

Description

Title of Invention: RESIN CONTAINER

Technical Field

5 [0001]

The present invention relates to a resin container.

Background Art

[0002]

10 Resin containers are widely used as containers for filling liquid products such as beverages and distributing and selling the liquid products. Resin containers have advantages such as being lighter than other containers, being easily formed into any shape in accordance with requirements in terms of volume, design, and the like, and being easily checked for the contents when transparent and are thus used for a wide range of applications.

15 [0003]

In, for example, storing or transporting resin containers after use for reuse or disposal, the bulkiness thereof may be a problem. For example, cans and paper containers can be easily crushed flat after use. Unfortunately, resin containers may be difficult to be crushed due to elasticity of resin.

20 [0004]

In response to this problem, for example, JP 2008-201448 A (Patent Document 1) discloses a synthetic resin container including lateral grooves having a unique shape with sidewall surfaces partially bulged. JP 2008-56291 A (Patent Document 2) discloses a container provided with vertical ribs and lateral ribs serving as starting points of folding operation.

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Citation List

Patent Literature

[0005]

Patent Document 1: JP 2008-201448 A

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Patent Document 2: JP 2008-56291 A

Summary of Invention

Technical Problem

[0006]

35 However, in the technique of Patent Document 1, only crushing of a container is made easy, and folding of the crushed container is not considered. In the technique of Patent Document

2, although folding of a shoulder portion and a bottom portion of a container is considered, folding of a body portion occupying the largest volume is not considered. Thus, there is room for improvement in the related technique in terms of reducing the bulkiness of a container after use.
[0007]

5 Therefore, achieving a resin container in which a body portion of a container is easily crushed and folded is awaited.

Solution to Problem

[0008]

10 A first resin container according to the present invention includes a mouth portion, a shoulder portion, a body portion, and a bottom portion. The body portion has a substantially quadrangular cylindrical shape. The shoulder portion has a shape continuously connecting the mouth portion and the body portion. At least part of the body portion is provided with a specific portion having a shape of a parallelogram whose internal angles are not right angles when two
15 pairs of opposing sides in a cross-section of the body portion are extended. The shoulder portion includes protruding ribs having an arch shape and extending between two vertex portions of vertex portions in a plan view, the two vertex portions being located directly above acute-angled vertices of the parallelogram in the specific portion.

[0009]

20 According to this configuration, the cross-section of the specific portion has a substantially parallelogram shape, and thus the specific portion can be crushed more easily and more flatly than a container having a rectangular cross-section in the related art by applying a force so as to close the acute-angled vertices of the parallelogram. Since the specific portion becomes flat, the container can be easily folded in half in the vertical direction with the specific
25 portion as a starting point. In deforming the shoulder portion so as to be recessed to the inner side of the container, the protruding rib having an arch shape becomes a starting point of deformation by being mountain-folded, facilitating the operation. Accordingly, the shoulder portion can be easily crushed by folding the resin container in half at the body portion such that the bottom portion enters the shoulder portion. In this way, the present invention can achieve a
30 resin container in which the body portion of the container is easily crushed and folded.

[0010]

 As one aspect, the first resin container according to the present invention preferably includes at least one of the protruding ribs in each of two regions of the shoulder portion bisected by a diagonal line connecting the two vertex portions opposed to each other in a plan view.

35 [0011]

This configuration does not limit the operation direction in folding in half at the body portion.

[0012]

As one aspect, the first resin container according to the present invention preferably further includes a recessed rib along a boundary between the shoulder portion and the body portion.

[0013]

According to this configuration, since the recessed rib functions as a folding line for the shoulder portion, operation of crushing the shoulder portion is facilitated.

[0014]

As one aspect, preferably, the first resin container according to the present invention allows, in folding the shoulder portion along the protruding rib and folding the body portion, a projecting portion having an eave shape to be formed in a region between the mouth portion and the protruding rib, allowing the bottom portion to be engaged with the projecting portion.

[0015]

This configuration can engage the bottom portion with the shoulder portion and thus easily fix the folded state of the resin container.

[0016]

As one aspect, in the first resin container according to the present invention, at a vertex portion of the shoulder portion where no end portion of the protruding rib is disposed and at a vertex portion of the bottom portion directly below the vertex portion of the shoulder portion, a pair of marks are each provided.

[0017]

This configuration can suggest a procedure for a folding operation to consumers or the like.

[0018]

As one aspect, in the first resin container according to the present invention, the body portion is preferably divided into an upper portion, the specific portion, and a lower portion in order from a side connected to the shoulder portion to a side connected to the bottom portion.

[0019]

According to this aspect, since the specific portion is located at the center of the body portion in the vertical direction, the container is more easily folded in half.

[0020]

As one aspect, in the first resin container according to the present invention, preferably, the body portion includes a lower portion which is a portion between the specific portion and the bottom portion, and provided are ribs extending along boundaries connected to boundaries

corresponding to acute-angled vertices of the parallelogram in the specific portion among boundaries between two surfaces in the lower portion.

[0021]

According to this configuration, in performing operation of crushing the lower portion,
5 the ribs function as folding lines, and thus the lower portion can be easily crushed.

[0022]

As one aspect, in the first resin container according to the present invention, preferably provided are ribs extending along boundaries corresponding to acute-angled vertices of the parallelogram among boundaries between two surfaces in the specific portion.

10 [0023]

According to this configuration, in performing operation of crushing the specific portion, the ribs function as folding lines, and thus the specific portion can be easily crushed.

[0024]

As one aspect, in the first resin container according to the present invention, the cross-
15 section of the body portion preferably has a long side and a short side distinguishable from each other.

[0025]

This configuration can provide a container that is easier to hold than a case in which a container having the same volume is formed in another shape.

20 [0026]

A second resin container according to the present invention is a resin container including a mouth portion, a shoulder portion, a body portion, and a bottom portion. The body portion has a substantially polygonal column shape. At least part of the body portion is provided with a specific portion having a shape of a parallelogram whose internal angles are not right angles
25 when two pairs of opposing sides in a cross-section of the body portion are extended.

[0027]

According to this configuration, since the cross-section of the specific portion has a substantially parallelogram shape, the specific portion can be crushed more easily and more flatly than a container having a rectangular cross-section in the related art by applying a force so
30 as to close the acute-angled vertices of the parallelogram. Since the specific portion becomes flat, the container can be easily folded in half in the vertical direction with the specific portion as a starting point. In this way, the present invention can achieve a resin container in which the body portion of the container is easily crushed and folded.

