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(54) CONTAINER COMPRISING AN OUTER SKELETON AND AN INNER LINING AFFIXED TO THE OUTER SKELETON

(57) Container comprising an outer skeleton (2) and an inner lining (3) that is internally affixed to the outer skeleton (2), the container (1) having an upper annular flange (9) and a side wall (6) which comprises a succession of first portions (11) and second portions (12) that follow one another, alternately. Each first portion (11) comprises a first part (13) consisting of the outer skeleton (2), and a second part (14) consisting of the inner lining (3), the first part (13) and the second part (14) being coupled together and extending for the entire height of the side wall (6). Each second portion (12) consists only of the inner lining (3), and also extends for the entire height of the side wall (6).

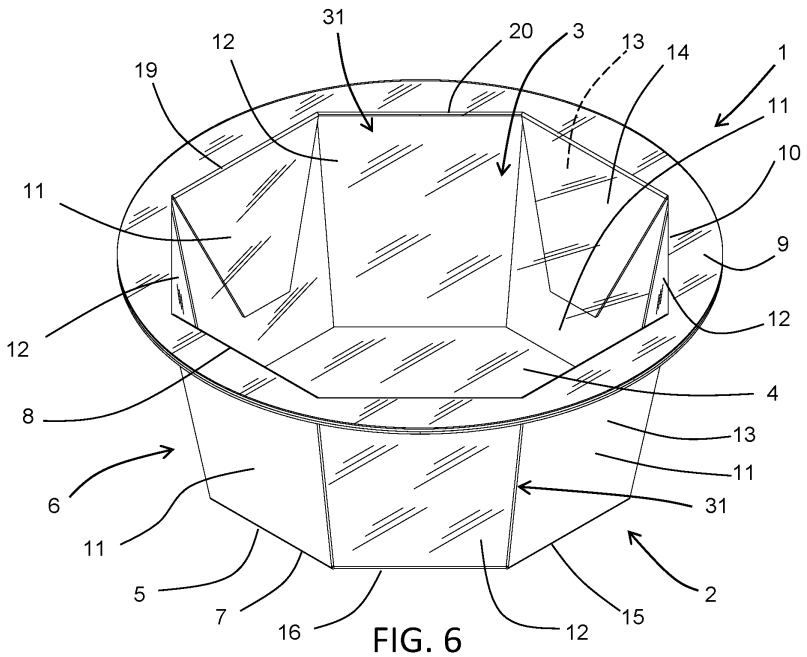


FIG. 6

EP 4 545 432 A1

Description

[0001] This invention relates to a container comprising an outer skeleton and an inner lining affixed to the outer skeleton, wherein the inner lining is made of plastic material, in particular composed of a thermoplastic material thermoformed on the outer skeleton.

[0002] The containers for which this invention is intended are, therefore, containers which overall have the shape of a tray or a tub with a bottom wall, a side wall and an upper flange, and in which the outer skeleton forms the structural part whilst the plastic inner lining makes it watertight and, if necessary, acts as a barrier to oxygen.

[0003] In particular, this invention was devised with reference to the prior art type of containers in which the outer skeleton consists of a paper and cardboard industry article, that is to say, a cellulose material-based article (paper, cardboard or paperboard), which comprises a plurality of flaps of material connected to each other, usually provided with fold lines, and which, starting from a spread out configuration in which they develop mainly in one plane, may be brought into a three-dimensional configuration corresponding to the shape of the outer skeleton to be formed, by means of suitable folds and connections between the various flaps. Despite that, this invention is not linked to the material of which the outer skeleton is composed.

[0004] At present, containers of this type may belong to various types.

[0005] In the first type the outer skeleton is formed by a single sheet of cardboard or paperboard which extends continuously on the entire outer surface of the container. That sheet, before adopting the three-dimensional shape of the skeleton, has a central zone (that intended to form the bottom wall of the skeleton, surrounded by a main annular portion of material, intended to form the side wall of the skeleton. During upward folding of the side wall relative to the bottom wall, in the side wall itself wrinkled zones are created suitable for compensating for the smaller surface area deriving from the folding. In many applications, the main annular portion is surrounded by a further secondary annular portion suitable for forming a perimeter flange of the container, which develops outward starting from the upper edge of the side wall. Since the perimeter flange also extends in plan view less than the secondary annular portion, the wrinkled zones also continue on the annular flange.

[0006] In contrast, in the second prior art type, the outer skeleton comprises a single sheet of material in which there is a main flap, and a plurality of secondary flaps which develop outwards from the main flap. The main flap is the one which in the container is positioned at the bottom wall, whilst the secondary flaps are those which in the container are positioned at the side wall. Depending on the embodiments, the secondary flaps may or may not comprise outer projections which, if present, are positioned at the upper perimeter flange of the container.

[0007] Unlike those of the first type described above, the skeletons of the second type usually do not have wrinkled zones, and a degree of continuity of the perimeter flange is obtained exclusively by attempting to draw the edges of the adjacent flaps as near to each other as possible. Examples of containers which use outer skeletons of the second type are described in the following documents: US 3358900, US 3489331, US 4046310, FR 2406522, US 5253801, FR 2826938, FR 2933329, WO 2012/049005 and WO 2018/017783.

[0008] However, both of these prior art technologies have several major disadvantages.

