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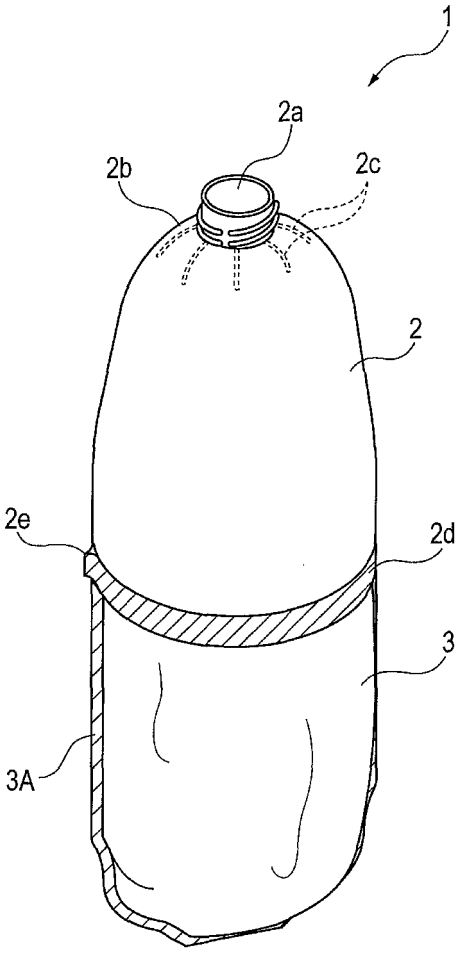
(54) Storage container

(57) A storage container (1) according to an aspect of the invention is provided with a tube-shaped storing portion (2) formed of a resin having an extraction opening (2a) enabling a stored substance to be sucked in a center area on one end side, and a circular opening on the other end side, and a bag-shaped storing portion (3) which is welded along the circular opening of the tube-shaped storing portion (2), enters inside the tube-shaped storing portion (2) to be able to come into intimate contact with an inner surface of the tube-shaped storing portion (2) in sucking through the extraction opening (2a), and is formed of a thin film in the shape of a bag to be a non-independent body, where the tube-shaped storing portion (2) changes in cross-sectional shape from a circular shape to an elliptical shape toward one end side from the other end side.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a storage container for storing viscous liquids.

[0002] Conventionally, for example, as disclosed in Japanese Unexamined Patent Publication No. 2001-199455, a storage container has been known which is capable of storing viscous liquids (hereinafter, referred to as stored substances) such as ink for printing. Such a storage container is installed in a predetermined position of an external apparatus such as a printer, and the stored substance is extracted with a suction mechanism provided in the external apparatus, and supplied to a predetermined position. More specifically, a storage container as disclosed in Japanese Unexamined Patent Publication No. 2001-199455 has a configuration provided with a container body formed in the shape of a bag made of a thin-film-shaped resin film, and a support member which is enclosed in the inside of the container body, retains the container body in the shape of a box, and has an extraction opening protruding from the container body.

[0003] Then, in the aforementioned configuration, when suction is performed from the extraction opening using a pump or the like, the thin-film-shaped resin film is inverted to roll inside the support member as the stored substance flows out. Then, when the stored substance is extracted completely, the resin film changes to a state of entering inside the support member.

[0004] The aforementioned storage container has the structure that the support member is enclosed inside the container body formed of a resin film, the support member retains the container body in predetermined form, the manufacturing process is thereby complicated, and the cost is increased.

[0005] Further, since the above-mentioned storage container has the structure that the surface of the support member and the container body are in intimate contact with each other widely, the adhesion therebetween tends to be insufficient such that the container body becomes wrinkled, the stored substance thereby remains in a gap (outer side of the support member) therebetween in sucking, and there is a possibility that the stored substance is wasted. Further, the container body formed from the resin film has the structure in the shape of a box (with the bottom) in consideration of the shape retention property. However, in such a shape, even when the container body enters inside the support member in sucking, the adhesion with the inner surface of the support member deteriorates finally, and as a result, the stored substance tends to remain also on the inner surface side of the support member.

[0006] Accordingly, required is a storage container enabling a stored substance to be extracted with minimum wastage while having inexpensive manufacturing cost.

BRIEF SUMMARY OF THE INVENTION

[0007] In an aspect of the invention, a storage container is provided with a tube-shaped storing portion formed of a resin having an extraction opening enabling a stored substance to be sucked in a center area on one end side, and a circular opening on the other end side, and a bag-shaped storing portion which is welded along the circular opening of the tube-shaped storing portion, enters inside the tube-shaped storing portion to be able to come into intimate contact with an inner surface of the tube-shaped storing portion in sucking through the extraction opening, and is formed of a thin film in the shape of a bag to be a non-independent body, where the tube-shaped storing portion changes in cross-sectional shape from a circular shape to an elliptical shape toward one end side from the other end side.

[0008] The storage container with the aforementioned configuration has the structure that the bag-shaped storing portion formed in the shape of a bag that is a non-independent body is welded along the circular opening on the other end side of the tube-shaped storing portion formed of a resin having the extraction opening, thus has a simplified structure, while being manufactured with ease, and thereby enables reductions in cost. Particular, since the bag-shaped storing portion is configured as a non-independent body (in a state where three sides, the side portions and bottom portion, are welded), the welding process is simplified, and the cost is reduced.

[0009] Further, since the bag-shaped storing portion is configured as a non-independent body, when the bag-shaped storing portion is welded along the circular opening of the tube-shaped storing portion, its cross-sectional shape is circular in the welding portion, and the cross section changes to an elliptical shape as separating from the welding portion (the bag-shaped storing portion enters inside the tube-shaped storing portion and comes into intimate contact with the inner surface in sucking from the extraction opening of the tube-shaped storing portion.) In consideration of such a shape, since the tube-shaped storing portion is changed in cross-sectional shape from a circular shape to an elliptical shape toward the extraction opening side from the welding portion, and thus is adapted to the cross-sectional shape of the entering bag-shaped storing portion, the bag-shaped storing portion comes into intimate contact with the inner surface of the tube-shaped storing portion without causing wrinkles or the like, and it is possible to extract the stored substance with efficiency.

[0010] Furthermore, the tube-shaped storing portion is configured such that the welding portion with the bag-shaped storing portion is circular, therefore, does not cause a crush or the like in sucking the stored substance, and further has the configuration that the basic shape changes from circular cross section to elliptical cross section, the entire inner surface is thus configured as a curved surface, and therefore, the stored substance is hard to remain in sucking the stored substance.

[0011] In a preferred embodiment, in the bag-shaped storing portion cut portions are formed in corner portions on an end portion side opposite to an end portion welded to the tube-shaped storing portion.

[0012] In that embodiment, the tube-shaped storing portion may have a curved portion such that the diameter decreases toward the extraction opening, and edge shapes of the cut portions formed in the bag-shaped storing portion are almost adapted to a shape of the curved portion.

[0013] In an inner surface of the curved portion of the tube-shaped storing portion protrusion portions can be formed that extend toward the extraction opening and that are arranged radially.

[0014] In a preferred embodiment, a capacity of the tube-shaped storing portion is substantially the same as a capacity of the bag-shaped storing portion.

[0015] Preferably, the tube-shaped storing portion has an area that is formed in the same diameter over a predetermined length on the other end side having the circular opening, and the bag-shaped storing portion is welded to the outer surface of the area with the same diameter in the tube-shaped storing portion.

[0016] In that embodiment, a pair of protrusions protruding outward may be formed at an interval of 180 degrees in the circumferential direction, in an area where the bag-shaped storing portion is welded, in the outer surface of the tube-shaped storing portion.

[0017] In a further embodiment, the storage container comprises

a blockage preventing member detachable with respect to the extraction opening,

wherein the blockage preventing member has a tube portion (21), and the tube portion has a cut groove for defining a flow path with the bag-shaped storing portion entering inside the tube-shaped storing portion in sucking through the extraction opening.

[0018] Preferably, the tube portion has the substantially same axis length as a length in the axis direction of the extraction opening.

[0019] Herewith, the cut groove has a function of facilitating extraction, through the cut groove, of the stored substance remaining in the vicinity of a bottom edge of the bag-shaped storing portion in a stage when an inner surface of the bag-shaped storing portion comes into intimate contact with the inner surface of the tube-shaped storing portion in sucking and a suction force does not act on the bag-shaped storing portion.

[0020] That is, the cut groove is arranged to facilitate extraction.

[0021] The extraction opening may have a plug with a screw.

[0022] Another aspect of the invention is a storage container, comprising a tube-shaped storing portion formed of a resin having an extraction opening enabling a stored substance to be sucked in a center area on one end side, and a circular opening on the other end side; and

a bag-shaped storing portion which is welded along the circular opening of the tube-shaped storing portion , enters inside the tube-shaped storing portion to be able to come into intimate contact with an inner surface of the tube-shaped storing portion in sucking through the extraction opening, and is formed of a thin film in the shape of a bag to be a non-independent body,

wherein the bag-shaped storing portion has a length in the range of 90% to 110% relative to a storing length in the longitudinal direction of the tube-shaped storing portion.