[0028]

As one aspect, in the second resin container according to the present invention, the body portion is preferably divided into an upper portion, the specific portion, and a lower portion in order from a side connected to the shoulder portion to a side connected to the bottom portion.
[0029]

5 According to this aspect, since the specific portion is located at the center of the body portion in the vertical direction, the container is more easily folded in half.
[0030]

 As one aspect, in the second resin container according to the present invention, the specific portion is preferably recessed further inward than the upper portion and the lower
10 portion.
[0031]

 According to this configuration, the specific portion functions as a suitable gripping position for a user to grip the container.
[0032]

15 As one aspect, the second resin container according to the present invention preferably includes a recessed portion recessed further inward from the specific portion.
[0033]

 According to this configuration, when a user grips the container, the gripping of the container is easily stabilized by hooking a finger on the recessed portion.
20 [0034]

 As one aspect, in the second resin container according to an aspect of the present invention, a lateral rib extending in a circumferential direction is preferably provided at the specific portion.
[0035]

25 This configuration easily provides both the strength of the container during use and the ease of folding of the container after use for the specific portion.
[0036]

 As one aspect, in the second resin container according to the present invention, a plurality of the lateral ribs are preferably provided in parallel on a pair of opposing surfaces of the specific
30 portion.
[0037]

 This configuration is easy to further increase the strength of the surfaces on which the plurality of lateral ribs are provided in parallel.
[0038]

35 As one aspect, in the second resin container according to the present invention, preferably, the body portion includes a lower portion which is a portion between the specific

portion and the bottom portion, and provided are ribs extending along boundaries connected to boundaries corresponding to acute-angled vertices of the parallelogram in the specific portion among boundaries between two surfaces in the lower portion.

[0039]

5 According to this configuration, in performing operation of crushing the lower portion, the ribs function as folding lines, and thus the lower portion can be easily crushed.

[0040]

 As one aspect, in the second resin container according to the present invention, preferably, the body portion includes an upper portion which is a portion between the specific
10 portion and the shoulder portion, and provided is a rib extending along a boundary between the shoulder portion and the upper portion.

[0041]

 According to this configuration, in performing operation of crushing the upper portion, the rib functions as a folding line, and thus the upper portion can be easily crushed.

15 [0042]

 As one aspect, in the second resin container according to the present invention, preferably provided are ribs extending along boundaries corresponding to acute-angled vertices of the parallelogram among boundaries between two surfaces in the specific portion.

[0043]

20 According to this configuration, in performing operation of crushing the specific portion, the ribs function as fold lines, and thus the specific portion can be easily crushed.

[0044]

 As one aspect, in the second resin container according to the present invention, the cross-section of the body portion preferably has a long side and a short side distinguishable from each
25 other.

[0045]

 This configuration can provide a container that is easier to hold than a case in which a container having the same volume is formed in another shape.

[0046]

30 A third resin container according to the present invention includes a mouth portion, a shoulder portion, a body portion, and a bottom portion. The body portion has a substantially quadrangular cylindrical shape. The shoulder portion has a shape continuously connecting the mouth portion and the body portion. The shoulder portion includes a protruding rib having an arch shape and extending between two vertex portions opposed to each other in a plan view.

35 [0047]

This configuration allows, in deforming the shoulder portion so as to be recessed to the inner side of the container, the protruding rib having an arch shape to become a starting point of deformation by being mountain-folded, facilitating the operation. Accordingly, the shoulder portion can be easily crushed by folding the resin container in half at the body portion such that the bottom portion enters the shoulder portion, and thus the resin container can be easily folded.
[0048]

As one aspect, the third resin container according to the present invention preferably includes at least one protruding rib in each of two regions of the shoulder portion bisected by a diagonal line connecting the two vertex portions opposed to each other in a plan view.
[0049]

This configuration does not limit the operation direction in folding in half at the body portion.
[0050]

As one aspect, in the third resin container according to the present invention, preferably, the protruding rib extends continuously between the two vertex portions.
[0051]

According to this configuration, since the protruding rib is formed as a continuous rib, the protruding rib can easily function as a starting point of deformation of the shoulder portion.
[0052]

As one aspect, the third resin container according to the present invention preferably further includes a recessed rib along a boundary between the shoulder portion and the body portion.
[0053]

According to this configuration, since the recessed rib functions as a folding line for the shoulder portion, operation of crushing the shoulder portion is facilitated.
[0054]

As one aspect, preferably, the third resin container according to the present invention allows, in folding the shoulder portion along the protruding rib and folding the body portion, a projecting portion having an eaves shape to be formed in a region between the mouth portion and the protruding rib, allowing the bottom portion to be engaged with the projecting portion.
[0055]

According to this configuration, since the bottom portion and the shoulder portion can be engaged with each other, the folded state of the resin container can be easily fixed.
[0056]

As one aspect, in the third resin container according to the present invention, at a vertex portion of the shoulder portion where no end portion of the protruding rib is disposed and at a

vertex portion of the bottom portion directly below the vertex portion of the shoulder portion, a pair of marks are each provided.

[0057]

According to this configuration, a procedure for a folding operation can be suggested to consumers or the like.

[0058]

A fourth resin container according to the present invention includes a mouth portion, a shoulder portion, a body portion, and a bottom portion. The body portion includes protruding ribs extending in a vertical direction at respective two locations symmetrical with respect to a plane including a central axis connecting a center of the mouth portion and a center of the bottom portion.

[0059]

According to this configuration, since the protruding ribs function as folding lines in folding the resin container, the body portion is easily folded as compared with a resin container in the related art.

[0060]

As one aspect, in the fourth resin container according to the present invention, preferably, the protruding ribs are substantially parallel to the central axis.

[0061]

According to this configuration, the resin container folded with the protruding ribs as folding lines can be easily flattened, which is further advantageous in suppressing the bulkiness of the container after use.

[0062]

As one aspect, in the fourth resin container according to the present invention, preferably, the body portion further includes recessed ribs extending in a circumferential direction of the body portion, and the protruding ribs intersect the recessed ribs.

[0063]

This configuration, in the resin container, can increase the strength by providing the recessed rib extending in the circumferential direction and facilitate folding with the protruding ribs as folding lines in a compatible manner.

[0064]

As one aspect, in the fourth resin container according to the present invention, preferably, the body portion has a substantially polygonal cylindrical shape, and the protruding ribs are provided along ridge portions of the body portion.

[0065]

In folding an object having a polygonal cylindrical shape, operation of folding the object along ridges is easily understandable to a user. According to the above-described configuration, since the protruding ribs functioning as folding lines are provided at the locations according to this easy-to-understand operation, the user can easily understand the folding operation.

5 [0066]

Further features and advantages of the present invention will become more apparent from the following description of exemplary and non-limiting embodiments that will be given with reference to the drawings.

10 Brief Description of Drawings

[0067]

FIG. 1 is a front view of a bottle according to a first embodiment.

FIG. 2 is a side view of the bottle according to the first embodiment.

FIG. 3 is a top view of the bottle according to the first embodiment.

15 FIG. 4 is a cross-sectional view (a cross-sectional view taken along a line IV-IV in FIG. 1) of a specific portion of a body portion of the bottle according to the first embodiment.

FIG. 5 is a view illustrating a procedure for a method of folding the bottle according to the first embodiment.

20 FIG. 6 is a view illustrating a procedure for a method of folding the bottle according to the first embodiment.

FIG. 7 is a view illustrating a procedure for a method of folding the bottle according to the first embodiment.

FIG. 8 is a front view of a bottle according to a second embodiment.

FIG. 9 is a top view of the bottle according to the second embodiment.

25 FIG. 10 is a cross-sectional view of the bottle according to the second embodiment in the middle of folding.

FIG. 11 is a view comparing portions IV of FIG. 10 with and without a protruding rib.

FIG. 12 is a front view of a bottle of Comparative Example 1 that is compared with Example according to the second embodiment.

30 FIG. 13 is a front view of a bottle of Comparative Example 2 that is compared with Example according to the second embodiment.

