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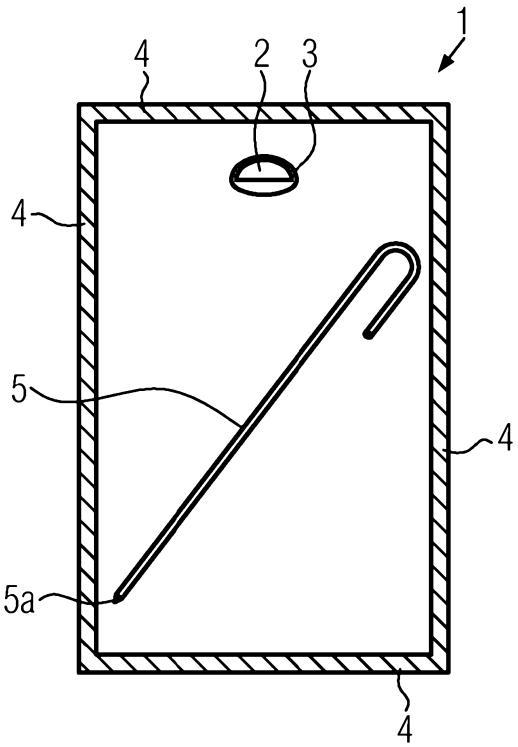

FIG. 1

(57) Abstract: Beverage container (1), in particular beverage pouch, which is provided with a piercing opening (2) for piercing with a drinking straw (5), in which beverage container (1) the piercing opening (2) is stamped and, on the inside, an outwardly exposed closure foil is fastened to the inner side around the piercing opening (2) by means of a welded joint (7), with the result that a sealed closure is produced, characterized in that a pocket (6) is formed between the inner welded edge (3) of the welded joint (7) and the lower edge (2b) of the piercing opening (2), in which pocket (6) the material of the beverage container (1) and the closure foil are not connected to one another.

(57) Zusammenfassung: Getränkebehälter (1), insbesondere Getränkebeutel, der mit einer Einstichöffnung (2) zum Einstechen eines Trinkhalms (5) versehen ist, bei dem die Einstichöffnung (2) eingestanzt ist und an der Innenseite eine nach außen freiliegende Verschlussfolie um die Einstichöffnung (2) an der Innenseite mittels einer Schweißung (7) befestigt ist, so dass ein dichter Abschluss entsteht, gekennzeichnet dadurch, dass zwischen dem inneren Schweißrand (3) der Schweißung (7) und der Unterkante (2b) der Einstichöffnung (2) eine Tasche (6) ausgebildet ist, in der das Material des Getränkebehälters (1) und die Verschlussfolie nicht miteinander verbunden sind.

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BEVERAGE CONTAINER WITH IMPROVED PIERCING POSSIBILITY

The invention relates to a beverage container, in particular a beverage pouch with a puncture opening for puncturing it with a drinking straw. Such beverage containers, in particular beverage pouches, for example with a stand-up bottom, are known from prior art. They can be made, for example, of foils, of a monomaterial, or of multilayer composite materials.

With such beverage containers, in particular beverage pouches, problems can arise when the drinking straw is punctured into them. In particular, liquid can be spilled out in case of a flexible beverage pouch due to the pressure during puncturing with the drinking straw. Moreover, if excessive pressure is applied, not only the puncture hole, but also the other side of the beverage container might be penetrated.

It should be simultaneously taken care that such a beverage container is environmentally friendly, that in particular no foils are used that might be thrown into the environment.

Such beverage containers with a puncture opening are known, for example, from EP 0 600 502 A2.

There is a need to provide a beverage container with an improved puncture possibility.

It is an object of the present invention to at least substantially satisfy the above need.

An aspect of the present invention provides a beverage container, in particular beverage pouch, provided with a puncture opening for puncturing it with a drinking straw, wherein the puncture opening is punched in and a sealing foil exposed to the outside is fixed at the inner side around the puncture opening by means of a weld, such that a tight closure is formed, characterized in that between the inner welding edge of the weld and the lower edge of the puncture opening, a bag is formed in which the material of the beverage container and the sealing foil are not connected to each other, and that the lower edge comprises a region which is embodied to be flatter, i.e. less bent, than the smallest circle completely enclosing the puncture opening, the widest region of the puncture opening being obtained in the lower half of the puncture opening.

A beverage container, in particular a beverage pouch, according to a preferred embodiment, such as a stand-up foil pouch, comprises a puncture opening for puncturing it with a drinking straw. This puncture opening is punched into the beverage container, where usually the total wall thickness of the beverage container, that means in particular, for example, the complete foil thickness of a beverage pouch, is punched through. At the inner side of the beverage container, a sealing foil exposed to the outside is fixed around the puncture opening by means of a weld. Exposed here in particular means that no further sealing foil, sealing paper or the like are attached from outside.