[0023] Moreover, the storage container is characterized by having a cylindrical storing portion formed of a resin in the shape of a cylinder having an extraction opening enabling a stored substance to be sucked in a center area on one end side, and a bag-shaped storing portion formed in the shape of a bag to be a non-independent body using a thin film that is welded along a circular opening on the other end side of the cylindrical storing portion and that enters inside the cylindrical storing portion to be able to come into intimate contact with an inner surface of the cylindrical storing portion in sucking from the extraction opening, where the bag-shaped storing portion has a length in the range of 90% to 110% relative to the storing length in the longitudinal direction of the cylindrical storing portion, and is cut in corner portions on the end portion side opposite to the welding portion.

[0024] The storage container with the aforementioned configuration has the structure that the bag-shaped storing portion formed in the shape of a bag that is a non-independent body is welded along the circular opening on the other end side of the cylindrical storing portion formed of a resin having the extraction opening, thus has a simplified structure, while being manufactured with ease, and thereby enables reductions in cost. Further, the storage container is in the form of a cylinder in the basic portion, the stored substance is thereby hard to remain in sucking the stored substance, and with respect to the bag-shaped storing portion, since the corner portions are cut on the end portion side opposite to the welding portion in the non-independent body, the stored substance is hard to remain. Furthermore, the bag-shaped storing portion has the length in the range of 90% to 110% relative to the storing length in the longitudinal direction of the cylindrical storing portion, its bottom edge area can be located in the vicinity of the extraction opening portion when the bag-shaped storing portion is inverted and drawn into the inside of the cylindrical storing portion in sucking, and by this means, it is possible to extract the stored substance with efficiency.

[0025] Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0026] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention, and together with the general description given above and the detailed description of the embodiments given below, serve to explain the principles of the invention.

FIG. 1 is a perspective view showing a storage container according to embodiment 1 of the invention;
FIG. 2A is a front view of the storage container:
FIG. 2B is a side elevational view of the storage container;
FIG. 3A is a cross-sectional view taken along the A-A line in FIG .2A;
FIG. 3B is a cross-sectional view taken along the B-B line of FIG. 2B;
FIG. 3C is a cross-sectional view taken along the C-C line of FIG. 2B;
FIG. 4 is a diagram showing a configuration of a bag-shaped storing portion (non-independent body) while showing the configuration that corner portions on the end portion side are not cut;
FIGs.5A to 5C are views showing a configuration of the bag-shaped storing portion as shown in FIG. 1, and are views showing a configuration example of a cut portion in a corner portion on the end portion side;
FIGs.6A to 6F are views sequentially showing changes of the bag-shaped storing portion in storing a viscous stored substance in the storage container as shown in FIG. 1 and sucking the substance from an extraction opening;
FIG. 7A is a perspective view of a blockage preventing member inserted in the extraction opening;
FIG. 7B is a front view of the blockage preventing member inserted in the extraction opening;
FIG. 7C is a plan view of the blockage preventing member inserted in the extraction opening;
FIG. 8 is a view showing a state where the blockage preventing member as shown in FIG. 7 is inserted in the extraction opening portion;
FIG. 9A is a perspective view showing a storage container according to embodiment 2 of the invention;
FIG. 9B is a front view showing the storage container according to embodiment 2 of the invention;
FIG. 10A is a view showing a configuration of a cylindrical storing portion as shown in FIGs. 9A and 9B;
FIGs. 10B and 10C are views showing modification examples of the cylindrical storing portion;
FIG. 11 is a view showing a configuration of a bag-shaped storing portion without corner portions on the end portion side being cut;
FIGs. 12A to 12C are views showing a configuration of the bag-shaped storing portion as shown in FIGs. 9A and 9B and showing an example of a cut state of corner portions on the end portion side; and
FIGs. 13A to 13F are views sequentially showing changes of the bag-shaped storing portion in storing a viscous stored substance in the storage container as shown in FIGs. 9A and 9B and sucking the substance from an extraction opening.

DETAILED DESCRIPTION OF THE INVENTION

[0027] As shown in FIGs. 1 to 3, a storage container 1 according to embodiment 1 of the invention stores a viscous liquid (referred to as a stored substance) such as ink, and as described later, is provided with a tube-shaped storing portion 2 changing in cross-sectional shape from a circular shape (on the welding portion side) to an elliptical shape (on the extraction opening side), and a bag-shaped storing portion 3 welded along a lower circular opening of the tube-shaped storing portion 2.

[0028] In the tube-shaped storing portion 2, an extraction opening 2a enabling a stored substance to be sucked is formed on the center axis on one end side. In this embodiment, the extraction opening 2a is formed from a plug with a screw, and by attaching and detaching a cap (sealing member) not shown, enables a stored substance to be sealed and extracted. In other words, in actually using the storage container 1, the container 1 is inserted in a predetermined portion of an external apparatus with the sealing member removed, and the stored substance is extracted by a sucking mechanism such as a pump. In addition, the above-mentioned extraction opening 2a may be not used only in extracting the stored substance, and also have the function as a filling opening to fill the stored substance. Further, the extraction opening may have a configuration that an extraction needle is inserted in the sealing member to suck the stored substance.

[0029] The above-mentioned tube-shaped storing portion 2 is formed in one piece (blow molding, injection molding, etc.) of a plastic material such as, for example, polyethylene, polystyrene, polypropylene and polyvinyl chloride, and is configured by a method and material enabling its manufacturing with low cost. Further, the thickness is only required to be an extent (for example, about 0.8 mm to 2.0 mm) to which the shape is maintained when the bag-shaped storing portion 3 is inverted and drawn into the inside in sucking.

[0030] Further, with respect to the outside shape, the cross section changes in shape from a circular shape to an elliptical shape toward the extraction opening 2a side from the welding portion 2d with the bag-shaped storing portion 3. This is because of adapting to the cross-sectional shape of the bag-shaped storing portion 3 entering inside the tube-shaped storing portion 2 in sucking the extraction opening portion to extract the stored substance. In other words, as described later, the bag-shaped storing portion 3 is configured as a non-independent body (three sides, side portions and bottom portion, are welded) that is easily manufactured, and therefore, when the portion 3 is welded along the circular opening of the tube-shaped storing portion 2, the cross-sec-

tional shape is circular in the welding portion 2d, while changing to an elliptical shape as separating from the welding portion.

[0031] By this means, the bag-shaped storing portion 3 comes into intimate contact with the inner surface of the tube-shaped storing portion without causing wrinkles or the like in inverting and entering inside the tube-shaped storing portion 2, and it is possible to extract the stored substance from the extraction opening 2a with efficiency. In this case, the change of the shape is not limited particularly, but it is preferable to gently change the shape continuously, rather than abruptly change from the circular shape to elliptical shape. In other words, a configuration is preferable that a large step difference is not made between the shapes.

[0032] Further, the shape of the tube-shaped storing portion 2 is not limited particularly, and in this embodiment, as shown in FIGs. 1 and 2, in order that the stored substance can be extracted effectively, a curved portion 2b is formed such that the diameter decreases gradually toward the extraction opening 2a positioned on the center axis from the upper end side of the circular side wall. Then, it is preferable that radial protrusion portions 2c (are arranged radially) are formed in the inner surface of the curved portion 2b to extend toward the extraction opening 2a. The radial protrusion portions 2c constitute a flow path guide to enable the stored substance to effectively move toward the extraction opening 2a in sucking, and can be integrally formed in molding. In this case, the specific extension length, pitch and height of the radial protrusion portions 2c are capable of being modified as appropriate corresponding to dimensions of the tube-shaped storing portion 2, type (viscosity) of the stored substance, etc.

[0033] In addition, with respect to the curved portion 2b formed in the tube-shaped storing portion, the portion 2b is only required to adapt to cut portions described later formed in the bag-shaped storing portion 3, and can be modified as appropriate. In other words, as long as such a configuration is obtained that the stored substance is capable of moving toward the extraction opening equally in undergoing the sucking action, the shape can be modified as appropriate.

[0034] To the tube-shaped storing portion 2 is welded the opening end portion of the bag-shaped storing portion 3. In this case, in the tube-shaped storing portion 2, at least the circular opening is formed in the same diameter over a predetermined length L, and the bag-shaped storing portion 3 is welded to the outer surface of the area (within the range of the predetermined length L, and in this range, the welding portion 2d is formed) in which the tube-shaped storing portion 2 has the same diameter.

[0035] More specifically, for example, the welding portion 2d may be in the range of about 5 mm to 15 mm, is covered with the opening area of the bag-shaped storing portion 3, and then, welded using a heat bar or the like, and it is thereby possible to weld the bag-shaped storing portion 3 to the tube-shaped storing portion 2 with ease.