Description of Embodiments

[0068]

35 1. First Embodiment

A first embodiment of a resin container according to the present invention will be described with reference to the drawings. Hereinafter, an example in which the resin container according to the present invention is applied to a plastic bottle 1 (hereinafter simply referred to as a “bottle 1”) will be described.

5 [0069]

Overall Configuration of Bottle

The bottle 1 according to the present embodiment is made of polyethylene terephthalate, and is a colorless and transparent container. The bottle 1 is obtained by biaxial stretch blow molding using a preform made of polyethylene terephthalate as a base material. The material
10 constituting the bottle is not limited to polyethylene terephthalate and may be polyethylene or polypropylene, for example. In addition, the material may be derived from petroleum, a plant-derived raw material, a recycled raw material, or the like.

[0070]

In the present embodiment, the volume of the bottle 1 is 2 L. However, the volume of the
15 bottle 1 is not particularly limited and may be a commonly distributed volume ranging from approximately 200 mL to 2 L, such as 280 mL, 350 mL, or 500 mL.

[0071]

The bottle 1 is used as a container for liquid products such as beverages including soft drinks (carbonated drinks, fruit drinks, coffee drinks, tea drinks, mineral water, soymilk,
20 vegetable drinks, sports drinks, cocoa drinks, and the like), alcoholic drinks, and milk drinks; liquid foods such as soups; liquid seasonings such as sauces and soy sauce; and the like, for example.

[0072]

The bottle 1 according to the present embodiment includes a mouth portion 2, a shoulder
25 portion 3, a body portion 4, and a bottom portion 5 (FIG. 1 and FIG. 2). In the following description, the vertical direction of the bottle 1 refers to a vertical direction with reference to a posture in which the bottle 1 is placed with the bottom portion 5 in contact with the ground (the posture illustrated in FIG. 1 and FIG. 2). That is, the upper side of the bottle 1 corresponds to the mouth portion 2 side, and the lower side of the bottle 1 corresponds to the bottom portion 5 side.
30 In addition, the lateral direction (or the horizontal direction) of the bottle 1 refers to a direction orthogonal to the vertical direction (i.e., the left-right direction in FIG. 1 or a direction orthogonal to the paper surface). A pair of opposing surfaces of the bottle 1 has the same shape.

[0073]

The bottle 1 has a substantially quadrangular shape in a plan view (FIG. 3). Note that the
35 substantially quadrangular shape is not limited to a quadrangular shape according to a mathematical definition, and may be a shape that can be regarded as a substantially quadrangular

shape provided with rounding or the like that can be provided as an industrial product. More specifically, the quadrangular shape is a rectangle, and the side surfaces of the bottle 1 can be distinguished between surfaces on the long side (FIG. 1) and surfaces on the short side (FIG. 2) in the cross-section.

5 [0074]

The mouth portion 2 is an opening through which a liquid product filling inside is poured in and out, and is provided with, at the outer surface thereof, an external thread portion that is engaged with a cap (not illustrated). The shoulder portion 3 is a portion where the bottle 1 is gradually expanded from the mouth portion 2 toward the body portion 4. The position in the height direction at which the bottle 1 gradually expanding downward from the mouth portion 2 expands to the maximum degree is defined as the boundary between the shoulder portion 3 and the body portion 4. The bottom portion 5 is a portion serving as a contact surface when the bottle 1 is placed on a surface such as a desk, and the bottle 1 also gradually expands from the bottom portion 5 toward the body portion 4. The position in the height direction at which the bottle 1 gradually expanding upward from the contact surface expands to the maximum degree is defined as the boundary between the bottom portion 5 and the body portion 4. The structures and functions of the mouth portion 2 and the bottom portion 5 are substantially the same as those of a mouth portion and a bottom portion of a known plastic bottle, and thus the detailed description thereof will be omitted.

20 [0075]

Configuration of Shoulder Portion

The shoulder portion 3 has a shape continuously connecting the mouth portion 2 and the body portion 4. Since the mouth portion 2 has a shape in which the external thread portion is provided at an outer surface of a substantially cylindrical body and the body portion 4 has a substantially quadrangular prism shape, the shoulder portion 3 has a substantially circular cross-section at an upper end portion thereof and has a substantially quadrangular cross-section at a lower end portion thereof. In a plan view (FIG. 3), the shape of the shoulder portion 3 appears as a substantially quadrangular shape of the lower end portion.

[0076]

30 The shoulder portion 3 is provided with two protruding ribs 31 having an arch shape. Each protruding rib 31 extends continuously between two vertex portions A, A opposed to each other in the plan view. One protruding rib 31 is provided in each of two regions of the shoulder portion 3 bisected by a diagonal line L1 connecting the two vertex portions A, A. The term “protruding rib” refers to a rib projecting from a surface of the bottle 1.

35 [0077]

In a side view (FIG. 2), the protruding rib 31 extends obliquely upward at an angle of about 45° from an end portion located at the vertex portion A. The position of the protruding rib 31 in the height direction becomes maximum in the vicinity of a diagonal line L2 connecting vertex portions B, B different from the vertex portions A, A.

5 [0078]

By providing the protruding rib 31 at the shoulder portion 3, a function of facilitating the folding of the shoulder portion 3 along the protruding rib 31 is achieved. More specifically, the shoulder portion 3 can be folded in a mountain fold manner at the portion of the protruding rib 31. At this time, a lower shoulder portion 32 which is a region between the body portion 4 and the protruding rib 31 can be put under an upper shoulder portion 33 which is a region between the mouth portion 2 and the protruding rib 31. By deforming the shoulder portion 3 in this way, the upper shoulder portion 33 becomes a projecting portion having an eave shape, and serves to engage with the bottom portion 5 (to be described below) when the body portion 4 is folded.

10 [0079]

15 An engraved mark 34 having a circular shape (an example of marking) is provided at the vertex portions B, B (vertex portions at which the end portions of the protruding ribs 31 are not disposed) of the shoulder portion 3 (FIGS. 1 to 3). Similarly, an engraved mark 51 having a circular shape (an example of marking) is provided at the bottom portion 5 (FIGS. 1 and 2). In the bottom portion 5, the engraved mark 51 is provided at vertex portions directly below the vertex portions B, B of the shoulder portion 3. Note that the engraved mark 51 being located directly below the engraved mark 34 indicates that there is a positional relationship in which the engraved mark 51 is reached by tracing the surface of the bottle 1 downward (to the downward direction in FIG. 1 and FIG. 2) from the engraved mark 34. That is, it is sufficient that the engraved mark 51 is located “directly below” the engraved mark 34 in the arrangement on the bottle 1, and the engraved mark 34 and the engraved mark 51 are not necessarily located strictly on the same vertical line. In the following description, for a vertical positional relationship between components, “directly above” or “directly below” similarly indicates the vertical positional relationship in the arrangement on the bottle 1, and does not require presence on the same vertical line in a strict sense.

