

Description

BOTTLE FOR WATER DISPENSER

[TECHNICAL FIELD]

[0001] The present invention relates to a bottle for a water dispenser which will be filled with liquid such as mineral water.

[BACKGROUND OF THE INVENTION]

[0002] A bottle for a water dispenser provides mineral water stored therein through a water dispenser while the bottle is detachably mounted on the water dispenser. As such a bottle for a water dispenser, a bottle having a rectangular bottom portion, a rectangular cylindrical-shaped body portion, a shoulder portion, and a neck portion has been proposed (see Patent Document 1).

[PRIOR ART]

[Patent Document]

[0003]

[Patent Document 1] Japanese Patent No. 5,253,085

[SUMMARY OF INVENTION]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

[0004] The above-mentioned bottle filled with liquid is transported before it is mounted on a water dispenser, and therefore the bottle is required to have strength to restrict water leakage or the like due to damage that occurs during transportation.

Further, the body portion of the above-mentioned bottle has a bellows portion that is expandable in the vertical direction, and in a state of being mounted on the water dispenser, the bellows portion is configured to collapse as the mineral water in the bottle decreases due to being discharged from the neck portion.

[0005] When rigidity of the bellows portion is high, there may be a case where the mineral water in the bottle cannot be appropriately discharged since the bellows portion does not collapse appropriately. On the other hand, when rigidity of the bellows portion is low, there may be a case where strength of the bottle having the rectangular cylindrical-shaped body portion cannot be ensured at an appropriate level.

[0006] The present invention focuses on these points, and its object is to provide a bottle for a water dispenser in which a bellows portion can be appropriately collapsed and strength of a body portion can be ensured at an appropriate level.

[MEANS FOR SOLVING THE PROBLEMS]

[0007] An aspect of the present invention provides a bottle for a water dispenser, including a bottom portion having a rectangular shape; a body portion having a rectangular cylindrical shape and continuing upward from a peripheral of the bottom portion; a shoulder portion which is inclined upward from an upper edge of the body portion toward a central portion; and a neck portion protruding upward from the central portion, wherein the bottle for the water dispenser is made of a resin material, the body portion has a bellows portion that is freely extendable in a vertical direction, and a thickness of each of four corner portions of the bellows portion, when viewed in a plane, is smaller than a thickness of each of four connecting portions connecting the corner portions of the bellows portion.

[0008] A corner of each corner portion may be formed with an arc shape.

[0009] A thickness of the corner portions may be 0.05 millimeters or more and 0.11 millimeters or less.

[0010] A thickness of the connecting portions may be 0.09 millimeters or more and 0.16 millimeters or less.

[0011] A thickness of the bellows portion may be 0.05 millimeters or more and 0.16 millimeters or less.

[0012] A thickness of the shoulder portion at a position near the neck portion may be greater than a thickness of the shoulder portion at a position away from the neck portion.

[0013] Further, the thickness of the shoulder portion may gradually decrease as a distance from the neck portion increases.

[0014] The body portion may have (i) a first end portion connecting a first end of the bellows portion and the shoulder portion and (ii) a second end portion connecting a second end of the bellows portion and the bottom portion, and the bellows portion may be smaller than a thickness of first end and a thickness of the second end.

[0015] A thickness of the bellows portion may be smaller than a thickness of the shoulder portion. The shoulder may also have a plurality of ribs which are protruding radially around the neck from the shoulder portion, and the height of the ribs may be greater than a thickness of the shoulder portion. A connecting part of the shoulder portion and the body portion may be a curved surface portion, and longitudinal tips of the ribs may be connected to the curved surface portion.

[EFFECT OF THE INVENTION]

[0016] According to the present invention, it is possible to achieve an effect that the bellows portion is appropriately collapsed and strength of the body portion can be ensured at an appropriate level.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0017] FIG. 1 is a perspective view of a bottle 1 for a dispenser according to an embodiment of the present invention.

FIG. 2 is a front view of the bottle 1 for the dispenser.

FIG. 3 is a bottom view of the bottle 1 for the dispenser.

FIG. 4 is a planar view of the bottle 1 for the dispenser.

FIG. 5 is a schematic diagram illustrating a state in which the bottle 1 for the dispenser is mounted on a dispenser 100.

FIG. 6 is a schematic diagram illustrating a state in which mineral water in the bottle 1 for the dispenser is reduced.