By this weld, which comprises an inner welding edge (on the side of the welding facing the puncture opening) and an outer welding edge, a tight closure is formed, so that a beverage can be filled into the beverage container without leaking.

According to a preferred embodiment, a bag is now formed in such a beverage container between the inner welding edge and the lower edge of the puncture opening, in which bag the material of the beverage container and the sealing foil are not connected to each other.

It should be noted here that a puncture opening comprises an upper edge and a lower edge which are connected to each other in transition areas between the upper and lower edges, for example in a round manner or with corners. The lower edge may comprise, for example, a straight section or be embodied as such.

The bag designed according to a preferred embodiment may facilitate the introduction of a drinking straw and the puncturing of the beverage container. It may in particular assist in guiding the drinking straw into the correct puncturing direction, so that a penetration through the opposite beverage container side is less probable.

This may be facilitated, for example, in that a drinking straw, while it is being inserted into the bag, may be preoriented (that means arranged symmetrically to the puncture opening) and/or stabilized by the bag and/or the lower edge of the puncture opening, so that a controlled puncturing of the sealing foil is possible.

Usually, the sealing foil exposed to the outside is made of a material that can be more easily punctured than the material of the beverage container. In particular, the exposed sealing foil may be designed to be thinner and/or to be made of other materials than the beverage

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container. However, it may also be made of the same materials which may be arranged in the same or in a different combination and may have the same as or other thicknesses than the materials employed in the beverage containers. In particular, such a sealing foil and/or foil of a beverage container may be designed with several layers, where at least one layer may comprise an oxygen barrier. The sealing foil and/or the beverage container, however, may also be formed of a monomaterial.

The puncture opening is usually arranged in the upper region of the beverage container. In particular, it may be arranged in the upper third, in particular in the upper fourth, in particular in the upper fifth of the beverage container. It may be arranged at a horizontal surface or preferably a side face of the beverage container. For foil pouches, the puncture opening is usually punched in at a side face.

A beverage container will in this text be normally referred to as being upright when it is arranged such that the puncture opening is arranged in the upper region (in particular in the upper half) of the beverage container (in the text, the upper region is also designated as "top"), and if an optional bottom, for example a stand-up bottom, is provided, the latter is arranged horizontally, that means that the pouch is, for example, standing. All statements requiring an orientation of the beverage container, for example "top" and "bottom", "upper edge", "lower edge", "horizontal" and "vertical", and further spatial statements about symmetries and the like refer to an upright beverage container, if not stated otherwise.

Below, preferred embodiments will be described, without the respective possible variations due to possible finishing inaccuracies being explicitly described. A deviation from the described properties by less than the finishing accuracy, however, is also implicitly included in the description. In particular, beverage containers whose deviations from described properties are within the finishing accuracy are also included in the claims and the description. In particular, the finishing accuracy may be less than 1 mm, in particular less than 0.5 mm, and in particular, for example, less than 0.2 mm. Finishing inaccuracies may result in particular in the relation of the positions of the puncture opening to the weld, as these may be made in different machine parts. The shape of the puncture opening itself and the shape of the weld itself, however, only have very small finishing inaccuracies of less than 0.1 mm or 0.2 mm, because these are produced with fixed tool dies. In particular in the formation of the bag, it is preferred

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for the finishing inaccuracy above and underneath the bag to be less than 0.5 mm, particularly preferred less than 0.2 mm.

According to an embodiment of the present invention, the distance between the inner welding edge and the lower edge of the puncture opening is longer than the distance between the inner welding edge and the upper edge of the puncture opening.

The distances can be determined in this text, for example, as follows: With an upright beverage container, the distance between each point of the lower edge of the puncture opening and the closest point of the inner welding edge is determined. The maximum value of the thus determined distances is then the distance between the lower edge and the inner welding edge. The distance between the points of the upper edge of the puncture opening and the respective closest point of the inner welding edge is determined analogously. The maximum of this amount of distances is then the distance between the upper edge and the inner welding edge.

In particular, the distance between the inner welding edge and the lower edge of the puncture opening may be longer by more than 20 %, in particular more than 50 %, in particular more than 100 %, in particular more than 200 %, in particular more than 300 %, than the distance between the inner welding edge and the upper edge of the puncture opening.

The inner welding edge may additionally form, for example, an indentation, e. g. a funnel-like or triangular or rectangular recess towards the weld which may be included in the bag. Thereby, for example, the puncture direction for a drinking straw can be predetermined. Moreover, the weld with the inner welding edge and the outer welding edge may have an additional indentation in the region underneath the puncture opening and in the region of the bag, the bag obtaining an additional indentation downwards which can orient the straw tip into the horizontal direction, for example center it horizontally, with respect to the puncture opening.