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30 [0080]

Configuration of Body Portion

The body portion 4 is divided into an upper portion 41, a specific portion 42, and a lower portion 43 in order from a side connected to the shoulder portion 3 (upper side) to a side connected to the bottom portion 5 (lower side). Although irregularities are observed in the body portion 4 in the front view and the side view because the upper portion 41, the specific portion 42, and the lower portion 43 differ in horizontal dimension from each other and a plurality of

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ribs (to be described below) are provided, the body portion 4 is regarded as having a substantially quadrangular cylindrical shape as a handling feature during manufacturing, distribution, and the like. That is, the substantially quadrangular cylindrical shape of the body portion 4 is not necessarily a quadrangular cylindrical shape in a mathematical sense.

5 [0081]

(1) Upper Portion 41

The upper portion 41 is a portion of the body portion 4 above the specific portion 42, that is, a portion between the specific portion 42 and the shoulder portion 3. The upper portion 41 is provided with a first lateral rib 61 (an example of a recessed rib) along a boundary between the shoulder portion 3 and the upper portion 41, and a plurality of (five in the present embodiment) second lateral ribs 62 (FIG. 1 and FIG. 2). The first lateral rib 61 is a recessed rib (that refers to as a rib recessed to the inner side of the bottle 1, the same applies hereinafter) provided on each of the surfaces on the long side (FIG. 1) and the surfaces on the short side (FIG. 2) in the cross-section (four surfaces in total) with a length within the range of each surface. The depth of the first lateral rib 61 is uniform. Note that the depth of the recessed rib refers to the depth at which the rib is recessed to the inner side of the bottle 1, and the same applies to other recessed ribs to be described below.

[0082]

The second lateral rib 62 is a recessed rib provided along the horizontal direction over the entire circumference of the upper portion 41. The second lateral rib 62 has a wavy shape in which deep portions and shallow portions are alternately provided. More specifically, deep portions are provided at portions corresponding to the sides of the cross-section, and shallow portions are provided at portions corresponding to vertices of the cross-section.

[0083]

Note that the cross-sectional shape of the upper portion 41 is substantially the same as the plan view (FIG. 3) of the bottle 1.

[0084]

(2) Specific Portion 42

The specific portion 42 is formed as a portion recessed further inward of the bottle 1 than the upper portion 41 and the lower portion 43 (FIG. 1 and FIG. 2). A cross-section of the specific portion 42 is illustrated in FIG. 4. Two pairs of opposing sides 44, 45 can be seen in the cross-section, one pair of sides 44 corresponds to the surfaces on the long side (FIG. 1) and the other pair of sides 45 corresponds to the surfaces on the short side (FIG. 2). A parallelogram P is formed by extending these two pairs of opposing sides 44, 45. The parallelogram P has vertices P1 with an acute internal angle and vertices P2 with an obtuse internal angle, that is, the internal

angles of the parallelogram P are not right angles. In other words, the parallelogram P is not a rectangle.

[0085]

The vertex portion A (at which an end portion of the protruding rib 31 is disposed) and the vertex portion B (at which the engraved mark 34 is disposed) of the shoulder portion 3 and the vertex P1 (acute angle) and the vertex P2 (obtuse angle) of the specific portion 42 have a positional relationship in which the vertex portion A is directly above the vertex P1 and the vertex portion B is directly above the vertex P2.

[0086]

First vertical ribs 71 are provided along boundaries between the surfaces on the long side (FIG. 1) and the surfaces on the short side (FIG. 2) of the specific portion 42. More specifically, the first vertical ribs 71 are provided at two boundaries corresponding to the vertices P1 with the acute angle of the parallelogram P among the boundaries between the surfaces on the long side and the surfaces on the short side. In the present embodiment, the first vertical ribs 71 are protruding ribs provided projecting outward for the bottle 1.

[0087]

The specific portion 42 includes a recessed portion 42b recessed further to the inner side from a main portion 42a of the specific portion 42. The recessed portion 42b is provided at the center in the left-right direction of the surface on the long side of the cross-section (FIG. 1).

Further, a rib 46 having a cross shape is provided at the center of the recessed portion 42b. The rib 46 is formed of two recessed ribs orthogonal to each other.

[0088]

A third lateral rib 63 extending in the circumferential direction is provided at the main portion 42a of the specific portion 42. More specifically, three third lateral ribs 63 are provided side by side in parallel in the height direction on each of the left and right sides of the recessed portion 42b, and the length of the central one of the three third lateral ribs 63 is slightly longer than the lengths of the upper and lower ones of the third lateral ribs 63 (FIG. 1 and FIG. 2). The third lateral rib 63 is a recessed rib having a uniform depth. The first vertical ribs 71 are provided in the form of intersecting the three third lateral ribs 63.

[0089]

The specific portion 42 functions as a suitable gripping position for a user to grip the bottle 1. First, since the specific portion 42 is formed as a portion recessed further inward of the bottle 1 than the upper portion 41 and the lower portion 43, even a user whose hand is relatively small can easily grasp the specific portion 42 without difficulty. Secondly, when a user grips the specific portion 42, the user can hook his/her finger on the recessed portion 42b, and thus the gripping of the bottle 1 is easily stabilized.

[0090]

The sizes of the internal angles of the respective vertices with acute and obtuse angles of the parallelogram P are not limited as long as the parallelogram P is a parallelogram. In other words, using an angle θ greater than 0° , the internal angle of an acute vertex is expressed as $90^\circ - \theta$ and the internal angle of an obtuse vertex is expressed as $90^\circ + \theta$. In the present embodiment, θ is 5° , that is, the internal angle of the vertex P1 is 85° , and the internal angle of the vertex P2 is 95° . As in this example, θ is preferably 1° or more and 30° or less. The cross-sectional shape of the specific portion 42 being the parallelogram P produces an effect of facilitating operation of crushing the specific portion 42 (to be described below), and this effect is particularly likely to be exhibited when θ is 1° or more. When θ is 30° or less, the function of the specific portion 42 as the gripping position of the bottle 1 is less likely to be impaired. More preferably, θ is 3° or more, and still more preferably, θ is 4° or more. In addition, more preferably, θ is 10° or less, and still more preferably, θ is 6° or less.

[0091]

15 (3) Lower Portion 43

The lower portion 43 is a portion of the body portion 4 below the specific portion 42, that is, a portion between the specific portion 42 and the bottom portion 5. The lower portion 43 is provided with a wavy rib 64, a spring rib 65, and a plurality of (two in the present embodiment) fourth lateral ribs 66 in this order from the top. All of these ribs are recessed ribs. Provided are second vertical ribs 72 extending along two boundaries located below the first vertical ribs 71 among the boundaries between the surfaces on the long side (FIG. 1) and the surfaces on the short side (FIG. 2) of the cross-section of the lower portion 43. The second vertical ribs 72 are protruding ribs provided in the form of intersecting the wavy rib 64 and the fourth lateral ribs 66. Note that the cross-sectional shape of the lower portion 43 is substantially the same as the plan view of the bottle 1 (FIG. 3).

[0092]

The wavy rib 64 is a rib provided in such a shape that the position thereof in the vertical direction continuously changes along the circumferential direction of the lower portion 43. The spring rib 65 includes a groove portion 65a provided over the entire circumference of the lower portion 43, and a small recessed portion 65b formed above and below the groove portion 65a over the entire circumference of the lower portion 43. The spring rib 65 including the groove portion 65a and the small recessed portions 65b can be regarded as one rib as a whole.

