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(54) **DRINKS CONTAINER WHICH CONSISTS LARGELY OF CELLULOSE-CONTAINING MATERIAL, AND HAS A FOOD-COMPATIBLE BARRIER LAYER, FOR PRESSURIZED DRINKS**

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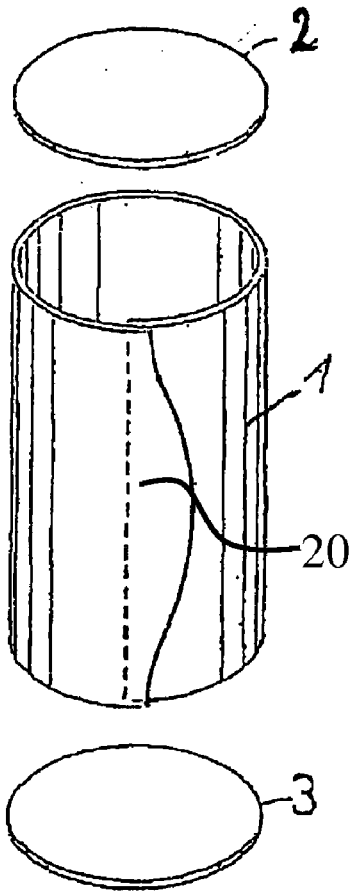
(57) **ABSTRACT**

A drinks container includes a lateral container surface defining an inner lateral surface and a height, a cover element which closes the lateral container surface, and a base element which closes the lateral container surface. The lateral container surface comprises the inner lateral surface comprising a barrier layer, an exterior side, at least one parallel-wound laminate comprising a cellulose-containing material, a multilayered sheet material arranged in a region of the inner lateral surface, and a laminate overlapping region arranged on the exterior side. The laminate overlapping region comprises a first strip-like section extending over the height of the lateral container surface. A second section curves convexly outwardly in a circumferential direction. The second section symmetrically adjoins the first strip-like section. The at least one parallel-wound laminate comprises overlapping peripheral strips and is covered at least in the laminate overlapping region on at least one side with an adhesive sheet material.



