



US 20060138152A1

(19) **United States**(12) **Patent Application Publication**
Pelletier et al.(10) **Pub. No.: US 2006/0138152 A1**(43) **Pub. Date: Jun. 29, 2006**(54) **ROUND OR NON-ROUND CONTAINER
BODY HAVING A SHOULDER AND FLUTES
BELOW SAID SHOULDER IN AT LEAST
TWO SIDE WALL AREAS**(76) Inventors: **Yves Pelletier**, Le Mans (FR); **Jean
Claude Hubert**, Crosmieres (FR)

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DUANE MORRIS, LLP**IP DEPARTMENT****30 SOUTH 17TH STREET****PHILADELPHIA, PA 19103-4196 (US)**(21) Appl. No.: **11/023,977**(22) Filed: **Dec. 28, 2004****Publication Classification**(51) **Int. Cl.****B65D 90/02** (2006.01)(52) **U.S. Cl.** **220/675**(57) **ABSTRACT**

In a first embodiment, the present invention is directed to a container body for a circular or non-circular container with an attached lid covering the upper opening, the container body comprising a bottom and a side wall surrounding the bottom, the side wall extending essentially rectangular in respect to the general plane of the bottom or extending with an angle therewith which does not exceed about 95°, wherein in at least two first areas of the said side wall, a first shoulder is formed, the first shoulder being arranged at between $\frac{1}{3}$ and $\frac{2}{3}$ of the height of the side wall, wherein in at least part of said first areas, first flutes are arranged at least below the said first shoulder, the flutes running essentially vertically from the bottom side end of the side wall up to the lower end of the said first shoulder, wherein in case the container is a non-circular container, the first areas are areas which, seen in plan view from above, are most strongly curved, compared to second areas, and are situated between second areas which, seen in plan view from above, are straight or are less strongly curved than the first areas. In a second embodiment, specifically useful for relatively flat container bodies, the flutes below the first shoulder can be missing.