[0093]

The fourth lateral ribs 66 are provided along the horizontal direction over the entire circumference of the lower portion 43. However, as described above, the second vertical rib 72

intersects the fourth lateral ribs 66. The depth of the fourth lateral ribs 66 is uniform except for the portions intersected by the second vertical rib 72.

[0094]

Bottle Folding Method

5 In the bottle 1 according to the present embodiment, by providing the above-described components, a container that is more easily folded than a plastic bottle in the related art is achieved. By folding the bottle 1 after use, the volume of the bottle 1 can be reduced when the bottle 1 after use is stored, transported, or the like for reuse, disposal, or the like. In the following, a method of folding the bottle 1 will be described.

10 [0095]

First, operation of crushing the specific portion 42 is performed (FIG. 5). Specifically, the two surfaces on the long sides of the cross-section are moved in opposing directions toward the respective vertices P1 (acute angles) of the parallelogram P of the cross-section. By performing this operation, the specific portion 42 is deformed (crushed) such that the internal angles of the vertices P1 of the parallelogram P decrease and the internal angles of the vertices P2 approaches 180°.

[0096]

In the present embodiment, since the cross-section of the specific portion 42 has a parallelogram shape, when a force is applied so as to close the vertices P1 having an acute internal angle, the specific portion 42 is easily deformed in accordance with the force. Thus, the specific portion 42 can be more easily and more flatly crushed as compared with a plastic bottle having a rectangular cross-section in the related art. The first vertical rib 71 is provided projecting outward from the bottle 1, increasing the movability of the portions of the vertices P1 to be deformed to reduce the internal angles. In this way, the first vertical rib 71 functioning as a so-called folding line also contributes to facilitating the above-described deformation.

25 [0097]

Secondly, the bottle 1 is folded at the specific portion 42 crushed (FIG. 6). At this time, operation of bringing the bottom portion 5 into contact with the shoulder portion 3 is required, and this operation is achieved by causing the engraved mark 34 of the shoulder portion 3 and the engraved mark 51 of the bottom portion 5 to approach each other. The engraved mark 34 and the engraved mark 51 having the same circular shape serve to suggest this operation to consumers.

30 [0098]

When the bottom portion 5 is pushed against the shoulder portion 3 after the bottom portion 5 is brought into contact with the shoulder portion 3, the shoulder portion 3 is mountain-folded at the protruding rib 31, the lower shoulder portion 32 gets under the upper shoulder portion 33, and the upper shoulder portion 33 becomes a projecting portion having an eave

shape. This projecting portion serves, by being finally engaged with the bottom portion 5, to fix a state in which the bottle 1 is folded in half. In performing this operation, the first lateral rib 61 functions as a folding line to facilitate the crushing of the shoulder portion 3.

[0099]

5 Thirdly, operation of crushing the upper portion 41, the lower portion 43, and the bottom portion 5 is performed. When these portions are crushed, the bottom portion 5 can be engaged with the upper shoulder portion 33 (the projecting portion) to fix the folded state of the bottle 1 (FIG. 7). At this time, the folded state of the bottle 1 can be easily fixed by folding the bottle 1 by raising the mouth portion 2 such that the bottom portion 5 is covered with the upper shoulder
10 portion 33. Similar to the first vertical rib 71, the second vertical ribs 72 function as folding lines to facilitate the crushing of the lower portion 43.

[0100]

 In the present embodiment, since the cross-section of the specific portion 42 is formed in a parallelogram shape so that the shape after being crushed is flat, the specific portion 42 can be
15 easily folded in the vertical direction as compared with a plastic bottle in the related art. In addition, since the protruding ribs 31 are provided at the shoulder portion 3 to facilitate engagement of the bottom portion 5, the bottle 1 is easily fixed in the folded state. Thus, the bottle 1 is more easily folded than a container of the same type in the related art, and thus the occupation volume before reuse, disposal, and the like can be reduced.

20 [0101]

Other Embodiments

 Other embodiments of the resin container according to the present invention will be described. Note that the configuration described in each of the following embodiments can also be applied in combination with the configuration described in another embodiment as long as no
25 contradiction arises.

[0102]

 In one aspect of the present invention, the number of divided portions of the body portion is not limited as long as the specific portion is provided at the body portion. For example, the entire region of the body portion may be provided as the specific portion. In addition, the body
30 portion may be divided into two regions including the specific portion. That is, the body portion may be divided into the upper portion and the specific portion, or may be divided into the specific portion and the lower portion.

[0103]

 In one aspect of the present invention, the structure of the specific portion is not limited
35 as long as the specific portion has a shape of a parallelogram whose internal angles are not right angles when two pairs of opposing sides in a cross-section of the specific portion are extended.

[0104]

In one aspect of the present invention, the presence or absence and the arrangement of the ribs at the specific portion are arbitrary. Thus, one or both of these ribs is/are not necessarily provided. In addition, ribs other than these ribs may be provided.

5 [0105]

In one aspect of the present invention, the shape may be a substantially square shape in a plan view in which the surfaces on the long side and the surfaces on the short side in the cross-section cannot be distinguished from each other. In this case, the parallelogram formed by extending two pairs of opposing sides in the cross-section of the specific portion is a rhombic shape, and the prerequisite that the internal angles are not right angles is also satisfied in this case. Further, in this case, although the surfaces on the long side and the surfaces on the short side cannot be distinguished from each other, the present invention can be implemented in the same manner as in the above-described embodiment by setting one of two pairs of opposing two surfaces as the surfaces on the long side (FIG. 1) and the other pair as the surfaces on the short side (FIG. 2).

15

[0106]

Note that, in the comparison between a shape in which the surfaces on the long side and the surfaces on the short side of the cross-section of the container can be distinguished from each other (the cross-section has a substantially rectangular shape) and a shape in which the surfaces on the long side and the surfaces on the short side cannot be distinguished from each other (the cross-section has a substantially square shape), the former has such a feature that the width of the surfaces on the short side can be made smaller when the former and the latter are compared on the assumption that they have the same container volume. This feature is advantageous in that, in a case of a container having a relatively large volume (for example, 1.5 L or more), it is possible to provide an easy-to-hold container because the width of the surface on the short side is limited to a certain degree that allows a user to easily hold the container with his/her hand.

25

[0107]

In one aspect of the present invention, the presence or absence and the arrangement of the ribs at the lower portion are arbitrary.

30 [0108]

In one aspect of the present invention, the presence or absence and the arrangement of the ribs at the upper portion are arbitrary.

[0109]

In one aspect of the present invention, the number of the protruding ribs having an arch shape is arbitrary. In addition, when a plurality of protruding ribs are provided, the arrangement thereof is arbitrary, and for example, the protruding ribs may be provided only in one of two

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regions of the shoulder portion bisected by a diagonal line connecting two vertex portions at which end portions of the protruding ribs are located.

[0110]

In one aspect of the present invention, the protruding rib may have an intermittent shape.

5 [0111]

In one aspect of the present invention, the presence or absence of the recessed rib along the boundary between the shoulder portion and the body portion is arbitrary.

[0112]

In the present invention, the presence or absence of the marks is arbitrary. When the marks are provided, the marks are not limited to engraved marks, and may be projections, patterns, prints, pasting objects, or the like. In addition, the marks at the shoulder portion and the bottom portion only need to be recognized by customers as a pair of marks, and may have the same shape as in the above-described embodiment or may have different shapes associated with each other. Examples of the latter include a combination of a circle mark and a cross mark and a combination of a protruding portion and a recessed portion.