In some embodiments of the present invention, the lower edge of the puncture opening may be designed to be flatter than a circle enclosing the puncture opening, or it may comprise a region which is flatter, i. e. less bent, than a circle that encloses the puncture opening.

A circle that encloses the puncture opening may in particular be the smallest circle completely enclosing the puncture opening. The latter can be clearly determined for each shape of puncture opening. According to the above described embodiment, the bend of this enclosing

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circle is greater than the bend of the lower edge or of a part of the lower edge. A lower edge may comprise, for example, an arc of a circle with a constant bend having a smaller bend than the smallest circle enclosing the puncture opening. This is automatically true, for example, with a lower edge embodied as a straight section, or a lower edge comprising a straight section.

In some embodiments of the present invention, the puncture opening may be symmetric with respect to a vertical plane.

As an alternative or in addition, the inner and/or the outer welding edge may be embodied to be symmetric with respect to the same or another vertical plane. At this point, it should be noted again that this also comprises beverage containers which only have this feature within the finishing accuracy.

In particular, with a puncture opening that is symmetric to a vertical plane, and/or an inner welding edge that is symmetric to a vertical plane, the bag may have the region of its largest expansion on this plane of symmetry, or on one of these planes of symmetry. So in particular, the connection between a point on the lower edge of the puncture opening and the closest point on the inner welding edge which, of all points of the lower edge, reaches the maximum for this distance which is achieved in this combination of puncture opening and inner welding edge, may lie on this or on one of these planes of symmetry.

In some embodiments of the present invention, the puncture opening may be designed such that it is not symmetric with respect to each horizontal plane. A horizontal plane is here defined as a plane which extends horizontally when the beverage container is held upright.

This feature may in particular mean that the puncture opening is precisely not circular but only has, for example, some symmetry in the vertical direction.

In some embodiments, the lower edge of the puncture opening is embodied to be flat. This may mean in particular that the lower edge comprises a region with a bend that is smaller than the bend of a region (or of all regions) of the upper edge or the remaining parts of the puncture opening.

In some embodiments of the present invention, the puncture opening is embodied to be wider at the bottom than at the top. This may mean in particular that the widest region is

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obtained at the bottom at the lower edge which is embodied, for example, as a straight section. In other embodiments, this may mean that the widest region is obtained in the lower half, the lower third, the lower fifth or else the lower tenth of the puncture opening.

One may consider in this text the lower fraction / upper fraction each as the fraction of the puncture opening / of the container, which is determined as follows: Between the lowermost or one of the lowermost points on the lower edge and the highest point or one of the highest points on the upper edge, a straight section is placed. Then, that fraction of the section which corresponds to the desired fraction of the puncture opening / of the container is determined. For the lower fraction / upper fraction, this fraction is then (mentally) marked from the bottom / from the top along the section. A (mental) horizontal plane through the upright container through this point would divide the puncture opening / the beverage container and determine the lower / upper fraction of the beverage container respectively.

In some embodiments of the present invention, the edge of the puncture opening is partially or completely bent and/or non-circular. In particular, the edge of such a puncture opening may comprise, for example, an arc of a circle or two arcs of a circle, or more than two arcs of a circle.

In some embodiments, the edge of the puncture opening is partially or completely defined by straight sections, so the puncture opening may be partially or completely defined by straight sections. In particular, the edge of the puncture opening may be embodied as a polygon, for example as a triangle, in particular as an isosceles, in particular e. g. right-angled or equilateral (equiangular) triangle.

The parts comprised by the edge of the puncture opening, e. g. the upper and lower edges or parts comprised by them, may each be connected in an angular or round manner. A polygon may have, for example, rounded corners (that means the straight sections are connected in a round manner).

For example, the puncture opening can be crescent-shaped, where usually the straight section is horizontal, and the bent part is arranged above the straight section when the container is held upright. The bent part and the straight section of the edge of the puncture opening may be connected to each other in an angular or rounded (round) manner. The bent part may be, for

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example, embodied in the form of an arc of a circle or comprise arcs of an oval, in particular be embodied to be semicircular or semioval.

In beverage containers according to preferred embodiments, the inner and/or outer welding edge may follow the shape of the puncture opening (e. g. the upper edge) at the upper side of the puncture opening. At the lower side, the inner and/or outer welding edge may have a different shape than the lower edge of the puncture opening (e. g. the lower edge). Thereby, e. g. the bag may be formed.

In beverage containers according to preferred embodiments, the inner and/or outer welding edge may be embodied to be bent and/or non-circular. In particular, the inner and/or outer welding edge may be, for example, oval or comprise one or two or more arcs of a circle with different bends which are connected in a round manner, that means where the transition is in particular usually not embodied to be angular. In some embodiments, all or only some of the arcs of a circle may be, however, connected in an angular manner.

