, the curvature of the first subpart also includes the first radius of curvature of the first subpart and the curvature of the second subpart also includes the second radius of curvature of the second subpart. Similarly, a difference in curvature is thus to be understood as a difference in the radius of curvature.

[0079] It is furthermore noted that the difference in radius of curvature between the first radius and the second radius also includes that the first and/or the second radius is an average radius over a predetermined distance. In other words, the first and/or the second radius may also be an average radius of a number of slightly varying radii that together form the first and/or the second radius.

[0080] In an embodiment of the container lid according to the invention, the edge portion further comprises a second curved part that is connected to an outward end of the first curved part, and wherein the second curved part is, relatively to the first curved part, at least partially displaced or tapering inwards.

[0081] An advantage of an at least partially inwardly displaced or tapering second curved part is that it provides an even higher clamping force of the lid on a container. This reduces the risk of accidental opening even further.

[0082] In an embodiment of the container lid according to the invention, the edge portion further comprises a second outwardly curved part that is shaped as an outward curl.

[0083] An advantage of this embodiment is that the curl provides easy access for a tool below the lid edge when it is placed (or engaged on) a container. This improves the ease with which the lid according to the invention can be removed from an associated container.

[0084] Another advantage is that the curl also obviates any sharp edges that may harm users.

[0085] A further advantage is that the curl also increases the rigidity of the outer edge of the lid, especially compared to the first curved part. As a result, a force that is exerted with a tool on the lid according to the invention will be transferred mostly onto the first curved part, thus allowing the lid to be opened with less force.

[0086] In more detail, the second outwardly curved part subsequently comprises, in order to form the outward curl, a first subpart that extends outwardly and downwardly, a second subpart that extends outwardly and upwardly, and a third part that extends upwardly and inwardly.

[0087] In an embodiment of the container lid according to the invention, the edge portion further comprises a second inwardly curved part that is shaped as an inward curl.

[0088] An advantage of this embodiment is that the inward curl is positioned below and inwardly from the nose-shaped outer edge of a container, therewith further improving the strength of the closure to prevent accidental release thereof. As such, the inward curl provides a

locking engagement with the nose-shaped edge portion of the container.

[0089] Another advantage is that the inward curl also increases the rigidity of the outer edge of the lid. As a result, the inward curl can, by using a tool, be forced outward to allow the lid to be opened with less force, while simultaneously increasing the strength of the closure.

[0090] In more detail, the second inwardly curved part subsequently comprises, in order to form the inward curl, a first subpart that extends inwardly and downwardly, a second subpart that extends inwardly and upwardly, and a third part that extends upwardly and outwardly.

[0091] In an embodiment of the container lid according to the invention, the first outwardly curved portion and the second curved part may be connected with a straight portion that extends downwardly.

[0092] The container lid may, to provide an even further improved clamping of the container lid on the container, also comprise a substantially straight part that connects the first outwardly curved part and the second curved part. It is noted that the second curved part may be outwardly curved or inwardly curved.

[0093] Another advantage is that, during a clamping operation of the container lid on the container, the straight portion may slightly plastically deform to provide a tight fit with the nose-shaped edge portion of the container.

[0094] In an embodiment of the container lid according to the invention, the straight portion extends substantially parallel to or inwardly under angle with the central container axis.

[0095] By providing the straight portion parallel to the central container axis, the improved fit as described above is achieved. If the straight portion extends under an inward angle with the central container axis, the second curved part substantially hooks even more under the nose-shaped portion of the container, therewith providing an even further improved clamping.

[0096] In an embodiment of the container lid according to the invention, the straight portion have an angle in the range of 5° - 70°, more preferably in the range of 20° - 55° and even more preferably in the range of 30° - 45°.

[0097] In an embodiment of the container lid according to the invention, the straight portion may comprise a first straight subportion and a second straight subportion, wherein the first and the second straight subportion are connected via a bend, and wherein the first straight subportion extends under an inward angle with the central container axis and the second straight subportion extends under an outward angle with the central container axis.

[0098] An advantage of this embodiment is that a pronounced clamping edge is formed by means of the straight subportions and the bend therebetween. This even further improves the clamping between the container lid and the nose-shaped edge of the container.

[0099] Another advantage is that, due to the outwardly extending second straight subpart, a increased space is

created for inserting an opening tool. This improves ease of opening of the container of the container assembly.

[0100] In an embodiment of the container lid according to the invention, the first straight sub portion and/or the second straight subportion may have an angle in the range of 5° - 70°, more preferably in the range of 20° - 55° and even more preferably in the range of 30° - 45°.

[0101] In an embodiment of the container lid according to the invention, the first outwardly curved portion has a shape chosen from the group of: a semi-circular shape, a nose-shape or a semi-oval shape.

[0102] An advantage of the abovementioned shapes is that they provide a good fit with the edge portion of a container according to the invention.

[0103] In an embodiment of the container lid according to the invention, the first curved part of the edge portion is, on an inner side of the curvature, provided with a sealing compound.

[0104] An advantage of providing a sealing compound is that an even further improved sealing is achieved between the edge portion of the container lid and the edge portion of the container. This is especially true for sealing material that is relatively soft and therewith slightly compressible.

[0105] It is noted that the sealing compound in this respect acts as a gasket between the (edge portion of the) container lid and the (edge portion of the) container.

[0106] In an embodiment of the container lid according to the invention, the lid is manufactured from a metallic material.

[0107] An advantage of metallic material, especially sheet metal, is that is substantially endlessly recyclable and thus has a relatively low environmental impact, especially compared to plastics.

[0108] Another advantage of metallic material is that, especially compared to plastics, has a high strength. As a result, a lower amount of material is required for manufacturing the container according to the invention.

[0109] In an embodiment according to the invention, the metallic material may comprise one or more of sheet metal, steel, preferably stainless steel, aluminum, coated steel, coated aluminum, a laminate comprising metal or a composite comprising metal.

[0110] The metallic material may be a metal or a combination of different metals. However, it may be advantageous to provide a combination of a metal and another material to provide characteristics that are useful for specific substances to be stored in the container.

[0111] An advantage of a coating is that it can be easily applied to add specific characteristics to the container, such as surface protection against deterioration and/or corrosion. The coating may be a coating from a metal or may be a polymeric coating, such as a polypropylene (PP) or a polyethylene terephthalate (PET) coating. The coating may also be an organic coating, for example an epoxy or organosol coating.

[0112] In respect of the invention, a laminate is considered to be a structure at least comprising a metal layer

and a second layer. The second layer may be any material suitable to achieve a desired effect, including a plastic, a metal or another material. An advantage of a laminate is that it does not require lacquering and that it reduces the amount of solvent emissions.

[0113] A composite may be a mixture of a metal and another material, which may be a metal or another material.

[0114] In an embodiment of the container lid according to the invention, the container lid is adapted to cooperate with a container according to the invention to form a reclosable, sealed closure.

[0115] The invention also relates to a container assembly comprising:

- a container according to the invention; and
- a container lid according to the invention.

[0116] An advantage of the container assembly according to the invention is that, by virtue of the nose-shaped edge portion, an increased holding force is provided to the container lid is placed on the container. During placement of the lid a closing force is exerted on the nose-shaped edge portion of the container and in particular on the apex thereof. In the container according to the invention this results in the nose-shaped edge portion being pressed slightly downwards and/or inwards during application of a container lid to the container.

[0117] After application of the lid, the nose-shaped portion returns to its original form and position, therewith exerting an outwardly directed force on the point of contact of the nose-shape outer edge with the lid. The point of contact is, relatively to the bottom of the container positioned upwardly from the lower part of the edge portion (i.e. the lower of the outwardly curved part) of the container lid. This means that the lid is subjected to an outwardly directed force at the point of contact with the lid (i.e. is pushed outward), which positions the point of contact outwardly relative to the outer edge of the lid. As a result, the lid is clamped onto the container with an increased clamping force that obviates or at least significantly reduces the risk of accidental opening.

[0118] In an embodiment of the container assembly according to the invention, a circumference of at least a part of the outer edge portion of the container lid, when measured from the central lid axis, is smaller than a circumference of the outer edge portion of the container, when measured from the central container axis.

[0119] An advantage of this embodiment is that the lid, when placed on the container, provides an inwardly directed clamping force on the container which improves the sealing of the lid on the container. This is especially true in combination with the nose-shaped edge portion of the container which provides an outwardly directed clamping force to the lid.

[0120] In an embodiment of the container assembly according to the invention, a radius of the container lid, when measured from the central lid axis, is smaller than

a radius of the container, when measured from the central container axis.

[0121] An advantage of this embodiment is that the lid, when placed on the container, provides an inwardly directed clamping force on the container which improves the sealing of the lid on the container. This is especially true in combination with the nose-shaped edge portion of the container which provides an outwardly directed clamping force to the lid.

[0122] In a preferred embodiment of the container assembly according to the invention, a radius of the outer edge portion of the container lid, when measured from the central lid axis, is smaller than a radius of the nose-shaped outer edge of the container, when measured from the central container axis.

[0123] An advantage of having the radius of the container lid outer edge smaller than the radius of the nose-shaped outer edge of the container is that the container lid provides a strong clamping connection with the nose-shaped portion of the container edge.

[0124] Another advantage is that the container lid provides a 'click-on' connection with the nose-shaped outer edge of the container.

[0125] In an embodiment of the container assembly according to the invention, the container assembly has an open state and a closed state in which the container lid is positioned on the container and, wherein, in the closed state, the central lid axis and the central container axis are configured to be substantially collinear with each other.

[0126] The container assembly is preferably manufactured such that the central axes of the container and the container lid in a closed state or position of the assembly are collinear in order to provide a stable and sturdy container.

[0127] The invention also relates to a method for manufacturing a container, the method comprising the steps of:

- providing a sheet metal blank;
- manufacturing a side wall and a bottom wall from the sheet metal blank;
- shaping a top end of the side wall into a rim; and
- shaping an edge portion to provide a nose-shaped edge portion.

[0128] The method according to the invention provides similar effects and advantages as mentioned above for the container, the container lid and the container assembly according to the invention. It is noted that the embodiments as described for the container, the container lid and the container assembly according to the invention may also freely be used and combined for the method according to the invention.

[0129] An advantage of the method according to the invention is that it provides a container with an improved closing. This is due to nose-shape of the edge portion that, during closing of the container with a lid is pressed

slightly downwards and/or inwards, and subsequently returns to its original position. Therewith it has an increased closing strength compared to existing containers.

[0130] It is noted that the sheet metal blank as mentioned above may also be two separate sheet metal blanks, for example a sheet metal blank for the side wall and a separate sheet metal blank for the bottom wall.

[0131] In an embodiment of the method according to the invention, the step of shaping the edge portion is a rolling or a die operation, wherein the rolling or die operation is a single rolling or die operation or comprises multiple subsequent rolling or die operations or rolling or die steps.

[0132] An advantage of shaping the edge portion using a rolling or die operation is that rolling and die operations provide a reliable and cost-effective process to shape sheet metal. This is particularly true for providing curves or curved portions to sheet metal.

[0133] In an embodiment of the method according to the invention, the shaping of the top end of the side wall comprises folding or bending the top end of the side wall to form an edge portion.

[0134] An advantage of folding or bending the top end in an outward direction is that the edge portion is formed.

An additional advantage is that the outwardly folded or bend edge also provides a smooth top edge that prevents a user from damage. Yet another advantage is that the upper end of the container has an increased strength due to the fact that the top end of the side wall has been folded or bend over.