[0009] In fact, the containers of the type of interest for this invention are containers which, in many cases, must allow the packaging of food products in controlled atmosphere conditions. For that purpose, the inner thermoplastic material is such that it guarantees preservation of the protective atmosphere for the entire useful like of the food product and is intended to be coupled, once the product has been inserted into the container, to an upper protective film with similar features, which is sealed to the inner thermoplastic material. With both prior art types of containers described above, the sealing is usually performed at the perimeter flange, but may also extend on the rest of the free surface of the container (known as Skin packaging).

[0010] However, over the years it was possible to ascertain that the two types of outer skeleton described above, although able to guarantee the container mechanical stiffness, at the perimeter flange make operations for sealing the upper protective film very critical. In fact, at the wrinkled zones or the zones of discontinuity of the skeleton respectively, the sealing may in many cases prove to be either ineffective (that is to say, small air passages remain) or in any case weak (that is to say, such as to yield easily as a result of handling by users).

[0011] In an attempt to overcome this disadvantage, further embodiments were proposed featuring the fact that, at the perimeter flange, the skeleton comprises a continuous, flat annular portion.

[0012] In a first example of this type, described for example in patent application WO 2020/033350 A1, the outer skeleton is obtained from a single sheet of material folded on itself, and the side wall and the bottom wall are defined by wings of the skeleton which develop starting from the continuous annular portion (inward or inward from it while the sheet is in the spread out configuration). A second example of containers in which the skeleton has a continuous flange is described for example in patent applications WO 2019/020863 A2 and WO 1999/067143 A2, and in them the outer skeleton is formed by a plurality of separate sheets, one of which defines the annular frame at the annular flange, and one of which defines the skeleton at the bottom wall. The various sheets are fixed to each other by means of an adhesive, to make the skeleton on which the layer of thermoplastic material is then thermoformed.

[0013] A further type of containers in which the outer

skeleton has a continuous flange is described in patent application WO 2022/264022 A1 in the name of this same Applicant. In this case the outer skeleton is formed by two separate sheets. A first sheet develops at both the entire bottom wall, and the entire side wall, whilst a second sheet develops at the annular flange and has a series of wings which are superposed on the first sheet at the side walls. The two sheets are fixed to each other directly by the layer of thermoplastic material thermoformed on them.

[0014] In all of these prior art embodiments in which the outer skeleton has a continuous upper flange, despite developing across the entire side wall at that zone the skeleton is not continuous but is instead formed by a plurality of parts placed side by side.

[0015] Although all of these prior art types of containers in which the skeleton has a continuous, flat portion at the annular flange allow resolution of the previous problems linked to sealing of the final pack, they too are not without disadvantages.

[0016] As is known, the containers formed by an outer skeleton and an inner lining affixed to the outer skeleton, were devised and developed in order to obtain savings in plastic material compared with the containers formed exclusively using a thermoformed plastic material. That was done both to reduce the consumption of plastic in favour of using more recyclable materials (such as cellulose materials), and to reduce the costs of the containers.

[0017] Over the years containers were gradually developed and put on sale in which the thicknesses of the plastic material were gradually reduced, guaranteeing a further saving, the performance being equal.

[0018] Despite the optimum results already achieved regarding optimisation of the use of the plastic material, the Applicant realised that over the years in contrast little or nothing was done regarding optimisation of the use of the material which forms the outer skeleton (whether a cellulose material or other type of material) and that consumption of that material is now the main problem when making prior art containers.

[0019] In this context, the technical purpose which forms the basis of this invention is to make a container comprising an outer skeleton and an inner lining affixed to the outer skeleton which overcomes the above-mentioned disadvantages. In particular, the technical purpose of this invention is to make a container comprising an outer skeleton and an inner lining affixed to the outer skeleton which can be made using a quantity of material for making the outer skeleton that is less than is required for making prior art containers.

[0020] It is also the technical purpose of this invention to make a container comprising an outer skeleton and an inner lining affixed to the outer skeleton which also has sufficient structural stiffness.

[0021] The technical purpose and the aims indicated are substantially achieved by a container comprising an outer skeleton and an inner lining affixed to the outer skeleton, as defined in the independent claim 1. Particular embodiments of this invention are defined in the corresponding dependent claims.

[0022] Further features and the advantages of this invention will be more apparent from the detailed description of several preferred, non-limiting embodiments, of a container comprising an outer skeleton and an inner lining affixed to the outer skeleton illustrated in the accompanying drawings, in which:

- Figure 1 shows a first sheet which is part of an outer skeleton of a container according to a first embodiment of this invention;
- Figure 2 shows a second sheet which is part of the container according to the first embodiment of this invention;
- Figure 3 shows a variant of the first sheet of Figure 1, which is part of a container according to a second embodiment of this invention;
- Figure 4 shows a variant of the second sheet of Figure 2, which is part of the container according to the second embodiment of this invention;
- Figure 5 shows the outer skeleton of the container in accordance with the first embodiment of this invention, formed by joining the first sheet and the second sheet of Figures 1 and 2;
- Figure 6 shows the container in accordance with the first embodiment of this invention, with an inner lining applied to the outer skeleton of Figure 5.

[0023] With reference to the above-mentioned figures, the reference number 1 denotes in its entirety a container according to this invention.

[0024] It should be noticed that, for clarity, various elements relating to the assembled container 1, have been indicated with a broken line even in Figures 1 to 5 which each show only one or two pieces of the container 1 itself.

[0025] The container 1 comprises an outer skeleton 2 and an inner lining 3 that is internally affixed to the outer skeleton 2 and that comprises a layer of thermoplastic material, thermoformed on the outer skeleton 2. Advantageously, the inner lining 3 is formed by one or more layers of thermoplastic materials.

