EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:  

(21) Application number: 00126072.8

(22) Date of filing: 06.03.1996

(54) Laminated peel container
Behälter aus laminiertem, leicht schälbarem Material
Récipient en matière laminé dont les couches sont déléaminables

(84) Designated Contracting States:
CH DE FR GB IT LI NL

(30) Priority:
10.03.1995 JP 8855895
16.05.1995 JP 14010595
22.06.1995 JP 17793695
18.08.1995 JP 23203895
13.09.1995 JP 23546395

(43) Date of publication of application:  
18.04.2001 Bulletin 2001/16

(60) Divisional application:  
02017205.2 / 1 266 697
02017206.0 / 1 266 698

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:  
96905010.3 / 0 759 399

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(56) References cited:  
US-A- 5 301 388


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Description

[0001] The present invention relates to a separable laminated container, of which an inner layer is separated from an outer layer and shrinks according to the decrease of the liquid content, and the related arts.

[0002] A separable laminated container is made up of an outer layer and an inner layer which are made of synthetic resin. The inner layer is separably laminated to the outer layer. The separable laminated container is normally used in the sealed state with a pump installed to a neck portion thereof. As the liquid content is poured out by the pump, the inner layer is separated from the outer layer and shrinks according to the decrease of the liquid content. In order to smoothly conduct the shrinkage of the inner layer, the outer layer is provided with an air suction hole.

[0003] As one of methods of forming such an air suction hole, a method in which the air suction hole is formed by partially fusing the outer layer of the separable laminated container has been proposed (for example, Japanese Published Unexamined Patent Application NO. H06-345069). In this method, the inner layer of the laminated container is made of resin having melting point higher than that of the outer layer and the resin of the outer layer is only fused to form the air suction hole by fusion means which is set at a temperature higher than the melting point of the outer layer and lower than the melting point of the inner layer.

[0004] However, the method of forming the air suction hole as mentioned above has following problems.

[0005] In case of a little difference between the melting points of the inner layer and the outer layer, it is quite difficult to fuse the outer layer only. Therefore, a predetermined difference in temperature between the melting points of the inner layer and the outer layer is required, thereby restricting the selection of resins used for the inner layer and the outer layer.

[0006] Since the air suction hole is formed by fusing the resin of the outer layer by the fusion means, it is difficult to sharply form the air suction hole into a predetermined configuration. Therefore, a finishing is necessary to make the hole neat.

[0007] Temperature control is necessary to keep the fusion means in a constant temperature range, thereby complicating the device.

[0008] There is a separable laminated container in which an outer layer and an inner layer are partially bonded as disclosed in Japanese Published Unexamined Patent Application No. H04-339759, Japanese Published Unexamined Patent Application No. H05-310265, or the like. The position where the outer layer and the inner layer are bonded has been considered variously. For example, the bonded portion is provided linearly along the longitudinal direction of the separable laminated container.

[0009] By the way, the separable laminated container is normally made in a method as described below.

[0010] First, a laminated parison or laminated preform (hereinafter, referred to as the laminated parison) having a laminated structure corresponding to the separable laminated container to be manufactured is molded by extrusion molding. During this molding, a bonded area extending the axial direction is provided in a predetermined position in such a manner as to allow the separation between the outer layer and the inner layer beside the bonded area. Then, the laminated parison is set in the mold and molded into a desired bottle-like configuration by blow molding in such a manner as to have an air suction hole in the outer layer.

[0011] For making sure to introduce air through the air suction hole, the position of the air suction hole should be shifted from the bonded area. When the diameter of the air suction hole is equal to or smaller than the width of the bonded area, overlap between the air suction hole and the bonded area results the blockage of the air suction hole so that air can not be introduced into a space the outer layer and the inner layer and the inner layer can not shrink.

[0012] However, since there is no mark indicating the position of the bonded area in the conventional separable laminated container, the air suction hole is sometimes formed to be overlapped with the bonded area.

[0013] A separable laminated container may be provided which allows an air suction hole to be positively positioned at a portion shifted from the bonded area.