[0036] Further, in the tube-shaped storing portion 2, a pair of protrusions 2e protruding outward are formed at an interval of 180 degrees in the area where the bag-shaped storing portion is welded. By forming such a pair of protrusions 2e, as described above, it is possible to stabilize a seal state in welding the bag-shaped storing portion 3 using the heat bar.

[0037] The bag-shaped storing portion 3 is formed in the shape of a bag by welding the circumference of a thin-film-shaped film (thin film with a thickness ranging from about 0.05 mm to 0.15 mm, for example, a laminate film where a seal portion layer is polyethylene) having flexibility made of polyethylene, polypropylene or the like, and to reduce the cost, for example, is configured as a three-side seal bag such that two thin-film-shaped films are stacked and welded in the circumference.

[0038] Herein, the configuration of the bag-shaped storing portion is described with reference to FIGs. 4 and 5.

[0039] The bag-shaped storing portion 3 in the invention has the structure (non-independent structure) where one end is opened to enable the portion 3 to be welded to the outer surface (welding portion 2d) of the circular opening portion of the tube-shaped storing portion 2, while a bottom that is a plane is not formed on the other end (welding area 3A is shown by oblique lines). Further, the bag-shaped storing portion 3 of this embodiment is configured such that corner portions on the end portion side opposite to the welding portion 2d are cut. More specifically, the shape of the side surface is not rectangular as shown in FIG. 4, and as shown in FIG. 5A, by cutting (forming cut portions 3d) the corner portions on the end portion side in the shape of a curve corresponding to the curved portion 2b of the tube-shaped storing portion 2, has the configuration that does not cause the point portions P of substantially 90 degrees or less between the bottom edge 3a and side edges 3b inside the storing portion as shown in FIG. 4.

[0040] That is, cross-sectional shape of the bag shaped storing portion in a plane of the shorter axis of the elliptical cross section essentially is in form of a parabola, see fig. 2B.

[0041] In addition, as shown in FIGs. 5B and 5C, an aspect of the cut between the bottom edge 3a and side edge 3b inside the storing portion is not limited particularly, and the cut may be made linearly so that the bottom edge 3a is longer as shown in FIG. 5B or may be made so that the bottom edge 3a is shorter as shown in FIG. 5C.

[0042] In this case, the shape of the cut portion (edge-shape cut portion) 3d is preferably formed in the shape in accordance with the curved portion 2b formed in the tube-shaped storing portion 2 (edge shapes of the cut portions formed in the bag-shaped storing portion are almost adapted to a shape of the curved portion). More specifically, the shape as shown in FIG. 5B is preferably adapted to the tube-shaped storing portion such that the curved portion is a relatively gently surface as shown in FIG. 2, and the shape as shown in FIG. 5C is preferably

adapted to the tube-shaped storing portion such that the curved portion 2b is a relatively longer surface along the longitudinal direction than that in the configuration as shown in FIG. 2.

[0043] By thus forming the cut portions, it is possible to decrease the possibility that the stored substance remains in the corner portions.

[0044] Further, the capacity of the bag-shaped storing portion 3 is preferably set at the same (including substantially the same) capacity of the tube-shaped storing portion 2. By this means, when the bag-shaped storing portion 3 undergoes suction from the extraction opening 2a portion, the inner surface of the bag-shaped portion 3 comes into intimate contact with the inner surface of the tube-shaped storing portion 2, while the portion 3 is inverted and drawn into the inside space of the tube-shaped storing portion 2 with the flow of the stored substance, and at this point, by setting the above-mentioned capacity, it is possible to position the bottom edge 3a of the bag-shaped storing portion in the vicinity of the opening 2A on the storing portion side of the extraction opening 2a, and to extract the stored substance effectively without waste.

[0045] In other words, in the case where the capacity of the bag-shaped storing portion 3 is larger than that of the tube-shaped storing portion 2, when the bag-shaped storing portion 3 is inverted and drawn into the inside space of the tube-shaped storing portion 2 while being inverted with the flow of the stored substance, it happens that the bottom edge 3a of the bag-shaped storing portion bends, etc. a tendency increases to block the opening 2A on the storing portion side of the extraction opening 2a, the suction force thereby stops acting, and the possibility increases that the stored substance existing in the vicinity of the opening 2A on the storing portion side of the extraction opening 2a cannot be sucked and remains. Meanwhile, in the case where the capacity of the bag-shaped storing portion 3 is smaller than that of the tube-shaped storing portion 2, when the bag-shaped storing portion 3 is inverted and drawn into the inside space of the tube-shaped storing portion 2 while being inverted with the flow in the storing portion, the distance between the bottom edge 3a inside the bag-shaped storing portion and the opening 2A on the storing portion side of the extraction opening 2a increases, and by this means, as the internal pressure decreases by suction, the possibility increases that the stored substance existing in the area of the bottom edge 3a does not undergo sufficient suction and remains.

[0046] Referring to FIGs. 6A to 6F, described next is a result of storing a viscous stored substance (commercially available mayonnaise) in the storage container with the configuration as shown in FIGs. 1 and 2, and extracting the stored substance by applying a predetermined suction force.

[0047] First, when the stored substance is extracted by applying suction to the extraction opening 2a with the stored substance stored in the tube-shaped storing portion 2 and bag-shaped storing portion 3 (see FIG. 6A), the bag-shaped storing portion 3 gradually shrinks while causing vertical wrinkles, and the bottom edge 3a rises toward the circular opening (area of the welding portion 2d) of the tube-shaped storing portion 2 (see FIGs. 6B and 6C). Then, as the suction further proceeds, the bottom edge 3a inside the storing portion passes through the circular opening (area of the welding portion 2d) of the tube-shaped storing portion 2 and rises with the flow of the stored substance, and the bag-shaped storing portion 3 is inverted and drawn into the inside space of the tube-shaped storing portion 2 (see FIGs. 6D and 6E). Then, as the suction furthermore proceeds, the inner surface of the bag-shaped storing portion 3 comes into intimate contact with the inner surface of the tube-shaped storing portion 2 (see FIG. 6F), and the stored substance concentrates on the opening area on the storing portion side of the extraction opening 2.

[0048] In addition, as shown in FIG. 6F, when the bag-shaped storing portion 3 is inverted and drawn into the inside space of the tube-shaped storing portion 2, the inner surface of the bag-shaped storing portion 3 comes into intimate contact with the inner surface of the tube-shaped storing portion 2. In this case, since in the tube-shaped storing portion 2 the cross-section shape changes from the circular shape to the elliptical shape toward the extraction opening side from the welding portion, and is adapted to the cross-sectional shape of the entering bag-shaped storing portion 3, the bag-shaped storing portion 3 does not cause wrinkles or the like, and is easy to come into intimate contact with the inner surface of the tube-shaped storing portion 2, and it is possible to extract the stored substance with efficiency. Further, since in the tube-shaped storing portion 2 the circular opening is formed in the same diameter over the predetermined length L, and the bag-shaped storing portion 3 is welded to this range, when the bag-shaped storing portion 3 is inverted and enters in the welding portion area, wrinkles or the like are prevented from occurring in this portion, and the possibility decreases that the stored substance remains.

[0049] Further, in the tube-shaped storing portion 2, since the welding portion to the bag-shaped storing portion 3 is configured in circular form, any crush or the like does not occur in sucking the stored substance. Moreover, in the tube-shaped storing portion, since the basic shape changes from the circular shape in cross section to the elliptical shape in cross section, and the entire inner surface is configured as a curved surface, the stored substance is hard to remain in sucking the stored substance.

[0050] Furthermore, since the inner surface of the tube-shaped storing portion 2 is a curved surface and any point portions do not exist, the bag-shaped storing portion 3 is hard to come into intimate contact when becoming wrinkled, and it is possible to suck (squeeze) the stored substance as much as possible. Meanwhile, when the inner surface of the bag-shaped storing portion 3 comes into intimate contact with the inner surface of the

tube-shaped storing portion 2, the suction force does not act on the bag-shaped storing portion 3. However, since the curved shape is formed such that the diameter decreases gradually toward the extraction opening 2a side, it is possible to extract the stored substance as much as possible even when the suction force reduces.

[0051] Moreover, as described above, the radial protrusion portions 2c extending toward the extraction opening 2a are formed in the inner surface of the curved portion 2b, flow paths toward the extraction opening 2a are easy to reserve, and it is possible to efficiently extract the stored substance.

[0052] Further, since the capacity of the bag-shaped storing portion 3 is set at the same capacity of the tube-shaped storing portion 2, as shown in FIG. 6F, the bottom edge 3a area can be positioned in the vicinity of the extraction opening portion, and by this means, it is possible to efficiently extract the stored substance even when the internal pressure decreases by suction. Particularly, the bag-shaped storing portion 3 is a non-independent body, and is configured so that point portions with an acute angle do not exist in the bottom edge portion by cutting corner portions on the end portion side, and further, since the edge shape of the cut portion is formed to follow the curved portion of the tube-shaped storing portion 2, it is possible to extract the stored substance efficiently without the substance remaining.