[0026] In the preferred embodiments the outer skeleton 2 is cellulose material-based, advantageously made of paper, paperboard or cardboard.

[0027] However, in other embodiments, the outer skeleton 2 may even be made with other materials. By way of example it may be made of fossil-based plastic, bio-based plastic, natural plastic, biodegradable or compostable plastic, mixtures of the preceding materials, aluminium, lignin, or with a multi-layer laminated or coupled material based on one or more of those previously indicated.

[0028] This being an aspect in itself known to experts in the sector, the features that the inner lining 3 (the thermoplastic material) must have to allow it to be made to

adhere to the outer skeleton 2, as well as the related thermoforming method will not be described herein. However, advantageously, the inner lining 3 may consist of fossil-based plastic, bio-based plastic, natural plastic, biodegradable or compostable plastic, or mixtures thereof, or of a multi-layer material based on one or more of them. Moreover, preferably, the inner lining 3 has a thickness of between 10 μm and 200 μm, more preferably between 10 μm and 100 μm, even more preferably between 40 μm and 60μm.

[0029] As is visible in Figure 6 and as is common for this type of containers, the container 1 has a bottom wall 4 which has an outer perimeter edge 5, a side wall 6 which has a lower annular edge 7 connected to the outer perimeter edge 5 (the two edges coincide) and an upper annular edge 8, and an upper annular flange 9 which has an inner annular edge 10 connected to the upper annular edge 8 of the side wall 6 (the two edges coincide). Advantageously, as a whole the side wall 6 has a flared shape which widens moving from the bottom wall 4 towards the upper flange.

[0030] Both the outer skeleton 2 and the inner lining 3 develop across the bottom wall 4, the side wall 6 and the upper annular flange 9. Moreover, advantageously, the inner lining 3 develops seamlessly on the bottom wall 4, on the side wall 6 and at least on part of the upper annular flange 9 (to allow sealing of an upper protective film at the upper annular flange 9, the inner lining 3 must define at least one band of material which develops along the entire upper annular edge 8 for at least part of the width of the upper annular flange 9 (measured perpendicularly to the upper annular edge 8.

[0031] In accordance with one of the main innovative aspects of this invention, the side wall 6 of the container 1 comprises a succession of first portions 11 and second portions 12. The first portions 11 and second portions 12 follow one another, alternately, along the lower annular edge 7 and the upper annular edge 8 and each of them extends for the entire height of the side wall 6 (from the lower annular edge 7 to the upper annular edge 8). In other words, each first portion 11 is alongside a second portion 12 and each second portion 12 is alongside a first portion 11.

[0032] Advantageously, the first portions 11, in the aggregate, extend across not more than two thirds of a total surface area of the side wall 6, preferably across not more than six tenths, the rest of the side wall 6 being formed by the second portions 12. Preferably, the first portions 11, in the aggregate, extend across not less than one quarter of the total surface area of the side wall 6.

[0033] If all of the first portions 11 have the same extent and all of the second portions 12 have the same extent, the same proportions indicated above also apply for the areas of each first portion 11 and each second portion 12. In some embodiments, such as those illustrated in the accompanying figures, the first portions 11 and the second portions 12 all have the same area, as well as the same shape.

[0034] In some embodiments, the first portions 11 are separated from the second portions 12 by an edge which lies in a vertical plane (when the bottom wall 4 is horizontal - Figure 6), so that each first portion 11 and each second portion 12 have the shape of an inverted isosceles trapezium. In contrast, in other embodiments, the separating edges may have different shapes; for example, they may extend both as inclined straight lines which form an acute angle relative to the outer perimeter edge 5, or as curved lines or polylines.

[0035] In accordance with a second innovative aspect of this invention, the first portions 11 and the second portions 12 differ due to the fact that the outer skeleton 2 is present exclusively at the first portions 11.

[0036] In fact, each first portion 11 comprises a first part 13 consisting of the outer skeleton 2, and a second part 14 consisting of the inner lining 3, whilst each second portion 12 consists only of the inner lining 3.

[0037] The first part 13 and the second part 14, forming each first portion 11, are coupled together and each extend from the lower annular edge 7 to the upper annular edge 8 for the entire height of the side wall 6. Similarly, each second portion 12 extends from the lower annular edge 7 to the upper annular edge 8 for the entire height of the side wall 6.

[0038] With reference to the outer perimeter edge 5 of the bottom wall 4 (or to the lower annular edge 7), in it there is a succession of first sections 15 and second sections 16 that follow one another, alternately, along its development. The first sections 15 delimit the bottom of the first portions 11, whilst the second sections 16 delimit the bottom of the second portions 12. Similarly, with reference to outer upper annular edge 8 of the side wall 6, in it there is a succession of third sections 19 and fourth sections 20 that follow one another, alternately, along its development. The third sections 19 delimit the top of the first portions 11, whilst the fourth sections 20 delimit the top of the second portions 12.

[0039] Preferably the first sections 15 have a straight development.

[0040] In some embodiments, such as that of Figures 1-2 and 5-6, the second sections 16 also have a straight development. In some embodiments the outer perimeter edge 5 has the shape of a polygon, advantageously a regular polygon. In contrast, in other embodiments, the second sections 16 may have different shapes, for example arched shapes as in the embodiment of Figures 3 and 4.