[0014] By the way, to smoothly separate the inner layer from the outer layer according to the decrease of the liquid content in the separable laminated container, pre-separation is made before filling the container with the liquid content, for example, as disclosed in Japanese Published Unexamined Patent Application No. 06-345069. The conventional pre-separation is made by blowing air through the air suction hole of the separable laminated container to separate the inner layer from the outer layer, then blowing air into the container through the neck, and deaerating a space between the inner layer and the outer layer through the air suction hole so that the inner layer is returned in such a manner as to cling to the inner surface of the outer layer.

[0015] However, in the conventional separable laminated container, the inner layer is made of synthetic resin having a melting point higher than that of the material of the outer layer and flexural modules between 10,000 kg/cm² and 50,000 kg/cm² (measured by ASTM D790 method of measurement) so as to have good distortion resistance, that is, higher elasticity. Therefore, to smoothly separate the inner layer according to the decrease of the liquid content, the inner layer must be completely separated over the entire laminated area during the pre-separation.

[0016] For that, a predetermined amount of air according to the dimensions of the container should be blown between the layers. Therefore, there is a problem that the separation can not be completed overall when the control of blowing is mistook.
Further, a control unit is necessary for controlling the amount of air, thereby complicating the device.

As well known, since the outer layer and the inner layer should be made of resin having lower bond properties for the purpose of separating the inner layer from the outer layer, the inner layer and the outer layer are not completely bonded to each other at a pinch-off portion formed at a bottom of the blow-molded container. This causes a cracking of the pinch-off portion and a slit between the layers due to a separation, thereby causing a sealing defect.

Under the circumstances mentioned above, the synthetic resin having good distortion resistance, that is, higher elasticity as described above further facilitates the defect. There is a problem that the container entraps moisture between the inner layer and outer layer from the sealing defect when the container is used in a damp area.

In the conventional pre-separation, the inner layer is separated from the outer layer and then returned in the original position. At this point, the inner layer is compressed against the outer layer, thereby making the separability between the layers low.

A separable laminated container may be provided in which an inner layer can be easily separated from an outer layer.

Since, once separated from the outer layer, the inner layer is returned in such a manner as to cling to the inner surface of the outer layer in the conventional pre-separation, the level to which the pre-separation is finished does not appear externally so that it is difficult to inspect the level.

The separable laminated container may allow the easy inspection of the level to which the pre-separation is finished.

In case of a container for liquid, since the ratio of the amount of liquid content to the capacity of the container is generally constant, larger capacity of the container makes an upper space after filled with the liquid content larger so that the level is sometimes lowered to a lower portion of a shoulder or near an upper end of the drum portion of the container.

In case of installing a pump to the neck of the container, taking into consideration the rise of the level due to the insertion of the pump and troubles for inserting the pump, the liquid content is filled in the container in such a manner as to have larger upper space, thereby sometimes lowering the level.

As the upper space is increased and the level of the liquid is lowered to the lower portion of the shoulder or near the upper end of the drum of the container as mentioned above, the water face of the liquid content waves and the splash of the liquid content becomes violent, thereby bubbling the liquid content and/or generating gases depending on the kind of the liquid content.

As the level of the liquid content is lowered to the upper end of the drum of the container, in case of transparent or translucent container, this gives consumers the same impression because of the degree of the splash of the liquid content when swinging the container.

The pre-separation method may allow a smaller upper space when a container is in the filled state, and a container with a pump may allow a smaller upper space.

Another example of a multilayer plastic container is described in US Patent No. 5,301,838. Here the inner layer readily separates from the outer layer and collapses to dispense a product from the container.

According to the invention a separable laminated container comprises: (a) an outer layer made of synthetic resin and having an air suction hole; and (b) an inner layer made of synthetic resin, and separably laminated on the inside of said outer layer, characterised in that said inner layer has a portion previously separated from the outer layer just around the air suction hole.

In the separable laminated container, air is smoothly introduced between the outer layer and the inner layer even at the first time to pour out the liquid content for use so that the separation of the inner layer is easily made. Since only a part of the inner layer is separated in the pre-separation, a small amount of air for the pre-separation is enough.