[0053] In addition, when suction tests were actually performed in the storage container with the structure as shown in FIGs. 1 and 2, the residual amount of the stored substance was 2.0% or less, and the result that the stored substance can be extracted efficiently was obtained.

[0054] Then, since the storage container 1 as described above has the structure that the bag-shaped storing portion 3 formed in the shape of a bag to be a non-independent body is welded along the circular opening on the other end side of the tube-shaped storing portion 2 made of a resin having the extraction opening 2a, the structure is simple and is easy to manufacture, and it is possible to obtain the configuration with the cost reduced, easy to recycle, and the like.

[0055] FIG. 7 shows a blockage preventing member inserted in the extraction opening portion of the storage container 1 as described above, where FIG. 7A is a perspective view, FIG. 7B is a front view, and FIG. 7C is a plan view. For example, in the storage container 1, the blockage preventing member 20 as shown in FIGs. 7A to 7C is inserted in the extraction opening portion as shown in FIG. 8, and it is thereby possible to extract the stored substance more efficiently.

[0056] The blockage preventing member 20 is formed in one piece using a resin or the like, is provided with a tube portion 21 inserted in the extraction opening 2a, and fringe 22 coming into contact with a circumferential edge 2a' of the extraction opening 2a so as not to drop inside when being inserted in the extraction opening, and is configured to be detachable with respect to the extraction opening 2.

[0057] The tube portion 21 is provided with a substantially same axial length as the length in the axial direction of the extraction opening 2a, and is configured so that the front end is positioned in the opening 2A on the storing portion side of the extraction opening 2a. Then, in the end face of the tube portion 21 is formed a plurality of cut grooves 21a at predetermined intervals (in this embodiment, four grooves substantially 90 degrees apart).

[0058] Such cut grooves 21a have the function of facilitating extraction of the stored substance remaining in the vicinity of the bottom edge 3a (in the vicinity of the opening 2A) of the bag-shaped storing portion 3 through the cut grooves 21a, as shown in FIG. 8, in a stage when the inner surface of the bag-shaped storing portion 3 comes into intimate contact with the tube-shaped storing portion 2 finally in the suction, and the suction force does not act on the bag-shaped storing portion 3. In other words, before the inner surface of the bag-shaped storing portion 3 comes into intimate contact with the inner surface of tube-shaped storing portion 2, the stored substance is extracted through the tube portion 21, and when the residual amount of the stored substance reduces finally, the residue existing in the vicinity thereof is easy to extract via the cut grooves 21a with thin movement paths (flow paths). It is thereby possible to reduce the residual amount of the stored substance as possible.

[0059] By installing the blockage preventing member 20 as described above, it is possible to further reduce the final remaining rate of the stored substance.

[0060] In addition, the blockage preventing member 20 may be configured to be detachable with respect to the extraction opening 2 as shown in the figure, or may be beforehand formed integrally in the extraction opening portion. Further, the length and thickness of the tube portion 21, the number of formed cut grooves 21a and the like are capable of being modified as appropriate.

[0061] FIGs. 9 and 10 show a storage container according to embodiment 2 of the invention. As shown in the figures, a storage container 101 according to this embodiment stores a viscous liquid (referred to as a stored substance) such as ink, and is provided with a cylindrical (tube-shaped) storing portion 102 formed in the shape of a cylinder circular in cross section, and a bag-shaped storing portion 103 welded along a lower circular opening of the cylindrical storing portion 102. The storage container 101 is formed in the shape of a circle in cross section over the longitudinal direction, and does not change the cross-sectional shape unlike embodiment 1.

[0062] In the cylindrical storing portion 102, an extraction opening 102a enabling a stored substance to be sucked is formed on the center axis on one end side, and a sealing member (not shown) such as a cap is attached to the extraction opening 102a and seals the stored substance. Then, in actual use, the container 1 is inserted in a predetermined portion of an external apparatus with the sealing member removed, and the stored substance is extracted by a sucking mechanism such as a pump. In this case, the extraction opening may have a config-

uration that an extraction needle is inserted in the sealing member to suck the stored substance.

[0063] The cylindrical storing portion 102 is formed in one piece (resin molding) of a plastic material such as, for example, polyethylene, polystyrene and polypropylene, and the thickness thereof is only required to be an extent (for example, about 0.3 mm to 1.8 mm) to which the cylindrical shape is maintained when the bag-shaped storing portion 103 is inverted and drawn into the inside in sucking.

[0064] Further, the outside shape (size of the diameter, length in the longitudinal direction, etc.) is not limited particularly, and in this embodiment, as shown in FIGs. 9 and 10A, a curved portion 102b is formed such that the diameter gradually decreases in the shape of a funnel toward the extraction opening 102a positioned on the center axis from the upper end side of the circumferential side wall. Then, it is preferable that radial protrusion portions 102c are formed in the inner surface of the curved portion 102b to extend toward the extraction opening 102a. The radial protrusion portions 102c constitute a flow path guide to enable the stored substance to effectively move toward the extraction opening 102a in sucking, and can be integrally formed in molding. In this case, the specific extension length, pitch and height of the radial protrusion portions 102c are capable of being modified as appropriate corresponding to dimensions of the cylindrical storing portion 102, type (viscosity) of the stored substance, etc.

[0065] In addition, with respect to the curved portion 102b formed in the cylindrical storing portion, as shown in FIG. 10B, the portion may have a gentle surface 102b' changing to the extraction opening 102a from the circular side wall, or as shown in FIG. 10C, may have a flat surface 102b" (surface with a substantially right angle) changing to the extraction opening 102a from the side wall without forming the curved portion. In other words, as long as such a configuration is obtained that the stored substance is capable of moving toward the extraction opening equally in undergoing the sucking action, the shape can be modified as appropriate, and further, may be formed of an acuter tapered curved surface than the curved surface of FIG. 10A.

[0066] As shown in FIG. 10A, a welding portion 102d is formed on the lower end side of the cylindrical storing portion 102 to facilitate welding of the opening end portion of the bag-shaped storing portion 103. For example, as shown in the figure, the welding portion 102d has a predetermined length L2 (about 5 mm to 15 mm) in the longitudinal direction. In addition, the portion 102d may be formed of a circular surface with a diameter smaller than that of the cylindrical portion of the cylindrical storing portion 102. By this means, the welding portion 102d is be covered with the opening area of the bag-shaped storing portion 103, and then, welded by heat using a heat bar or the like, and it is thereby possible to weld the bag-shaped storing portion 103 to the cylindrical storing portion 102 with ease.

[0067] The bag-shaped storing portion 103 is formed in the shape of a bag by welding the circumference of a thin-film-shaped film (thin film with a thickness ranging from about 0.05 mm to 0.15 mm) having flexibility made of polyethylene, polypropylene or the like, and is configured, for example, as a three-side seal bag such that two films are stacked and welded in the circumference, or a two-side seal bag such that a single film is folded and welded in the side and bottom. Alternately, the portion 103 may be configured as a tube-shaped bag.

[0068] Herein, the configuration of the bag-shaped storing portion is described with reference to FIGs. 11 and 12.

[0069] The bag-shaped storing portion in the invention has the structure where one end is opened to enable the portion 103 to be welded to the circular opening (welding portion 102d) of the cylindrical storing portion 102, while a bottom that is a plane is not formed in the other end (such a structure is referred to as a non-independent body) (the welding area is shown by oblique lines). Further, the bag-shaped storing portion of the invention is configured such that corner portions on the end portion side opposite to the welding portion 102d are cut. More specifically, the shape of the side surface is not rectangular as shown in FIG. 11, and, for example, as shown in FIG. 12A, by cutting the corner portions on the end portion side, has the configuration that does not cause the point portions P of 90 degrees or less between the bottom edge 103a and side edges 103b inside the storing portion as shown in FIG. 11.

[0070] In addition, as shown in FIGs. 12B and 12C, an aspect of the cut between the bottom edge 103a and side edge 103b inside the storing portion is not limited particularly, and the cut may be made so that the bottom edge 103a is longer than that shown in FIG. 12A as shown in FIG. 12B or may be made so that the bottom edge 103a is longer as shown in FIG. 12C.

[0071] In this case, the shape of the cut portion i.e. edge shape 103d that is the cut portion is preferably formed in the shape in accordance with the curved portion 102b formed in the cylindrical storing portion 102. More specifically, the shape as shown in FIG. 12A is preferably adapted to the cylindrical storing portion such that the curved portion is a relatively gently surface as shown in FIG. 12A, and the shape as shown in FIG. 12B is preferably adapted to the cylindrical storing portion such that the curved portion 102b is a relatively longer surface along the longitudinal direction than that in the configuration as shown in FIG. 12A. Further, the shape as shown in FIG. 12C is preferably adapted to the cylindrical storing portion such that the curved portion is a gentler surface as shown in FIG. 10B.