FIG. 7 is a schematic diagram illustrating a relationship among a thickness of a bottom portion 10, a shoulder portion 30, and a bellows portion 50.

FIG. 8 shows a section view taken along an A-A line of FIG 2.

FIG. 9 is a schematic diagram illustrating a thickness of the shoulder portion 30.

FIG. 10 is a schematic diagram illustrating a state in which a bottle 900 for a dispenser according to a comparative example is mounted on the dispenser 100.

FIG. 11 is a table showing a measurement result of a thickness of bellows 52 and evaluation results of strength and residual water.

FIG. 12 is a table showing a measurement result of a thickness of the shoulder

portion 30 and evaluation results of mountability and residual water.

[DETAILED DESCRIPTION OF THE INVENTION]

[0018]

<Outline of a bottle>

A bottle for a water dispenser (hereinafter referred to as a bottle for a dispenser) according to an embodiment of the present invention will be described by referring to FIG. 1 to FIG. 4.

[0019] FIG. 1 is a perspective view of a bottle 1 for a dispenser according to an embodiment. FIG. 2 is a front view of the bottle 1 for the dispenser. FIG. 3 is a bottom view of the bottle 1 for the dispenser. FIG. 4 is a planar view of the bottle 1 for the dispenser.

[0020] The bottle 1 for the dispenser is a hollow bottle, and its inside is filled with liquid such as mineral water. In a state in which the bottle 1 for the dispenser is mounted on a water dispenser (hereinafter referred to as a dispenser), mineral water in the bottle is provided to a user via the dispenser. The bottle 1 for the dispenser is made of a resin material and is formed by blow molding (also called hollow molding), for example. As the resin material, a polyethylene terephthalate (PET) resin is used as an example, but the resin material is not limited thereto and may be another resin.

[0021] The bottle 1 for the dispenser has a substantially square shape when viewed from above (see FIG. 4). This makes it possible to increase the volume of mineral water to be stored inside, as compared with a circular bottle. As shown in FIG. 1, the bottle 1 for the dispenser has a bottom portion 10, a body portion 20, a shoulder portion 30, and a neck portion 40.

[0022] The bottom portion 10 is a planar portion contacting a floor surface at the time of storage or the like. Here, the bottom portion 10 is formed with a rectangular shape as shown in FIG. 3. The bottom portion 10 may be provided with a handle which the user grips when the bottle 1 for the dispenser is turned upside down.

[0023] The body portion 20 is a body portion continuing upward from the periphery of the bottom portion 10, as shown in FIG. 2. Here, the body portion 20 is formed with a rectangular cylindrical shape as shown in FIG. 1. The body portion 20 has a bellows portion 50 that can expand and contract in the vertical direction. As shown in FIG. 2, the bellows portion 50 includes a plurality of bellows 52 arranged along the vertical direction. For example, the height of the bellows portion 50 becomes reduced when each of the plurality of bellows 52, which are connected to each other in the vertical direction (that is, the body portion 20 contracts in the vertical direction) is collapsed.

[0024] The shoulder portion 30 is inclined upward from an upper edge of the body portion 20 toward a central portion 31, as shown in FIG. 2. Specifically, the shoulder portion 30 is inclined upward toward the neck portion 40. A connecting part of the shoulder portion 30 and the body portion 20 has a curved surface.

[0025] A plurality of ribs 32 are provided in the shoulder portion 30, as shown in FIG. 1. The plurality of ribs 32 are arranged radially around the neck portion 40. That is, the plurality of ribs 32 are arranged in a wide area of the shoulder portion 30. Each rib 32 is formed to protrude from the shoulder portion 30 by a predetermined amount. For example, each rib 32 is formed to be raised in a semicircular shape. The height of each rib 32 is preferably greater than a thickness of the shoulder portion 30, and preferably greater than twice the thickness of the shoulder portion 30. Increasing the height of the ribs 32 increases rigidity of the shoulder portion 30. Further, a longitudinal tip of

each rib 32 arranged radially from the central portion 31 side is connected to the curved surface portion 35, which is the connecting part of the shoulder portion 30 and the body portion 20. In the present embodiment, since the radius of curvature of the curved surface portion 35 is increased, the tip of the rib 32 is connected to the curved surface portion 35. Therefore, a tip portion of the rib 32 is also curved along the curved surface portion 35 (see FIG. 2). By increasing the radius of curvature of the curved surface portion 35, it is possible to increase a thickness of the curved surface portion 35 during blow molding, as compared with the case where the radius of curvature is small, and therefore strength of the curved surface portion 35 can be increased. As a result, since it is possible to restrict an occurrence of a pinhole (a small hole) in the curved surface portion 35 during the transportation of the bottle 1 for the dispenser, it is possible to prevent water leakage from the pinhole, for example.