In the separable laminated container, the position of the air suction hole is not limited so that the air suction hole may be formed in any place. Therefore, the air suction hole may be formed in a neck of the container or a drum portion of the container. In addition, the method for forming the air suction hole is also not limited so that a welding means or a punching means by a punch may be employed.

In the separable laminated container, though the resin materials for the inner layer and the outer layer are not limited, it is preferable that resins which allow the easy separation therebetween are employed. As for the inner layer, a resin with high flexibility is preferably employed.

The separable laminated container may further comprise a neck, wherein the neck is provided with the air suction hole formed in the outer layer by driving a punch from the outside of the outer layer and punching the outer layer, leaving the inner layer behind.

The separable laminated container may further comprise a neck, wherein the neck is provided with the air suction hole formed in the outer layer, and where-in the inner layer has an extended portion extended toward the inward of the neck at the part previously separated from the outer layer near the neck. As structured above, the extended portion of the inner layer can be observed from an upper position over the neck of the container, thereby facilitating the check of the state of the pre-separation and thus making the inspection. For
pouring out the liquid content, air is securely entered from the first time to pour out the liquid content so as to proceed the separation, thereby improving the entire separability. In case of filling a fixed volume of the liquid content into the container, since the upper space after filling is reduced by the volume excluded by the extended portion, the level of the liquid content can be risen to a desired level by controlling the volume of the air for pre-separation. Particularly, when the level is risen to the neck of the container, it can decrease the waves of the water face of the liquid content during the container A is transported. Even when the liquid content generates gases, the inner layer is moved by the pressure of the gases so that the profile of the container is not changed.

[0036] The container may further comprise a pump comprising a cylinder inserted into the container body through a neck of the container body and a cap whereby the pump is hermetically fitted to the neck, where the cylinder is provided with a flange-like seal around the outer periphery thereof, the flange-like seal coming in contact with the inner surface of the neck tightly.

[0037] In the container with a pump, air is smoothly introduced between the outer layer and the inner layer even at the first time to pour out the liquid content for use so that the separation of the inner layer is easily made. Since only a part of the inner layer is separated in the pre-separation, a small amount of air for the pre-separation is enough.

[0038] In the container with a pump, the inner layer is inwardly extended in the pre-separation of the container. When the cylinder of the pump is inserted through the neck of the container body after filling the liquid content into the container body, the cylinder of the pump is inserted with the cylinder sealing the ring-like seal so that the inner pressure of the container body is risen so as to return the previously extended portion of the inner layer into the original state, thereby discharging the air, which has been blown between the inner layer and the outer layer, through the air suction hole. The extended portion of the inner layer may be brought in contact with the outer layer by completely discharging the air, which has been blown between the inner layer and the outer layer in the pre-separation. Alternatively, some of the air may be left between the inner layer and the outer layer even after the installation of the pump so that the inner layer and the outer layer is spaced from each other.

[0039] In the container with a pump and an inner lid with a ring-like seal, the position of the air suction hole is not limited so that the air suction hole may be formed in any place. Therefore, the air suction hole may be formed in a neck of the container or a drum portion of the container. In addition, the method for forming the air suction hole is also not limited so that a welding means or a punching means by a punch may be employed.

[0040] In the container with a pump, though the resin materials for the inner layer and the outer layer are not limited, it is preferable that resins which allow the easy separation therebetween are employed. As for the inner layer, a resin with high flexibility is preferably employed.

[0041] The container with a pump may further comprise an inner lid having a ring-like seal coming in contact with the outer surface of the cylinder of the pump tightly, and fitted in the neck of the container body.

[0042] In the container with a pump and an inner lid with a ring-like seal, air is smoothly introduced between the outer layer and the inner layer even at the first time to pour out the liquid content for use so that the separation of the inner layer is easily made. Since only a part of the inner layer is separated in the pre-separation, a small amount of air for the pre-separation is enough.