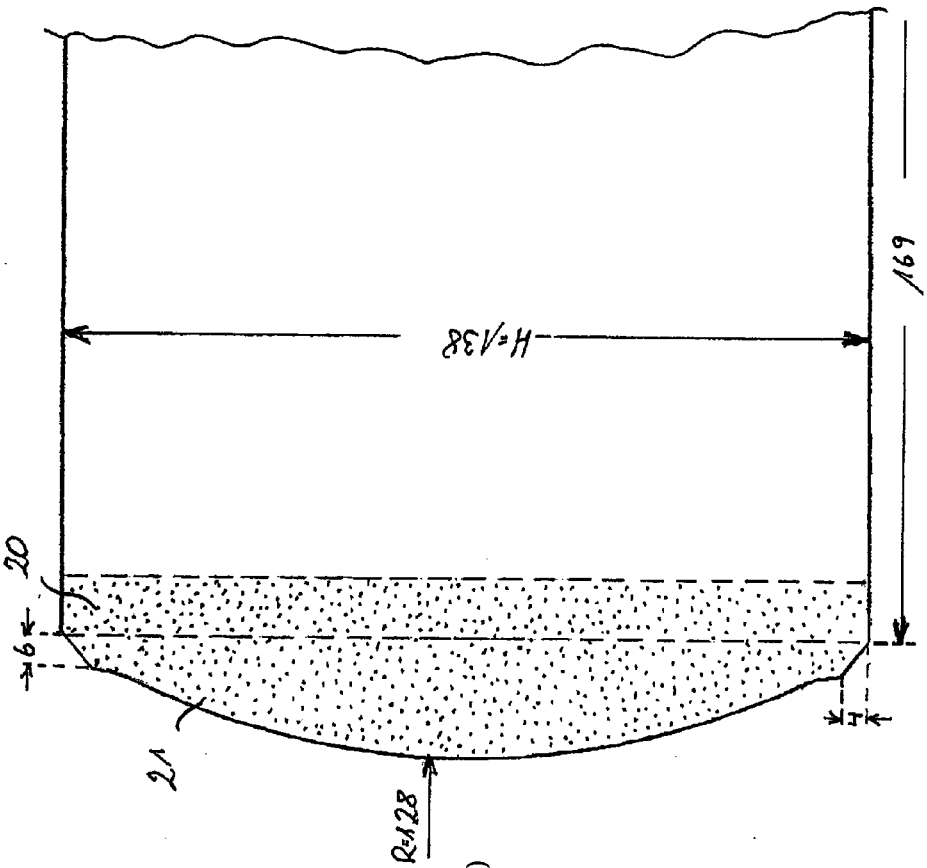


Fig. 3

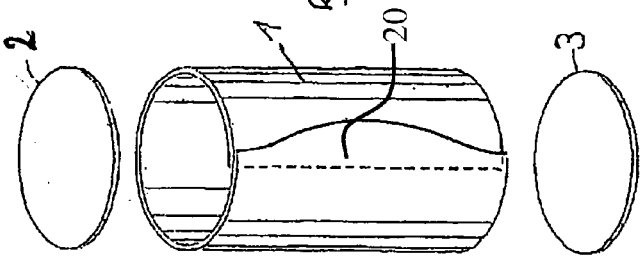


Fig. 2

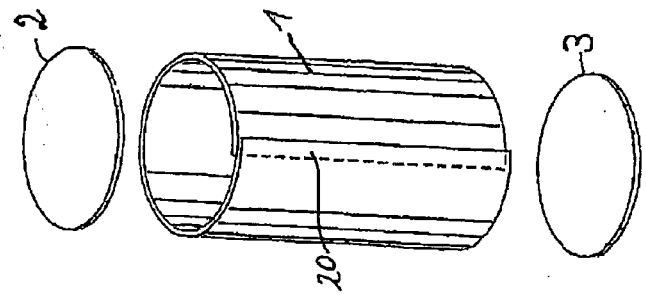


Fig. 1
Prior Art

Fig. 4

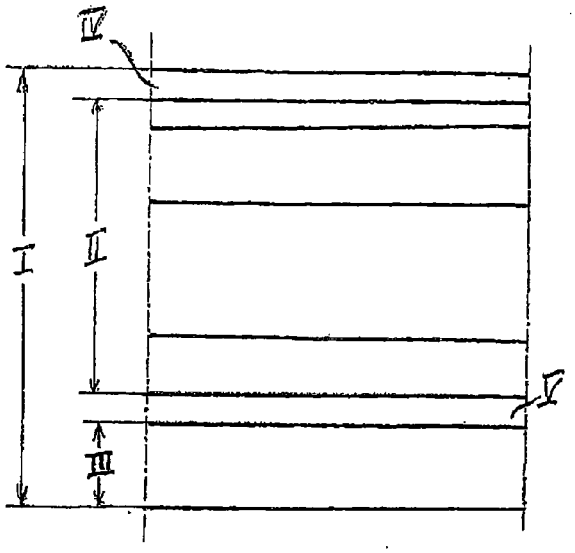


Fig. 5

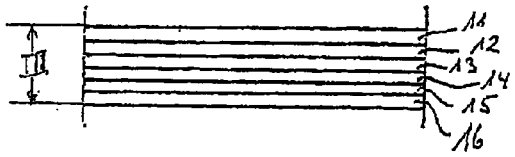
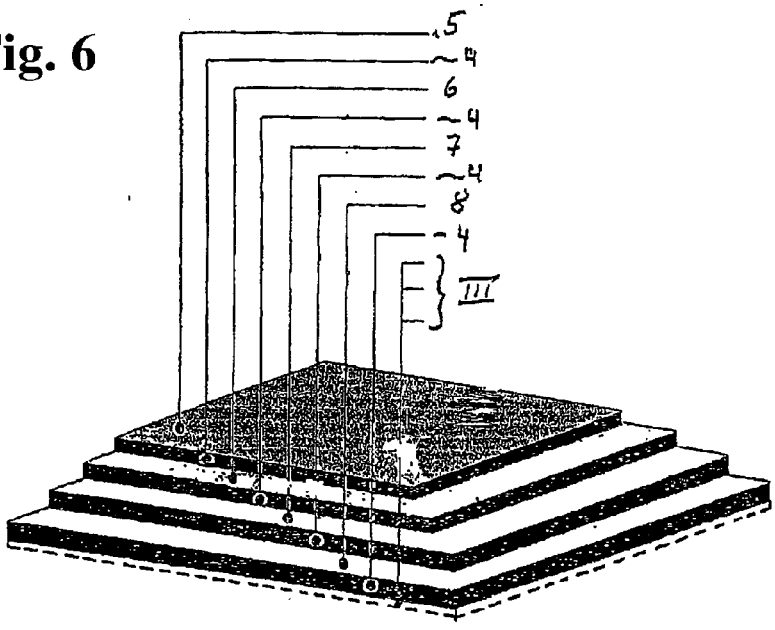