[0026] The neck portion 40 protrudes upward from the central portion 31 of the shoulder portion 30, as shown in FIG. 1. Here, the neck portion 40 is formed with a cylindrical shape. The neck portion 40 serves as a flow path when filling the bottle with mineral water or when discharging the mineral water inside the bottle. The neck portion 40 also functions as a mounting portion for mounting the bottle 1 for the dispenser onto the dispenser. The neck portion 40 has a communication hole, and a cap for sealing the communication hole is detachably attached.

[0027] The above-described bottle 1 for the dispenser is detachably mounted on the dispenser. FIG. 5 is a schematic diagram illustrating a state in which the bottle 1 for the dispenser is mounted on a dispenser 100. A liquid level L, which indicates a liquid level before the mineral water in the bottle 1 for the dispenser is consumed, is shown in

FIG. 5. The bottle 1 for the dispenser is mounted on the dispenser 100 in an inverted state.

[0028] The dispenser 100 includes a support portion 110 and a pipe 120, as shown in FIG. 5. The support portion 110 supports the bottle 1 for the dispenser. For example, the support portion 110 contacts and supports the shoulder portion 30 of the bottle 1 for the dispenser. A concave portion 112 is formed in the center of the support portion 110, and the neck portion 40 of the bottle 1 for the dispenser is mounted on the concave portion 112.

[0029] The pipe 120 is provided with a rod shape such that it protrudes upward from a bottom surface of the concave portion 112, and is a water receiving rod for receiving the mineral water in the bottle 1 for the dispenser. The inside of the pipe 120 is a flow path through which the received mineral water flows. When the neck portion 40 is mounted on the concave portion 112, the pipe 120 is inserted into the neck portion 40 from a communication hole 42 of the neck portion 40 and fits into the neck portion 40. It should be noted that the pipe 120 has a tapered shape so that its diameter becomes smaller toward the tip.

[0030] FIG. 6 is a schematic diagram illustrating a state in which mineral water in the bottle 1 for the dispenser is reduced. When the mineral water in the bottle is consumed in the state of being mounted on the dispenser 100, the bottle 1 for the dispenser is collapsed by atmospheric pressure and negative pressure from the dispenser 100. Specifically, as the mineral water in the bottle 1 for the dispenser decreases by being discharged from the neck portion 40, the bellows 52 collapse. In FIG. 5 and FIG. 6, as a matter of convenience, the ribs 32 of the shoulder portion 30 are omitted.

[0031] The bottle 1 for the dispenser filled with mineral water is transported or the like

before being mounted on the dispenser 100, and damage may occur during transportation. For example, when the bottle 1 for the dispenser is transported, a pinhole may occur due to contact with another object, and water may leak from the pinhole. For this reason, the bottle is required to be strong in order to restrict damage such as the pinhole or the like. Further, in the bottle 1 for the dispenser, it is preferable to adjust the rigidity of the bellows portion 50 (specifically, the bellows 52) appropriately. That is, when rigidity of the bellows portion 50 is high, there may be a case where the mineral water in the bottle 1 for the dispenser cannot be discharged appropriately because the bellows 52 of the bellows portion 50 do not collapse appropriately. On the other hand, when the rigidity of the bellows portion 50 is low, there may be a case where the strength of the rectangular cylindrical-shaped body portion 20 cannot be ensured at an appropriate level. On the other hand, by appropriately adjusting a thickness of the bellows portion 50, the bottle 1 for the dispenser of the present embodiment ensures the strength of the body portion 20 at an appropriate level while the bellows portion 50 is collapsed appropriately, as will be described in detail below.

[0032]

<Detailed configuration of the bellows portion 50>

A detailed configuration of the bellows portion 50 will be described by referring to FIG. 7 and FIG. 8.