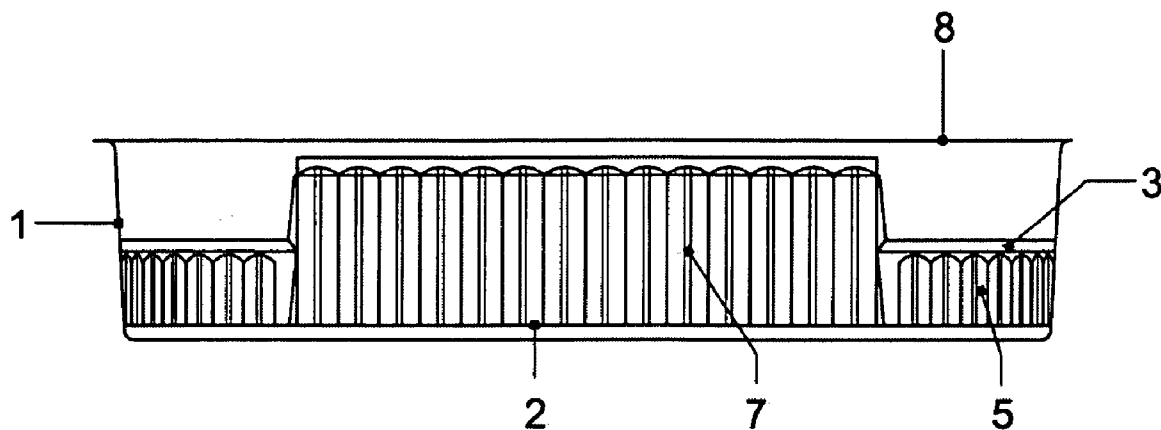


Figure 1

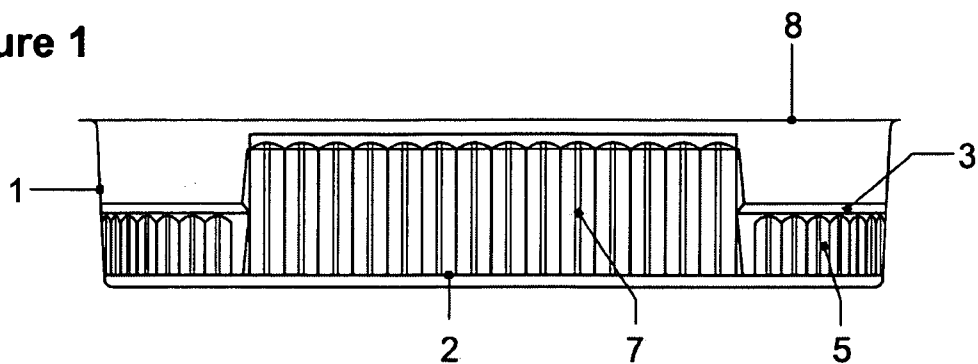


Figure 2

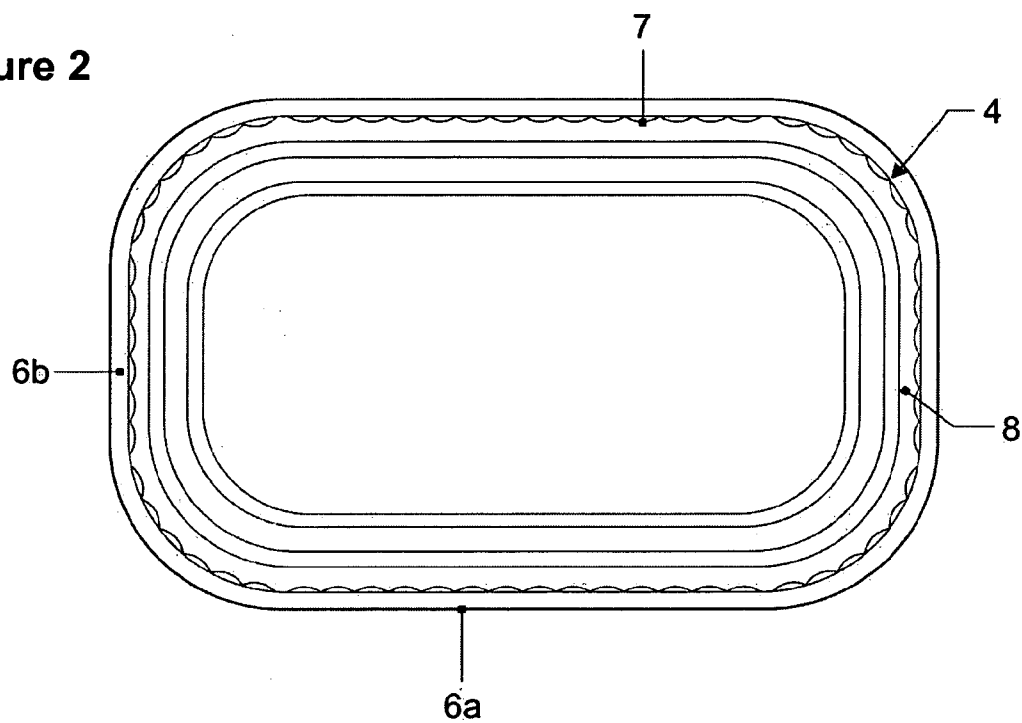


Figure 3

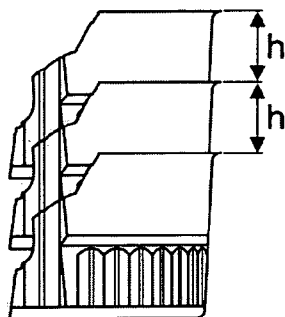


Figure 4

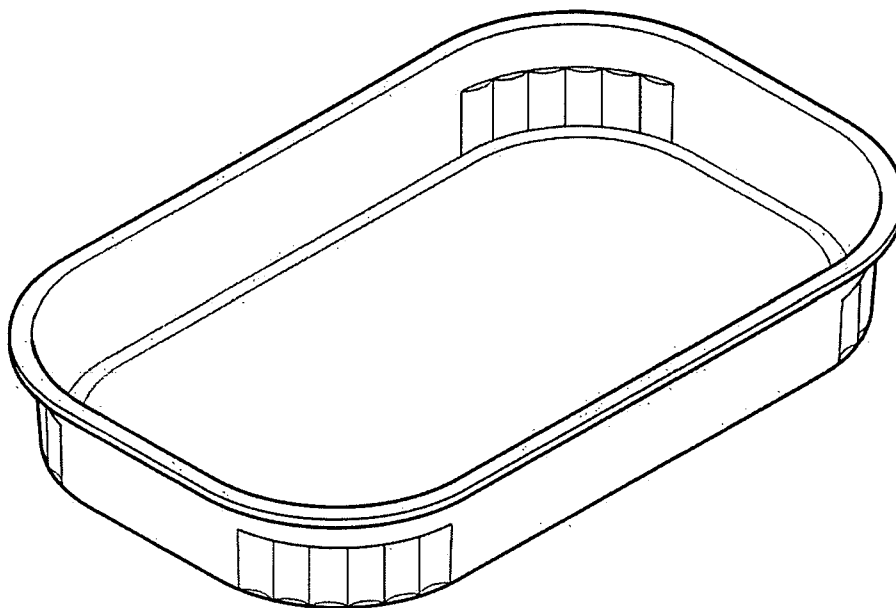
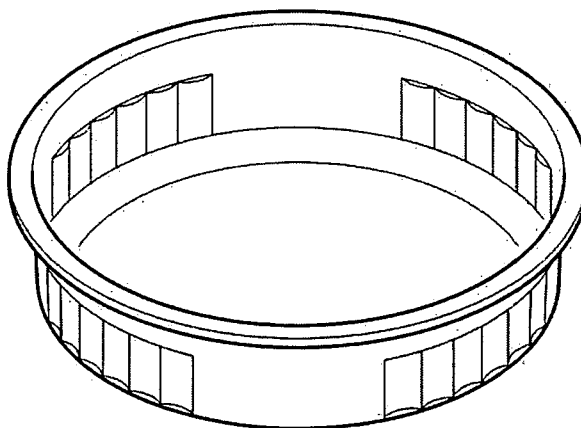


Figure 5



**ROUND OR NON-ROUND CONTAINER BODY
HAVING A SHOULDER AND FLUTES BELOW
SAID SHOULDER IN AT LEAST TWO SIDE WALL
AREAS**

[0001] The present invention is directed to a container body with upright or substantially upright side walls, preferably a metal container body, for a non-round container having curvatures or for a container with a round side wall, when seen from above, with a cover or lid which is e.g. flanged, clinched or double-seamed onto its upper edge. In at least two parts of the side wall, which in the case of non-round container bodies are at least relatively strongly curved areas, seen in plan view from above, the side wall is provided with a shoulder. In a first embodiment, flutes are present below said shoulder. In a second embodiment, said flutes are missing.

[0002] Nestable containers have been known for a long time. They are usually being made with the aid of drawing processes, allowing the formation of container bodies from only one piece of metal or other sheet. For example, EP 480 854 to Cebal discloses a container body which has a longitudinally oval shape. In the curved regions or regions with smaller radius, the side wall takes the form of a shoulder relatively close to and below the flanged edge, whilst in the straight or only slightly curved regions (that is: the elongated sides), at the height of the shoulders, the side wall has the shape of an inclined surface. This surface forms a defined angle with the side wall below it, due to its inclination. In the upward direction, the inclined surface ends with an abrupt change of direction of the side wall. The inclined surface aims to stabilize the side wall during flanging a lid to the container body.

[0003] In EP 852 555 B1 and in EP 854 823 B1, container bodies for non-round containers are disclosed which on one hand can be stacked and unstacked easily, but, on the other hand, have also a shape which makes them especially well suited for the flanging of a lid, because the covering of the flange (e.g. a double seam) is safe. The side wall of said container bodies is provided with shoulders at different heights, wherein a first shoulder in at least a part of those regions which seen in plan view are long extended or in comparison to other segments are less strongly curved, is arranged closer to the upper edge of the container side wall than a second shoulder in the remaining regions. Either, the shoulders merge into each other and are so formed that the side wall, seen in section and detailed from below upwards, is taken first in a circular crescent shape outwards and then inwards in a circular crescent shape, without a straight section lying between, or the side wall has side flutes in those regions where the first shoulder which is situated closer to the upper edge is present, whereby the side flutes extend up above the height at which the second shoulder is arranged, or both.