Fig. 6



DRINKS CONTAINER WHICH CONSISTS LARGELY OF CELLULOSE-CONTAINING MATERIAL, AND HAS A FOOD-COMPATIBLE BARRIER LAYER, FOR PRESSURIZED DRINKS

CROSS REFERENCE TO PRIOR APPLICATIONS

[0001] This application is a U.S. National Phase application under 35 U.S.C. §371 of International Application No. PCT/DE2012/000508, filed on May 16, 2012 and which claims benefit to German Patent Application No. 20 2011 050 151.5, filed on May 17, 2011. The International Application was published in German on Nov. 22, 2012 as WO 2012/155890 A1 under PCT Article 21(2).

FIELD

[0002] The present invention relates to a drinks container for pressurized drinks, in particular for carbonated drinks. The drinks container has a lateral container surface which is closed by base and cover elements and comprises at least one parallel-wound layer of cellulose-containing material, for example, cardboard, and at least one liquid-tight, food-compatible barrier layer.

BACKGROUND

[0003] Such drinks containers have previously been described, for example, in US 2004/0052987 A1, WO 03/006237, JP 2005-239230 A and EP 08 013 126.

[0004] The drinks containers described in the prior art have proved to not have a sufficiently high barrier action against water, water vapor, oxygen and carbon dioxide, and also, in particular in the region of their lateral surface, are not able, over the long term, to withstand internal pressures acting thereupon, as they occur, in particular, in the case of beer containers.

SUMMARY

[0005] An aspect of the present invention is to provide a drinks container which is able to withstand high pressure forces acting thereupon, in particular, in the region of a lateral surface.

[0006] In an embodiment, the present invention a drinks container for a pressurized drink which includes a lateral container surface defining an inner lateral surface and a height, a cover element configured to close the lateral container surface, and a base element configured to close the lateral container surface. The lateral container surface comprises the inner lateral surface comprising a barrier layer, an exterior side, at least one parallel-wound laminate comprising a cellulose-containing material, a multilayered sheet material arranged in a region of the inner lateral surface, and a laminate overlapping region arranged on the exterior side. The laminate overlapping region comprises a first strip-like section extending over the height of the lateral container surface. The first-strip-like section comprises a width of from 8 to 15 mm. A second section is configured to curve convexly outwardly in a circumferential direction. The second section is arranged to symmetrically adjoin the first strip-like section. The at least one parallel-wound laminate comprises overlapping peripheral strips. The at least one parallel-wound laminate is covered at least in the laminate overlapping region on at least one side with an adhesive sheet material. The overlapping peripheral strips are connected to each other via an ultrasonic welding or a hot gluing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The present invention is described in greater detail below on the basis of embodiments and of the drawings in which:

[0008] FIG. **1** shows a drinks container of the prior art, the lateral container surface of which consists of at least one parallel-wound laminate made of cellulose-containing material;

[0009] FIG. **2** shows, in an exploded view, a drinks container having the overlapping region configured according to the present invention for connecting superimposed laminate sections;

[0010] FIG. **3** shows an unrolling of the lateral container surface;

[0011] FIG. **4** shows, in a simplified view, a cross section of the laminate used in particular for the lateral container surface;

[0012] FIG. **5** shows the layer structure of a multilayered sheet material forming a barrier layer facing the container interior; and

[0013] FIG. **6** shows, in a simplified perspective view, and on a greatly enlarged scale, the layer structure of the laminate used in particular for the lateral container surface.

DETAILED DESCRIPTION

[0014] It has now been found that ultrasonic welding, for example, using a sonotrode, produces a drinks container which even resists high internal pressures.

[0015] In an embodiment of the present invention, the overlapping region can, for example, have a first strip-like section which extends over the entire height of the lateral container surface which has a width of 8 to 15 mm, for example, 9 to 12 mm, and symmetrically adjoining this first section, a second section that is curved convexly outwardly in the circumferential direction. An optimum distribution of the forces, in particular tensile forces, acting on the lateral container surface is achieved via this "bulge".

[0016] In an embodiment of the present invention, the convex section can, for example, be slanted at the ends thereof towards the upper and lower lateral container rims in the direction of the first strip-like section in order to achieve the highest possible strength and safety in the region of the transition points between the lateral container surface and the container bottom or the container cover.