[0033] FIG. 7 is a schematic diagram illustrating a relationship among the thickness of the bottom portion 10, the thickness the shoulder portion 30, and the thickness the bellows portion 50. In FIG. 7, as a matter of convenience, the ribs 32 of the shoulder portion 30 are omitted. In this embodiment, the thickness of the entire bottle 1 for the

dispenser is uneven, and the thickness of the bellows portion 50 is different from the thickness of the bottom portion 10 and the thickness of the shoulder portion 30. Specifically, a thickness t_1 of the bellows portion 50 is smaller than a thickness t_2 of the bottom portion 10 and a thickness t_3 of the shoulder portion 30. For example, the thickness t_1 of the bellows portion 50 is 0.05 millimeters or more and 0.16 millimeters or less. Since the bellows portion 50 can be appropriately collapsed by adjusting the thickness of the bellows portion 50 as described above, it is possible to restrict the increase of residual water in the bottle 1 for the dispenser. In addition, high rigidity of the bottom portion 10 and the shoulder portion 30 increases the strength of the bottle 1 for the dispenser, and therefore the occurrence of water leakage can be restricted since the occurrence of pinholes can be restricted, for example.

[0034] The bellows portion 50 is located on the central part of the body portion 20 in the vertical direction. The body portion 20 has a first end portion 22 connecting a first end of the bellows portion 50 and the shoulder portion 30, and a second end portion 23 connecting a second end of the bellows portion 50 and the bottom portion 10. The thickness t_1 of the bellows portion 50 is smaller than the thickness t_{21} of the first end portion 22 and the thickness t_{22} of the second end portion 23. That is, the thickness of the body portion 20 varies in different parts of the body portion 20.

[0035] The bottle 1 for the dispenser is formed by blow molding as described above, and the thickness t_1 of the bellows portion 50 is made smaller than the thickness of the bottom portion 10 and the shoulder portion 30 by adjusting, for example, a shape of a mold, a shape of a preform, a blowing condition of air into the preform, and the like. The thickness t_3 of the bottom portion 10 may be the same as a thickness t_4 of the shoulder portion 30.

[0036] As shown in FIG. 7, the bellows portion 50 has a configuration in which a plurality of bellows 52 (for example, six bellows) are stacked vertically. The configuration of each of the plurality of bellows 52 is the same. The bellows 52 are formed with a ring shape as shown in FIG. 8, and a thickness of the entire bellows 52 is uneven.

[0037] FIG. 8 is a section view taken along an A-A line of FIG. 2 and illustrates the thickness of the bellows 52. When the bellows 52 are viewed in a plane, the bellows 52 include four corner portions 52a and four connecting portions 52b. Since the six bellows 52 have the same configuration, a single bellows 52 will be described below as an example.

[0038] The corner portions 52a are the portions at the four corners of the bellows 52 (parts circled with dashed lines in FIG. 8). The corner portions 52a are each bent at about a 90-degree angle and formed with an arc shape. A thickness of the corner portions 52a is in a range of 0.05 millimeters to 0.11 millimeters, for example. Preferably, the thickness of the corner portions 52a is 0.05 millimeters or more and less than 0.10 millimeters.

[0039] The connecting portions 52b are portions connecting the corner portions 52a. The connecting portions 52b are substantially straight. A thickness of the connecting portions 52b is in a range of 0.09 millimeters to 0.16 millimeters, for example. Preferably, the thickness of the connecting portions 52b is 0.10 millimeters or more and 0.16 millimeters or less.

[0040] A thickness t_{11} of the corner portions 52a is different from a thickness t_{12} of the connecting portions 52b. Specifically, the thickness t_{11} of the corner portions 52a is set within the range described above so that the thickness t_{11} is smaller than the

thickness t_{12} of the connecting portions 52b. On the other hand, the thickness t_{11} of the corner portions 52a is greater than one half of the thickness t_{12} of the connecting portions 52b. By making the thickness t_{11} of the corner portions 52a smaller than the thickness t_{12} of the connecting portions 52b in the manner described above, (i) rigidity of the corner portions 52a each bent at about a 90-degree angle and (ii) rigidity of the connecting portions 52b extending substantially linearly become the same, and therefore the bellows 52 become easy to collapse when the mineral water in the bottle is discharged. On the other hand, by increasing the thickness of the connecting portions 52b, a decrease in rigidity of the connecting portions 52b can be restricted, and the strength of the entire body portion 20 including the bellows 52 can be ensured.