[0135] In an embodiment of the method according to the invention, the step of shaping the edge portion to provide a nose-shaped edge portion comprises the steps of outwardly curving with a first curvature, for example by folding, bending or rolling, a first part of the edge portion, and curving outwardly with a second curvature a second part of the edge portion, wherein the first curvature and the second curvature are different. Preferably the step of shaping also comprises curving the second part downwardly.

[0136] The specific shape of the nose-shaped edge portion is, at least partially, provided by providing different curvatures to the first and second part of the nose-shaped portion. As indicated before, the different curvatures may also be indicated as curvatures with a different radius of curvature. The difference in (radius of) curvature provides a more flexible edge portion having a nose-shape, thus allowing the abovementioned effect that the apex is, during closing, pressed downwardly and/or inwardly.

[0137] A further advantage of the container according to this embodiment is that, due to the different curvatures, any liquid remaining on the edge portion easily flows back into the container. This is especially true if the radius of curvature of the first part is relatively large.

[0138] It is preferred that the first part, which extends from the second end of the side wall, has a radius of curvature that is larger than the radius of curvature of the second part. This will provide that the resistance against

bending of the second part is larger than the resistance of the first part against bending. As a result, during a closing action, the first part of the nose-shaped portion will act as a bend spring allowing the nose-shaped portion to be pressed downward and/or inward.

[0139] It is noted that the difference in radius of curvature between the first radius and the second radius also includes that the first and/or the second radius is an average radius over a predetermined distance. In other words, the first and/or the second radius may also be an average radius of a number of slightly varying radii that together form the first and/or the second radius.

[0140] In an embodiment of the method according to the invention, the second curvature is larger than the first curvature.

[0141] An advantage of this embodiment is that the resistance against bending of the second part is larger than the resistance of the first part against bending. As a result, during a closing action, the first part of the nose-shaped portion will primarily act as a bend spring allowing the nose-shaped portion to be pressed downward and/or inward, whereas the second part provides rigidity.

[0142] In an embodiment of the method according to the invention, the method further comprising the steps of providing a bottom wall and attaching the bottom to a bottom end of the side wall.

[0143] Several different processes can be used to attach the bottom wall to the side wall at a bottom end thereof. This may for example be folding the edge, soldering or welding the edge, or seaming the edges together.

[0144] In an embodiment of the method according to the invention, the bottom wall is formed from a sheet metal blank.

[0145] The bottom wall may be formed from a sheet metal blank, which may be the same sheet metal blank as used for the side wall. Alternatively, it may be a different sheet metal blank, for example a sheet metal blank having different characteristics such as a different thickness.

[0146] In an embodiment of the method according to the invention, the step of manufacturing the side wall comprises the steps of forming the blank into a cylindrical pre-shape, and expanding the pre-shape to a cylindrical or frusto-conical shape to form the container side wall.

[0147] An advantage of a cylindrical or frusto-conical shape is that it provides a high strength compared other shapes. Another advantage is that the shape can easily be stacked and packed, especially with a cylindrical shape. A specific advantage of the frusto-conical shape is that it provides the advantage that the containers can, when empty, be nested to reduce the amount of space required for transportation.

[0148] In an embodiment of the method according to the invention, the step of manufacturing the side wall comprises one or more of the steps of:

- providing a flange on a bottom end of the side wall;

- providing a pre-rim on the top end of the side wall; and
- optionally, providing a bead in the side wall.

[0149] An advantage of providing a flange on a bottom end of the side wall is that it provides additional stability and strength to the bottom end of the container. Another advantage is that the flange can be used to establish a folded edge with the bottom wall in order to provide a sealing connection between the side wall and the bottom wall. This process is known as seaming.

[0150] An advantage of providing a bead in the side wall, especially near the top end thereof, is that the containers can, when empty, be nested and disconnected from each other in a relatively easy manner.

[0151] It is noted that the steps of providing the pre-rim and providing a bead may be performed in a single manufacturing step.

[0152] In an embodiment of the method according to the invention, the method may comprise the step of providing a handle to the container, wherein the step preferably comprises the steps of manufacturing openings in the rim for attaching a handle and attaching the handle to the openings or attaching ears that are configured to rotatably hold a handle and attaching the handle to the ears on the side wall.

[0153] An advantage of providing a handle to the container is easy of handling. The method may include attaching the handle to the rim. This provides the advantage that the formation of rust can be substantially prevented. Another advantage is that the use of ears is obviated, thus reducing the complexity and costs of manufacturing.

[0154] An advantage of the use of ears is that the ears can be positioned at the most suitable position on the side wall of the container.

[0155] The invention also relates to a method for manufacturing a container lid, the method comprising the steps of:

- providing a plate, preferably from sheet metal; and
- shaping the plate to provide a central lid portion; and
- shaping the plate to provide a lid edge portion to the container lid.

[0156] The method for manufacturing a container lid has similar effects and advantages as the method for manufacturing a container, the container, the container lid and the assembly according to the invention. The method for manufacturing a container lid may be freely used with embodiments as disclosed for the container, the container lid, the container assembly and/or the method for manufacturing a container.

[0157] In an embodiment according to the method for manufacturing a container lid, the steps of providing and shaping the plate are performed in a single step.

[0158] An advantage of providing both steps in a single step or operation is that it increases production speed

and reduces cost per manufactured unit.

[0159] In an embodiment according to the method for manufacturing a container lid, the step of shaping the lid edge portion comprises providing an outwardly curving part adapted to engage with a nose-shaped outer edge of a container to form a sealing connection therewith.

[0160] An advantage of an outwardly curving part is that it easily slides over an edge portion of a container. Another advantage that is associated with the outwardly curving part being adapted to the nose-shaped outer edge, is that an improved clamping of the lid on the container is achieved.

[0161] It is preferred that the outwardly curving part comprises an inward or an outward curl adapted to provide a mating fit with the geometry of the container, especially the nose-shaped part of the container.

[0162] In an embodiment according to the method for manufacturing a container lid, the step of providing the outwardly curving part comprises the steps of:

- providing a first curved subpart extending outwardly and upwardly and having a first curvature; and
- a second curved subpart extending outwardly and downwardly and having a second curvature,

wherein the first and the second curvature preferably are different from each other.

[0163] An advantage of this embodiment is that the lid outer edge is shaped to substantially reflect the contour of the nose-shaped outer edge of a container, thus providing a closer (and tighter) fit on the container.

[0164] In an embodiment according to the method for manufacturing a container lid, the step of shaping the lid edge portion further comprises shaping a second curved part as an outward curl, wherein the second part extends from the first curved part.

[0165] An advantage of second curved part is that it allows an improved clamping on the container outer edge. Especially with a circular, preferably inward curving, second part the second part is connected underneath the nose-shaped portion to provide an improved clamping.

[0166] An outward curl provides the advantage that the lid edge is more rigid and provides an opening for inserting a tool.

[0167] In an embodiment according to the method for manufacturing a container lid, the step of shaping the plate comprises pressing at least part of the edge portion inwards towards a central axis of the container lid, and, alternatively, comprises pressing the second curved part inward.

[0168] An advantage of inward pressing is that the container lid provides an even further improved clamping over the nose-shaped outer edge of a container to prevent even further the accidental opening of the lid.

[0169] In an embodiment according to the method for manufacturing a container lid, the step of shaping the plate comprises pre-curling the edge portion.

[0170] In an embodiment according to the method for manufacturing a container lid, the method additionally comprises the step of attaching a sealing compound in the edge portion.

[0171] A sealing compound provides the advantage that an improved seal between the lid and a container is achieved.

[0172] In an embodiment according to the method for manufacturing a container lid, the step of providing a plate comprises the steps of providing a sheet metal blank, and providing a plate from the sheet metal blank.

[0173] In an embodiment according to the method for manufacturing a container lid, the step of providing a plate from the sheet metal blank comprises one of cutting, laser-cutting, punching the plate from the sheet metal blank.

[0174] The invention also relates to a method for manufacturing a container assembly, the method comprising:

- manufacturing a container according to the invention;
- manufacturing a container lid; and
- assembling the container and the container lid.

[0175] The method for manufacturing a container assembly has similar effects and advantages as the container, the container lid, the container assembly, the method for manufacturing a container and the method for manufacturing a container lid according to the invention. The method for manufacturing a container assembly may be freely used with embodiments as disclosed for the container, the container lid, the container assembly, the method for manufacturing a container and/or the method for manufacturing a container lid according to the invention.

[0176] Further advantages, features and details of the invention are elucidated on the basis of preferred embodiments thereof, wherein reference is made to the accompanying drawings, in which:

Figure 1 shows a perspective view of a first example of a container according to the invention;

Figure 2 shows a cross sectional view of the first example of figure 1;

Figure 3 shows a detailed view of the second end of the container according to figure 1;

Figure 4 shows a perspective view of a second example of a container according to the invention;

Figure 5 shows a cross sectional view of the second example of figure 4;

Figure 6 shows a detailed view of the second end of the container according to figure 4;

Figure 7 shows a perspective view of a first example of a container lid according to the invention;

Figure 8a shows a detailed view of the outer edge portion of the container lid according to figure 7;

Figure 8b shows a detailed view of a second example of a container lid according to the invention;

Figure 9 shows a detailed view of a third example of a container lid according to the invention;

Figure 10a and 10b show a perspective view of a first and a second example of a container assembly according to the invention;

Figure 10c shows a detailed view of the example of figure 10a;

Figure 11 shows schematic overview of an example of the method for manufacturing a container according to the invention;

Figure 12 schematic overview of an example of the method for manufacturing a container lid according to the invention; and

Figure 13 shows a schematic overview of an example of the method for manufacturing a container assembly according to the invention.

[0177] In a first example of container 2 according to the invention (see figures 1 - 3), container 2 comprises container body 3 having bottom wall 4 and side wall 6. In this example container body 3 has a frustoconical shape and is manufactured from a single piece of sheet metal. Side wall 6 has first end 8 that in this example is connected to bottom wall 4 by means of a folded edge 8. It is noted that other connection means, such as soldering are also possible. Side wall 6 extends in first direction z towards second end 10. In this example, container 2 further comprises a bead 11 that is positioned at a predetermined distance from second end 10. Bead 11 may serve to increase the strength of container 2 and/or serves to provide an edge for stacking containers 2 (at least partially) inside each other.

[0178] Container 2 is further provided with nose-shaped edge portion 12 that is positioned at second end 10 of side wall 6. Second end 10 and nose-shaped edge portion 12 together define opening 14.

[0179] Nose-shaped edge portion 12 in this example (see figure 3) comprises first part 16 that is outwardly curved and that has first radius of curvature $R1$. Nose-shaped edge portion 12 in this example further comprises second part 18 that is curved outwardly and downwardly. Second part 18 has second radius of curvature $R2$ that is different from first radius $R1$, which provides the outer edge 12 with the nose-shape. In this example, radius $R1$ is larger than radius $R2$.

[0180] Furthermore, in this example nose-shaped edge portion 12 also comprises third part 20 that extends inwardly and downwardly under an angle α with central axis A (shown in figure 3 with parallel axis A'). Third part 20 may also be provided as an inwardly and downwardly curved part. It is noted that in this example outwardly and inwardly are defined with respect to central axis A of container 2, in which outwardly is radially outward relative to central axis A and inwardly is radially inwards relative to central axis A . Upward and downward are in this example defined relative to bottom wall 2, wherein upward is defined as from bottom wall 2 towards second end 10 of side wall 6 in first direction z , whereas downward is the

direction opposite the upward direction.