[0072] Further, the length L1 (see FIG. 9) of the bag-shaped storing portion 103 is configured to be the length in the range of 90% to 110% relative to the storing length L in the longitudinal direction of the cylindrical storing portion 102. By this means, when the bag-shaped storing portion 103 undergoes suction from the extraction open-

ing 102a portion, the inner surface of the bag-shaped portion 103 comes into intimate contact with the inner surface of the cylindrical storing portion 102, while the portion 103 is inverted and drawn into the inside space of the cylindrical storing portion 102 with the flow of the stored substance, and at this point, by setting the length at the above-mentioned range, it is possible to position the bottom edge 103a inside the storing portion in the vicinity of the opening 102A on the storing portion side of the extraction opening 102a, and to extract the stored substance effectively without waste.

[0073] In other words, in the case where the length L1 of the bag-shaped storing portion 103 exceeds 110% relative to the storing length L in the longitudinal direction of the cylindrical storing portion 102, when the bag-shaped storing portion 103 is inverted and drawn into the inside space of the cylindrical storing portion 102 while being inverted with the flow of the stored substance, it happens that the bottom edge 103a inside the storing portion bends, etc. a tendency increases to block the opening 102A on the storing portion side of the extraction opening 102a, the suction force thereby stops acting, and the possibility increases that the stored substance existing in the vicinity of the opening 102A on the storing portion side of the extraction opening 102a cannot be sucked and remains. Meanwhile, in the case where the length L1 of bag-shaped storing portion 103 is less than 90% relative to the storing length L in the longitudinal direction of the cylindrical storing portion 102, when the bag-shaped storing portion 103 is inverted and drawn into the inside space of the cylindrical storing portion 102 while being inverted with the flow in the storing portion, the distance between the bottom edge 103a inside the storing portion and the opening 102A on the storing portion side of the extraction opening 102a increases, and by this means, as the internal pressure decreases by suction, the possibility increases that the stored substance existing in the area of the bottom edge 103a does not undergo sufficient suction and remains.

[0074] Referring to FIGs. 13A to 13F, described next is a result of welding the bag-shaped storing portion 103 as shown in FIG. 12A to the cylindrical storing portion 102 with the configuration as shown in FIG. 10A to form a storage container, storing a viscous stored substance (commercially available mayonnaise) in the storage container, and extracting the stored substance by applying a predetermined suction force.

[0075] First, when the stored substance is extracted by applying suction to the extraction opening 102a with the stored substance stored in the cylindrical storing portion 102 and bag-shaped storing portion 103 (see FIG. 13A), as described previously, the bag-shaped storing portion 103 gradually shrinks while causing vertical wrinkles, and the bottom edge 103a rises toward the circular opening (area of the welding portion 102d) of the cylindrical storing portion 102 (see FIGs. 13B and 13C). Then, as the suction further proceeds, the bottom edge 103a inside the storing portion passes through the circular opening (area of the welding portion 102d) of the cylindrical storing portion 102 and rises with the flow of the stored substance, and the bag-shaped storing portion 103 is inverted and drawn into the inside space of the cylindrical storing portion 102 (see FIGs. 13D and 13E). Then, as the suction furthermore proceeds, the inner surface of the bag-shaped storing portion 103 comes into intimate contact with the inner surface of the cylindrical storing portion 102 (see FIG. 13F), and the stored substance concentrates on the opening area on the storing portion side of the extraction opening 102.

[0076] In addition, as shown in FIG. 13F, when the bag-shaped storing portion 103 is inverted and drawn into the inside space of the cylindrical storing portion 102, the inner surface of the bag-shaped storing portion 103 comes into intimate contact with the inner surface of the cylindrical storing portion 102, and since the inner surface of the cylindrical storing portion 102 is a curved surface and any point portions do not exist, the bag-shaped storing portion 103 is hard to come into intimate contact when becoming wrinkled, and enables the stored substance to be sucked (squeezed) as much as possible. Further, when the inner surface of the bag-shaped storing portion 103 comes into intimate contact with the inner surface of the cylindrical storing portion 102, the suction force does not act on the bag-shaped storing portion 103. However, since the curved shape is formed such that the diameter decreases gradually toward the extraction opening 102a side in the shape of a funnel, it is possible to extract the stored substance as much as possible even when the suction force reduces.

[0077] In this case, as described above, the radial protrusion portions 102c extending toward the extraction opening 102a are formed in the inner surface of the curved portion 102b, flow paths toward the extraction opening 102a are easy to reserve, and it is possible to efficiently extract the stored substance.

[0078] Further, the bag-shaped storing portion 103 is formed of a thin film, and therefore, sometimes partially shrinks. However, since the length L1 is set at the range of 90% to 110% relative to the storing length L in the longitudinal direction of the cylindrical storing portion 102, as shown in FIG. 13F, the bottom edge 103a area can be positioned in the vicinity of the extraction opening portion, and by this means, it is possible to efficiently extract the stored substance even when the internal pressure decreases by suction. Particularly, the bag-shaped storing portion 103 is a non-independent body, and is configured so that points portions with an acute angle do not exist in the bottom edge portion by cutting corner portions on the end portion side, and further, since the edge shape of the cut portion is formed to follow the curved portion of the cylindrical storing portion 102, it is possible to extract the stored substance efficiently without the substance remaining.

[0079] In addition, when suction tests were actually performed under the same conditions in the bag-shaped storing portion with the structure as shown in FIG. 12A

and the configuration without the corner portions on the end portion side being cut as shown in FIG. 11, 5.70% of the stored substance remained relative to the initial filling amount in the bag-shaped storing portion 103 with the structure as shown in FIG. 11, and in contrast thereto, 3.07% of the stored substance only remained in the structure (with the corner portions cut) as shown in FIG. 12A. Thus, the result that the stored substance can be extracted efficiently was obtained.

[0080] Then, since the storage container 101 as described above has the structure that the bag-shaped storing portion 103 formed in the shape of a bag to be a non-independent body is welded along the circular opening on the other end side of the cylindrical storing portion 102 made of a resin having the extraction opening 102a, the structure is simple and is easy to manufacture, and it is possible to obtain the configuration with the cost reduced, easy to recycle, and the like.

[0081] In the storage container 101 of this embodiment, the cross-sectional shape is not changed along the longitudinal direction, but may be changed as in embodiment 1 described previously.

[0082] In the foregoing, the embodiments of the invention are described, but the invention is not limited to the above-mentioned embodiments, and is capable of being modified in various manners.

[0083] For example, it is possible to modify as appropriate the dimensions of the tube-shaped storing portion 2, the shape extending to the extraction opening 2 from the side surface, the configuration of the extraction opening 2a in the tube-shaped storing portion 2 and so on. Further, when cut portions are formed in corner portions of the bag-shaped storing portion 3, the cut portions are only required such that any acute portion of 90° or less does not exist in the storage space. Therefore, the end portion may be cut in the shape of an arc, or may be cut by a plurality of straight lines in multi-stage without cutting in the shape of an arc.

[0084] Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

Claims

1. A storage container (1) **characterized by** comprising:

   a tube-shaped storing portion (2) formed of a resin having an extraction opening (2a) enabling a stored substance to be sucked in a center area on one end side, and a circular opening on the other end side; and

   a bag-shaped storing portion (3) which is welded along the circular opening of the tube-shaped storing portion (2), enters inside the tube-shaped storing portion (2) to be able to come into intimate contact with an inner surface of the tube-shaped storing portion (2) in sucking through the extraction opening (2a), and is formed of a thin film in the shape of a bag to be a non-independent body,

   wherein the tube-shaped storing portion (2) changes in cross-sectional shape from a circular shape to an elliptical shape toward the one end side from the other end side.

2. The storage container (1) as claimed in claim 1, **characterized in that** in the bag-shaped storing portion (3), cut portions (3d) are formed in corner portions on an end portion side opposite to an end portion welded to the tube-shaped storing portion (2).

3. The storage container (1) as claimed in claim 2, **characterized in that** the tube-shaped storing portion (2) has a curved portion (2b) such that the diameter decreases toward the extraction opening (2a), and

   edge shapes of the cut portions (3d) formed in the bag-shaped storing portion (3) are almost adapted to a shape of the curved portion (2b).

4. The storage container (1) as claimed in claim 3, **characterized in that** in an inner surface of the curved portion (2b) of the tube-shaped storing portion (2) are formed protrusion portions (2c) that extend toward the extraction opening (2a) and that are arranged radially.

5. The storage container (1) as claimed in any one of the preceding claims, **characterized in that** a capacity of the tube-shaped storing portion (2) is substantially the same as a capacity of the bag-shaped storing portion (3).