15

[0113]

2. Second Embodiment

A second embodiment of the resin container according to the present invention will be described with reference to the drawings. Hereinafter, an example in which the resin container according to the present invention is applied to a plastic bottle 10 (hereinafter simply referred to as a “bottle 10”) will be described.

20

[0114]

Overall Configuration of Bottle

The bottle 10 according to the present embodiment is made of polyethylene terephthalate, and is a colorless and transparent container. The bottle 10 is obtained by biaxial stretch blow molding using a preform made of polyethylene terephthalate as a base material. The material constituting the bottle is not limited to polyethylene terephthalate and may be polyethylene or polypropylene, for example. In addition, the material may be derived from petroleum, a plant-derived raw material, a recycled raw material, or the like.

25

30 [0115]

In the present embodiment, the volume of the bottle 10 is 525 mL. However, the volume of the bottle 10 is not particularly limited and may be a commonly distributed volume ranging from approximately 200 mL to 2 L, such as 280 mL, 350 mL, or 500 mL.

[0116]

The bottle 10 is used as a container for liquid products such as beverages including soft drinks (carbonated drinks, fruit drinks, coffee drinks, tea drinks, mineral water, soymilk,

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vegetable drinks, sports drinks, cocoa drinks, and the like), alcoholic drinks, and milk drinks; liquid foods such as soups; liquid seasonings such as sauces and soy sauce; and the like, for example.

[0117]

5 The bottle 10 according to the present embodiment includes a mouth portion 12, a shoulder portion 13, a body portion 14, and a bottom portion 15 (FIG. 8 and FIG. 9). In the following description, the vertical direction of the bottle 10 refers to a vertical direction with reference to a posture in which the bottle 10 is placed with the bottom portion 15 in contact with the ground (the posture illustrated in FIG. 8). That is, the upper side of the bottle 10 corresponds
10 to the mouth portion 12 side, and the lower side of the bottle 10 corresponds to the bottom portion 15 side. In addition, the lateral direction (or the horizontal direction) of the bottle 10 refers to a direction orthogonal to the vertical direction (i.e., the left-right direction in FIG. 8 or a direction orthogonal to the paper surface).

[0118]

15 The bottle 10 has a substantially quadrangular shape in a plan view (FIG. 9). Note that the substantially quadrangular shape is not limited to a quadrangular shape according to a mathematical definition, and may be a shape that can be regarded as a substantially quadrangular shape provided with rounding or the like that can be provided as an industrial product. In the present embodiment, the quadrangular shape is a square shape.

20 [0119]

 The mouth portion 12 is an opening through which a liquid product filling inside is poured in and out, and is provided with, at the outer surface thereof, an external thread portion that is engaged with a cap (not illustrated). The shoulder portion 13 is a portion where the bottle 10 is gradually expanded from the mouth portion 12 toward the body portion 14. The position in
25 the height direction at which the bottle 10 gradually expanding downward from the mouth portion 12 expands to the maximum degree is defined as the boundary between the shoulder portion 13 and the body portion 14. The bottom portion 15 is a portion serving as a contact surface when the bottle 10 is placed on a surface such as a desk, and the bottle 10 also gradually expands from the bottom portion 15 toward the body portion 14. The position in the height
30 direction at which the bottle 10 gradually expanding upward from the contact surface expands to the maximum degree is defined as the boundary between the bottom portion 15 and the body portion 14. The structures and functions of the mouth portion 12, the shoulder portion 13, and the bottom portion 15 are substantially the same as those of a mouth portion, a shoulder portion, and a bottom portion of a known plastic bottle, and thus the detailed description thereof will be
35 omitted.

[0120]

Configuration of Body Portion

The body portion 14 is a portion having a substantially quadrangular cylindrical shape (an example of a polygonal cylindrical shape) extending between the shoulder portion 13 and the bottom portion 15 and includes vertical protruding ribs 141 extending in the vertical direction (an example of protruding ribs extending in the vertical direction) and lateral recessed ribs 142 extending in the horizontal direction (an example of recessed ribs extending in the circumferential direction of the body portion). Since the body portion 14 has a substantially quadrangular cylindrical shape, the body portion 14 includes four surface portions 143, and ridge portions 144 extending in the vertical direction are formed at portion where respective two surface portions 143 meet. Although irregularities are observed in the body portion 14 because the vertical protruding rib 141 and the lateral recessed rib 142 are provided, the body portion 14 is regarded as having a substantially quadrangular cylindrical shape as a handling feature during manufacturing, distribution, and the like. That is, the substantially quadrangular cylindrical shape (substantially polygonal cylindrical shape) of the body portion 14 is not necessarily a quadrangular cylindrical shape (polygonal cylindrical shape) in a mathematical sense.

[0121]

The vertical protruding rib 141 is a rib projecting from a surface of the bottle 10, and is provided substantially parallel to a central axis X along two ridge portions 144a located on a diagonal line in a plan view (FIG. 9) out of four ridge portions 144. Thus, the two vertical protruding ribs 141 are provided at respective two locations symmetrical with respect to a plane including the central axis X. Note that “substantially parallel” means that the vertical protruding ribs 141 are provided in such a manner that the vertical protruding ribs 141 can be regarded as being parallel to the central axis X in an industrial or practical sense, and the two vertical protruding ribs 141 are not necessarily parallel in a mathematical sense. Each of the vertical protruding ribs 141 extends continuously from the vicinity of the upper end of the body portion 14 (the boundary with the shoulder portion 13) to the vicinity of the lower end of the body portion 14 (the boundary with the bottom portion 15).

[0122]

The lateral recessed rib 142 is a rib recessed to the inner side of the bottle 10, and extends in the circumferential direction (horizontal direction) of the body portion 14. In the present embodiment, seven lateral recessed ribs 142 are provided.

[0123]

The vertical protruding ribs 141 and the lateral recessed ribs 142 have a relationship in which the vertical protruding ribs 141 are provided in the form of intersecting the seven lateral recessed ribs 142. That is, portions of the vertical protruding ribs 141 that project from the

surface of the bottle 10 extend continuously, whereas portions of the lateral recessed ribs 142 that are recessed to the inner side of the bottle 10 are divided by the vertical protruding ribs 141. [0124]

Bottle Folding Method

5 In the bottle 10 according to the present embodiment, when the body portion 14 is crushed to fold the bottle 10, the two vertical protruding ribs 141 function as folding lines, inducing the folding of the body portion 14 at the two ridge portions 144a. FIG. 10 illustrates a change in the cross-sectional shape of the body portion 14 in pushing the body portion 14 so as to cause two ridge portions 144b where the vertical protruding ribs 141 are not provided to
10 approach each other, and the body portion 14 can be flattened by this operation. [0125]

FIG. 11 illustrates an enlarged view of the portion of the vertical protruding rib 141 in FIG. 10 alongside a case where the vertical protruding rib 141 is not provided. When the vertical protruding rib 141 is provided, the vertical protruding rib 141 originally provided in a shape
15 projecting outward bears the deformation of the ridge portion 144a, and thus the repulsive force generated by the deformation is less likely to increase. On the other hand, in the case where the vertical protruding rib 141 is not provided, a corner portion 145 provided so as to have a substantially right angle directly bears the deformation of the ridge portion 144a, and thus the repulsive force is likely to increase as the deformation progresses. [0126]