[0004] Metallic container bodies as disclosed in EP 852 555 B1 and EP 854 823 B1 are specifically well suited in case they have a slightly inclined side wall. This allows a narrow nestability of the empty can bodies, although their side walls form shoulders in a rather close neighbourhood to the upper end periphery of the side wall. At the same time, the specific feature of a shoulder which in the long extending areas of the side wall is close to the upper end of the opening of the can body, wherein either long extending flutes are

situated in the area below said shoulder or the shoulder has the specific shape as detailed above, imparts an improved stiffness to the side wall, such that the force of the flanging, clinching and/or seaming tool, transmitted to the wall during closing the container, cannot result in a deformation of the end part of the side wall. Therefore, a safe and superior covering between the flange or hook of the container body and that of the lid is obtained upon application of the lid.

[0005] However, such a design is less suitable for non-round containers as well as for round containers in case the container body has upright or substantially upright side walls. Cans with side walls being in a right angle to the bottom plane have the advantage that they are easier to produce as their production in general requires less intermediate steps of drawing. Moreover, they may be superior over conically shaped containers, e.g. in some fields of food canning. However, due to the fact that the external dimensions of the container close to the bottom (for example the length and the width of a rectangular can) are similar or even slightly greater than the internal dimensions in the upper part, the cans cannot be stacked or nested in order to save space prior to their filling.

[0006] Moreover, it is an ongoing intention to reduce the gauge of container body walls in order to save material, to reduce the weight of packagings, and to reduce the waste bulk. Metallic container bodies are usually manufactured via drawing. A negative side effect of using thinner materials is that pleads may form during manufacture. Thus, container bodies made from rather thin materials should be shaped such that the formation of pleads is avoided.

[0007] It is an object of the present invention to provide a container body for a non-circular container having curvatures, or for a circular container, the walls of which may be made from rather thin metal sheet and which may have upright side walls and is, despite thereto, easily stackable.

[0008] The invention provides a container body with an upright or substantially upright side wall having a circular or non-circular, but curved contour, when seen in plan view from above, for a container with an attached lid covering the upper opening, the container body comprising a bottom and the said side wall surrounding the bottom. The container body is characterized in that in at least two first areas of the said side wall, a first shoulder is formed, the first shoulder being arranged at between $\frac{1}{3}$ and $\frac{2}{3}$ of the height of the side wall, wherein, in a first embodiment, in said first areas first flutes are arranged below the said first shoulder which run essentially vertically from the bottom side end of the side wall up to the lower end of the said first shoulder, wherein in case the container has a non-circular side wall contour, seen in plan view from above, the first areas are areas which are most strongly curved, compared to second areas, and are situated between second areas which, seen in the same view, are straight or are less strongly curved than the first areas.

[0009] In a second, special embodiment, the flutes below the first shoulder can be missing.

[0010] The first shoulder of the inventive container body is formed by a horizontally running, outwards and upwards step of the side wall material. The cross section of the shoulder may be in the form of an inclined surface, as known from EP 480 854, or may be rounded, as e.g. known from EP 852 555 B1 and EP 854 823 B1, or may take another suitable

form, e.g. may be rounded in such a way that the different parts of the shoulder are bent around different (i.e. two or even more) radii, when viewed in cross-section of the side wall.

[0011] The container body of the present invention can be made from any desired material, but will in most cases be made of metal, e.g. from sheets of stainless steel, aluminium or aluminium alloy, plated or laminated metal, or from tin plate or ECCS (electrolytic chromium coated steel). However, use of other materials, e.g. plastics materials like polyethylene or polypropylene, or natural, possibly modified or processed plastics materials, is also possible, provided that they are suitable for the attachment of a cover or lid. In the former case, the upper end of the side wall will usually be in the form of a flange which serves as the can body hook when a lid is flanged or otherwise attached to the body in order to seal the container after filling by providing a double seam. However, different shapes of the upper end of the side wall are possible in either case, depending on the way of closing the container.

[0012] The container may be but not necessarily must be a can, for example a food can.

[0013] The invention is suitable for all container bodies which, in plan view from above, show at least one curvature, e.g. being oval or having a shape with two rounded areas which are separated from each other by less strongly curved parts of the side wall, and in specific cases may even have a precise circular shape. Especially included within the invention, however, are container bodies which are derived from a rectangular shape wherein the right angles are replaced by rounded curves. Such containers may e.g. have a volume of 225 ml, 425 ml or 750 ml, but of course can be larger or smaller or may have other dimensions. Other preferred examples are containers having a side wall which on two opposite, elongated sides runs straight and parallel, while the connecting sides are rounded, e.g. having the shape of a circle section. Such containers are frequently used for fish canning, e.g. in the form of the so called "Hansa" cans. Other examples suitable for the present invention are oval shapes.