In some embodiments, the inner and/or outer welding edge of beverage containers according to the invention may be embodied to be flat at the bottom. For example, it may comprise a region in the lower region (the bottom) where the bend is smaller than in another region of the respective welding edge (that means a smaller bend in the inner welding edge in a lower region than in another region of the inner welding edge, and/or a smaller bend in a lower region in the outer welding edge than in another region of the outer welding edge), for example in the upper region and/or the lateral regions. Moreover, for example the region of the inner and/or outer welding edge situated underneath the lower edge may be less bent than the region of the respective welding edge situated above the upper edge, and/or one or all lateral regions of the respective welding edge.

For example, the bend of the inner and/or the outer welding edge may be smaller at the lower side, that means, for example, in the lower half, the lower third, the lower fifth or in particular the lower tenth of the respective welding edge, than a bend or all bends in regions of the upper part of the respective welding edge, and/or than the bend of the smallest circle into which the respective welding edge can be inscribed. The circle may in particular be the smallest circle in which the respective welding edge can be inscribed.

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A beverage container according to preferred embodiments may comprise a drinking straw with which it may be distributed, for example. This may in particular mean that a beverage container is usually sold with a drinking straw. Such a drinking straw may be fixed, for example, to the beverage container. As an alternative, a number of drinking straws (e.g. a corresponding or a higher one) suited for these beverage containers may be included in a package with several such beverage containers, or there may be a possibility of having handed out the drinking straws by which the beverage container can be opened together with the beverage container. The drinking straw may be packed (individually) or non-packed. Moreover, several drinking straws may be packed in one package. For example, one (or several) packs with a number of drinking straws may be included in a package with several beverage containers. In particular, the total number of drinking straws included in one or more packages in a pack with several beverage containers is usually equal to or higher than the number of beverage containers in the pack.

Usually, in beverage containers according to preferred embodiments, the diameter of the drinking straw is smaller than the diameter of the puncture opening at its smallest point. This means that such a drinking straw can usually be passed through the puncture opening without it being necessary to compress the drinking straw, for example to squeeze it. On the other hand, the diameter of the drinking straw may also be equal to or (somewhat, for example up to 15 %, in particular up to 10 %, for example in particular up to 5 %) larger than the diameter of the puncture opening at the point of its smallest diameter. This may be e. g. advantageous since it may reduce the probability of liquid leaking after the penetration operation.

Here, the diameter of the drinking straw is considered to be the diameter of the smallest circle into which the drinking straw can be inscribed when the drinking straw is seen perpendicularly to the axis in the direction of which the beverage can be sucked through the drinking straw. With a drinking straw with an oval cross-section perpendicular to the axis in the direction of which the beverage can be sucked through the drinking straw, the diameter would be, for example, the long axis of symmetry of the oval.

Such a drinking straw may optionally comprise a pointy end at one side to permit an easier introduction or puncturing into the beverage container.

In particular, a sealing foil according to preferred embodiments, for example with a drinking straw with a pointy end, may be more easily punctured open because the bag, and in some embodiments also the lower edge of the puncture opening, which comprises e. g. a flat region, may take care of preorientation, so that the tip symmetrically meets the sealing foil and can penetrate the latter more easily.

In some beverage containers, the maximum extension of the bag to the bottom may be at least 1 mm, in particular at least 2 mm, and in particular, for example, at least 3 mm. As an alternative or in addition, the maximum extension of the bag to the bottom may be more than one fifth of the diameter of the drinking straw, it may in particular be more than one third, in particular more than half the diameter of the drinking straw. The drinking straw may comprise a pointy end.

For the weld to enclose the puncture opening, the inner and/or the outer welding edge includes a bend, this bend preferably only running in one direction (to the inside towards the center of the puncture opening). Regions where the inner and/or outer welding edge are bent to the outside (away from the puncture opening) are preferably not provided, or only provided in not more than two regions. Such regions with a bend to the outside could be provided, for example, to obtain, underneath the puncture opening in the region of the bag, an additional indentation of the bag which is preferably centered underneath the center of the puncture opening.

In some embodiments of the present invention, the puncture opening is non-circular. For example, the edge of the puncture opening may comprise at least two regions with different bends, for example an upper edge which comprises, at least in one region, a first bend, and a lower edge which comprises, at least in one region, a second bend, where preferably the bend in the region considered for the lower edge is smaller than the bend in the considered region of the upper edge. In particular, the bend may be smaller for each point of the lower edge than for each region of the upper edge, that means the maximum bend in any region of the lower edge may be smaller than the minimum bend in a region of the upper edge. Thereby, guidance for the drinking straw may be already provided by the puncture opening.