6. The storage container (1) as claimed in any one of the preceding claims, **characterized in that** the tube-shaped storing portion (2) has an area that is formed in the same diameter over a predetermined length on the other end side having the circular opening, and the bag-shaped storing portion (3) is welded to the outer surface of the area with the same diameter in the tube-shaped storing portion (2).

7. The storage container (1) as claimed in claim 6, **characterized in that** a pair of protrusions protruding (2e) outward are formed at an interval of 180 degrees in the circumferential direction, in an area where the bag-shaped storing portion (2) is welded, in the outer surface of the tube-shaped storing portion (2).

8. The storage container (1) as claimed in any one of the preceding claims, **characterized by** further comprising:

a blockage preventing member (20) detachable with respect to the extraction opening (2a),

wherein the blockage preventing member (20) has a tube portion (21), and the tube portion (21) has a cut groove (21a) for defining a flow path with the bag-shaped storing portion (3) entering inside the tube-shaped storing portion (2) in sucking through the extraction opening (2a).

9. The storage container (1) as claimed in claim 8, **characterized in that** the tube portion (21) has the substantially same axis length as a length in the axis direction of the extraction opening (2a).

10. The storage container (1) as claimed in claim 8, **characterized in that** the cut groove (21a) has a function of facilitating extraction, through the cut groove (21a), of the stored substance remaining in the vicinity of a bottom edge (3a) of the bag-shaped storing portion (3) in a stage when an inner surface of the bag-shaped storing portion (3) comes into intimate contact with the inner surface of the tube-shaped storing portion (2) in sucking and a suction force does not act on the bag-shaped storing portion (3).

11. The storage container (1) as claimed in any one of the preceding claims, **characterized in that** the extraction opening (2a) has a plug with a screw.