[0181] In this example, container body 3 further comprises groove portion 22 that extends downwardly from nose-shaped edge portion 12. Groove portion 22 may extend outwardly or may extend substantially straight downward. Container 2 further comprises rim 24 that extends from groove portion 22. It is noted that rim 24 may also be connected directly to edge portion 12 without the presence of a groove portion.

[0182] Rim 24 in this example comprises first curved rim part 26 that extends downwardly and outwardly. The curvature of the first curved rim part 26 in this example is a composite curve having a number of different radii that together define an average radius of curvature. It is noted that the curvature of first curved rim part 26 may also have a single radius of curvature. The curvature is preferably chosen such that at least the part of first curved rim part 26 that is adjacent groove 22 or edge portion 12 is positioned under angle β with central axis A . In this particular example, with first curved rim part 26 being a composite curved part with different (radii of) curvatures, angle β is an average of the composite curvature parts. In this example, angle β is about 40° . However, any other angle β may also be possible, such as for example angle β in the range of 30° to 60° or another range. The advantage of providing a curve, especially with an upper part having an angle β , is that a tool for opening or releasing a lid can be inserted in an easy and effective manner. In this example (see figure 3), rim 24 further comprises second curved rim part 28 that extends from first rim part 26 in an inwardly and at least partially upwardly curve. The radius of curvature $R4$, which may be an average radius of curvature, is chosen such that the strength and rigidity of rim 24 is increased. Especially the shown combination the downwardly and outwardly extending first curved rim part 26 and the inwardly and upwardly curved second curved rim part 28 provides such rigidity. This also provides a barrier against accidental opening of the container by collision or hooking with an object or other container.

[0183] In a second example of container 102 according to the invention (see figures 4 - 6), container 102 comprises container body 103 having bottom wall 104 and side wall 106. In this example container body 103 has a frustoconical shape and is manufactured from a single piece of sheet metal. Side wall 106 has first end 108 that in this example is connected to bottom wall 104 by means of a folded edge 108. It is noted that other connection means, such as soldering are also possible. Side wall 106 extends in first direction z towards second end 110. Container 102 is further provided with nose-shaped edge portion 112 that is positioned at second end 110 of side wall 106. Second end 110 and nose-shaped edge portion 112 together define opening 114.

[0184] Nose-shaped edge portion 112 in this example comprises first part 116 that is outwardly curved and that has first radius of curvature $R1$. Nose-shaped edge portion 112 in this example further comprises second part 118 that is curved outwardly and downwardly. Second

part 118 has second radius of curvature R2 that is different from first radius R1, which provides the outer edge 112 with the nose-shape. In this example, radius R1 is larger than radius R2.

[0185] Furthermore, in this example nose-shaped edge portion 112 also comprises third part 120 that extends inwardly and downwardly under an angle γ with central axis C (shown in figure 6 with parallel axis C'). Third part 120 may also be provided as an inwardly and downwardly curved part. It is noted that in this example outwardly and inwardly are defined with respect to central axis C of container 102, in which outwardly is radially outward relative to central axis C and inwardly is radially inwards relative to central axis C. Upward and downward are in this example defined relative to bottom wall 102, wherein upward is defined as from bottom wall 102 towards second end 110 of side wall 106 in first direction z, whereas downward is the direction opposite the upward direction.

[0186] In this example, container body 103 further comprises groove portion 122 that extends downwardly from nose-shaped edge portion 112. Groove portion 122 may extend outwardly or may extend substantially straight downward. Container 102 further comprises rim 124 that extends from groove portion 122. In this particular example, groove portion 122 extends under an outward angle λ with central axis C (shown in figure 6 using parallel axis C'). The outward angle in this example is about 15°. It may also be a different range, such as a range of 5° - 50°, more preferably 5° - 40°. It is noted that rim 124 may also be connected directly to edge portion 112 without the presence of a groove portion.

[0187] Rim 124 in this example comprises first curved rim part 126 that extends downwardly and outwardly and second rim part 150 that extends substantially straight in a downward direction over a predetermined distance. Rim 124 further comprises third rim part 152 that is curved and extends inwardly to form an inwardly curved edge 152.

[0188] In this example, the curvature of the first curved rim part 126 is a composite curve having a number of different radii that together define an average radius of curvature R5. It is noted that the curvature of first curved rim part 126 may also have a single radius of curvature. The curvature is preferably chosen such that at least the part of first curved rim part 126 that is adjacent groove 122 or edge portion 112 is positioned under angle $\varnothing$ with central axis C. In this example, angle $\varnothing$ is about 40°. However, any other angle $\varnothing$ may also be possible, such as for example angle $\varnothing$ in the range of 30° to 60° or another range. The advantage of providing a curve, especially with an upper part having an angle $\varnothing$, is that a tool for opening or releasing a lid can be inserted in an easy and effective manner.

[0189] Second rim part 150 extends from first rim part 126 straight downward over a predetermined distance L. As such, second rim part 150 extends substantially parallel to side wall 106. As a result, rim 124 and in particular

second rim part 150 provides additional strength to side wall 106.

[0190] Third rim part 152 is curved primarily inwardly and forms a roughly inwardly curved U-shaped edge 152. The inward curve also provides additional stability and rigidity to rim 124. The radius of curvature of third part 152, which may be an average radius of curvature, may be chosen such that third part 152 does not engage with side wall 106. Rim 124, especially inward curve 152 thereof, further provides a barrier against accidental opening of the container by collision or hooking with an object or other container. Straight part 150 of rim 124 may further be used to rotatably connect a handle (not shown), for example by means of openings.

[0191] In a first example (see figures 7 and 8a), container lid 260 comprises central lid portion 262 and edge portion 264. In this example, container lid 260 is manufactured from (sheet) metal, although container lid 260 could also be manufactured from any other material such as plastic. Edge portion 264 is positioned radially outward from central lid axis CL and forms the circumference of container lid 260. Edge portion 264 of lid 260 comprises outwardly curved part 266 that is adapted to engage with a nose-shaped portion of a container. In this example, outwardly curved part 266 comprises first curved subpart 268 that extends outwardly and upwardly and second curved subpart 270 that extends downwardly and outwardly from first curved subpart 268 (see figure 8a). Both subparts 268, 270 together form, in this example, a semi-circular curve. It is noted however that first subpart 268 and second subpart 270 do not have the same curvature in this example. First subpart 268 has radius of curvature RL1, whereas second subpart 270 has radius of curvature RL2. It is conceivable that first subpart 268 and second subpart 270 do have a similar radius of curvature so as to provide a curve that is half of a circle. First subpart 268 and second subpart 270 together form space 272 in which a nose-shaped outer edge of a container can be inserted to form a sealing and clamping connection.

[0192] It is noted that, although in this example first outwardly curved part 266 is roughly semi-circular in shape, the shape may also be another shape, such as a nose-shape or an oval shape.

[0193] In this example, edge portion 264 further also comprises second outwardly curved part 274, which roughly has the shape of an inward curl 276. In other words, second outwardly curved part 274 has first subpart 278 that extends outwardly and downwardly with a radius of curvature RL3 and second subpart 280 that extends outwardly and upwardly with radius of curvature RL4 from first subpart 278. Second subpart 280 ends in a substantially straight, upwardly extending portion 281 that in turn emanates in inward curl 276. Portion 281 may extend vertically or under a slight angle inwardly or outwardly.

[0194] For clarity reasons, it is mentioned that first subpart 278 of second outwardly curved part 274 could also

be defined as third subpart 278 of edge portion 264 and second subpart 280 of second outwardly curved part 274 could also be defined as fourth subpart 280.

[0195] Although first outwardly curved part 266 and second outwardly curved part 274 could be directed connected to each other, in this example a substantially straight portion 269 is provided. Straight portion 269 may extend downward in a straight line or may extend slightly inwardly. In this example, substantially straight portion 269 extends inwardly with respect to central axis CL (shown here as parallel axis CL') under an angle μ of a few degrees.

[0196] In this example, outwardly curved part 266 is at an inner side, that is inside space 272 that is formed by first subpart 268 and second subpart 270, provided with sealing material 282.

[0197] Furthermore, in this example central lid portion 262 is provided with bead 284 that provides additional strength to container lid 260. This bead 284 may be omitted and central lid portion 262 may be substantially entirely flat. The transfer between central lid portion 262 and edge portion 264 in this example is formed by bend 283 and straight portion 285 that is connected to outwardly curved part 266.

[0198] In a second example (see figure 8b), container lid 260 is in most respects similar to the example shown in figure 8a. Similar features are therefore denoted with the same reference numbers and for a description of these features reference to the abovementioned description of figure 8a is made. The second example of container lid 260 differs from the first example (as shown in figure 8a) with regard to substantially straight part 269.

[0199] In the second example, first outwardly curved part 266 is connected to second outwardly curved part 274 by means of bent part 261. Bent part 261 comprises substantially straight and inwardly extending subpart 263, bend 267 and substantially straight and outwardly extending subpart 265. Substantially straight and inwardly extending subpart 263 is connected to first outwardly curved part 266, whereas substantially straight and outwardly extending subpart 265 is connected to second outwardly curved part 274. Bend 267 connects substantially straight and inwardly extending subpart 263 with substantially straight and outwardly extending subpart 265. Bend part 261, and especially bend 267 thereof, forms a clamping edge that clamps container lid 260 with even more clamping force on a container. In use of container lid 260, bend part 261, especially bend 267 thereof, is viewed in vertical direction z positioned underneath and against third part 20, 120, thus further increasing the clamping force.

[0200] In a third example (see figure 9), container lid 360 is substantially similar to container lid 260 shown in figures 7, 8a and 8b, and similar features are referred to with similar reference numbers. For the description of these similar features is referred to the description provided above. A difference between the two examples of central lid 260, 360 is that the form of the second curved

part 388 of edge portion 364 differs from the form of second (outwardly) curved part 274. In this example, second curved part 388 is second inwardly curved part 388. Second inwardly curved part 388 is provided with first downwardly and inwardly curved subpart 390 and with second curved subpart 392 that forms an inward curl.

[0201] First subpart 390 and second subpart 392 each have a respective radius of curvature RL5, RL6 that in this example differ from each other. In fact, first subpart 390 has a composite radius of curvature RL5 that comprises multiple different radii of curvature that are provided as a single composite radius of curvature RL5.

[0202] Although first outwardly curved part 366 and second inwardly curved part 388 could be directed connected to each other, in this example a substantially straight portion 369 is provided. Straight portion 369 may extend downward in a straight line or may extend slightly inwardly.

[0203] In an example of container assembly 500 (see figure 10a) container assembly 500 comprises container 502 and lid 560. Container 502 comprises container body 503 having bottom wall 504 and side wall 506. In this example container body 503 has a frustoconical shape. Side wall 506 has first end 508 that in this example is connected to bottom wall 504 by means of a folded edge 508. It is noted that other connection means, such as soldering are also possible. Side wall 506 extends in first direction z towards second end 510. Container 502 is further provided with nose-shaped edge portion 512 that is positioned at second end 510 of side wall 506. Second end 510 and nose-shaped edge portion 512 together define opening (not visible) that in this example is closed by means of lid 560.

[0204] Lid 560 and nose-shaped edge portion 512 at second end 510 together form a sealing closure of container 502. Container 502 further comprises rim 524 that extends around the circumference of container 502.