[0017] In order to obtain a drinks container having a high barrier effect with respect to water, water vapor, oxygen and carbon dioxide, an embodiment of the present invention provides that the multilayered sheet material (III) can, for example, have a total thickness between 50 μm and 120 μm, for example, between 80 and 100 μm, and that the thickness fraction of the sheet (14), based on the total thickness of the multilayered sheet material (III), can, for example, be between 5% and 15%, for example, between 8% and 12%, and that the sheet (14), for example, be embedded on both sides over the whole surface between polyolefin sheets, for example, PE sheets.

[0018] It has been found that a satisfactory solution to the existing problems in drinks containers of the type according to the present invention is achieved for the first time using the

thicknesses and grammages of the individual layer that are proposed according to the present invention.

[0019] In an embodiment of the present invention, at least one metal foil can, for example, be integrated into the lateral container surface.

[0020] The present invention will hereinafter be described in greater detail with reference to the drawings.

[0021] FIG. **1** shows a drinks container **1** which can be composed of at least one parallel-wound laminate of cellulose-containing material, for example, cardboard, a cover **2** and a base **3**, wherein the cover **2** and the base **3** can, for example, consist of the same laminate material as the lateral container surface **1**.

[0022] The laminate I contains a cardboard sheet II consisting of a plurality of cardboard layers, a multilayered sheet material III forming a barrier layer, an outer PE and/or PE/PA and/or LDPE coating IV and an adhesive sheet V (see FIG. **4**).

[0023] The outer coating IV, which in FIG. **6** corresponds to the outer sheet 5, has a weight per unit area of 13 to 50 g/m^2, for example, 20 to 40 g/m^2, or, for example, 40 g/m^2.

[0024] The total thickness of the laminate I according to the present invention is 0.5 to 0.8 mm, for example, 0.5 to 0.7 mm, for example, 0.58 to 0.63 mm, or, for example, 0.61 mm, and the total thickness of the multilayered sheet material III is 50 to 120 μm, for example, 80 to 100 μm.

[0025] The multilayered sheet material III has the following structure, as shown in FIG. **5**:

[0026] Inner layer **11** and the outer layer **16** of a sealable polyolefin, a copolymer of a sealable polyolefin, or mixtures of these substances, in particular of PE, for example, HDPE; the fraction of these polyolefin layers **11** and **16** is, based on the total thickness of the multilayered sheet material III, between 30 and 80%, for example, between 50 and 75%.

[0027] At least one polymer layer **12** made of a polymer of the group polyester, polyamide or polypropylene. The fraction of this layer (these layers) is, based on the total thickness of the multilayered sheet material III, between 8 and 25%, for example, between 10 and 18%. This layer is responsible for the strength of the multilayered sheet material and also provides sufficient elasticity and stability.

[0028] At least one polymeric barrier layer **14** consisting of EVOH, polyamide or polyvinylidene chloride, having a fraction of this layer, based on the total thickness of the multilayered sheet material, of between 5 and 15%, for example, between 8 and 12%.

[0029] Also adhesive layers **13** and **15** of PE, HDPE or LDPE.

[0030] The actual polymeric barrier layer **14**, for example, made of EVOH, must be embedded without a gap on both sides between the adhesive layers **13** and **15** in order to obtain the action of the barrier layer for a relatively long period.

[0031] FIG. **6** shows the cardboard layer II containing a plurality of, for example, four, cardboard layers **4**, which can, for example, consist of bleached and/or unbleached sulfate paper or kraft paper. These cardboard layers **4** can each have a gram weight of, for example, between 80 and 120 g/m^2, for example, 95 to 105 g/m^2.

[0032] To increase the strength of the drinks container, an embodiment of the present invention provides that a metal foil, for example, a stainless steel or aluminum foil, can be laid or glued between two layers **4** of cardboard, which metal foil can, for example, have a thickness of between 15 and 20 μm.

[0033] The layers **6**, **7** and **8** have in particular the function of adhesive layers and consist of polyolefins, for example, PE, HDPE, LIDPE and the like, having a gram weight in the range from 13 to 17 g/m^2, for example, 15 g/m^2.

[0034] The layer **6** can, for example, also consist of polyethylene terephthalate (PET) having a gram weight of 13 to 17 g/m^2, for example, 15 g/m^2.

[0035] The layer **8** can, for example, also consist of PA/PE having a gram weight in the range from 18 to 22 g/m^2, for example, 20 g/m^2. This layer **8** can also be a composite layer of a PA/PE-Surlyn film having a gram weight between 18 and 27 g/m^2, for example, 25 g/m^2.