[0043] In the container with a pump and an inner lid with a ring-like seal, the inner layer is inwardly extended in the pre-separation of the container. When the cylinder of the pump is inserted through the neck of the container body after filling the liquid content into the container body and fitting the inner lid into the neck of the container body, the cylinder of the pump is inserted with the cylinder sealing the ring-like seal so that the inner pressure of the container body is risen so as to return the previously extended portion of the inner layer into the original state, thereby discharging the air, which has been blown between the inner layer and the outer layer, through the air suction hole. The extended portion of the inner layer may be brought in contact with the outer layer by completely discharging the air, which has been blown between the inner layer and the outer layer in the pre-separation. Alternatively, some of the air may be left between the inner layer and the outer layer even after the installation of the pump so that the inner layer and the outer layer is spaced from each other.

[0044] In the container with a pump and inner lid with a ring-like seal, the position of the air suction hole is not limited so that the air suction hole may be formed in any place. Therefore, the air suction hole may be formed in a neck of the container or a drum portion of the container. In addition, the method for forming the air suction hole is also not limited so that a welding means or a punching means by a punch may be employed.

[0045] In the container with a pump and an inner lid with a ring-like seal, though the resin materials for the, inner layer and the outer layer are not limited, it is preferable that resins which allow the easy separation therebetween are employed. As for the inner layer, a resin with high flexibility is preferably employed.

[0046] In the container with a pump and an inner lid with a ring-like seal, the cylinder may have narrow grooves or a roughened surface on the outer surface thereof extending from the lower edge thereof to a position above the seal of the inner lid after installation of the pump.

[0047] In the container with a pump and an inner lid with a ring-like seal, the seal of the inner lid may have a narrow groove or a roughened surface formed in a sealing surface thereof.

[0048] In the container with a pump and an inner lid
with a ring-like seal, the seal of the inner lid may protrude inward and upward in such a manner as to elastically expand and contract in the radial direction.

[0049] A punching method suitable for forming an air suction hole in a separable laminated container may comprise steps of: driving a punch from the outside into a neck of a container body made up of an inner layer and an outer layer which are made of synthetic resin and separably laminated on each other; and punching out the outer layer by the blade of the punch, leaving the inner layer behind.

[0050] In the above punching method, the outer layer is punched by the blade of the punch leaving the inner layer behind so that the air suction hole can be formed only in the outer layer whereby the air suction hole can be quite easily formed. The air suction hole can be formed in the same configuration as that of the blade and the hole is neatly made only by the punching so that no finishing after the punching is required. Particularly when this punching method is conducted during the molded container is in a predetermined range of temperature after blow molding, it further facilitates and secures the formation of the air suction hole.

[0051] The punching method may be carried out using a punching device comprising: (a) a pedestal which is inserted into a neck of a container body made up of an inner layer and an outer layer, which are made of synthetic resin and separably laminated on each other, to come in contact with an inner surface of the neck; (b) a punch supported in such a manner as to come close to and move away from the pedestal, the punch having a tubulous blade; and (c) a space keeping mechanism for keeping a distance between the tubulous blade and the pedestal constant when the punch is at the nearest position to the pedestal.

[0052] The punching device described has a simple structure and facilitates the formation of the air suction hole. Since the punch pushes the inner layer at the same time of punching out the outer layer, the separation between the layers are made around the air suction hole during punching, thereby allowing the inner layer to be quite easily separated from the outer layer.

[0053] The punching device may further comprise an adjusting mechanism for adjusting the distance between the tubulous blade and the pedestal at a point in time when the punch is at the nearest position to the pedestal. As structured above, the adjusting mechanism adjusts the distance between the tubulous blade and the pedestal so that the air suction hole can be formed only in the outer layer even with a spread in the thickness of the inner layer.

[0054] Layers of the separable laminated container may be pre-separated by a method comprising steps of: punching an air suction hole in an outer layer of a separable laminated container made up of an inner layer and the outer layer which are made of synthetic resin and separably laminated on each other; and introducing a little amount of air through the air suction hole to previously separate a portion of the inner layer around the air suction hole from the outer layer.