[0014] The invention is, although not limiting, especially well suited for containers having rather thin side walls, e.g. made from a material of about 0.10 to 0.40 mm and preferably from 0.14 to 0.25 mm thickness.

[0015] In summary, the shape or contour of the container body, seen from above, is completely round, or—preferably—it has regions which when seen in plan view from above are more or most strongly curved, as well as regions which are less curved or long extending (straight). A customary oval fish can, for example, is more strongly curved in the tear off region and at the opposite end than in the regions lying between them, which mostly run straight and parallel. A four-sided can with rounded corners, for example an asparagus can, has four strongly curved areas, whilst the areas lying between them are straight. The container body according to the present invention has a shoulder (so called first shoulder) in at least two areas which is arranged in about $\frac{1}{3}$ to $\frac{2}{3}$ of the height of the side wall in this area. In case the container body is of the non-round type, the said areas are, seen in plan view from above, most strongly curved, compared to second areas. This first shoulder serves as a bearing shoulder for nesting/denesting. Most conve-

nient, it is arranged in about $\frac{1}{2}$ of the height of the side wall in this area. Even if the side wall of such a container body is completely vertical, stacking or nesting of container bodies will save space, since each body will rest on the bearing shoulder of the next lower one. It is of course needless to say that in such a case of a completely upright wall, a bearing shoulder will be present around the full circumference of the side wall, as outlined below in more detail. Thus, the present invention allows production of containers at considerably low costs which despite their (almost) upright side wall may be stacked/nested.

[0016] In the first embodiment of the invention, flutes or recesses are arranged below the said shoulder in at least part of the areas where the first shoulder is present, and preferably everywhere in these areas. These flutes are essentially vertically arranged; they run up to at least about the lower end of the shoulder, thus improving the stability of the side wall in the said areas and specifically of the shoulder and giving it more depth in those parts where the flutes are impressed into the side wall. By providing a more rigid structure, the flutes also allow a better control of the overall geometry. This measure is specifically advantageous in that the fitting of one can or container in the other is rather accurate, thus resulting in very good nesting properties because the flutes assist each of the container bodies to slide into the proper nested position. Moreover, it is a precaution which minimizes the risks of pleats due to extra material in this area, specifically if the gauge of the side wall is rather small since the flutes according to their position, shape and depth are a convenient way to control the metal (or other material) flow during the drawing operations. Another advantage in providing flutes in these areas is that they facilitate venting of trapped air during the stacking of a multiplicity of cans (they minimize the so called piston effect).

[0017] However, in a second, special embodiment, the flutes are missing. This embodiment will mostly, but not exclusively, be used for smaller, rather flat can bodies in which the height of the side wall is rather low, e.g. in a 225 ml can body, where the area below the first shoulder is rather small so that questions of rigidity or formation of pleats are less important.

[0018] The bottom of the container body according to the invention can be formed as desired according to need, e.g. it can be flat or be domed or comprise flooding flutes or a clearance for the tab of a container lid of a below arranged container (intended for stacked, filled and closed containers) and the like as desired. The bottom merges into the side wall whereby the two said parts can be formed integrated, as one piece, or joined together by flanging or welded joins from two or more parts.

[0019] As known from prior art, remaining parts of the side wall, for example the long extended or only slightly curved parts thereof, can also be provided with flutes which preferably extend vertically from the bottom up to an area which is close to the upper flange at the periphery of the opening of the container body, in order to provide improved stability at the time of attaching a lid to the container body, as detailed above. The higher the flutes extend, the more stability is provided. The flutes may be present in the most critical areas only, e.g. in the centre of the longer ones of the said long extended or only slightly curved areas. More

preferably, they are present in each of said areas, and most preferably, they extend along the full width of said areas or of those areas which do not carry the first shoulder, respectively. Thus, in a most preferable embodiment of the present invention, a non-round container body is provided which comprises flutes around the full circumference of its side wall, wherein the flutes in the strongly curved parts thereof extend to the said shoulder present in said parts and the flutes in the remaining parts extend such that they end in neighbourhood to the end flange of the side wall. This embodiment provides most strength during flanging or otherwise attaching the lid, so that the side wall is able to withstand the forces applied during flanging, is easily stackable even in the case of a completely vertical side wall, and avoids pleading during formation.