[0036] The multilayered sheet material III can, for example, be produced by coextrusion in a blow-molding process, coextrusion in a casting process, or by an adhesive-based lamination of two or more individual layers which can, for example, themselves in turn be coextruded.

[0037] Drinks containers having a capacity of, e.g., 3 to 15 liters or more can, for example, be produced from multilayer wound laminate I.

[0038] The width of overlapping of the laminate in the region of the lateral container surface, and therefore the width of the adhesive strip can, for example, be in the range of from 5 to 25 mm, for example, in the range between 10 and 15 mm.

[0039] In order to protect the outer rims of the cardboard layers **4** against the penetration of moisture, the laminate in the region of the peripheral strips can, for example, be coated or wrapped on both sides with a sealing film, for example, an adhesive film based on PE, in particular, HDPE.

[0040] The overlapping peripheral strips of the laminate can, for example, be connected to one another by ultrasonic welding, e.g., using a sonotrode or by hot gluing.

[0041] The laminate peripheries can, for example, be sealed with a sealed seam which in particular covers the cardboard layers and consists in particular of PE, for example, HDPE.

[0042] FIGS. **2** and **3** show that, for connecting the lateral container surface ends, an overlapping region is provided which has a first strip-like section **20** which extends over the entire height of the lateral container surface and has a width of 8 to 15 mm, for example, 9 to 12 mm, and symmetrically adjoining this first strip-like section **20**, a second convex section **21** that is curved convexly outwardly in the circumferential direction. The second convex section **21** is of a circular arc shape has a radius R which, based on the height H of the lateral container surface is

[0043] between R=0.85 H and R=0.93 H.

[0044] The second convex section **21** can, for example, be slanted at the ends thereof in the direction to the first strip-like section **20**.

[0045] The overlapping region has a fluted structure generated by press embossing, as a result of which the connection between the two laminate layers can be improved in the overlapping region.

[0046] The arc shape of the second convex section **21**, in a further embodiment of the present invention, can also follow an ellipse line.

[0047] The present invention is not limited to embodiments described herein; reference should be had to the appended claims.

What is claimed is:

1-20. (canceled)

21. A drinks container for a pressurized drink, the drinks container comprising:

a lateral container surface defining an inner lateral surface and a height;

a cover element configured to close the lateral container surface; and

a base element configured to close the lateral container surface,

wherein the lateral container surface comprises:

the inner lateral surface comprising a barrier layer,

an exterior side,

at least one parallel-wound laminate comprising a cellulose-containing material,

a multilayered sheet material arranged in a region of the inner lateral surface, and

a laminate overlapping region arranged on the exterior side, the laminate overlapping region comprising:

a first strip-like section extending over the height of the lateral container surface, the first-strip-like section comprising a width of from 8 to 15 mm,

a second section configured to curve convexly outwardly in a circumferential direction, the second section being arranged to symmetrically adjoin the first strip-like section, and

the at least one parallel-wound laminate comprising overlapping peripheral strips, the at least one parallel-wound laminate being covered at least in the laminate overlapping region on at least one side with an adhesive sheet material,

wherein,

the overlapping peripheral strips are connected to each other via an ultrasonic welding or a hot gluing.

22. The drinks container as recited in claim **21**, wherein the second section comprises a circular arc shape comprising a radius, the radius of the second section corresponding to the height of the lateral container surface multiplied by a factor of between 0.85 and 0.93.

23. The drinks container as recited in claim **21**, wherein the lateral container surface further comprises an upper lateral container surface rim and a lower lateral container surface rim, and the second section comprises ends, the ends being configured to respectively slant in a direction of the upper lateral container surface rim and the lower lateral container surface rim.

24. The drinks container as recited in claim **21**, wherein the laminate overlapping region comprises a fluted structure generated by a press embossing.

25. The drinks container as recited in claim **21**, wherein the multilayered sheet material comprises a total thickness of between 50 μm and 120 μm, and the barrier layer comprises a first side and a second side which are each substantially completely embedded between polyolefin sheets, and a barrier-layer thickness comprising between 5% and 15% of the total thickness of the multilayered sheet material.

26. The drinks container as recited in claim **21**, wherein the lateral container surface further comprises at least one metal foil integrated therein.

27. The drinks container as recited in claim **26**, wherein the at least one metal foil is a film comprising at least one of a stainless steel and aluminum.

28. The drinks container as recited in claim **26**, wherein the at least one metal foil comprises a thickness of between 15 μm and 20 μm.