[0055] Since only a part of the inner layer is separated, a small amount of air for the pre-separation is enough and it is not necessary to change the volume of the air even with containers of somewhat different volumes, thereby allowing easy operation. The extended portion of the inner layer may be brought in contact with the outer layer again or may be left in the state separated from the outer layer.

[0056] The method of forming the air suction hole is not limited, so that the hole may be made by welding the outer layer or punching only the outer layer by a punch.

[0057] The layers of the separable laminated container may be pre-separated by a method comprising steps of: punching an air suction hole in an outer layer of a separable laminated container made up of an inner layer and the outer layer which are made of synthetic resin and separably laminated on each other; introducing a little amount of air through the air suction hole to previously separate a portion of the inner layer around the air suction hole from the outer layer; blowing air into the inside of the separable laminated container to discharge the air introduced between the inner layer and the outer layer; and bringing the separated layer in contact with the outer layer again.

[0058] Since only a part of the inner layer is separated, a small amount of air for the pre-separation is enough and it is not necessary to change the volume of the air even with containers of somewhat different volumes, thereby allowing easy operation. Though the inner layer separated from the outer layer is brought in contact with the outer layer again, the separated inner layer can be easily separated from the outer layer again.

[0059] The method of forming the air suction hole is not limited so that the hole may be made by welding the outer layer or punching only the outer layer by a punch.

[0060] The pre-separation method for a separable laminated container may comprise steps of: punching an air suction hole in an outer layer of a separable laminated container made up of an inner layer and the outer layer which are made of synthetic resin and separably laminated on each other; introducing a little amount of air through the air suction hole to previously separate a portion of the inner layer around the air suction hole from the outer layer; installing a pump to a neck of the separable laminated container after filling liquid content in the separable laminated container; sealing a space between the cylinder of the pump and the neck by a seal when a cylinder of the pump is inserted into the neck during the installation so as to discharge at least some of the air introduced between the inner layer and the outer layer.

[0061] In the pre-separation method described above, at least some of the air previously introduced between the inner layer and the outer layer is enough to be discharged through the air suction hole. This means that the inner layer may be returned to come in contact
with the inner surface of the outer layer by completely discharging the introduced air during the installation of the pump, or, some of the air may be left between the inner layer and the outer layer even after the installation of the pump so that the inner layer and the outer layer is spaced from each other.

[0062] Since only a part of the inner layer is separated, a small amount of air for the pre-separation is enough. The step of completely or partly returning the inner layer to the original state and the step of installing the pump to the separable laminated container can be conducted by one action, thereby facilitating the manufacturing process of the container with a pump.

[0063] The method of forming the air suction hole is not limited so that the hole may be formed by welding the outer layer or punching only the outer layer by a punch.

[0064] The amount of residual air in the inner layer after installation of the pump may be controlled by controlling the amount of air introduced through the air suction hole to partly separate the inner layer from the outer layer.

[0065] The seal is formed on the circumference of the cylinder of the pump and the amount of air discharged through the air suction hole during the installation of the pump can be controlled by the sliding range of the seal against the neck and the position of the air suction hole.

[0066] The seal comprises an inner lid fitted in the neck in such a manner as to allow the insertion of the cylinder of the pump therethrough and the amount of air discharged through the air suction hole during the installation of the pump can be controlled by the length of the cylinder inserted into the seal.

[0067] The separated inner layer can be brought in contact with the outer layer again by adjusting the amount of air introduced through the air suction hole to the same amount of the air discharged through the air suction hole during the installation of the pump.

[0068] The pre-separation device for a separable laminated container may comprise: (a) a first air supply member for supplying air between an inner layer and an outer layer of a separable laminated container, which are made of synthetic resin and separably laminated on each other, through an air suction hole punched in the outer layer of the separable laminated container; (b) a second air supply member for blowing air into the separable laminated container through a neck of the separable laminated container; (c) a pressurized air supply device for supplying pressurized air into the first air supply member and the second air supply member; (d) a pressurized air storage disposed between the first air supply member and the pressurized air supply device; (e) solenoid valves disposed between the pressurized air supply device and the pressurized air storage, between the first air supply member and the pressurized air storage, and between the second air supply member and the pressurized air supply device, respectively; and (f) a control means for activating the solenoid valves at predetermined timings.