In some embodiments, the edge of the puncture opening may comprise one, two or more bent regions and one, two or more straight regions, which may also serve the guidance of a drinking straw.

The upper and the lower edges may respectively meet in transition regions which may be embodied to be, for example, round and/or angular. Moreover, parts of the upper and/or lower edge may meet in transition regions which may also be embodied to be angular and/or round.

These transition regions may be neglected for the determination of the bend of the upper and/or lower edge.

In some embodiments, the width of the puncture opening is greater than the height of the puncture opening. Here, the maximum distance between two points on the edge of the puncture opening in the horizontal direction is seen as width of the puncture opening, and the maximum distance between two points on the edge of the puncture opening in the vertical direction is considered as height. This may for example be advantageous because there is space across a sufficient width for puncturing and guiding the drinking straw. This in particular leads to the fact that a drinking straw can be better inserted into the puncture opening from above than from the side.

In some embodiments of the invention, the ratio of the width of the outer welding edge to the height of the outer welding edge is higher than the ratio of the width of the inner welding edge to the height of the inner welding edge. Here again, the maximum distance between two points on the inner/outer welding edge in the horizontal direction is considered as the width of the inner/outer welding edge. The maximum distance between two points on the inner/outer welding edge in the vertical direction is considered as the height of the inner/outer welding edge. This may be advantageous as this may lead to an increased stability of the weld in the lateral region of the puncture opening.

In some embodiments, the outer welding edge and/or the inner welding edge is embodied to be non-circular, but comprises at least two regions with different bends. Thereby, the shape of the welding edge may be adapted to the shape of the puncture opening. Thereby, an oxygen introduction through the puncture opening into the filling may be minimized.

In some embodiments, the maximum extension of the bag may be situated on a plane of symmetry of the puncture opening and/or the inner and/or outer welding edge and/or the beverage container. In some embodiments, this maximum extension is only obtained on the plane of symmetry. This may be advantageous as a drinking straw may be guided along the plane of symmetry thereby.

In other embodiments, the maximum extension of the bag is not only obtained on one plane of symmetry. Normally, the maximum distance between the upper edge of the puncture opening and the inner welding edge is smaller than the maximum extension of the bag. This may also assist in guiding the drinking straw.

Further embodiments and examples are shown in the following figures. In the figures:

Fig. 1 shows a view of a beverage container according to the invention, in this case by way of example a beverage pouch;

Fig. 2 shows various embodiments of a puncture opening with an inner welding edge;

Fig. 3 shows details of two possible different embodiments of beverage containers according to the invention.

Fig. 1 shows a view of a beverage pouch 1. Such a beverage pouch may have, as shown, a puncture opening 2 with a surrounding inner welding edge 3 in the upper region. In the figures, for example the puncture opening 2, the inner welding edge 3 and the drinking straw 5 are not necessarily drawn in the correct proportion in size with respect to the shown container.

Details of possible embodiments of such a puncture opening and of such an inner welding edge are shown in Figs. 2a to 2c.

The outer welding edge and the weld are not shown in Figures 1 and 2. Possible arrangements of the outer welding edge and the weld with respect to the inner welding edge will be discussed in Figures 3a and 3b and the corresponding description. All embodiments shown there can be combined with a beverage container 1 as is shown in Figure 1 and/or with a puncture opening (with an inner welding edge) as is disclosed in Figure 2 and its corresponding description.

At the edges, such a beverage pouch may comprise, for example, sealing seams 4. If such a pouch is a stand-up pouch, it normally comprises a stand-up bottom (not shown here). A drinking straw 5 may be fixed to such a beverage pouch. In this case, this drinking straw 5 is shown to be fixed, for example glued, to the pouch. However, it may also be connected to the pouch in any other way or distributed together with the pouch. Such a drinking straw may be packed into an additional package, for example a transparent or non-transparent plastic cover, where the additional package can be fixed (e. g. glued) to the beverage pouch (not shown here). Usually, such drinking straws have a pointy end 5a which may also assist in puncturing the beverage container. To now drink the beverage from the beverage container, the drinking straw can be removed, unwrapped if the drinking straw is packed, and then pierced through the puncture opening 2 through the sealing foil. Then, the beverage can be withdrawn through the drinking straw.

Figs. 2a to 2c show possible embodiments of the puncture openings 2 present in the beverage container with the respectively surrounding inner welding edges 3. The bags 6 formed between the lower edge of the puncture opening and the inner welding edges are also drawn in in each figure.

Fig. 2a in particular shows a puncture opening 2 which has a crescent shape. This may be, for example, a segment of a circle. In this example, the upper edge 2a comprises an arc of a circle and the lower edge 2b a straight section, or they are embodied as such. Preferably, such a puncture opening 2 is arranged at a beverage container according to the invention such that the straight edge is situated at the bottom. Thereby, the bag 6 may also extend downwards. The connection between the arc of a circle and the straight section can be embodied to be angular or rounded (not shown here).