[0041] Advantageously, in some embodiments the inner annular edge 10 of the upper annular flange 9 is geometrically similar to the outer perimeter edge 5 of the bottom wall 4 (that is to say, the two flat figures defined by the inner annular edge 10 and by the outer perimeter edge 5 only differ in their dimensions, not in the shape and in the proportions of the various parts).

[0042] In the preferred embodiments, at the upper annular flange 9 the outer skeleton 2 comprises a continuous, flat annular portion 21 that develops along the

entire upper annular edge 8 of the side wall 6 and to which the inner lining 3 is affixed.

[0043] In some embodiments, at the upper annular flange 9 the outer skeleton 2 comprises one or more brace portions 22 coupled to the continuous annular portion 21 on the opposite side relative to the inner lining 3, that is to say, at the lower part of the upper annular flange 9.

[0044] Whilst the innovative aspects of this invention relate to the shape of the outer skeleton 2 and, consequently, the shape of the container 1 as a whole at the side wall 6, regarding how it is made, the outer skeleton 2 may be made in any way suitable for the purpose, in particular in a similar way to that used for any of the prior art containers in which the skeleton comprises a continuous, flat annular portion 21 at the upper annular flange 9 (for example in accordance with WO 2020/033350 A1, WO 2019/020863 A2, WO 1999/067143 A2 and WO 2022/264022 A1).

[0045] In some embodiments, similarly to what is described for example in WO 2020/033350 A1, the outer skeleton 2 is formed by a single sheet of material folded on itself. In this case the outer skeleton 2 has alternating thin zones, in which it has a thickness equal to the thickness of the sheet of material, and thick zones, in which it has a thickness multiple times the thickness of the sheet of material. Advantageously, the outer skeleton 2 has one of the thick zones at the entire upper annular flange 9 (which, preferably, comprises on the top the continuous annular portion 21 and, on the bottom, a plurality of brace portions 22 which entirely cover the continuous annular portion 21).

[0046] In contrast, in some embodiments, the outer skeleton 2 is formed by two or more coupled sheets of material. Advantageously, in this case too, the outer skeleton 2 has alternating thin zones 23, in which it has a thickness equal to the thickness of a single one of the one or more coupled sheets of material, and thick zones 24, in which it has a thickness equal to the sum of the thickness of two or more of the one or more coupled sheets of material. Preferably, the outer skeleton 2 has one of the thick zones 24 at each first portion 11.

[0047] Moreover, advantageously, in this case too, the outer skeleton 2 has one of the thick zones 24 at the entire upper annular flange 9.

[0048] In some preferred embodiments, such as those illustrated in the accompanying figures, the outer skeleton 2 comprises a lower sheet 25 and an upper sheet 26. The lower sheet 25 comprises a central flap 27 located at the bottom wall 4, a plurality of first lateral flaps 28 developing radially from the central flap 27, each at an entire first portion 11 of the side wall 6, and a plurality of flange flaps 29 each of which is centrally connected to one of the first lateral flaps 28 and develops principally transversely from it. In the container 1 the flange flaps 29 following each other essentially seamlessly along the entire upper annular flange 9.

[0049] Figures 2 and 4 show two variants of a lower sheet 25 intended to form a container 1 in which the side wall 6 comprises four first portions 11 and four second portions 12.

[0050] In turn, the upper sheet 26 in contrast comprises a continuous annular portion 21 that runs along the entire upper annular flange 9, and a plurality of second lateral flaps 30 connected to the continuous annular portion 21. Each second lateral flap 30 extends at one of the first portions 11 and is coupled to one of the first lateral flaps 28 at that second portion 12. The coupling can be achieved by means of a glue interposed between the two sheets, or by means of a heat-activatable lacquer applied to one of the two sheets 25, 26, or exclusively by means of the inner lining 3 (for example in accordance with what is described in WO 2022/264022 A1).

[0051] Advantageously, the number of first lateral flaps 28 and of second lateral flaps 30 is equal to the number of first portions 11.

[0052] Each first lateral flap 28 is coupled to one of the second lateral flaps 30. Therefore, in accordance with this invention, as can be seen for example in Figure 6, the side wall 6 of the outer skeleton 2 of the container 1 defines a plurality of windows 31 with height equal to that of the entire side wall 6 at which windows the container 1 is defined only by the inner lining 3. Advantageously, the inner lining 3 is transparent and, consequently, the second portions 12 are also transparent so as to allow people to look at the contents of the container 1 without having to open it.

[0053] This invention brings important advantages.

[0054] In fact, thanks to this invention it was possible to make a container comprising an outer skeleton and an inner lining affixed to the outer skeleton, in which the quantity of material necessary for making the outer skeleton is less than that is required for making prior art containers.

[0055] Secondly, despite the use of a smaller quantity of material, the innovative structure with windows of the side wall of the outer skeleton guarantees the container more than enough structural stiffness.

[0056] Finally, it should be noticed that this invention is relatively easy to produce and that even the cost linked to its implementation is not very high.

[0057] The invention described above may be modified and adapted in several ways without thereby departing from the scope of the inventive concept.

[0058] All details may be substituted with other technically equivalent elements and the materials used, as well as the shapes and dimensions of the various components, may vary according to requirements.