[0205] In a more detailed view (see figure 10C), it can be seen that container lid 560 is clamped over nose-shaped edge portion 512 to provide a sealing closure of container 502. For completeness sake, it is noted that similar features are referred to with similar reference numbers in the different figures. For the description of these similar features is referred to the description of these features provided above. As is clearly visible (see figure 10C), second part 518 and third part 520 of nose-shaped edge portion 512 together clamp against inner side 571 of substantially straight portion 569.

[0206] It is further visible that first part 516 and a portion of second part 518 of edge portion 512 are in contact with sealing material 582 that is provided at an inner side of first outwardly curved part 566. Nose-shaped portion 512 is therewith provided inside space 572 that is formed by first subpart 568 and second subpart 570.

[0207] In a second example of container assembly 600 according to the invention (see figure 10b), container 602 comprises container body 603 having bottom wall 604 and side wall 606. In this example container body 603

has a frustoconical shape and is manufactured from a single piece of sheet metal. Side wall 606 has first end 608 that in this example is connected to bottom wall 604 by means of a folded edge 608. It is noted that other connection means, such as soldering are also possible. Side wall 606 extends in first direction z towards second end 610. Container 602 is further provided with nose-shaped edge portion 612 that is positioned at second end 610 of side wall 606. Second end 610 and nose-shaped edge portion 612 together define an opening (not visible) that is closed with lid 660. Lid 660 and nose-shaped edge portion 612 together form a sealing closure of container 602.

[0208] In an example of method 1000 for manufacturing a container 2, 102, 502, 602, method 1000 comprises the steps of providing 1002 a sheet metal blank and manufacturing 1004 a side wall and a bottom wall from the sheet metal blank. Method 1000 further comprises shaping 1006 a top end of the side wall into a rim and shaping 1008 an edge portion to provide a nose-shaped edge portion.

The step 1006 of shaping of the top end of the side wall in this example of the method comprises folding 1010 the end of the side wall to form an edge portion. Step 1008 may include the optional steps of outwardly curving 1012, with a first radius of curvature, a first part of the edge portion and curving outwardly 1014, with a second radius of curvature, a second part of the edge portion. The first radius of curvature and the second radius of curvature may be different.

[0209] In this example, method 1000 further comprises the step of providing 1016 a bottom wall. This step can be performed simultaneously with step 1004 and optional steps of forming 1018 the blank into a cylindrical pre-shape and expanding 1020 the pre-shape to a cylindrical or frusto-conical shape to form the container side wall. Further optionally, method 1000 may optionally also comprise the step of providing 1020 a flange on a bottom end of the side wall, which is then performed in advance of the step of attaching 1022 the bottom to a bottom end of the side wall.

[0210] In this example, method 1000 also shows the optional step of providing 1024 a pre-rim on the top end of the side wall and, the further optional step of providing 1026 a bead in the side wall. Preferably, these optional steps are performed before step 1006. Method 1000 in this example also discloses the further optional step of providing 1028 a handle to the container. This step may include the step of manufacturing 1030a openings in the rim for attaching a handle and attaching 1032 the handle to the openings or, alternatively attaching 1030b ears that are configured to rotatably hold a handle and attaching 1032 the handle to the ears on the side wall.

[0211] In an example of method 2000 for manufacturing a container lid (see figure 12), method 2000 comprises the steps of providing 2050 a sheet metal plate, shaping 2054 the plate to provide a central lid portion, and shaping 2056 the plate to provide a lid edge portion to

the container lid. The steps of shaping 2054, 2056 may be performed as a single step of shaping 2052.

[0212] The step of shaping 2056 the lid edge portion in this example comprises the step of providing 2058 an outwardly curving part adapted to engage with a nose-shaped outer edge of a container. This step of providing 2058 may in turn comprise the steps of providing 2060 a first curved subpart extending outwardly and upwardly and having a first radius of curvature, and providing 2062 a second curved subpart extending outwardly and downwardly and having a second radius of curvature.

[0213] The step of shaping 2056 the lid edge portion in this example also comprises the step of forming 2064 a second curved part. This step may comprise the step of forming 2066 a second curved part that substantially has a U-shape with an upwardly directed open end and is outwardly curved, with the second part extending from the first curved part. It may however also comprise the step of forming 2068 a second curved part that substantially has a circular shape that is inwardly curled, with the second part extending from the first curved part. It is noted that both of these method steps may be part of the method independently of the other features or steps, including optional steps, that are described in this example.

[0214] Method 2000 may optionally and/or additionally also comprise, in the step of shaping 2054, the step of pressing 2070 at least part of the edge portion inwards towards a central axis of the container lid, or, alternatively, pressing 2070 the second curved part inward.

[0215] In addition, method 2000 in this example includes the optional step of pre-curling 2072 the edge portion before performing the step of shaping 2052 the plate.

[0216] Further additionally, method 2000 in this example comprises the optional step of attaching 2074 a sealing compound in the edge portion.

[0217] In an example, method 3000 (see figure 13) comprises one or more steps of method 1000 and one or more steps of method 2000 and further may comprise the step of assembling 3100 of the container and the container lid.

[0218] The present invention is by no means limited to the above described preferred embodiments and/or experiments thereof. The rights sought are defined by the following claims within the scope of which many modifications can be envisaged.

Claims

1. A container having a container body comprising:

- a bottom wall;
- a side wall having a first end that is connected to the bottom wall and that extends from the first end to an opposite, second end;
- an edge portion at the second end of the side wall; and
- a rim that extends from the edge portion; and

wherein the edge portion, when viewed from a central container axis, comprises an outwardly directed nose-shaped portion.

2. Container according to claim 1, wherein the nose-shaped portion, when viewed from a central axis outwardly, comprises:

- a first part that is outwardly curved and that has a first curvature; and
- a second part that is curved outwardly and, when viewed towards the bottom end, downwardly and that has a second curvature,

wherein the first curvature and the second curvature are different, and preferably wherein the first curvature is larger than the second curvature.

3. Container according to claim 2, wherein the nose-shaped portion, when viewed from the central axis outwardly, comprises a third part that is curved inwardly and, when viewed towards the bottom end, downwardly, wherein the third part preferably emanates in a groove portion; and/or wherein the container body further comprises a groove portion that extends downwardly from the edge portion.

4. Container according to one or more of the preceding claims, wherein the rim comprises a first curved rim part that extends downwardly and outwardly from the edge portion, or wherein, when dependent on claim 3, the rim comprises a first curved rim part that extends downwardly and outwardly from the groove portion, and optionally wherein:

- the rim comprises a second curved rim part that extends from the first rim part in an inwardly and at least partially upwardly curve; or
- the rim comprises a second rim part that extends substantially straight downwardly from the first rim part.

5. Container according to claim 4, wherein the side wall and the edge portion, and optionally the rim and/or the groove portion, are manufactured from a single piece of material.

6. Container according to any one of the preceding claims, wherein the container body has a cylindrical or frustoconical shape and/or

wherein the side wall comprises a circumferential bead that is positioned at a predetermined distance from the rim; and/or

wherein the container is manufactured from a metallic material, wherein the metallic material preferably is one or more of sheet metal, (stain-

less) steel, aluminum or a laminate containing metal

7. Container according to any one or more of the preceding claims, wherein the container body comprises a handle, and wherein:

- the container body further comprises two ears that are connected to the side wall on opposite sides of the container and wherein the handle is connected, preferably rotatably connected, to the ears; or
- when dependent on claim 4, the handle is connected, preferably rotatably connected, to the straight rim part.

8. Container lid comprising a central lid portion and an edge portion, wherein the edge portion, when viewed from a central lid axis, comprises an outwardly curved part that is adapted to engage with a nose-shaped edge portion of a container to form a sealing connection therewith, and preferably wherein the container lid is adapted to cooperate with a container according to one or more of the preceding claims to form a reclosable, sealed closure; and optionally wherein the lid is manufactured from a metallic material, wherein the metallic material preferably is one or more of sheet metal, (stainless) steel, aluminum or a laminate containing metal.

9. Container lid according to claim 8, wherein the outwardly curved part comprises:

- a first curved subpart extending outwardly and upwardly and having a first curvature;
 - a second curved subpart extending outwardly and downwardly and having a second curvature, and
- wherein the first and the second curvature preferably are different from each other; and/or wherein the outwardly curved part has a shape chosen from the group of: a semi-circular shape, a nose-shape or a semi-oval shape; and/or wherein the outwardly curved part of the edge portion is, on an inner side of the curvature, provided with a sealing compound; and/or wherein the edge portion further comprises:

- a second outwardly curved part that is shaped as an outward curl; or
- a second inwardly curved part that is shaped as an inward curl.

10. Container assembly comprising:

- a container according to one or more of the claims 1 - 7; and
- a container lid according to one or more of the

claims 8-9,

and preferably wherein a circumference of at least a part of the edge portion of the container lid, when measured from the central lid axis, is smaller than a circumference of the edge portion of the container, when measured from the central container axis.

- 11.** Method for manufacturing a container, comprising the steps of:

- providing at least one sheet metal blank;
- manufacturing a side wall and a bottom wall from the at least one sheet metal blank;
- shaping a top end of the side wall into a rim; and
- shaping an edge portion to provide a nose-shaped edge portion.

- 12.** Method according to claim 11, wherein the step of shaping of the top end of the side wall comprises folding or bending the end of the side wall to form an edge portion and/or comprises performing a rolling operation or die operation of the end of the side wall to form an edge portion; and/or:
wherein the step of shaping the edge portion to provide a nose-shaped edge portion comprises the steps of:

- outwardly curving with a first curvature a first part of the edge portion, and
- curving outwardly with a second curvature a second part of the edge portion; wherein the first curvature and the second curvature are different, and preferably wherein the first curvature is larger than the second curvature.

- 13.** Method for manufacturing a container lid, the method comprising the steps of:

- providing a plate, preferably from sheet metal;
- shaping the plate to provide a central lid portion; and
- shaping the plate to provide a lid edge portion to the container lid.

- 14.** Method according to claim 13, wherein the step of shaping the lid edge portion comprises providing an outwardly curving part adapted to engage with a nose-shaped outer edge of a container to form a sealing connection therewith, and optionally further comprises:

- shaping a second curved part as an outward curl, wherein the second curved part extends from the outwardly curved part; or
- shaping a second curved part as an inward curl, wherein the second curved part extends from the outwardly curved part; and/or wherein