If now a drinking straw, which usually has a diameter that may be inscribed in the puncture opening, is introduced into the puncture opening, it may be preoriented by the lower edge 2b, for example a straight section as shown here, in such a way that the tip meets the sealing foil and can puncture the latter.

Simultaneously, the bag 6, into which the drinking straw is guided, may reduce the probability of also puncturing the back of the beverage container by puncturing the drinking straw perpendicularly to the container surface.

Moreover, the drinking straw may also be guided through the upper edge 2a of the puncture opening 2 as this region usually guides the drinking straw in the direction of the axis of symmetry (if present as in this example) of the puncture opening 2.

The inner welding edge 3 in Fig. 2a can, in the shown example, be described, for example, as comprising two arcs of a circle which are connected in a round manner.

In particular, the inner welding edge may approximately follow, at the upper edge of the puncture opening, the shape of the upper edge of the puncture opening, so that the distance between the boundary of the puncture opening having the shape of an arc of a circle and the inner welding edge remains approximately the same.

At the lower edge of the puncture opening, the inner welding edge 3 may, as in this example, for example have a different edge shape than that of the lower edge 2b which is designed here as a straight section. It is bent in the example shown here. However, as it is shown by way of example, the bend of the inner welding edge may be less distinct in the lower region in the shown example than in the upper region and/or the lateral regions of the inner welding edge.

Usually, the inner and/or outer welding edges do not have any corners as these would be, for example, particularly strained. In particular, the parts of the inner and/or outer welding edges with different bends are therefore usually connected in a round manner.

In Fig. 2b, a triangular puncture opening 2 is shown. Here, one side of the triangle, which is in this example approximately equiangular, is situated at the bottom. The inner welding edge 3 is in the shown example embodied such that the bag 6 is at the bottom larger than the bags formed next to the upper sides of the triangle. In particular, an inner welding edge 3 may be formed around an equiangular triangle in a circular manner, as is shown, where the circle is shifted downwards such that a bag 6 is formed at the bottom. Preferably, the distance between the lower edge 2b and the inner welding edge 3 is greater than the distance between the upper edge 2a and the inner welding edge 3. Thereby, a bag 6 is formed as described. In particular, the distance between the lower edge 2b and the inner welding edge 3 may be greater by at least 10 %, in particular at least 20 %, and in particular at least 50 %, in particular at least 100 %, than the distance between the upper edge 2a and the inner welding edge 3.

In other embodiments, the inner (and/or outer) welding edge can also be embodied by several arcs of a circle which are connected in a round manner. In particular, the lower region (bottom) of the inner (and/or outer) welding edge may be designed to be flatter (that means less bent) than one or several or all arcs of a circle or regions of the remaining respective welding edge.

A puncture opening may also be embodied as an isosceles or other triangle (not shown here). In some cases, triangles may also have rounded corners.

In Fig. 2c, a further puncture opening 2 with a further inner welding edge 3 is shown. In particular, the puncture opening 2 is in this case defined by two arcs of a circle 2a, 2b. The arc of a circle defining the lower region (in this example comprised by the lower edge 2b, or the lower edge 2b) is in the shown example flatter than the upper arc of a circle (which in this example is comprised by the upper edge 2a or embodied as the upper edge 2a), meaning it has a less distinct bend. In the example shown in Fig. 2c, the arcs of a circle meet such that they form corners. In other embodiments (not shown here), the regions where the arcs of a circle of the edge of the puncture opening 2a join may also be rounded, as was already described above, for example, for the inner welding edge 3.

The inner welding edge 3 shown in Fig. 2c may also be described as being defined by two arcs of a circle with different bends. In particular, here again, the bend of the lower region is flatter than the bend of the upper (and/or the lateral) region(s). In the shown example, the two arcs of a circle are connected in a round manner, so that no corners are formed which could increase the strain on the inner welding edge 3. With an outer welding edge, too, the arcs of a circle comprised by the welding edge may be connected in a round manner, so that no corners are formed.

In other embodiments, the inner (and/or outer) welding edge 3 may also be designed to be round, or as an oval.

The inner and/or outer welding edge may each be symmetric with respect to one or two or more (for example vertical and/or horizontal) planes.

In the example shown in Fig. 2c, the lower edge of the puncture opening is (slightly) bent convexly or comprises a (slightly) convexly bent region. In other examples, it may also comprise (slightly) concavely bent regions or be (slightly) concavely bent.

In Figs. 3a and 3b, two alternative possibilities of fixing the sealing foil in the interior of the pouch are shown. The puncture opening 2 is drawn in the two examples shown there, but it may also be invisible from this direction in some embodiments (for example, if the sealing foil 9 is opaque).