Claims

1. Container comprising an outer skeleton (2) and an inner lining (3) that is internally affixed to the outer skeleton (2) and that comprises a layer of thermoplastic material, wherein:

the container (1) has a bottom wall (4) having an outer perimeter edge (5), a side wall (6) that has a lower annular edge (7) connected to the outer perimeter edge (5) and an upper annular edge (8), and an upper annular flange (9) connected to the upper annular edge (8),
both the outer skeleton (2) and the inner lining (3) develop across the bottom wall (4), the side wall (6) and the upper annular flange (9);
the side wall (6) comprises a succession of first portions (11) and second portions (12) that follow one another, alternately, along the lower annular edge (7) and the upper annular edge (8);
each first portion (11) comprises a first part (13) consisting of the outer skeleton (2), and a second part (14) consisting of the inner lining (3);
the first part (13) and the second part (14) are coupled together and each extend from the lower annular edge (7) to the upper annular edge (8) for the entire height of the side wall (6); and
each second portion (12) consists only of the inner lining (3), and extends from the lower annular edge (7) to the upper annular edge (8) for the entire height of the side wall (6).

2. Container according to claim 1 wherein the outer perimeter edge (5) comprises a succession of first sections (15) and second sections (16) that follow one another, alternately, along its development, the first sections (15) delimiting the first portions (11) underneath and the second sections (16) delimiting the second portions (12) underneath.

3. Container according to claim 1, wherein the first sections (15) have a straight development.

4. Container according to claim 2 or 3, wherein the second sections (16) have a straight development.

5. Container according to any one of claims 2 to 4, wherein the upper annular flange (9) has an inner annular edge (10) that is connected to the upper annular edge (8) of the side wall (6) and is geometrically similar to the outer perimeter edge (5) of the bottom wall (4).

6. Container according to any one of claims 1 to 5, wherein, at the upper annular flange (9), the outer skeleton (2) comprises a continuous, flat annular portion (21) that develops along the entire upper annular edge (8) of the side wall (6) and to which the inner lining (3) is affixed.

7. Container according to claim 6, wherein, at the upper annular flange (9), the outer skeleton (2) comprises one or more brace portions (22) coupled to the continuous annular portion (21) on the opposite side relative to the inner lining (3).

8. Container according to any of claims 1 to 7 wherein the outer skeleton (2) is formed by a single sheet of material folded on itself and has alternating thin zones (23), in which it has a thickness equal to the thickness of the sheet of material, and thick zones (24), in which it has thickness multiple times the thickness of the sheet of material.

9. Container according to any of claims 1 to 7 wherein the outer skeleton (2) is formed by two or more coupled sheets of material and has alternating thin zones (23), in which it has a thickness equal to the thickness of a single one of the one or more coupled sheets of material, and thick zones (24), in which it has a thickness equal to the sum of the thickness of two or more of the one or more coupled sheets of material.

10. Container according to claim 9 wherein the outer skeleton (2) has one of said thick zones (24) at each first part (13) of a first portion (11).

11. Container according to claim 8 or 9 wherein the outer skeleton (2) has one of said thick zones (24) at the entire upper annular flange (9).

12. Container according to any one of claims 9 to 11 wherein:

the outer skeleton (2) comprises a lower sheet (25) and an upper sheet (26);
the lower sheet (25) comprises a central flap (27) located at the bottom wall (4), a plurality of first lateral flaps (28) developing radially from the central flap (27), each at an entire first portion (11) of the side wall (6), and a plurality of flange flaps (29) each of which is centrally connected to one of the first lateral flaps (28) and develops principally transversely from it, the flange flaps (29) following each other essentially seamlessly along the entire upper annular flange (9);
the upper sheet (26) comprises a continuous annular portion (21) that runs along the entire upper annular flange (9) and a plurality of second lateral flaps (30) connected to the continuous annular portion (21);
each second lateral flap (30) extends at one of the first portions (11) and is coupled to one of the first lateral flaps (28) at that one of the first portions (11); and
each first lateral flap (28) is coupled to one of the second lateral flaps (30) and defines with it the first part (13) of one of the first portions (11).

13. Container according to any one of claims 1 to 12 wherein the inner lining (3) is transparent and wherein the second portions (12) are transparent.

14. Container according to any one of claims 1 to 13 wherein the first portions (11), in the aggregate, extend across not more than two thirds of a total surface area of the side wall (6), preferably across not more than six tenths.