29. The drinks container as recited in claim **21**, wherein the barrier layer comprises a material selected from ethylene vinyl alcohol, polyamide, and polyvinylidene chloride.

30. The drinks container as recited in claim **25**, wherein the multilayered sheet material comprises at least one sheet comprising a polymer selected from polyester, polypropylene and polyamide, the at least one sheet comprising a thickness of between 8% and 25% the total thickness of the multilayered sheet material.

31. The drinks container as recited in claim **21**, wherein the multilayered sheet material comprises an inner wall, an outer wall, and, in a direction from the inner wall to the outer wall, comprises:

an inner high-density polyethylene sheet;

a polyethylene sheet;

an ethylene vinyl alcohol sheet;

a polyethylene sheet;

a polyamide sheet; and

an outer high-density polyethylene sheet.

32. The drinks container as recited in claim **21**, further comprising at least one of a polyethylene coating and a low-density polyethylene coating comprising a weight per unit area of from 13 g/m^2 to 50 g/m^2, wherein the lateral container surface further comprises an outer cardboard layer, and the at least one of a polyethylene coating and a low-density polyethylene coating being laminated to the outer cardboard layer.

33. The drinks container as recited in claim **21**, wherein the cellulose-containing material is a cardboard selected from at least one of a kraft paper and a sulfate paper.

34. A drinks container for a pressurized drink, the drinks container comprising:

a substantially cylindrical container body comprising:

a lateral container surface defining an inner lateral surface and a height;

a base element; and

a cover element,

wherein the lateral container surface comprises:

an inner web comprising a multi-layered sheet material and a barrier layer;

an outer web comprising at least one laminate comprising a cellulose-containing material;

ends; and

an exterior side comprising:

a first strip-like section extending over the height of the lateral container surface, the first strip-like section comprising a width which is less than the height of the lateral container surface, and

a second section configured to curve convexly outwardly in a circumferential direction, the second section being arranged to adjoin the first strip-like section,

wherein, the at least one laminate is wound and connected to itself via an ultrasonic welding or a hot gluing so as to provide an overlapping peripheral portion of the lateral container surface, the overlapping peripheral portion being arranged on the exterior side of the lateral container surface.

35. The drinks container as recited in claim **34**, wherein the lateral container surface further comprises a plurality of card-

board layers and at least one metal foil, the at least one metal foil being disposed between two of the plurality of cardboard layers.

36. The drinks container as recited in claim **34**, wherein the lateral container surface further comprises four cardboard layers each having a weight per unit area of 75 g/m^2 to 125 g/m^2, and adhesive layers arranged between each of the cardboard layers and between each of the cardboard layers and the barrier layer.

37. A drinks container for a pressurized drink, the drinks container comprising:

a base element;

a cover element; and

a lateral container surface configured to be closed by the base element and the cover element, the lateral container surface defining an inner lateral surface and a height, the lateral container surface comprising:

at least one laminate comprising a cellulose-containing material,

a multilayered sheet material arranged in a region of the inner lateral surface, and

a barrier layer,

wherein,

at least a part of the lateral container surface is wound and bonded to itself to create an overlapping area of the lateral container surface, an exterior of the overlapping portion comprising:

a first overlapping section extending over the height of the lateral container surface, the first overlapping section comprising a constant width in a circumferential direction of the lateral container surface, and

a second overlapping section comprising a convexly shaped contour in the circumferential direction, the convexly shaped contour being convex in relation to the height of the lateral container surface.

38. The drinks container as recited in claim **37**, wherein the at least one laminate comprises cardboard layers, and the multilayered sheet material is wound up so as to provide at least two-layers.

39. The drinks container as recited in claim **37**, wherein

the multilayered sheet material comprises an outside and an inside,

at least one first sheet comprising a high-density polyethylene is arranged on the inside of the multilayered sheet material,

at least one second sheet comprising a high-density polyethylene is arranged on the outside of the multilayered sheet material, and

an added thickness of the at least one first sheet and the at least one second sheet comprises between 30% and 80% of a total thickness of the multilayered sheet material.

40. A drinks container for a pressurized drink, the drinks container comprising:

a lateral container surface configured to be substantially cylindrical, the lateral container surface being wound and comprising:

an overlapping portion comprising an edge configured to be convexly shaped in a circumferential direction of the lateral container surface, the overlapping portion being bonded to the lateral container surface,

an interior multilayered sheet material, and

at least one exterior laminate comprising a cellulose-containing material and a barrier layer.

* * * * *