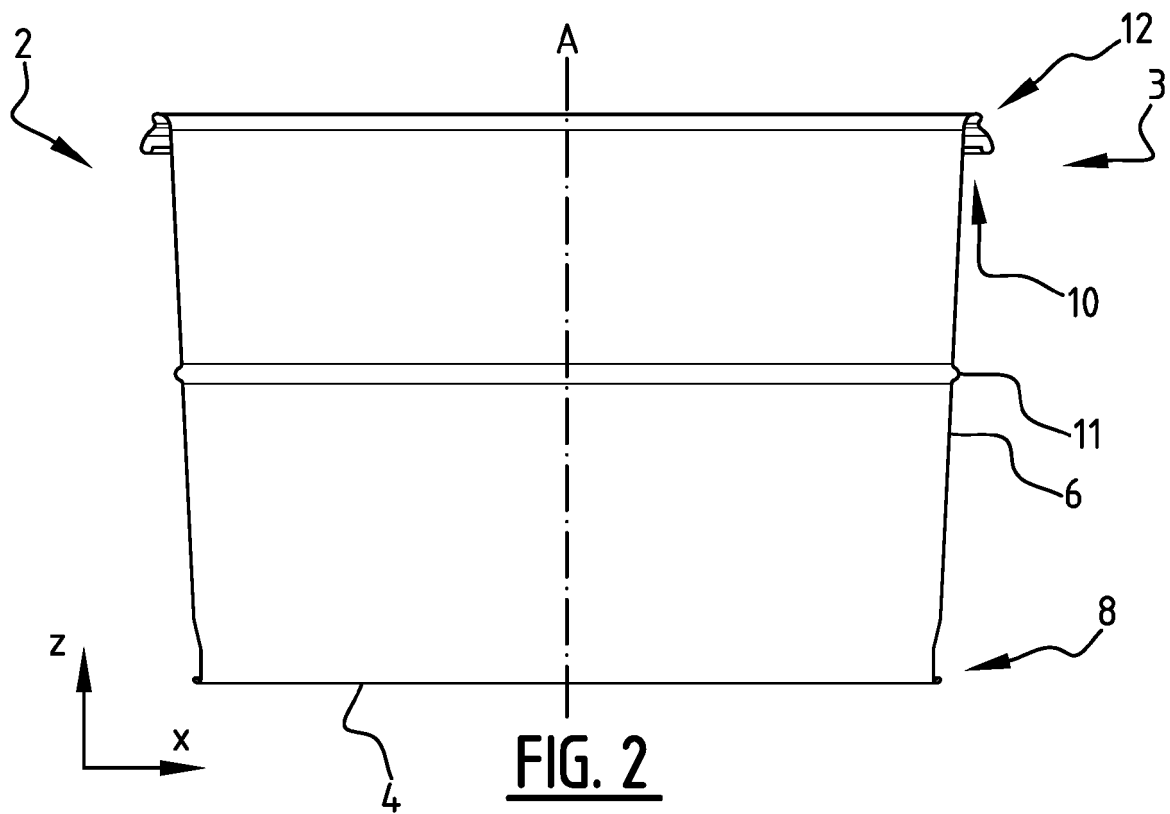
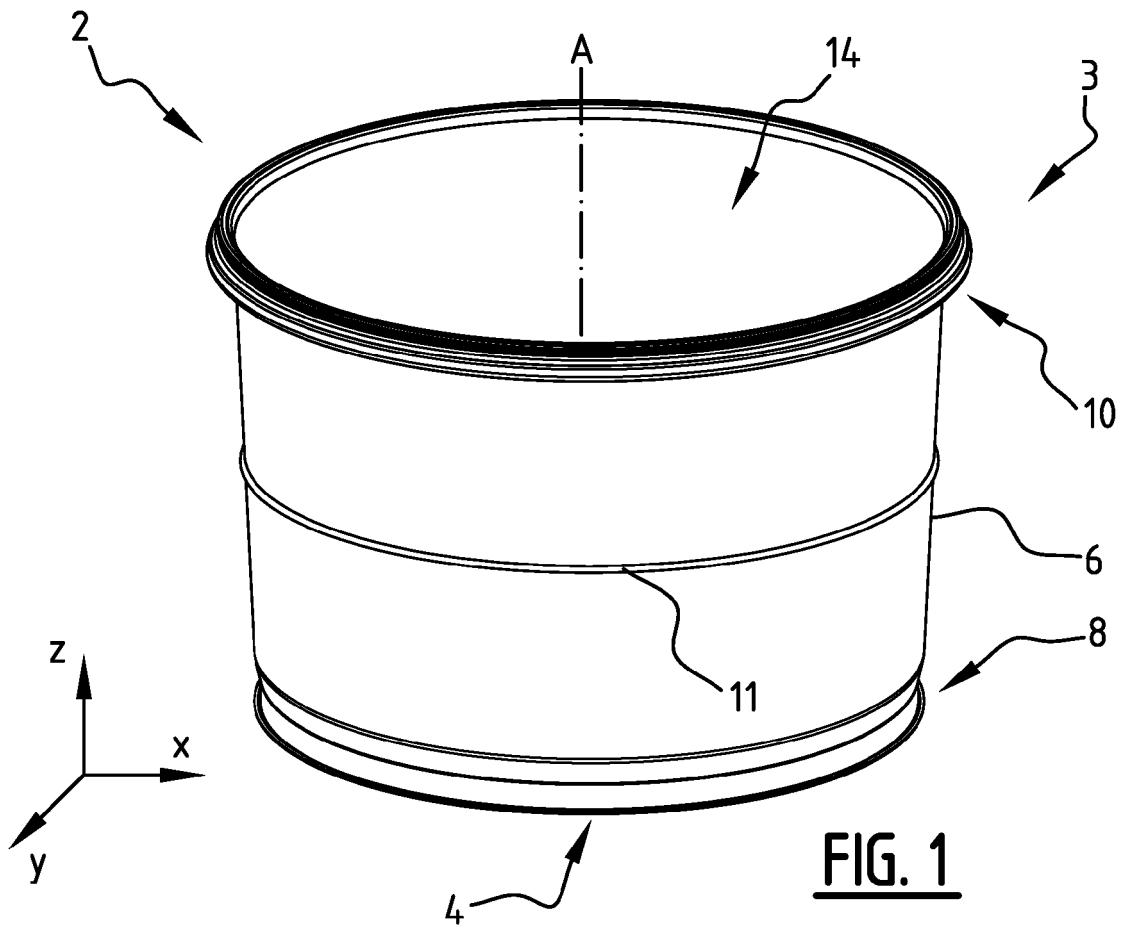
the step of providing the outwardly curving part comprises the steps of:

- providing a first curved subpart extending outwardly and upwardly and having a first curvature; and
- a second curved subpart extending outwardly and downwardly and having a second curvature,

wherein the first and the second curvature preferably are different from each other.

- 15.** Method for manufacturing a container assembly, the method comprising:

- manufacturing a container according to one or more of the claims 1 - 7;
- manufacturing a container lid according to one or more of the claims 8-9; and
- assembling the container and the container lid; and preferably wherein the step of manufacturing the container is performed using the method according to any one of the claims 11 or 12; and/or preferably wherein the step of manufacturing the container lid is performed using the method according to any one of the claims 13 or 14.