[0041]

<Detailed configuration of the shoulder portion 30>

A detailed configuration of the shoulder portion 30 will be described by referring to FIG. 9.

[0042] FIG. 9 is a schematic diagram illustrating the thickness of the shoulder portion 30. In this embodiment, the thickness of the entire shoulder portion 30 is uneven and varies depending on a position from the neck portion 40. A thickness of the shoulder portion 30 at a position near the central portion 31 is greater than a thickness of the shoulder portion 30 at a position away from the central portion 31. That is, as shown in FIG. 9, a thickness t_{41} of the shoulder portion 30 at a position that is a distance L_1 from the central portion 31 is greater than a thickness t_{42} of the shoulder portion 30 at a position that is a distance L_2 from the central portion 31. The thickness t_{41} is equal to or greater than twice the thickness t_{42} , for example.

[0043] The thickness of the shoulder portion 30 gradually decreases as the distance

from the central portion 31 increases, but the thickness remains the same along a concentric circle centered on the central portion 31. The thickness of the shoulder portion 30 may be reduced little by little. Also, the thickness of the plurality of ribs 32 (FIG. 4) formed on the shoulder portion 30 becomes greater near the central portion 31 and decreases as the distance from the central portion 31 increases.

[0044] By setting the thickness of the shoulder portion 30 as described above, the rigidity of the shoulder portion 30 (in particular, rigidity of the central portion 31 of the shoulder portion 30) can be increased. Further, in the present embodiment, the rigidity of the shoulder portion 30 is increased by increasing the height of the ribs 32 and by providing the plurality of ribs 32 at a predetermined interval in almost the entire region of the shoulder portion 30. This restricts the deformation of the shoulder portion 30 caused by a load of the mineral water in the bottle acting on the shoulder portion 30 even when the bottle 1 for the dispenser is turned upside down and the load acts on it, for example. Restricting the deformation of the shoulder portion 30 prevents falling of the neck portion 40, and therefore the neck portion 40 can be appropriately mounted at a desired position on the dispenser 100 (in other words, the mountability is good). When the shoulder portion 30 is deformed, the mineral water in the bottle may accumulate in a deformed part (i.e., edge portion) of the shoulder portion 30 at the time of consumption of mineral water in the bottle, and the amount of residual water may become increased. On the other hand, by restricting the deformation of the shoulder portion 30 as in the present embodiment, it is possible to restrict an increase in the amount of residual water.

[0045] FIG. 10 is a schematic diagram illustrating a state in which a bottle 900 for a dispenser according to a comparative example is mounted on the dispenser 100. In the

bottle 900 for the dispenser of the comparative example, the rigidity of a shoulder portion 930 is low because the thickness of the shoulder portion 930 is small. If insertion resistance is high at the time of inserting a neck portion 940 into the pipe 120 when the bottle 900 for the dispenser is installed, the shoulder portion 930 is deformed and warped, as shown in FIG. 10. In this case, the neck portion 940 is not inserted into a predetermined position with respect to the dispenser 100 and floats (that is, mountability is poor), and thus the neck portion 940 is not appropriately fitted to the pipe 120. Since the pipe 120 has the tapered shape so that its diameter becomes smaller toward the tip, as described above, if the fitting of the neck portion 940 to the pipe 120 is insufficient, the mineral water in the bottle may leak from a fitting portion for the pipe 120 and the neck portion 940. When the shoulder portion 930 is deformed and warped as shown in FIG. 10, the mineral water tends to accumulate in a connecting part between the shoulder portion 930 and a body portion 920, which results in a greater amount of residual water.

[0046] On the other hand, since the rigidity of the shoulder portion 30 is high in the present embodiment, the deformation of the shoulder portion 30 can be restricted. This makes it possible to prevent the shoulder portion 30 from warping as shown in FIG. 10, and therefore the neck portion 40 is inserted at a predetermined position as shown in FIG. 5 to appropriately fit the pipe 120 (that is, mountability of the neck portion 40 is good). As a result, the leakage of the mineral water in the bottle when the bottle 1 for the dispenser is mounted on the dispenser 100 can be restricted, and the increase of the amount of residual water can be restricted.

[0047]

<Concerning a measurement result and an evaluation result>

Effects of the thickness of the bellows 52 on (i) strength of the bottle 1 for the dispenser and (ii) the residual water in the bottle 1 for the dispenser will be described by referring to FIG. 11.