[0020] If desired, those parts of the side wall which do not carry the above mentioned shoulder (which subsequently is named “first shoulder”) may be provided with a second shoulder which may be arranged at the same height level as the first shoulder, (thus providing one shoulder running around the whole side wall), or may be arranged closer to the upper end of the side wall than the first shoulder which has been described above in detail. The second shoulder may be arranged at the upper end of the flutes provided in those parts of the side wall, or it may be arranged slightly below, thus resulting in flutes which extend through the profile of the shoulder, as it is known e.g. from International Design DM/047729. A second shoulder must be present only in case the side wall of the container body is strictly upright, i.e. vertical. In cases where the side wall is—more or less—slightly conical, this second shoulder is not a necessary feature since conicity of the side wall improves nestability. However, it may be of advantage, e.g. to provide a wider opening which makes access to the content of a filled and opened can or other container easier.

[0021] In terms of the present invention, “upright or substantially upright” shall mean that the side wall can be completely upright or can be slightly conical i.e. it does not deviate more than 10°, preferably not more than 50, more preferably not more than 2° and most preferably not more than 1° from vertical. In specific embodiments, it is completely vertical (i.e. rectangular in respect to the general plane of the bottom).

[0022] The first and second flutes may have well known profiles. For example the profile may be of curved, round, oval, triangular, trapezium or polygonal cross section. The first and the second flutes may have the same profile, or the profile may differ, as desired or appropriate.

[0023] The invention shall now be further illustrated with reference to the accompanying figures, wherein

[0024] FIG. 1 shows a non-round container body of the present invention in side view,

[0025] FIG. 2 shows the container body of FIG. 1 in plan view from above,

[0026] FIG. 3 shows parts of three container bodies in the embodiment according to FIG. 1 nested into each other,

[0027] FIG. 4 is a perspective drawing of another embodiment of a non-round container body of the present invention, and

[0028] FIG. 5 shows a perspective drawing of a round container body having the same arrangement of shoulders and flutes as that of FIG. 4.

[0029] The container body 1 as shown in FIGS. 1 to 3 has a shape the bottom 2 of which is derived from a rectangle where the right angles are replaced by areas of circular sections. The bottom surface merges into a vertical side wall, consisting of four straight parts 6a, 6b which are interrupted by four curved areas 4, as seen from the plan view in FIG. 2. The curved areas comprise a shoulder 3, consisting of a step (here having the shape of an outwardly and upwardly inclined plane surface) by which the side wall above the shoulder extends parallel, but farther outside than the side wall below the shoulder. The area below the shoulder 3 is almost completely filled with first flutes 5. The four straight areas 6a, 6b of the side wall are profiled to carry second flutes 7 which extend up to the neighbourhood of the upper end part 8 of the side wall and thus farther up than the height at which the first shoulder 3 is provided.

[0030] FIG. 3 illustrates three container bodies in a stacked condition. As may be derived from this figure, shoulder 3 serves as bearing shoulder. If, as in the illustrated example, the said shoulder 3 is at the height of half of the height of the side wall, stacking of the container bodies will save half of the space required for storing.

[0031] FIG. 4 illustrates another embodiment of a non-round container body of the present invention. In this embodiment, the most strongly curved areas are provided with a first shoulder, and first flutes are running from the bottom side of the side wall up to the said shoulder. The straight areas of this container body are without a shoulder or flutes.

[0032] Another embodiment of the invention is illustrated in FIG. 5 which is comparable to that of FIG. 4, but which comprises a container body which, seen in plan view from above, has a round circumference. Thus, the wall of this circular container body has the same curvature in each of its parts. Four parts (“first areas”) thereof are provided with a first shoulder and first flutes as defined herein.