As described above, in the bottle 10 according to the present embodiment, since the repulsive force at the ridge portions 144a being folded is suppressed by providing the vertical protruding ribs 141, it is possible to achieve a container that can be more easily folded than a
25 plastic bottle in the related art. In addition, the suppression of the repulsive force also exerts an effect of suppressing the bottle 10 from returning to the original shape after being folded. These effects can reduce the volume of the bottle 10 in, for example, storing or transporting the bottle 10 after use for reuse, disposal, or the like. [0127]

Example

30 Hereinafter, the present embodiment will be further described with reference to an example. However, the following example does not limit the present invention. [0128]

Bottle Used for Test

As an example, the bottle 10 (FIG. 8 and FIG. 9) according to the above-described
35 embodiment was used. [0129]

As Comparative Example 1, a bottle 16 illustrated in FIG. 12 was used. The bottle 16 is the same as the bottle 10 except that a vertical recessed rib 146 extending in the vertical direction is provided in place of the vertical protruding rib 141 of the bottle 10.

[0130]

5 As Comparative Example 2, a bottle 17 illustrated in FIG. 13 was used. The bottle 17 is the same as the bottle 10 and the bottle 16 except that the bottle 17 does not includes a rib extending in the vertical direction.

[0131]

Test Method

10 (1) Measurement of Fully-Filled Volume

For each of the bottles of examples and comparative examples, a tare mass and a mass after the bottle is fully filled with water were measured. The value obtained by subtraction of both of the masses was defined as a fully-filled volume of the bottle. The bottle was filled with water by immersing the bottle in a horizontal posture (meaning a posture in which the mouth
15 portion 12 and the bottom portion 15 were placed in the left-right direction) in a water tank filled with water in an amount sufficient to completely immerse the bottle. The value obtained by this method is a mass (gram unit) but can be regarded as an approximate value of a volume (mL unit), and thus is referred to as a “fully-filled volume”.

[0132]

20 (2) Crushing of Bottle

For each of the bottles of examples and comparative examples, one ridge portion of the bottle was selected, and three pressing points were set on the ridge portion selected. The first pressing point was set at an intermediate point between the first lateral recessed rib 142 and the second lateral recessed rib 142 from the bottom portion 15 side. The second pressing point was
25 set at an intermediate point between the third lateral recessed rib 142 and the fourth lateral recessed rib 142 from the bottom portion 15 side. The third pressing point was set at the upper end of the body portion 14 (the boundary between the shoulder portion 13 and the body portion 14). A unit operation of crushing was defined as operation of pressing the pressing point with the thumb in a state in which the ridge portion opposite to the pressing point was supported with four
30 fingers other than the thumb to deform the bottle until the two opposing ridge portions came into contact with each other. This unit operation was performed at the first pressing point, the second pressing point, and the third pressing point in this order. The number of the unit operations was one for each of the pressing points. In addition, for the bottle 10 (example), the pressing points were set at a ridge portion at which the vertical protruding rib 141 was not provided, and for the
35 bottle 16 (Comparative Example 1), the pressing points were set at a ridge portion at which the vertical recessed rib 146 was not provided.

[0133]

(3) Measurement of Volume after Crushing

After the bottles of examples and comparative examples were crushed by the above-described procedure, the volumes after crushing were measured by the same method as the measurement of the fully-filled volume. Residual volume ratios, each of which is a ratio of the volume after crushing to the fully-filled volume expressed in percentage, were compared. It can be said that the smaller the residual volume ratio is, the larger the effect of reducing the volume of the empty container by the crushing operation is.

[0134]

10 Results

The residual volume ratio of examples was 53%, the residual volume ratio of Comparative Example 1 was 60%, and the residual volume ratio of Comparative Example 2 was 67%. That is, the effect of reducing the volume of the empty container was the largest in the bottle 10 provided with the vertical protruding ribs 141. From the above tests, it was confirmed that a bottle which is easily folded and is unlikely to return to the original shape after being folded was achieved in Example.

[0135]

Other Embodiments

Other embodiments of the resin container according to the present invention will be described. Note that the configuration described in each of the following embodiments can also be applied in combination with the configuration described in another embodiment as long as no contradiction arises.

[0136]

In one embodiment of the present invention, the shape of the body portion is not limited and may be, for example, a cylindrical shape. In addition, in the aspect in which the body portion has a substantially polygonal cylindrical shape, the substantially polygonal cylindrical shape is not limited to a substantially quadrangular cylindrical shape having a substantially square cross-section unlike the above-described embodiment, and a substantially quadrangular cylindrical shape having a cross-sectional shape other than a substantially square shape or a substantially polygonal cylindrical shape having a cross-section of a different polygonal shape may be employed.

[0137]

In one aspect of the present invention, the protruding rib is not necessarily substantially parallel to the central axis X. For example, even when the protruding rib is provided obliquely with respect to the direction in which the body portion extends, the operational effect of the

present invention that allows the body portion to be easily folded at the protruding rib is similarly exhibited.

[0138]

In one aspect of the present invention, the protruding rib may have an intermittent shape.

[0139]

In one aspect of the present invention, as long as the protruding ribs are provided at respective two locations symmetrical with respect to a plane including the central axis, an additional protruding rib may be provided. For example, in the above-described embodiment, when the vertical protruding rib 141 is also provided at the ridge portions 144b in addition to the ridge portions 144a, that is, four protruding ribs are provided in total, the bottle 1 can be bended at either the ridge portions 144a or the ridge portions 144b when folded.

[0140]

In one aspect of the present invention, the presence or absence of the recessed rib is arbitrary. Although the configuration in which the vertical protruding ribs 141 are provided in the form of intersecting the seven lateral recessed ribs 142 has been described as an example, in a case where a recessed rib is provided, the positional relationship between the protruding rib and the recessed rib is not limited.

[0141]

With respect to other configurations, it should be understood that the embodiments disclosed in the present specification are illustrative in all respects and that the scope of the present invention is not limited thereto. It will be easily understood by those skilled in the art that modifications can be made as appropriate without departing from the spirit of the present invention. Accordingly, other embodiments modified without departing from the spirit of the present invention are naturally included in the scope of the present invention.

Industrial Applicability

[0142]

The present invention is applicable to a container for a liquid product such as a beverage, for example.