[0048] FIG. 11 is a table showing a measurement result of the thickness of the bellows 52 and evaluation results of strength and residual water. Here, nine bottles, Bottle A to Bottle I, are used, each with a different thickness of the bellows 52 (specifically, the corner portions 52a and the connecting portions 52b). As shown in the table, the thickness of the bellows 52 of Bottle A is the smallest, and the thickness of the bellows 52 increases in the order from Bottle B to Bottle I. The thickness t12 of the connecting portions 52b of the bellows 52 is approximately 1.5 to 2 times the thickness t11 of the corner portions 52a.

[0049] A strength evaluation is an evaluation of the strength of Bottles A to I evaluated on the basis of whether any damage (specifically, a pinhole) occurred during the transportation of Bottles A to I. In the strength evaluation, when Bottles A to I are not damaged at the time of the transportation, they are marked with "○", and when Bottles A to I are damaged at the time of the transportation, they are marked with "x". A residual water evaluation is to evaluate whether or not the amount of residual water at the time the mineral water in Bottles A to I is consumed exceeds a predetermined ratio (for example, 1.25%) of a filling amount. In the residual water evaluation, "○" is marked when the amount of residual water is less than the predetermined ratio of the filling amount, and "x" is marked when the amount of residual water is equal to or more than the predetermined ratio.

[0050] As can be seen from the table in FIG. 11, the bottles at the passing level of the strength evaluation are Bottles C to I, and the thickness of the bellows 52 of these

bottles is equal to or greater than 0.05 millimeters. The bottles at the passing level of the residual water evaluation are Bottles A to G, and the thickness of the bellows 52 of these bottles is 0.16 millimeters or less. The bottles satisfying both the strength evaluation and the residual water evaluation are Bottles C to G, and the thickness of the bellows 52 of these bottles is 0.05 millimeters or more and 0.16 millimeters or less. More preferably, the thickness of the bellows 52 is suitable at 0.05 millimeters or more and 0.14 millimeters or less.

[0051] Next, effects of the thickness of the shoulder portion 30 on mountability of the bottle 1 for the dispenser to the dispenser 100 and on the residual water in the bottle 1 for the dispenser will be described by referring to FIG. 12.

[0052] FIG. 12 is a table showing a measurement result of the thickness of the shoulder portion 30 and evaluation results of mountability and residual water. Here, six bottles, Bottle A to Bottle F, are used, each with a different thickness of the shoulder portion 30. As shown in the table, the thickness of the shoulder portion 30 of Bottle A is the smallest, and the thickness of the shoulder portion 30 increases in order from Bottle B to Bottle F. The thickness of the shoulder portion 30 is measured at positions at distances of 30 millimeters, 55 millimeters, and 80 millimeters from the central portion 31.

[0053] A mountability evaluation is evaluated on the basis of whether the neck portion 40 is appropriately fitted to the concave portion 112 of the support portion 110 when Bottles A to F are mounted on the dispenser 100. "o" is marked when the neck portion 40 is appropriately fitted to the concave portion 112, and "x" is marked when the neck portion 40 is not appropriately fitted to concave portion 112 due to the deformation or the like of the shoulder portion 30. A residual water evaluation is to evaluate whether

or not the amount of residual water at the time the mineral water in Bottles A to F is consumed exceeds a predetermined ratio (for example, 1.25%) of a filling amount. In the residual water evaluation, "○" is marked when the amount of residual water is less than the predetermined ratio of the filling amount, and "x" is marked when the amount of residual water is equal to or more than the predetermined ratio.

[0054] As can be seen from the table in FIG. 12, the bottles at the passing level of the mountability evaluation are Bottles B to F. Also, the bottles at the passing level of the residual water evaluation are Bottles C to F. From these measurement and evaluation results, it is preferable that the thickness of the shoulder portion 30 at the position at the distance of 30 millimeters from the central portion 31 is 0.43 millimeters or more, the thickness of the shoulder portion 30 at the position at the distance of 55 millimeters from the central portion is 0.23 millimeters or more, and the thickness of the shoulder portion 30 at the position at the distance of 80 millimeters from the central portion 31 is 0.16 millimeters or more, in order to have good mountability and residual water.