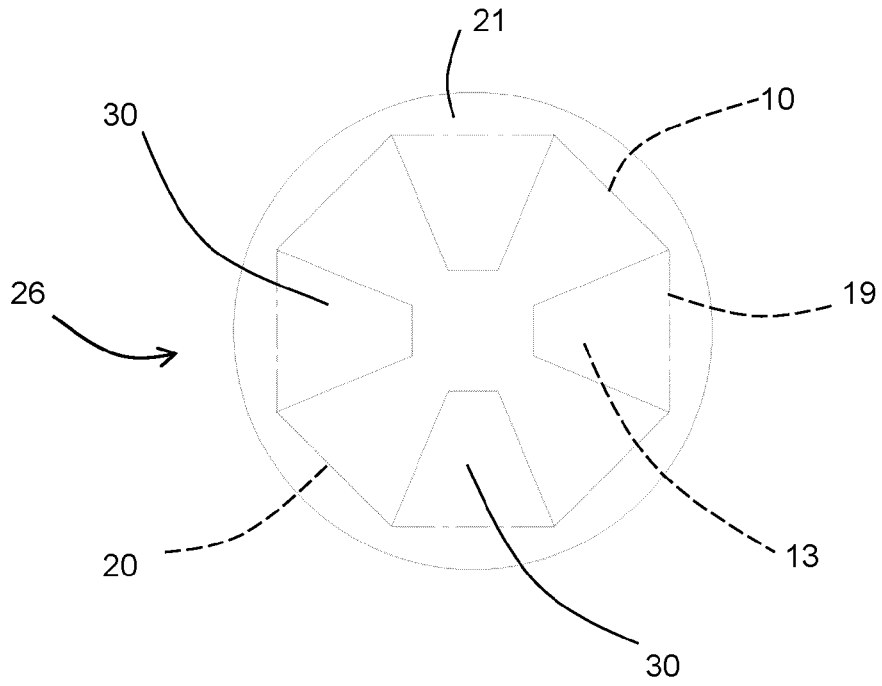


FIG. 1

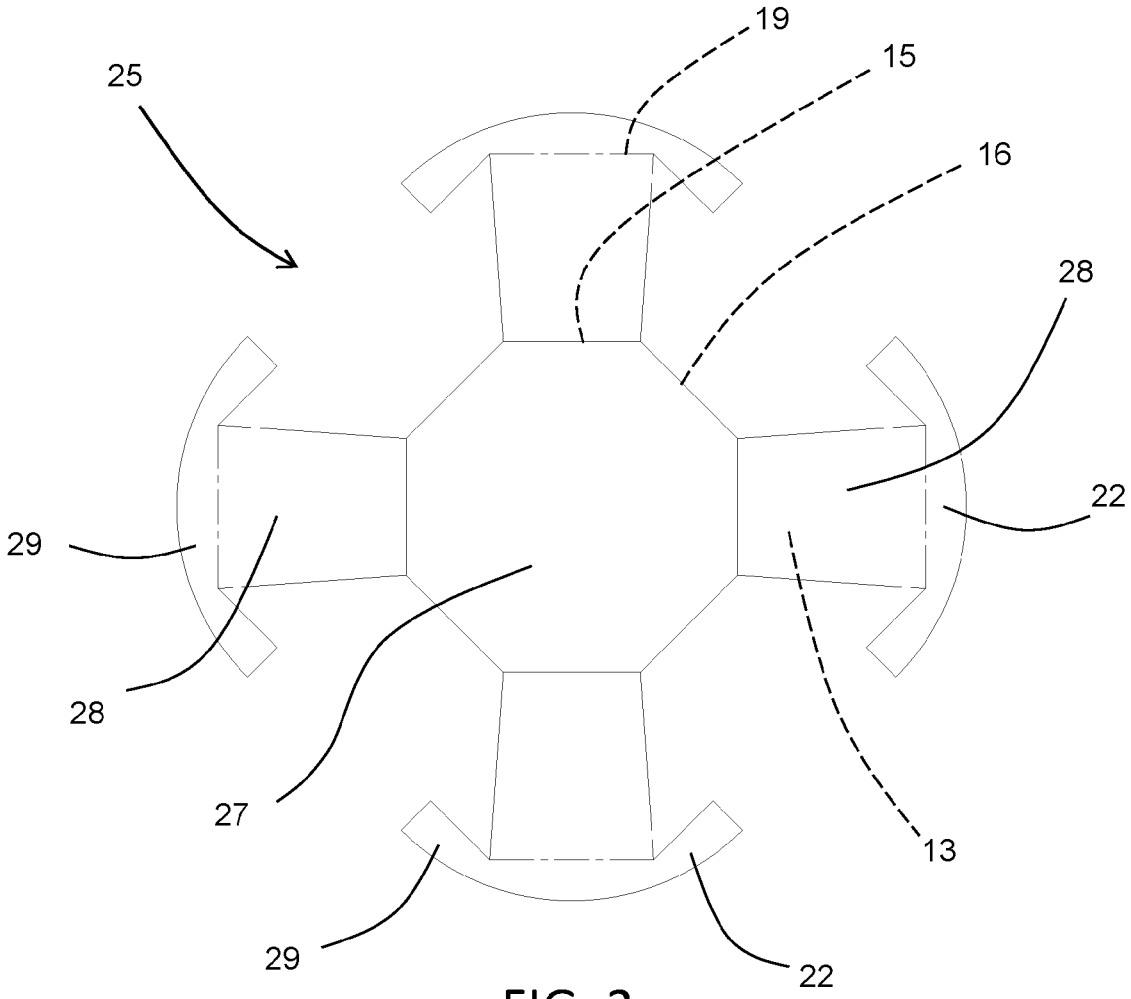


FIG. 2

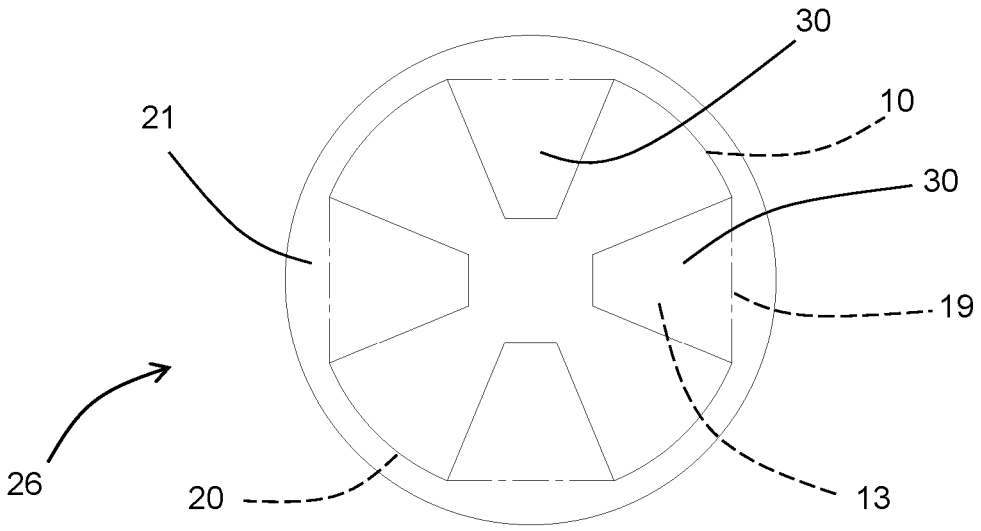


FIG. 3

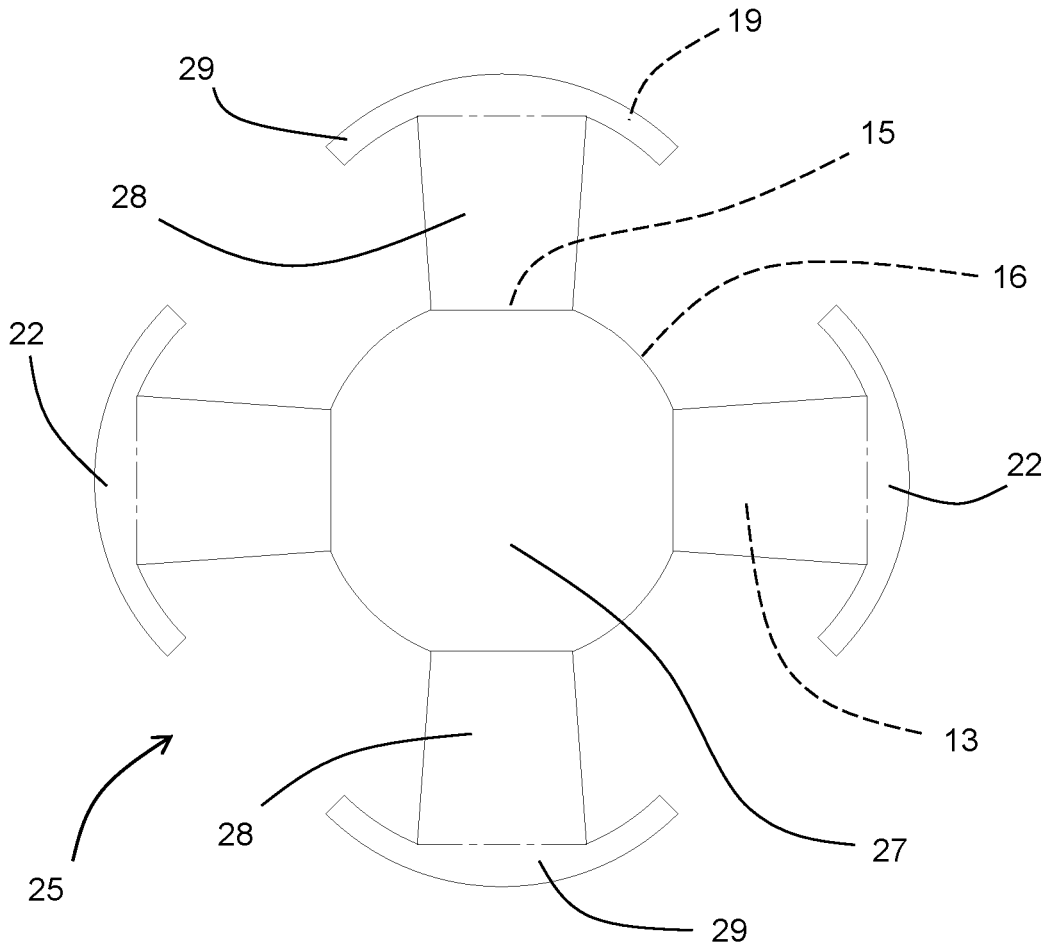


FIG. 4