FIG. 1

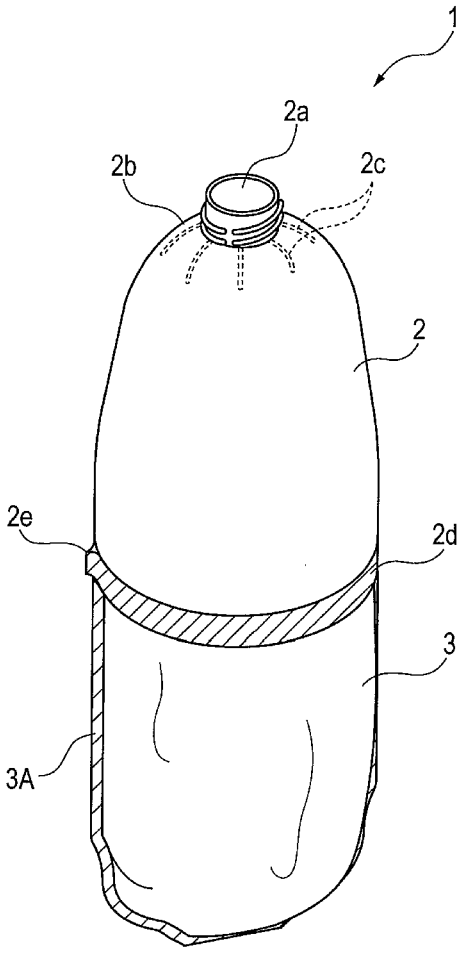


FIG. 2A

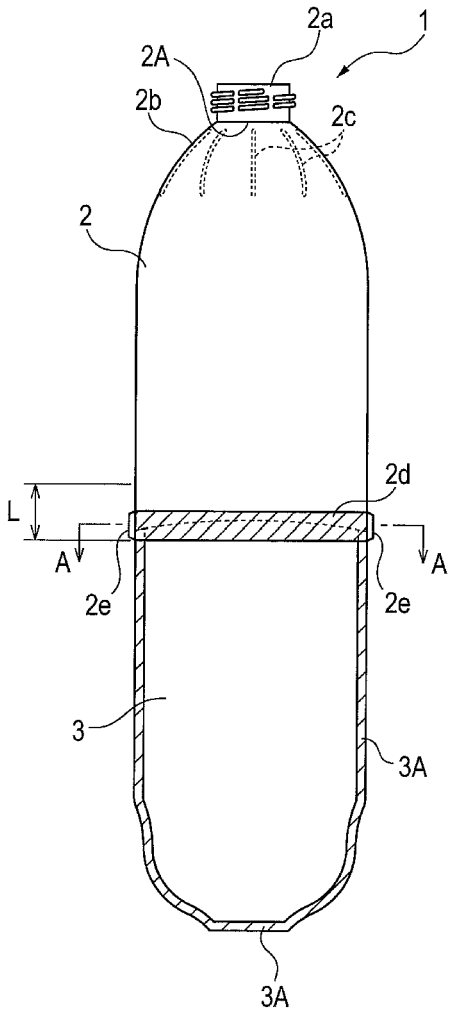


FIG. 2B

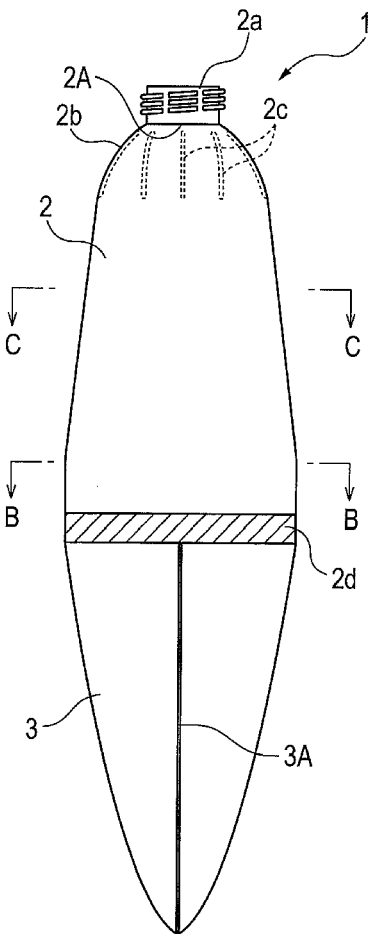


FIG. 3A

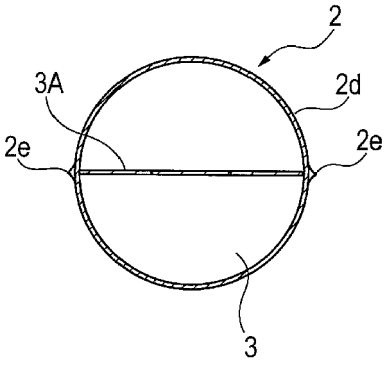


FIG. 3B

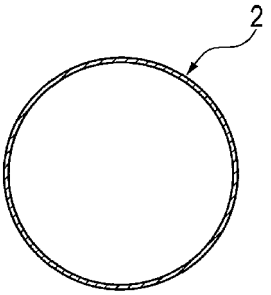


FIG. 3C

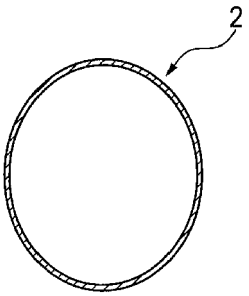


FIG. 4

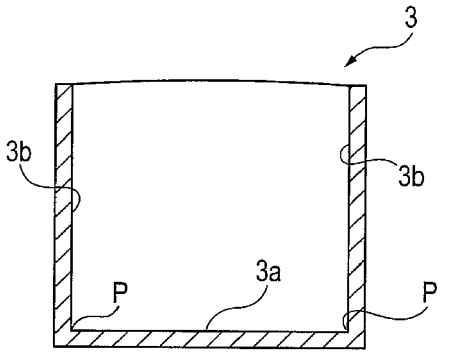


FIG. 5A

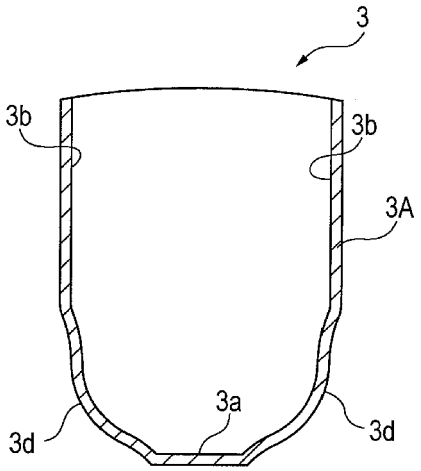


FIG. 5B

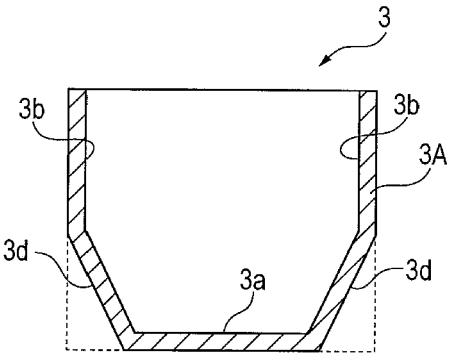


FIG. 5C

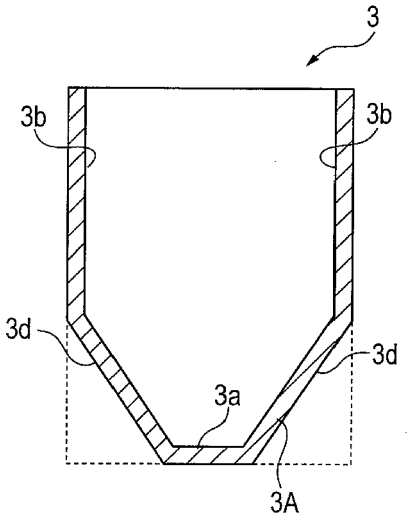


FIG. 6A

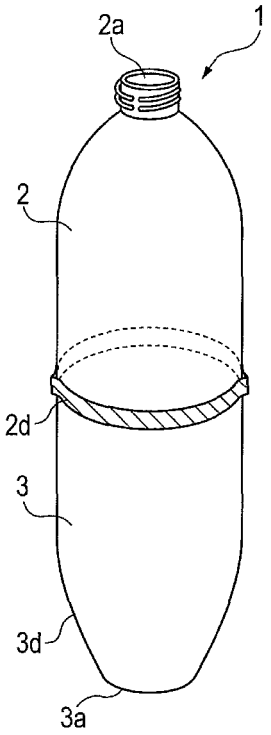


FIG. 6B

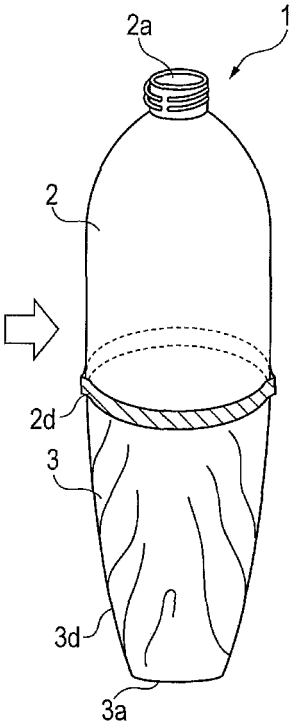


FIG. 6C

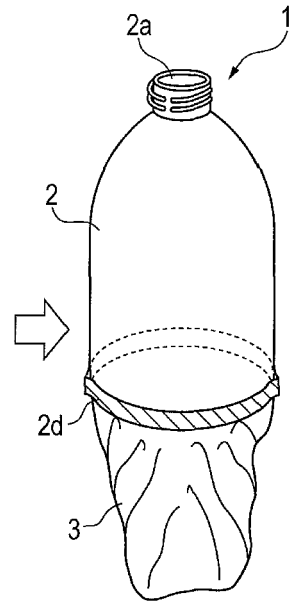


FIG. 6D

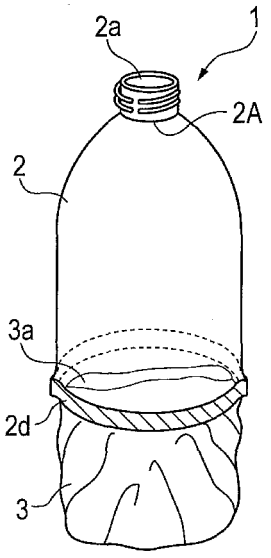


FIG. 6E

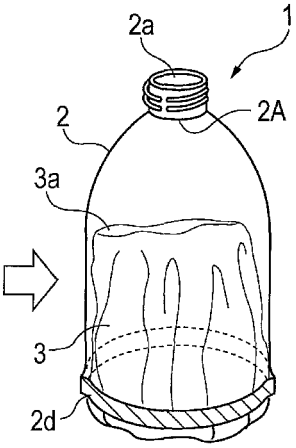


FIG. 6F

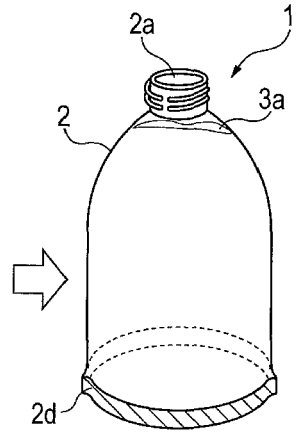


FIG. 7A

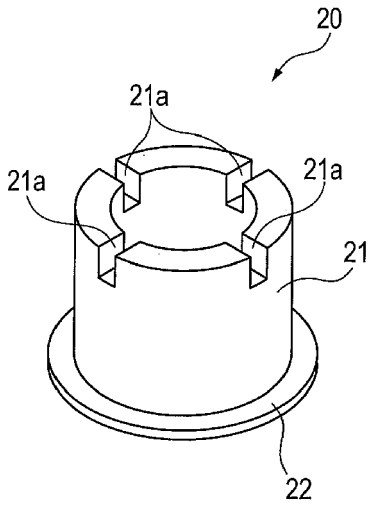


FIG. 7C

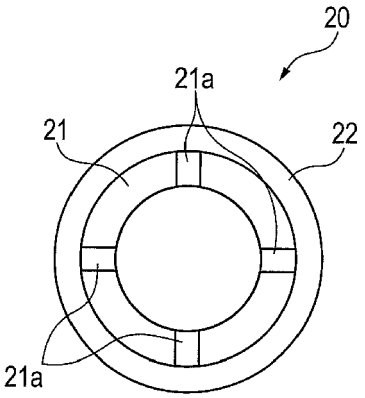


FIG. 7B

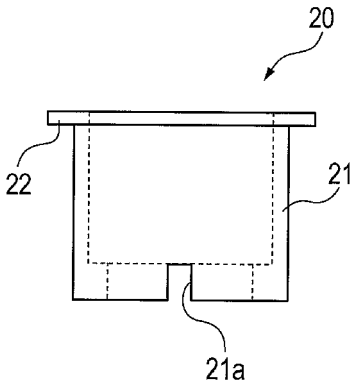


FIG. 8

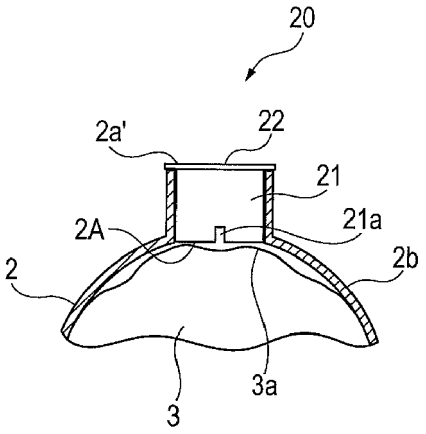


FIG. 9A

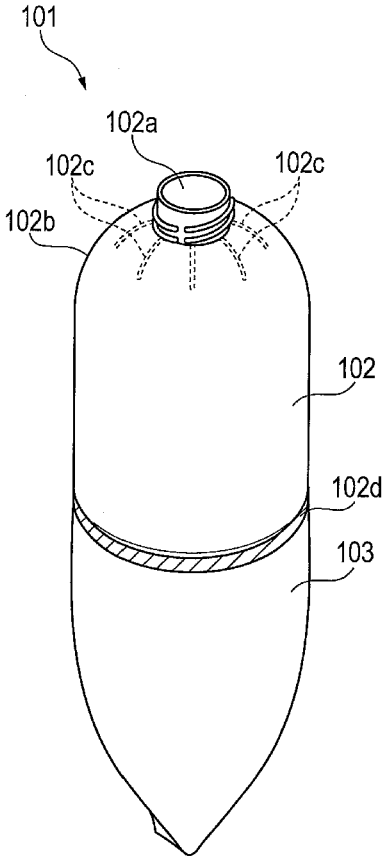

101
102a