Reference Signs List

[0143]

1. First Embodiment

1: Plastic bottle (bottle)

2: Mouth portion

3: Shoulder portion

- 31: Protruding rib
- 32: Lower shoulder portion
- 33: Upper shoulder portion
- 34: Engraved mark
- 5 4: Body portion
- 41: Upper portion
- 42: Specific portion
- 42a: Main Portion
- 42b: Recessed portion
- 10 43: Lower portion
- 44: Side
- 45: Side
- 46: Rib
- 5: Bottom portion
- 15 51: Engraved mark
- 61: First lateral rib
- 62: Second lateral rib
- 63: Third lateral rib
- 64: Wavy rib
- 20 65: Spring rib
- 65a: Groove portion
- 65b: Small recessed portion
- 66: Fourth lateral rib
- 71: First vertical rib
- 25 72: Second vertical rib
- A: Vertex portion
- B: Vertex portion
- L1: Diagonal line
- L2: Diagonal line
- 30 P: Parallelogram
- P1: Vertex
- P2: Vertex
- θ: Angle
- [0144]
- 35 2. Second Embodiment
- 10: Plastic bottle

- 12: Mouth portion
- 13: Shoulder portion
- 14: Body portion
- 141: Vertical protruding rib
- 5 142: Lateral recessed rib
- 143: Surface portion
- 144: Ridge portion
- 15: Bottom portion
- 16: Plastic bottle (Comparative Example 1)
- 10 146: Vertical recessed rib
- 17: Plastic bottle (Comparative Example 2)
- X: Central axis

Claims

[Claim 1]

A resin container, comprising:

5 a mouth portion;

a shoulder portion;

a body portion; and

a bottom portion,

the body portion having a substantially quadrangular cylindrical shape, and

10 the shoulder portion having a shape continuously connecting the mouth portion and the body portion, wherein

at least part of the body portion is provided with a specific portion having a shape of a parallelogram whose internal angles are not right angles when two pairs of opposing sides in a cross-section of the body portion form are extended, and

15 the shoulder portion includes protruding ribs having an arch shape and extending between two vertex portions of vertex portions in a plan view, the two vertex portions being located directly above acute-angled vertices of the parallelogram in the specific portion.

[Claim 2]

20 The resin container according to claim 1, wherein at least one of the protruding ribs is provided in each of two regions of the shoulder portion bisected by a diagonal line connecting the two vertex portions opposed to each other in a plan view.

[Claim 3]

25 The resin container according to claim 1, further comprising a recessed rib along a boundary between the shoulder portion and the body portion.

[Claim 4]

The resin container according to claim 1, wherein in folding the shoulder portion along

30 the protruding rib and folding the body portion, a projecting portion having an eave shape is allows to be formed in a region between the mouth portion and the protruding rib, allowing the bottom portion to be engaged with the projecting portion.

[Claim 5]

35 The resin container according to claim 4, wherein at a vertex portion of the shoulder portion where no end portion of the protruding rib is disposed and at a vertex portion of the

bottom portion directly below the vertex portion of the shoulder portion, a pair of marks are each provided.

[Claim 6]

5 The resin container according to any one of claims 1 to 5, wherein the body portion is divided into an upper portion, the specific portion, and a lower portion in order from a side connected to the shoulder portion to a side connected to the bottom portion.

[Claim 7]

10 The resin container according to any one of claims 1 to 5, wherein
the body portion includes a lower portion which is a portion between the specific portion and the bottom portion, and
provided are ribs extending along boundaries connected to boundaries corresponding to the acute-angled vertices of the parallelogram in the specific portion among boundaries between
15 two surfaces in the lower portion.

[Claim 8]

 The resin container according to any one of claims 1 to 5, wherein provided are ribs extending along boundaries corresponding to the acute-angled vertices of the parallelogram
20 among boundaries between two surfaces in the specific portion.

[Claim 9]

 The resin container according to any one of claims 1 to 5, wherein the cross-section of the body portion has a long side and a short side distinguishable from each other.

25

[Claim 10]

 A resin container, comprising:
a mouth portion;
a shoulder portion;
30 a body portion; and
a bottom portion, and
the body portion having a substantially polygonal column shape, wherein
at least part of the body portion is provided with a specific portion having a shape of a parallelogram whose internal angles are not right angles when two pairs of opposing sides in a
35 cross-section of the body portion are extended.

[Claim 11]

The resin container according to claim 10, wherein the body portion is divided into an upper portion, the specific portion, and a lower portion in order from a side connected to the shoulder portion to a side connected to the bottom portion.

5

[Claim 12]

The resin container according to claim 11, wherein the specific portion is recessed further inward than the upper portion and the lower portion.

10 [Claim 13]

The resin container according to claim 12, further comprising a recessed portion recessed further inward from the specific portion.

[Claim 14]

15 The resin container according to claim 13, wherein the specific portion is provided with a lateral rib extending in a circumferential direction.

[Claim 15]

20 The resin container according to claim 14, wherein a plurality of the lateral ribs are provided in parallel on a pair of opposing surfaces of the specific portion.

[Claim 16]

25 The resin container according to claim 10, wherein the body portion includes a lower portion which is a portion between the specific portion and the bottom portion, and provided are ribs extending along boundaries connected to boundaries corresponding to acute-angled vertices of the parallelogram in the specific portion among boundaries between two surfaces in the lower portion.

30 [Claim 17]

The resin container according to claim 10, wherein the body portion includes an upper portion which is a portion between the specific portion and the shoulder portion, and provided is a rib extending along a boundary between the shoulder portion and the upper portion.

35

[Claim 18]

The resin container according to any one of claims 10 to 17, wherein provided are ribs extending along boundaries corresponding to acute-angled vertices of the parallelogram among boundaries between two surfaces in the specific portion.

5

[Claim 19]

The resin container according to any one of claims 10 to 17, wherein the cross-section of the body portion preferably has a long side and a short side distinguishable from each other.

10 [Claim 20]

A resin container, comprising:

a mouth portion;

a shoulder portion;

a body portion; and

15

a bottom portion,

the body portion having a substantially quadrangular cylindrical shape,

the shoulder portion having a shape continuously connecting the mouth portion and the body portion, and

the shoulder portion including a protruding rib having an arch shape and extending

20

between two vertex portions opposed to each other in a plan view.

[Claim 21]

The resin container according to claim 20, wherein at least one protruding rib is provided in each of two regions of the shoulder portion bisected by a diagonal line connecting the two vertex portions opposed to each other in a plan view.

25

[Claim 22]

The resin container according to claim 20, wherein the protruding rib extends continuously between the two vertex portions.

30

[Claim 23]

The resin container according to claim 20, further comprising a recessed rib along a boundary between the shoulder portion and the body portion.

35

[Claim 24]

The resin container according to any one of claims 20 to 23, wherein in folding the shoulder portion along the protruding rib and folding the body portion, a projecting portion having an eave shape is allowed to be formed in a region between the mouth portion and the protruding rib, allowing the bottom portion to be engaged with the projecting portion.

5

[Claim 25]

The resin container according to claim 24, wherein at a vertex portion of the shoulder portion where no end portion of the protruding rib is disposed and at a vertex portion of the bottom portion directly below the vertex portion of the shoulder portion, a pair of marks are each

10

[Claim 26]

A resin container, comprising:

a mouth portion;

15

a shoulder portion;

a body portion; and

a bottom portion, wherein

the body portion includes protruding ribs extending in a vertical direction at respective two locations symmetrical with respect to a plane including a central axis connecting a center of the mouth portion and a center of the bottom portion.

20

[Claim 27]

The resin container according to claim 26, wherein the protruding ribs are substantially parallel to the central axis.

25

[Claim 28]

The resin container according to claim 26, wherein

the body portion further includes recessed ribs extending in a circumferential direction of the body portion, and

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the protruding ribs intersect the recessed ribs.

[Claim 29]

The resin container according to claim 26, wherein

the body portion has a substantially polygonal cylindrical shape, and

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the protruding ribs are provided along ridge portions of the body portion.