Fig. 3a shows an embodiment where the sealing foil 9 is attached in the pouch as a strip. Here, usually the two ends of the sealing foil strip are fixed in the edge sealings (sealing seam) 4 of the foil pouch, so that less force will act on the weld 7 and in particular the inner welding edge 3 and the outer welding edge 8 in the finished beverage container as it does not have to hold the sealing foil 9 fixed without any further support.

Usually, the weld 7 with the inner welding edge 3 and the outer welding edge 8 and the puncture opening 2 are then attached in the center of the sealing foil. The puncture opening 2 and/or the weld 7 with the inner welding edge 3 and the outer welding edge 8, however, may also be attached at other points of the sealing foil 9 than in the center. A sealing foil may, but does not have to, comprise axes of symmetry. A bag 6 is formed between the lower edge of the puncture opening 2 and the inner welding edge.

In the embodiment shown in Fig. 3a, the inner and the outer welding edges 3 and 8 are embodied such that at the lateral regions, the width of the weld 7 is larger than in the upper and lower regions of the weld. This may be advantageous, for example, as regards fabrication, when the transport of beverage container material (e. g. the foil for pouches) and the sealing foil 9 is effected laterally during the welding of the beverage container material with the sealing foil (lateral indicating the direction which would be lateral in the finished pouch), so that a higher force will act on the side of the weld than on the upper and lower regions. This may be advantageous in particular since possibly the (supporting) sealing seams 4 are not present at this time. Some force on the lateral regions of the weld 7 may occur, for example, when the

sealing foil and/or the beverage container material must be reeled off, for example, from a reel, or must be moved by traction during the operation, for example.

In other embodiments, the inner welding edge 3 and the outer welding edge 8 may also have a constant distance with respect to each other, or they may comprise the maximum distance with respect to each other in other regions than the lateral ones.

In the example shown in Fig. 3a, the puncture opening 2 is crescent-shaped with an inner welding edge 3 that may be described as two different arcs of a circle which are connected in a round manner. However, the puncture opening 2 and the inner welding edge 3 may also comprise any one of the other embodiments described above.

Fig. 3b shows an embodiment in which the sealing foil 9 is held by the weld 7. The inner and outer welding edges 3 and 8 are also drawn in. Here, the distance between the two welding edges 3, 8 may be constant or vary. For example, the distance between the two welding edges 3, 8 can be greater in the lateral regions than in the upper and lower regions of the weld, as is described e. g. in Figure 3a. Other embodiments, where the inner and outer welding edges 3, 8 have their maximum distance at other points than the lateral regions, are also possible.

Moreover, the outer welding edge may partially or completely extend to the edge of the sealing foil 9. The sealing foil 9 may comprise one or more symmetries or no symmetry at all.

In an embodiment in which the sealing foil is fixed to the beverage container, in particular the beverage pouch, as a patch, the patch may be, for example, rectangular, square, oval or round, or have some other shape. For example, two sides of the patch can be parallel with respect to each other, while the other boundaries of the patch can have an arbitrary shape, in particular also be torn off or irregularly frayed, for example.

Such a patch may in some embodiments hang beyond the outer welding edge in all regions of the outer welding edge. In other embodiments, the patch may hang beyond the outer welding edge in some regions of the latter, and in others terminate with the outer welding edge. In further embodiments, the outer welding edge may respectively altogether extend to the edge of the patch.

An embodiment in which the sealing foil 9 is held by the weld 7 may be advantageous as then, less material for the respective sealing foils is required. Here, the sealing foil is fixed to the foil as a patch, the patch being held by the weld 7. One can here also see again a puncture opening 2 and the bag 6. The puncture opening 2 is in this case shown as crescent-shaped. As

in Fig. 3a, all other puncture openings and welding edge shapes as they were described or shown above may be used for the inner and/or outer welding edge 3, 8 in such an embodiment.

In both the embodiments described in Fig. 3a and in Fig. 3b, the sealing foil that lies on the side of the inner welding edge where no puncture opening is provided may be flatly welded to the pouch.

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CLAIMS

1. Beverage container, in particular beverage pouch, provided with a puncture opening for puncturing it with a drinking straw, wherein the puncture opening is punched in and a sealing foil exposed to the outside is fixed at the inner side around the puncture opening by means of a weld, such that a tight closure is formed, characterized in that between the inner welding edge of the weld and the lower edge of the puncture opening, a bag is formed in which the material of the beverage container and the sealing foil are not connected to each other, and that the lower edge comprises a region which is embodied to be flatter, i.e. less bent, than the smallest circle completely enclosing the puncture opening, the widest region of the puncture opening being obtained in the lower half of the puncture opening.

2. Beverage container according to claim 1, wherein the distance between the inner welding edge and the lower edge of the puncture opening is greater than between the inner welding edge and the upper edge of the puncture opening.