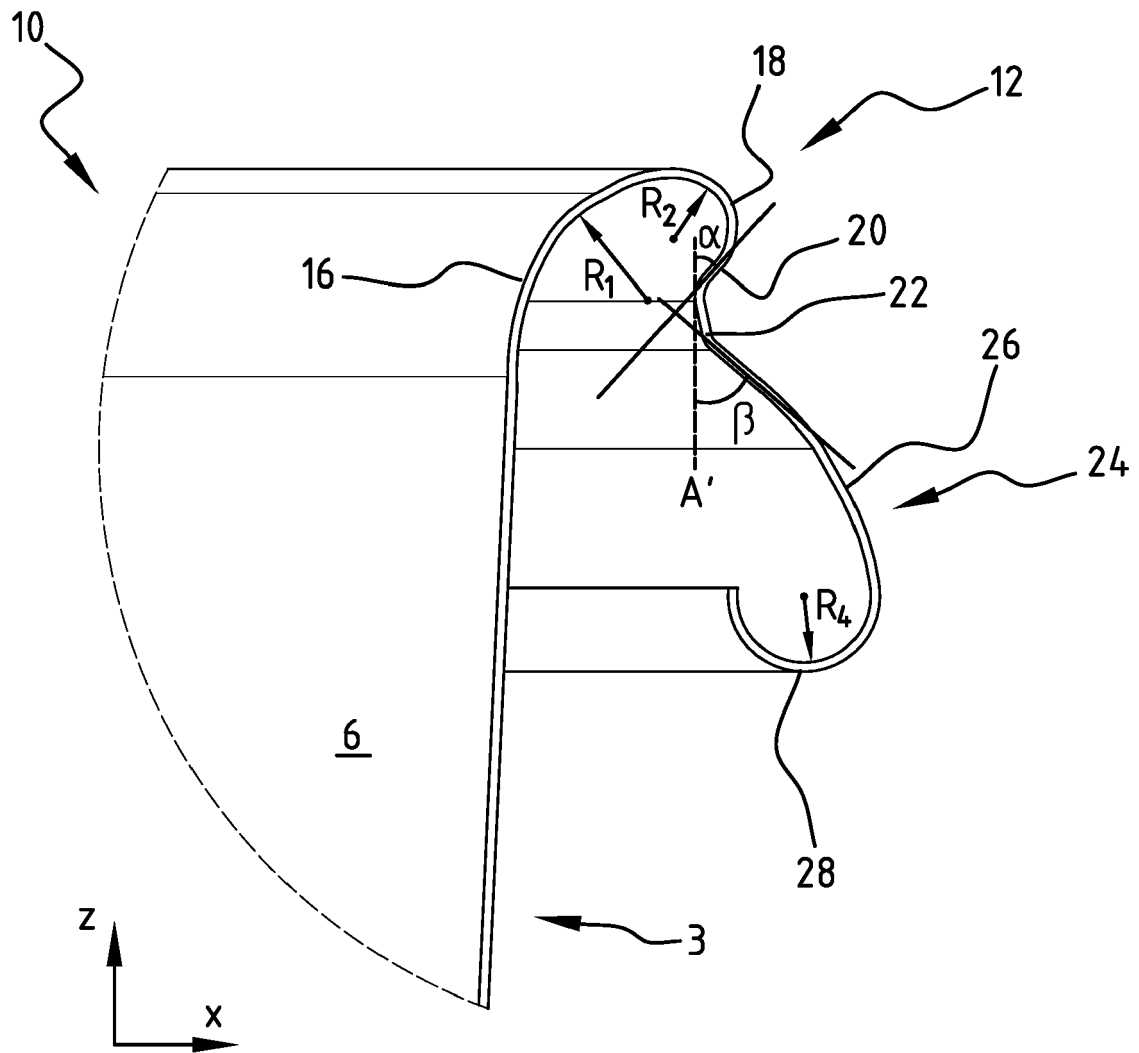
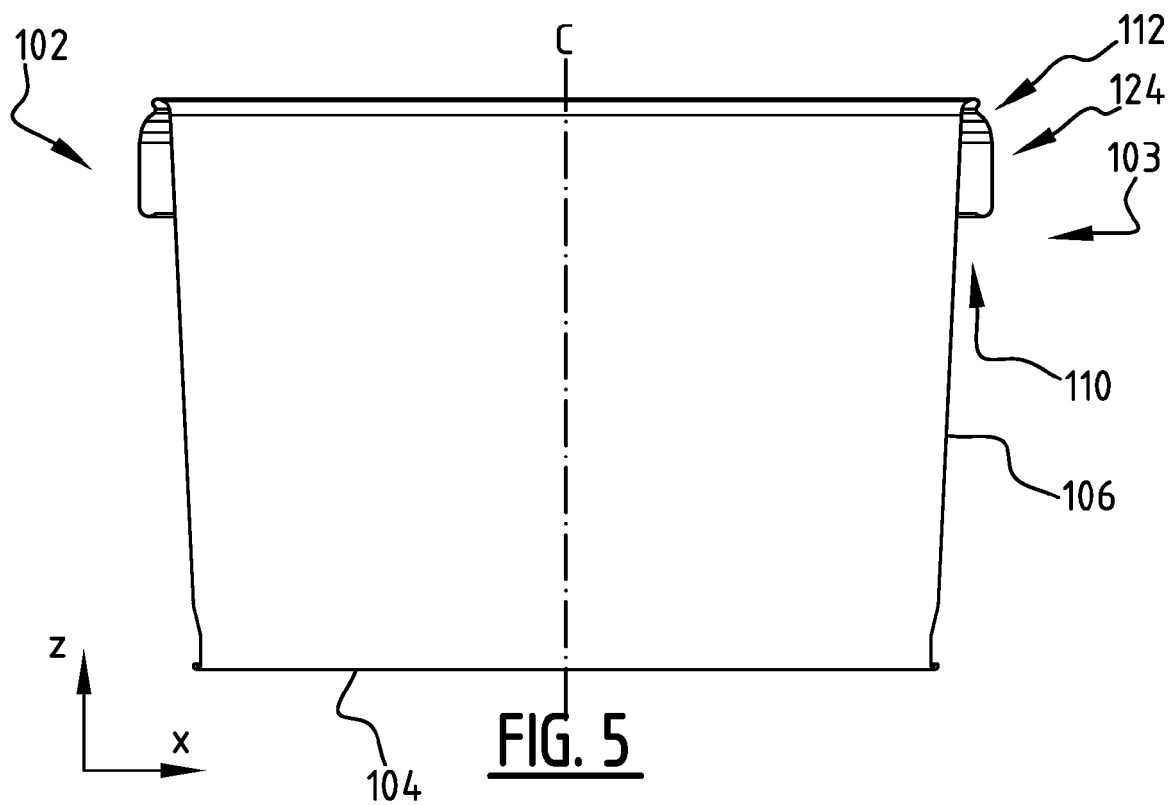
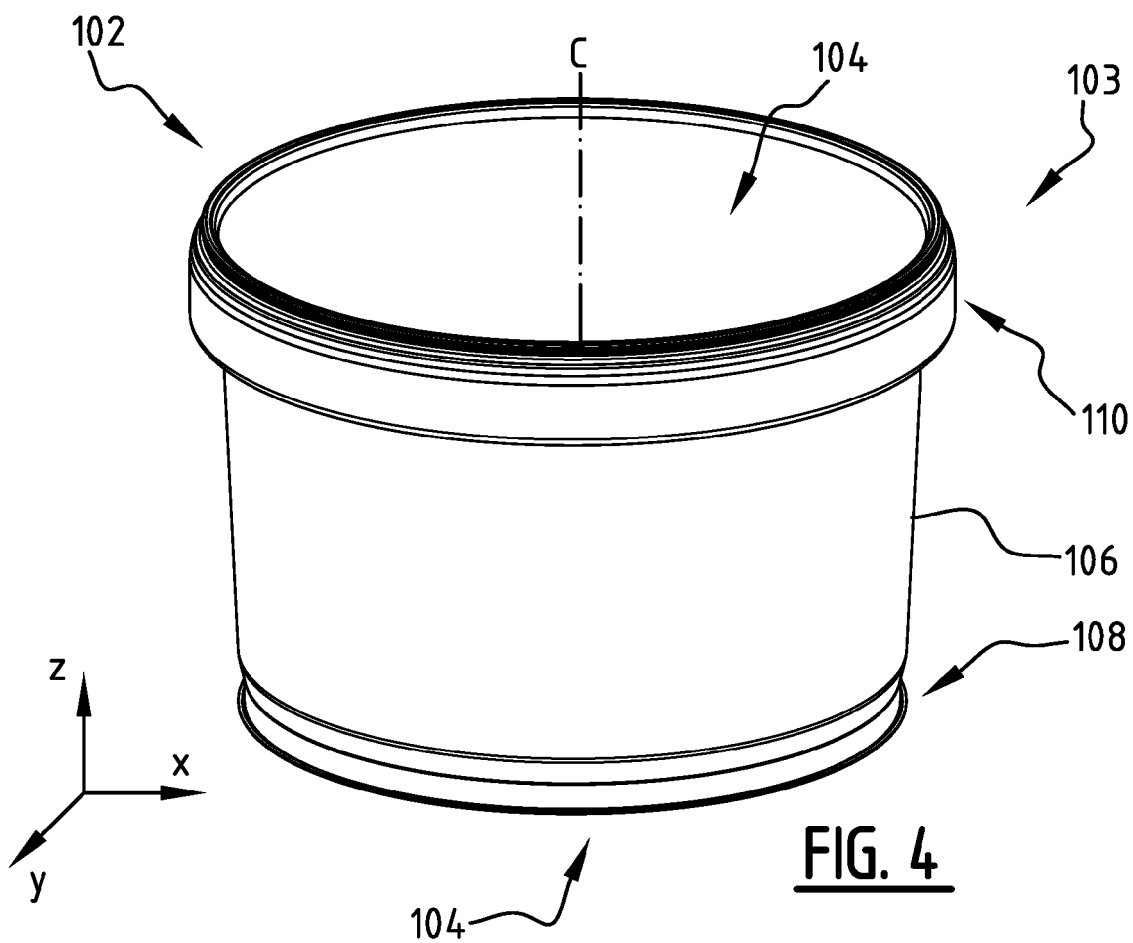
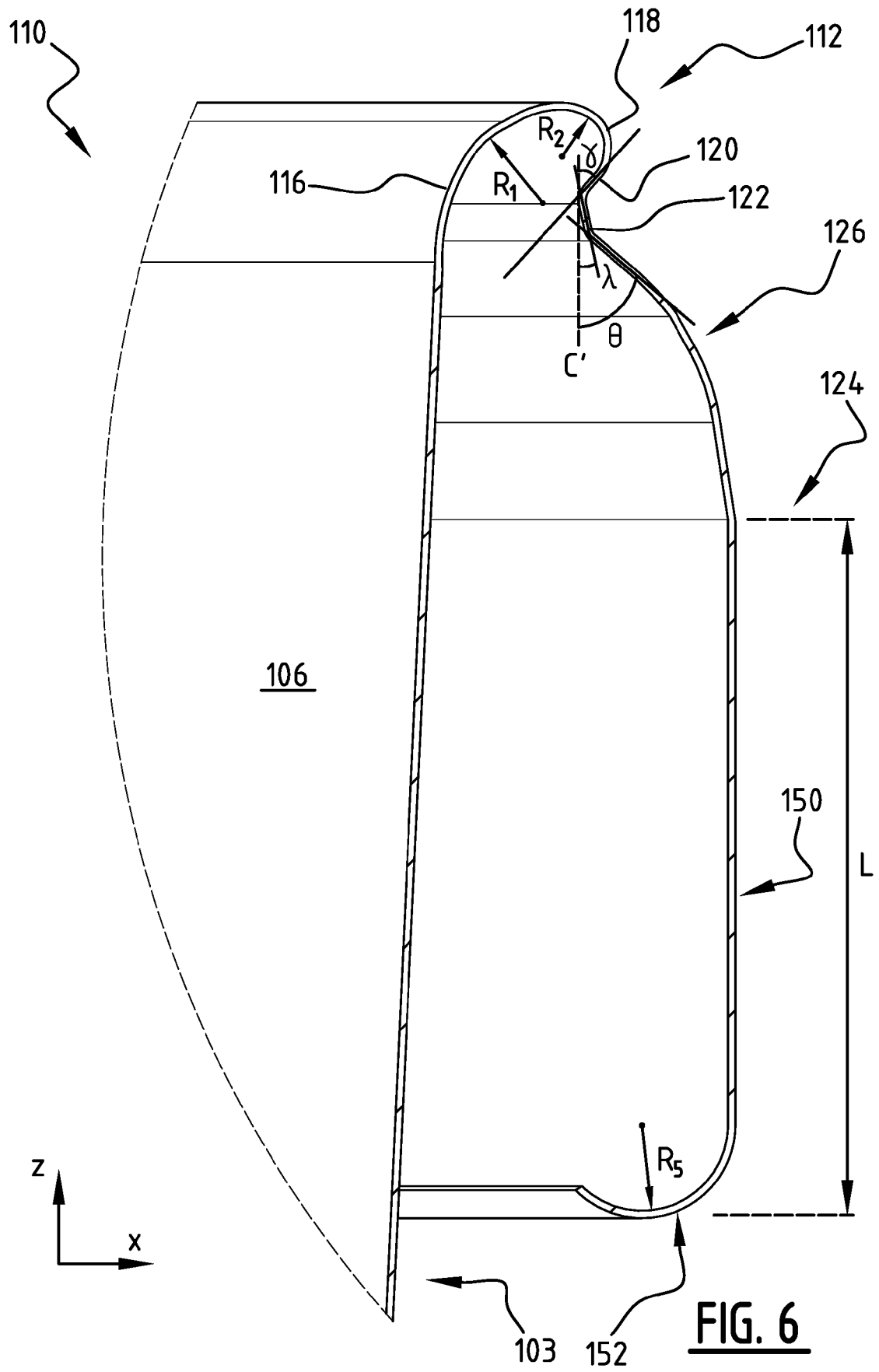
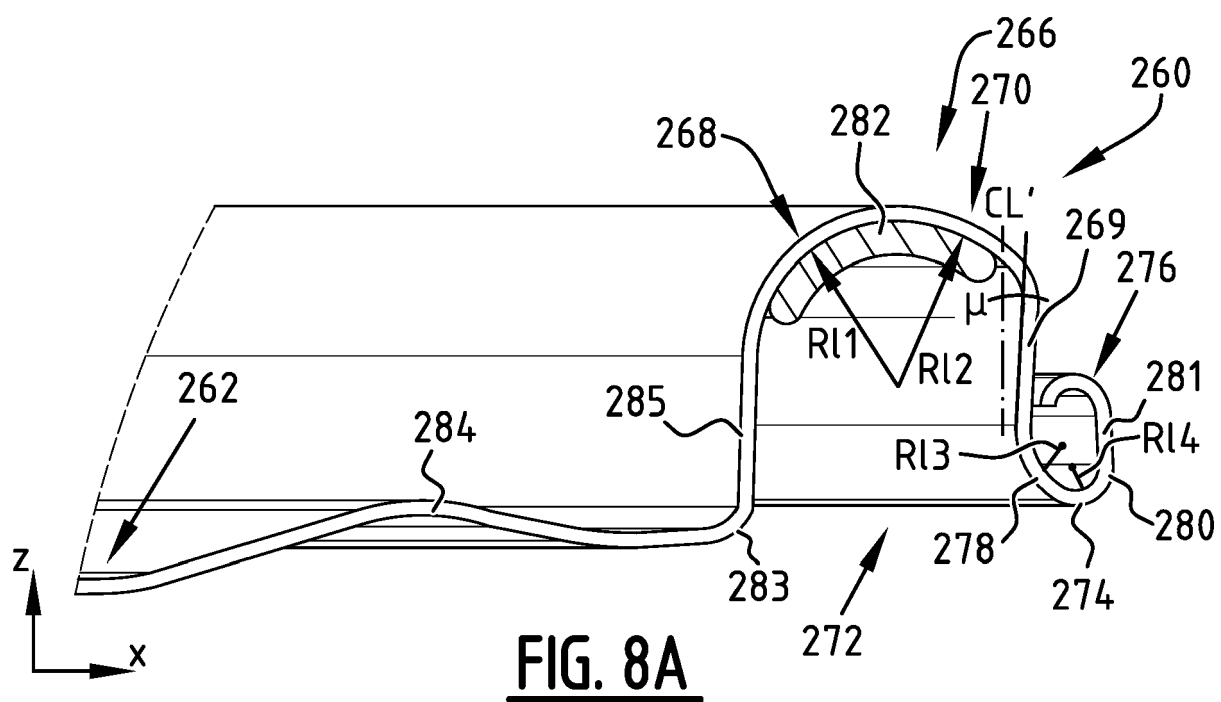
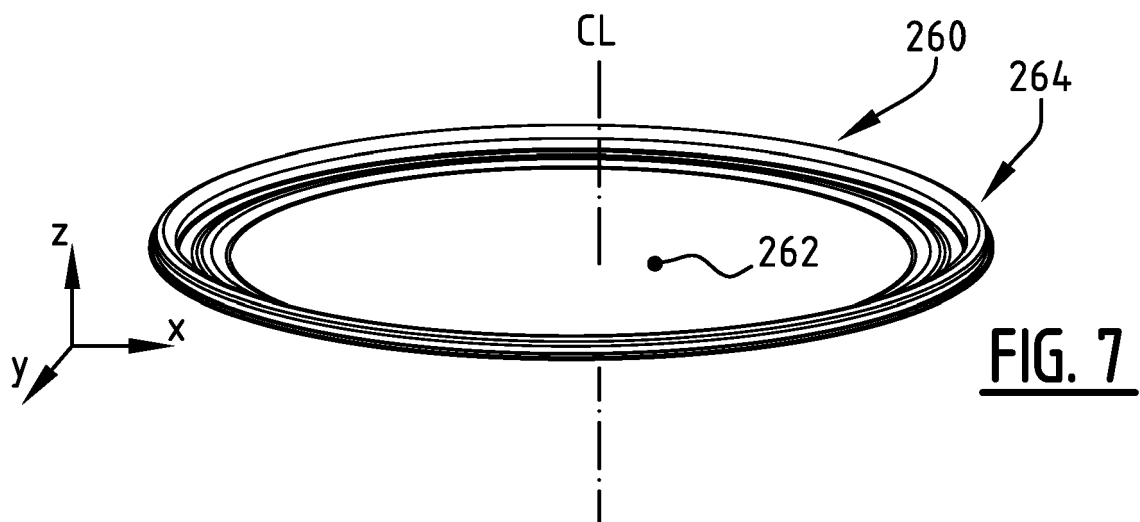
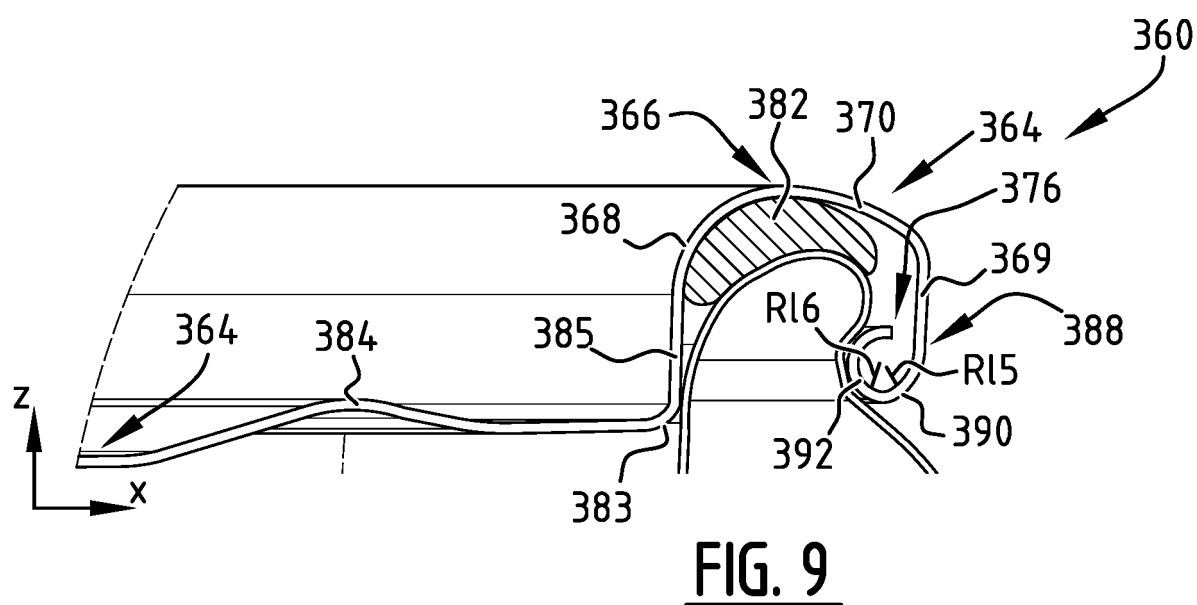
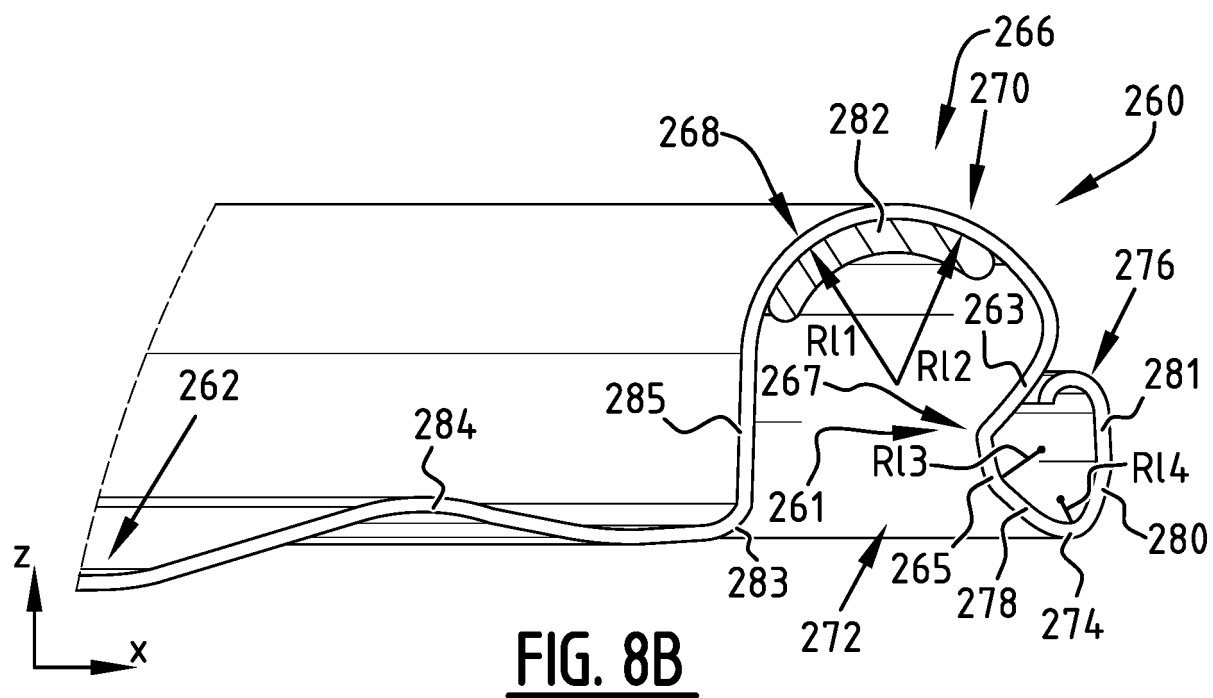