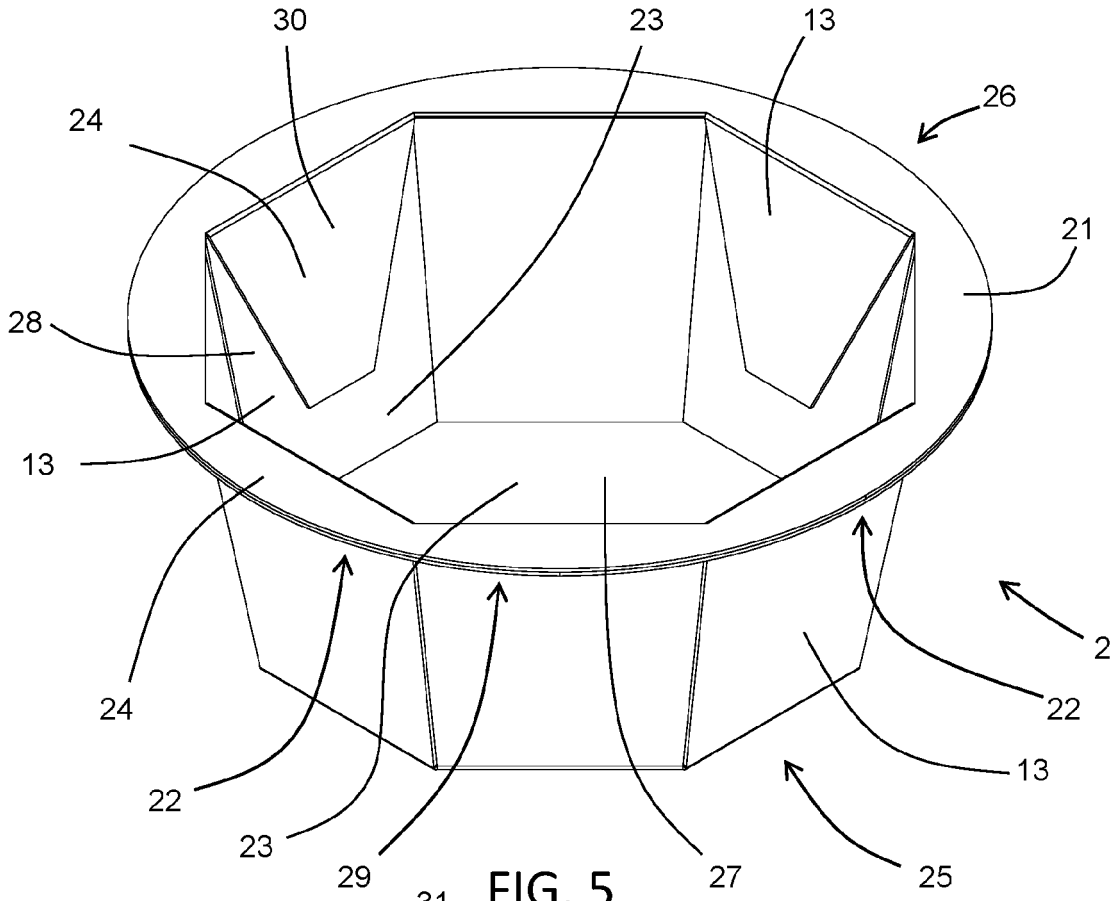

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FIG. 5

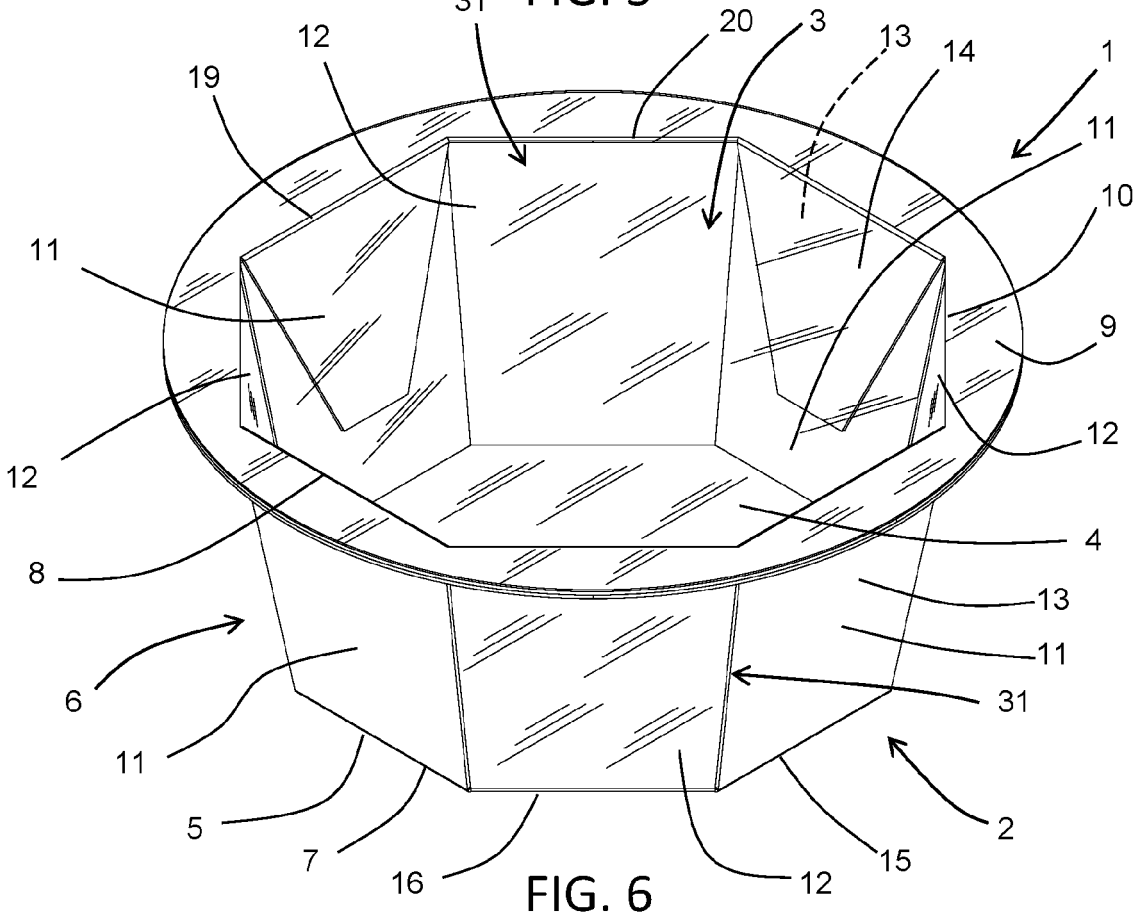

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FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 24 20 7768

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search	Date of completion of the search	Examiner
Munich	4 February 2025	Jervelund, Niels

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