[0055]

<Effects in the present embodiment>

In the above-mentioned bottle 1 for the dispenser, the rectangular cylindrical-shaped (rectangular shape when viewed in a plane) body portion 20 has the bellows portion 50 that can expand and contract in the vertical direction. The thickness t11 of the four corner portions 52a of the bellows portion 50 (specifically, the plurality of bellows 52 arranged in the vertical direction) is smaller than the thickness t12 of each of the connecting portions 52b connecting the corner portions 52a. As described above, by making the thickness t11 of the corner portions 52a smaller than the thickness t12 of the connecting portions 52b, (i) rigidity of the corner portions 52a each

bent at about a 90-degree angle and (ii) rigidity of the connecting portions 52b extending substantially linearly become the same, and therefore the bellows 52 become easy to collapse when the mineral water in the bottle is consumed. On the other hand, the strength of the body portion 20 including the bellows 52 can be ensured by restricting a decrease in rigidity of the connecting portions 52b.

[0056] The present invention is explained on the basis of the exemplary embodiments. The technical scope of the present invention is not limited to the scope explained in the above embodiments and it is possible to make various changes and modifications within the scope of the invention. For example, the specific embodiments of the distribution and integration of the apparatus are not limited to the above embodiments, all or part thereof, can be configured with any unit which is functionally or physically dispersed or integrated. Further, new exemplary embodiments generated by arbitrary combinations of them are included in the exemplary embodiments. Further, effects of the new exemplary embodiments brought by the combinations also have the effects of the original exemplary embodiments.

[Description of the reference numerals]

[0057]

- 1 Bottle for a dispenser
- 10 Bottom portion
- 20 Body portion
- 22 First end portion
- 23 Second end portion
- 30 Shoulder portion
- 31 Central portion

- 32 Rib
- 35 Curved surface portion
- 40 Neck portion
- 50 Bellows portion
- 52 Bellows
- 52a Corner portion
- 52b Connecting portion

CLAIMS

1. A bottle for a water dispenser, comprising
 - a bottom portion having a rectangular shape;
 - a body portion having a rectangular cylindrical shape and continuing upward from a peripheral of the bottom portion;
 - a shoulder portion which is inclined upward from an upper edge of the body portion toward a central portion; and
 - a neck portion protruding upward from the central portion, wherein the bottle for the water dispenser is made of a resin material, the body portion has a bellows portion that is freely extendable in a vertical direction, and a thickness of each of four corner portions of the bellows portion, when viewed in a plane, is smaller than a thickness of each of four connecting portions connecting the corner portions of the bellows portion.
2. The bottle for the water dispenser according to claim 1, wherein a corner of each corner portion is formed with an arc shape.
3. The bottle for the water dispenser according to claim 1 or 2, wherein a thickness of the corner portions is 0.05 millimeters or more and 0.11 millimeters or less.
4. The bottle for the water dispenser according to claim 1 or 2, wherein the thickness of the connecting portions is 0.09 millimeters or more and 0.16 millimeters or less.

5. The bottle for the water dispenser according to any one of claims 1 to 4, wherein a thickness of the bellows portion is 0.05 millimeters or more and 0.16 millimeters or less.
6. The bottle for the water dispenser according to any one of claims 1 to 5, wherein a thickness of the shoulder portion at a position near the neck portion is greater than a thickness of the shoulder portion at a position away from the neck portion.
7. The bottle for the water dispenser according to claim 6, wherein the thickness of the shoulder portion gradually decreases as a distance from the neck portion increases.
8. The bottle for the water dispenser according to any one of claims 1 to 7, wherein the body portion has (i) a first end portion connecting a first end of the bellows portion and the shoulder portion and (ii) a second end portion connecting a second end of the bellows portion and the bottom portion, and the bellows portion is smaller than a thickness of the first end and a thickness of the second end.
9. The bottle for the water dispenser according to any one of claims 1 to 8, wherein a thickness of the bellows portion is smaller than a thickness of the shoulder portion.
10. The bottle for the water dispenser according to any one of claims 1 to 9, wherein the shoulder portion has a plurality of ribs which are protruding radially around the neck portion from the shoulder portion, and the height of the ribs is greater than a thickness

of the shoulder portion.

11. The bottle for the water dispenser according to claim 10, wherein a connecting part of the shoulder portion and the body portion is a curved surface portion, and longitudinal tips of the ribs are connected to the curved surface portion.