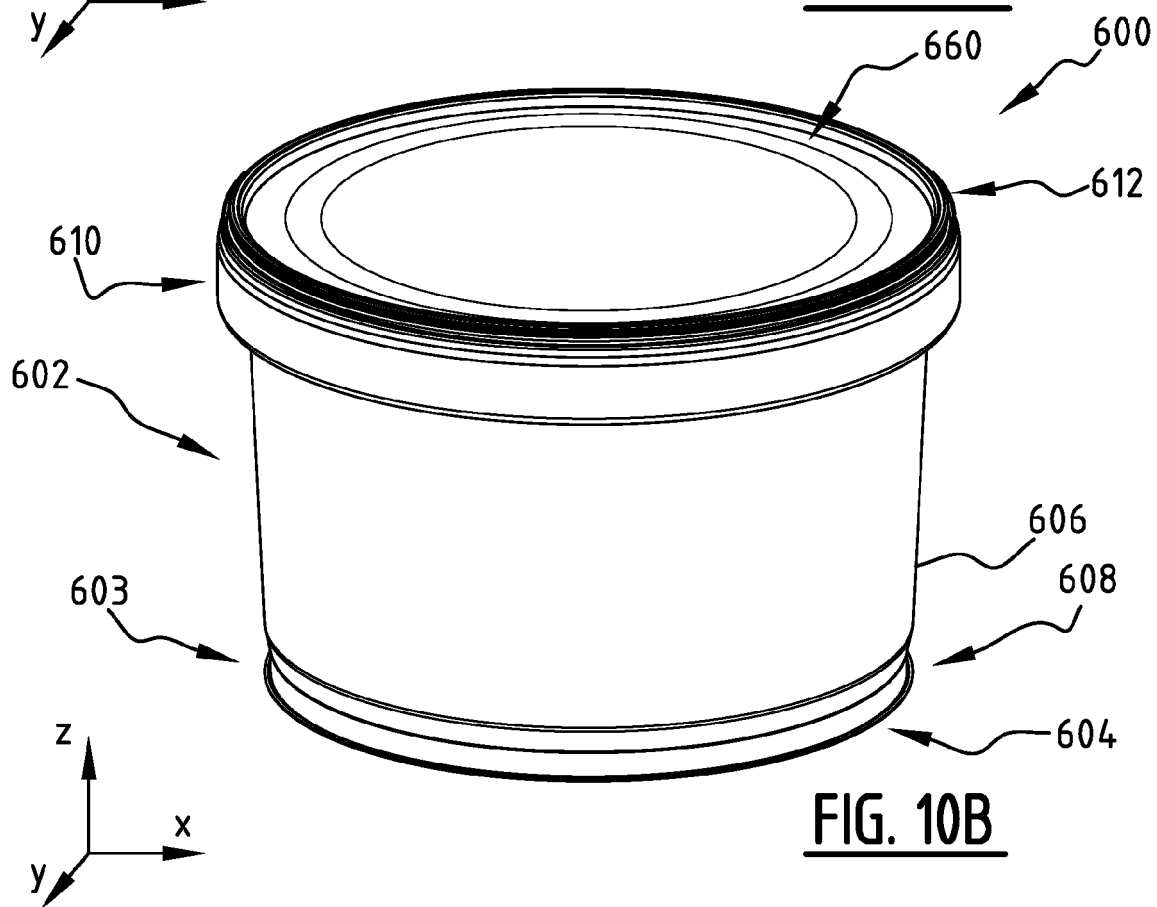
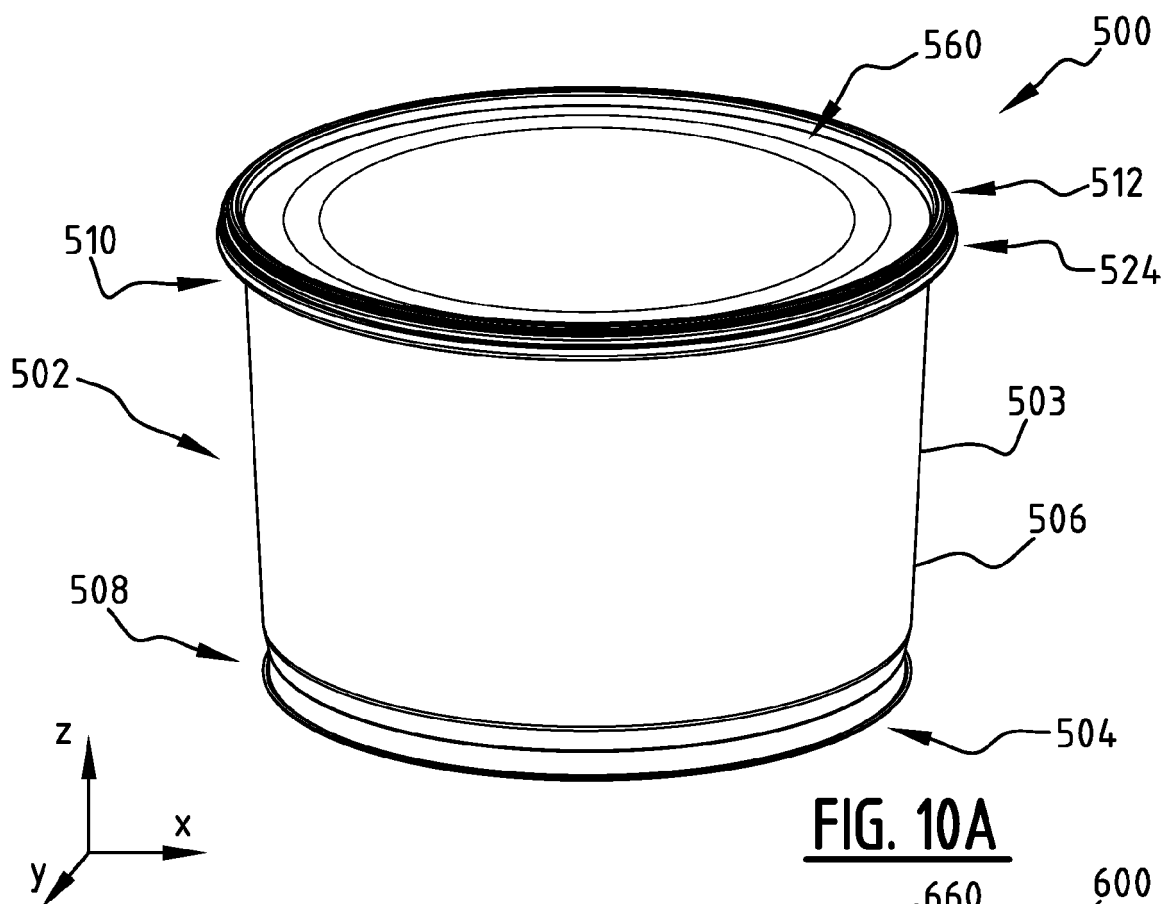
FIG. 3