102c
102c
102b
102
102d
103

FIG. 9B

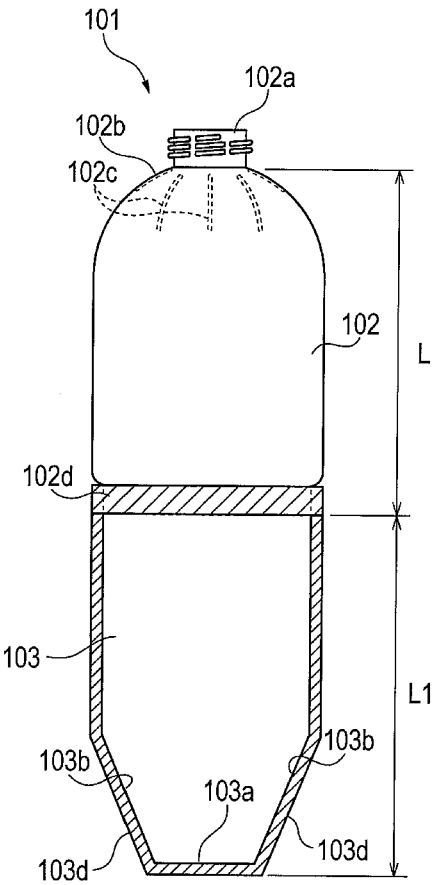

101
102a
102b
102c
102
L
102d
103
L1
103b
103b
103a
103d
103d

FIG. 10A

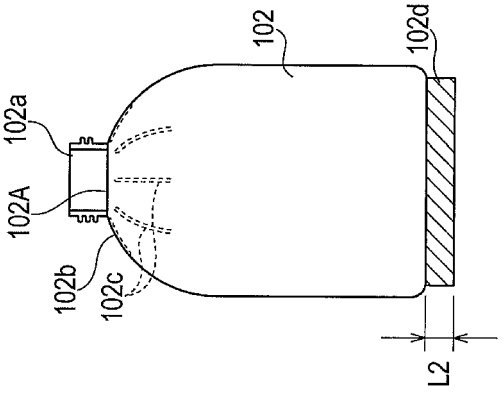


FIG. 10B

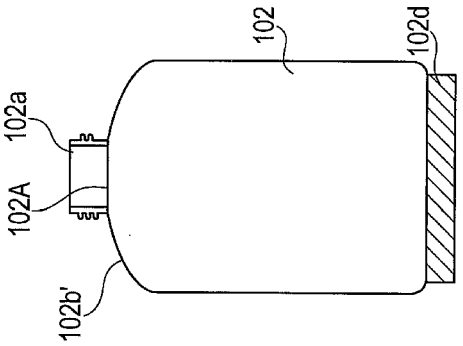


FIG. 10C

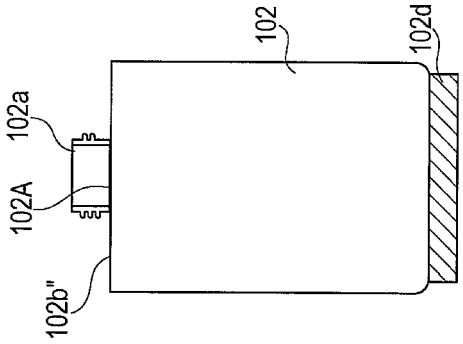


FIG. 11A

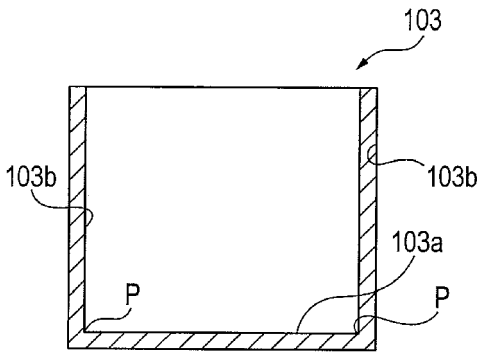


FIG. 12A

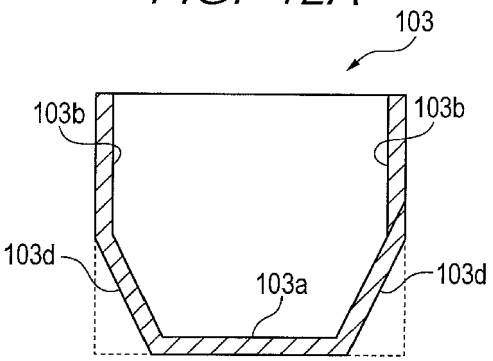


FIG. 12B

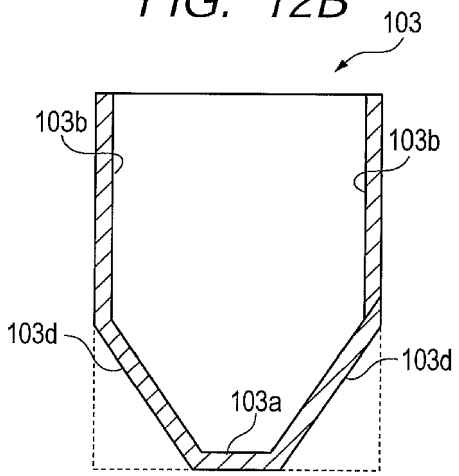


FIG. 12C

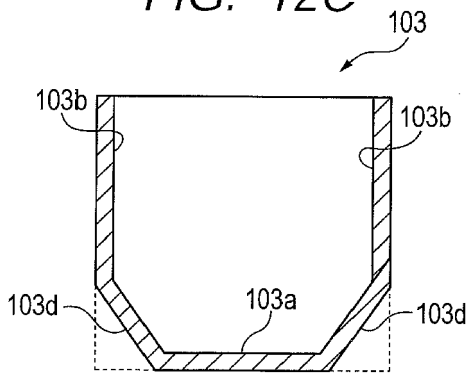


FIG. 13A

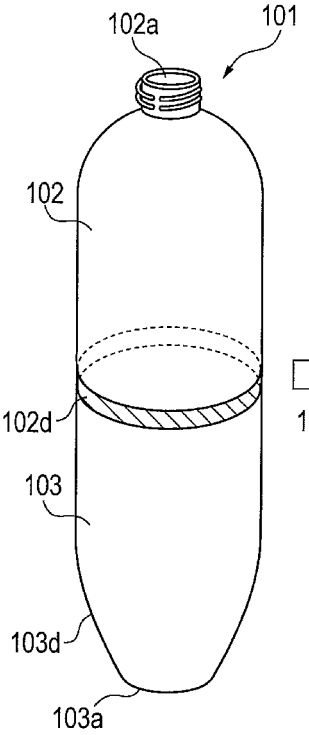


FIG. 13B

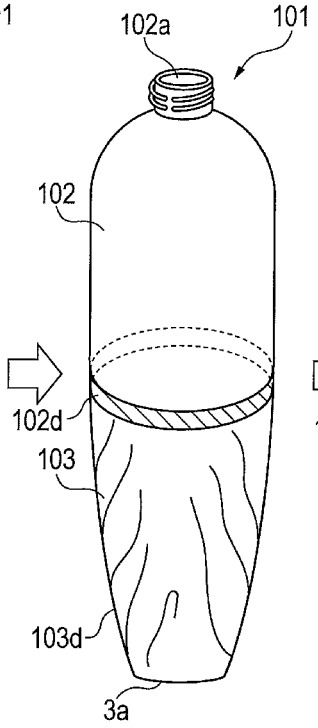


FIG. 13C

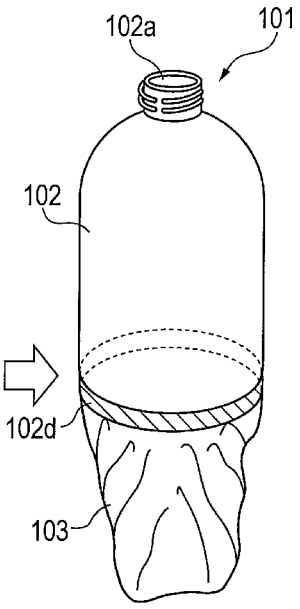


FIG. 13D

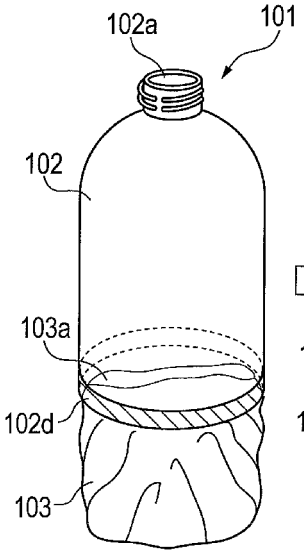


FIG. 13E

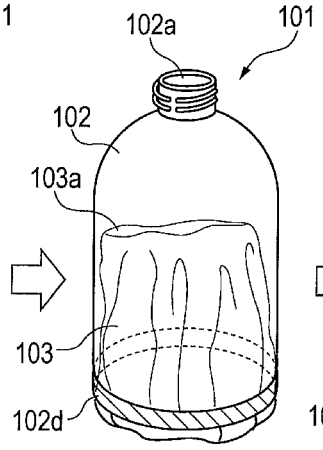
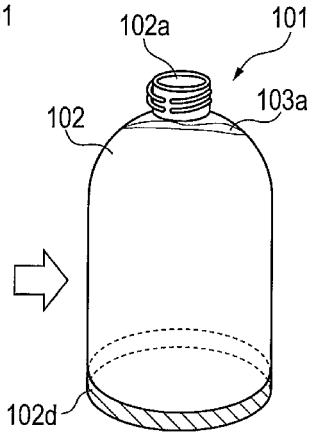


FIG. 13F



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Application Number
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B65D
B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 September 2010	Grondin, David

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