1. Container body for a container with an attached lid covering the upper opening, the container body comprising a bottom and an upright or substantially upright side wall surrounding the bottom, the side wall having a curved contour, when seen in plan view from above, and the side wall having at least two first areas interrupted by second areas, wherein in at least two of the first areas of the said side wall, a first shoulder is formed, the first shoulder being arranged at between $\frac{1}{3}$ and $\frac{2}{3}$ of the height of the side wall, wherein in at least part of said first areas, first flutes are arranged below the said first shoulder, the flutes running essentially vertically from a bottom side end of the side wall up to a lower end of the said first shoulder, wherein in case the side wall does not have a completely circular contour, when seen in plan view from above, the first areas are areas which, seen in said view, are stronger or most strongly curved, compared to the second areas, and are situated between second areas which, seen in said view, are straight or are less strongly curved than the first areas.

2. Container body as claimed in claim 1, wherein the first flutes are present in substantially or completely the full first areas.

3. Container body as claimed in claim 1, wherein the said shoulder is arranged in about $\frac{1}{2}$ the height of the side wall.

4. Container body as claimed in claim 1, wherein in at least part of the second areas of the side wall, essentially vertically running second flutes are present.

5. Container body as claimed in claim 4, having a contour which, when seen in plan view from above, is derived from a rectangle wherein the right angles have been replaced by curved areas, wherein said second flutes are present in at least a central part of the two straight areas of the side wall which are of a longer extension than the other two.

6. Container body as claimed in claim 5 wherein the second flutes are present in at least a central part of each of the straight areas present in the side wall.

7. Container body as claimed in claim 4, wherein said second flutes extend up above the height at which said first shoulder is arranged.

8. Container body as claimed in claim 7, wherein said second flutes extend up to a height which is closer to the upper end of the side wall than to the height where the said first shoulder is arranged.

9. Container body as claimed in claim 4, wherein the second areas are completely filled with essentially vertically running flutes.

10. Container body as claimed in claim 1, wherein a second shoulder is provided in at least part of the areas which are not first areas.

11. Container body as claimed in claim 1, wherein the side wall does not form a second shoulder.

12. Container body as claimed in claim 4, wherein the first flutes and the second flutes differ in shape.

13. Container body as claimed in claim 1, wherein the flutes are defined by impressions into the wall, the impressions having the same or different shapes and/or having a triangular or rounded cross section.

14. Container body for a container with an attached lid covering the upper opening, the container body comprising a bottom and an upright or substantially upright side wall surrounding the bottom, the side wall having a curved contour, when seen in plan view from above, and the side wall having at least two first areas interrupted by second areas, wherein in at least two of the first areas of the said side wall, a first shoulder is formed, the first shoulder being arranged at between $\frac{1}{3}$ and $\frac{2}{3}$ of the height of the side wall, wherein in case the side wall does not have a completely circular contour, when seen in plan view from above, the first areas are areas which, seen in said view, are stronger or

most strongly curved, compared to the second areas, and are situated between second which, seen in said view, are straight or are less strongly curved than the first areas.

15. Container body as claimed in claim 14, wherein the said shoulder is arranged in about $\frac{1}{2}$ the height of the side wall.

16. Container body as claimed in claim 14, wherein in at least part of the second areas of the side wall, essentially vertically running flutes are present.

17. Container body as claimed in claim 16, having a contour which, when seen in plan view from above, is derived from a rectangle wherein the right angles have been replaced by curved areas, wherein said flutes are present in at least a central part of the two straight areas of the side wall which are of a longer extension than the other two.

18. Container body as claimed in claim 17, wherein said flutes are present in at least a central part of each of the straight areas present in the side wall.

19. Container body as claimed in claim 16, wherein said flutes extend up above the height at which said first shoulder is arranged.

20. Container body as claimed in claim 19, wherein said flutes extend up to a height which is closer to the upper end of the side wall than to the height where the said first shoulder is arranged.

21. Container body as claimed in claim 16, wherein the second areas are completely filled with essentially vertically running flutes.

22. Container body as claimed in claim 14, wherein a second shoulder is provided in at least part of the areas which are not first areas.

23. Container body as claimed in claim 14, wherein the side wall does not form a second shoulder.

24. Container body as claimed in claim 16, wherein the flutes are defined to be impressions into the wall.

25. Container, comprising a container body as claimed in claim 1, and a lid.

26. Container as claimed in claim 25, wherein the lid is flanged to the body via a double seam.

27. Container, comprising a container body as claimed in claim 14, and a lid.

28. Container as claimed in claim 27, wherein the lid is flanged to the body via a double seam.

28. Container as claimed in claim 27, wherein the lid is flanged to the body via a double seam.

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