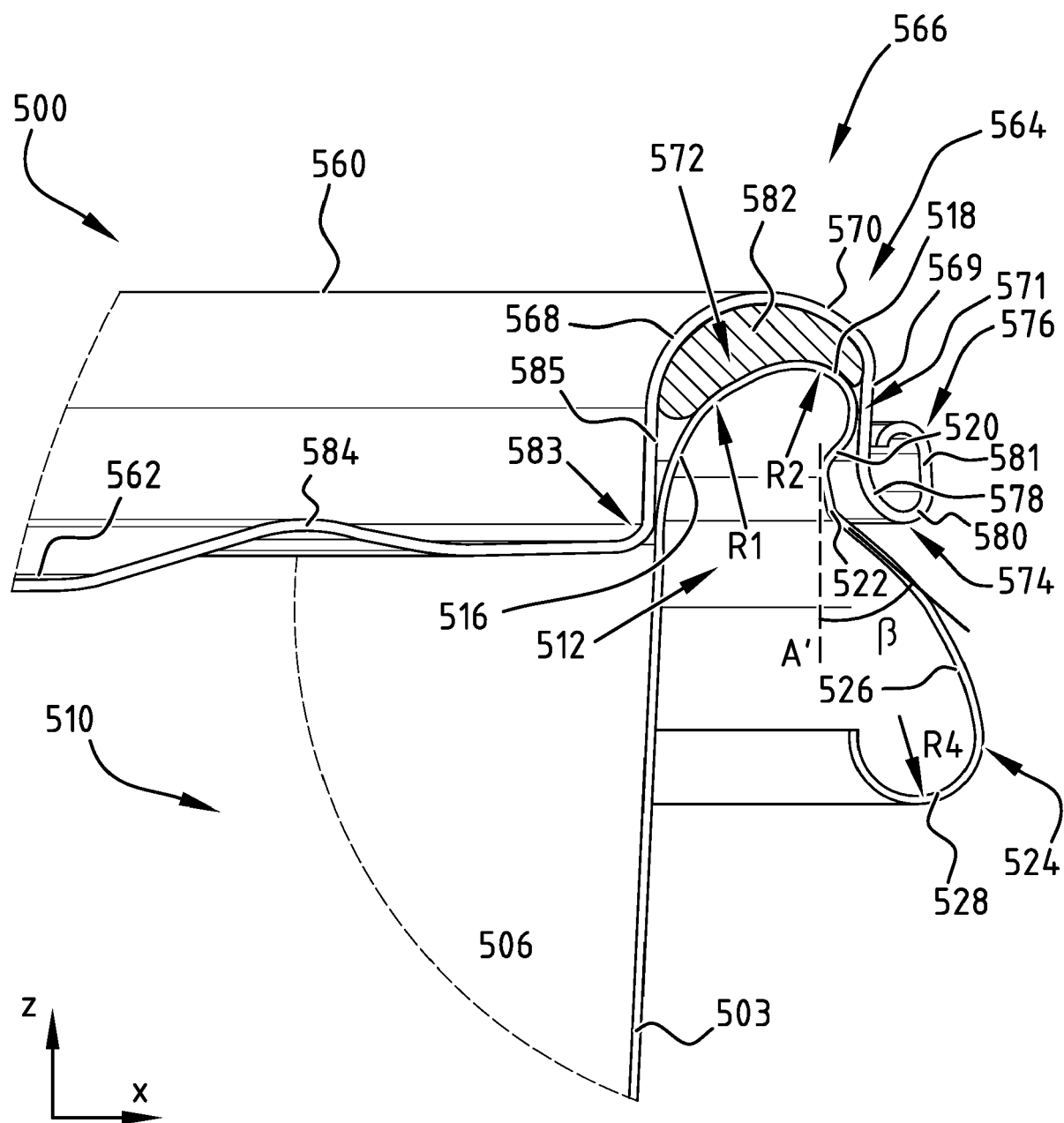
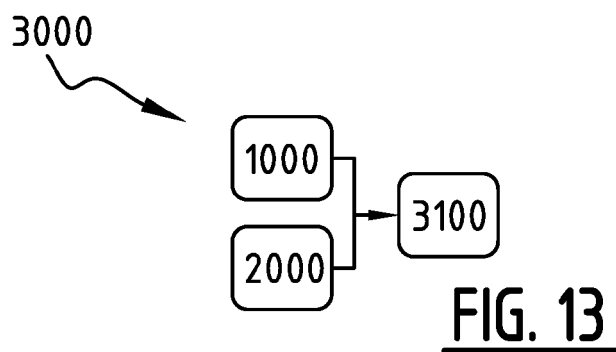
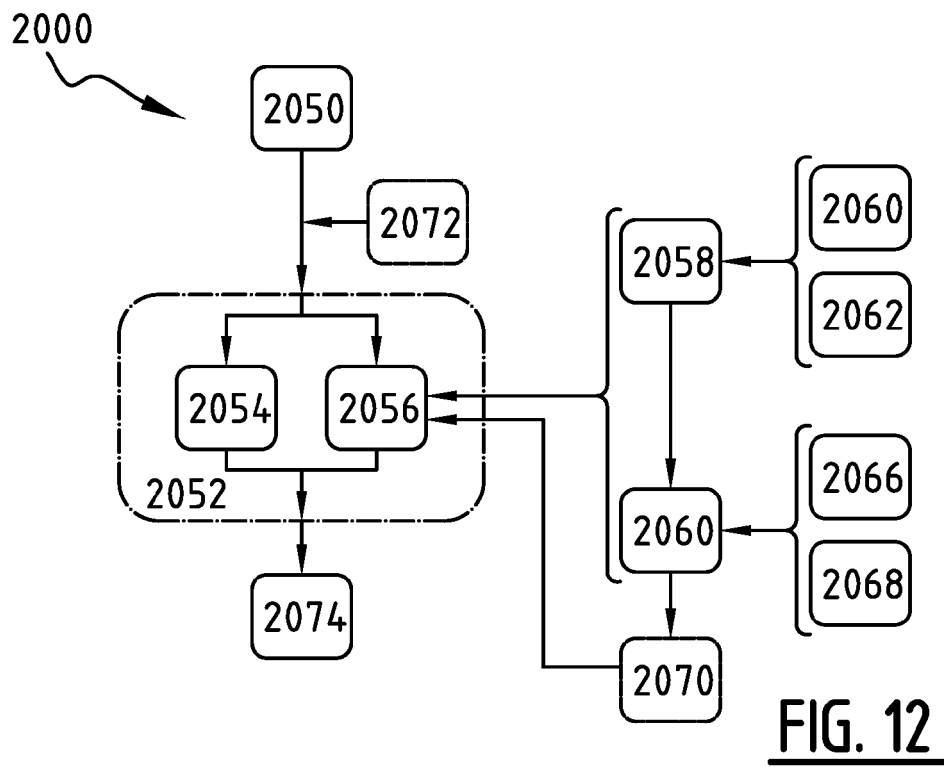
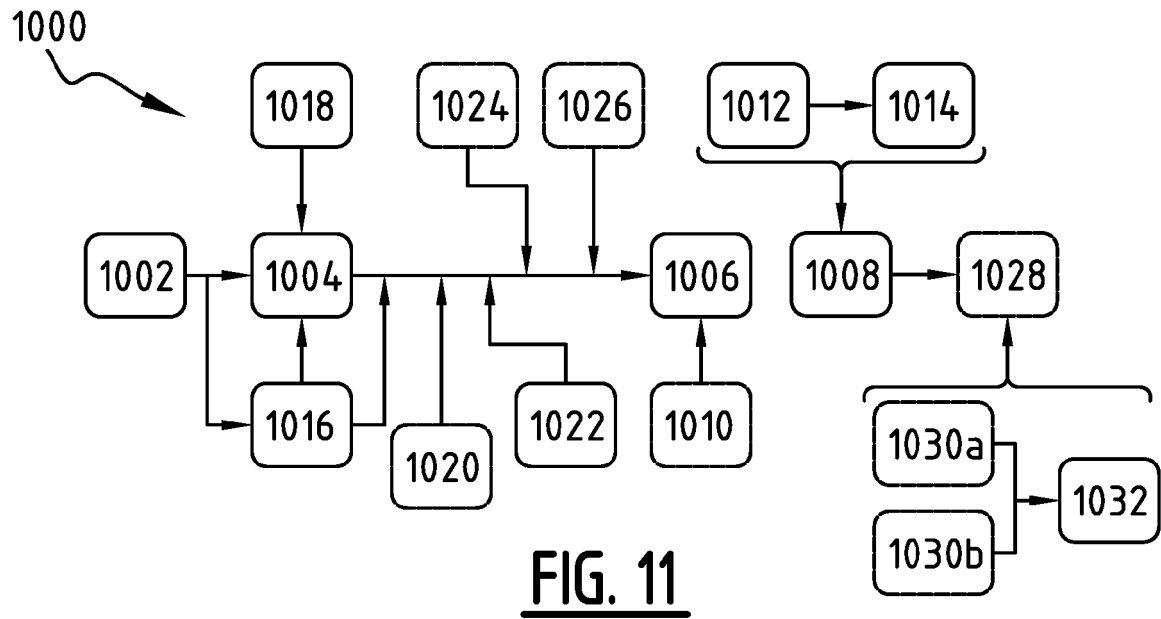


FIG. 10C





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