3. Beverage container according to any one of claims 1 to 2, wherein the puncture opening and/or the inner welding edge and/or the outer welding edge are symmetric with respect to a vertical plane.

4. Beverage container according to claim 3, wherein the bag has its region of largest extension on the plane of symmetry.

5. Beverage container according to any one of claims 1 to 4, wherein the puncture opening is not symmetric with respect to each horizontal plane.

6. Beverage container according to any one of claims 1 to 5, wherein the puncture opening is embodied to be flat at the bottom.

7. Beverage container according to any one of claims 1 to 6, wherein the puncture opening is wider at the bottom than at the top.

8. Beverage container according to any one of claims 1 to 7, wherein the puncture opening is partially or completely bent and/or non-circular.

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9. Beverage container according to any one of claims 1 to 8, wherein the puncture opening is partially or completely defined by straight sections.

10. Beverage container according to any one of claims 1 to 9, wherein the puncture opening is crescent-shaped.

11. Beverage container according to any one of claims 1 to 10, wherein the inner welding edge follows, at its upper side, the shape of the edge of the puncture opening, but has, at its lower side, a different edge shape than the lower edge of the puncture opening.

12. Beverage container according to any one of claims 1 to 11, wherein the inner and/or outer welding edge is bent and/or non-circular.

13. Beverage container according to any one of claims 1 to 12, wherein the inner and/or the outer welding edge is flatter at the bottom than in some other region of the inner and/or the outer welding edge, for example a lateral or upper region of the respective welding edge.

14. Beverage container according to any one of claims 1 to 13, wherein the beverage container comprises a drinking straw which is optionally fixed to the beverage container.

15. Beverage container according to any one of claims 1 to 14, wherein the diameter of the drinking straw is smaller than or equal to or larger than the diameter of the puncture opening at the point of smallest diameter, the drinking straw optionally comprising a pointy end.

16. Beverage container according to any one of claims 1 to 15, wherein the maximum extension of the bag to the bottom is at least 1 mm, or characterized in that the maximum extension of the bag to the bottom is more than 1/5 of the diameter of the drinking straw.

17. Beverage container according to any one of claims 1 to 16, wherein the inner and/or the outer welding edge is bent inwards towards the center of the puncture opening, and wherein no region or not more than two regions of the inner welding edge are bent away from the puncture opening.

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18. Beverage container according to any one of claims 1 to 17, wherein the ratio of the width of the outer welding edge to the height of the outer welding edge is higher than the ratio of the width of the inner welding edge to the height of the inner welding edge.

19. Beverage container according to any one of claims 1 to 18, wherein the puncture opening is non-circular and optionally comprises at least two different regions with two different bends.

20. Beverage container according to any one of claims 1 to 19, wherein the inner and/or the outer welding edge is non-circular.

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SPRUSON & FERGUSON

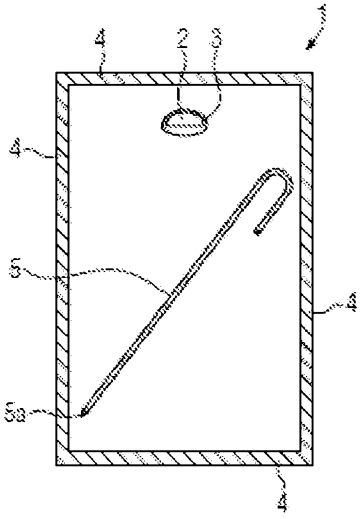

FIG. 1

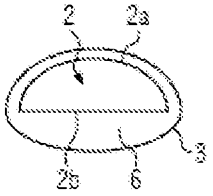

FIG. 2a

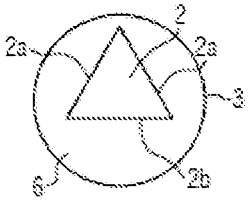

FIG. 2b

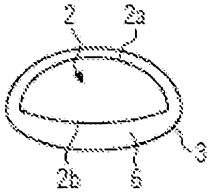

FIG. 2c

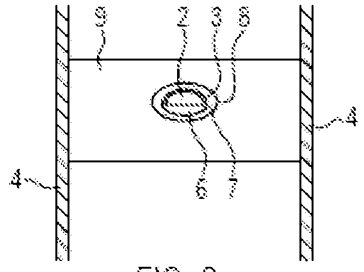

FIG. 3a

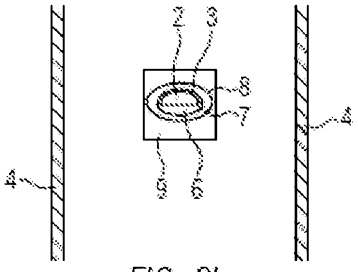

FIG. 3b