[0069] A little volume of the pressurized air of the pressurized air supply device is first stored in the pressurized air storage, then the pressurized air stored in the pressurized air storage is introduced between the inner layer and the outer layer of the separable laminated container through the air suction hole by the first air supply member so as to separate the inner layer around the air suction hole from the outer layer, and after that, the separated inner layer is brought in contact with the inner surface of the outer layer by blowing the pressurized air into the separable laminated container by the second air supply member. A sequence of actions as mentioned above are securely and easily carried out by controlling the solenoid valves by the control means.

[0070] The pre-separation device may further comprise an adjusting means for adjusting the amount of air supplied to the pressurized air storage. As the adjusting means are provided as mentioned above, the volume of the air for separating the inner layer can be changed if necessary.

[0071] In the above pre-separation device the first air supply member may comprise a nozzle inserted into the air suction hole of the separable laminated container, wherein the nozzle is opened at the front end and a side thereof so that the air supplied between the inner layer and the outer layer is discharged through the nozzle when air is blown into the separable laminated container through the second air supply member. As structured above, the air introduced between the inner layer and the outer layer can be completely discharged with the second air supply member is mounted on the separable laminated container, with the result that the entire surface of the separated inner layer can be brought in contact with the inner surface of the outer layer as the original state.

Fig. 1 is a front view showing a separable laminated container according to a first embodiment of the present invention;
Fig. 2 is a front view showing a punching device, suitable for use in conjunction with the present invention, parts being broken away;
Fig. 3 is a perspective view of a separable laminated container according to a second embodiment of the present invention;
Fig. 4 is a plan view of the separable laminated container according to the second embodiment of the present invention;
Fig. 5 is a cross sectional view showing the separable laminated container according to the second embodiment of the present invention before separation of an inner layer;
Fig. 6 is a front view of a separable laminated container according to a third embodiment of the present invention, parts being broken away;
Fig. 7 is a longitudinal sectional view of the separable laminated container according to the third embodiment of the present invention, as shown from
the right side;
Fig. 8 is a longitudinal sectional view of a pre-separation device suitable for use in conjunction with the present invention;
Fig. 9 is an enlarged longitudinal sectional view showing components of the pre-separation device suitable for use in conjunction with the present invention;
Fig. 10 is a left side view of a first air supply member of the pre-separation device, suitable for use in conjunction with the present invention;
Fig. 11 is a front view showing the first air supply member of the pre-separation device, parts being broken away;
Fig. 12 is a pneumatic piping drawing of the pre-separation device suitable for use in conjunction with the present invention;
Fig. 13 is a longitudinal sectional view of a volume controller of the pre-separation device suitable for use in conjunction with the present invention;
Fig. 14 is a timing chart of the pre-separation device suitable for use in conjunction with the present invention;
Fig. 15 is a front view of showing a separable laminated container according to a fourth embodiment of the present invention, parts being broken away;
Fig. 16 is a plan view of the separable laminated container according to the fourth embodiment of the present invention;
Fig. 17 is a right side view of the separable laminated container according to the fourth embodiment of the present invention;
Fig. 18 is a front view showing the separable laminated container during pre-separation, suitable for use in conjunction with the present invention, parts being broken away;
Fig. 19 is a longitudinal sectional view of a pre-separation device suitable for use in conjunction with the present invention;
Fig. 20 is a front view showing a container with pump according to a fifth embodiment of the present invention, parts being broken away;
Fig. 21 is a front view showing a container body of the container with pump in the fifth embodiment of the present invention, parts being broken away;
Fig. 22 is a longitudinal sectional view of a pre-separation device, suitable for use in conjunction with the present invention;
Fig. 23 is a front view showing the container body of the container with pump during the pre-separation, parts being broken away;
Fig. 24 is a right side view showing the container body of the container with pump during the pre-separation;
Fig. 25 is a sectional view showing components in the container with pump in an initial stage of installing a pump according to the fifth embodiment of the present invention;
Fig. 26 is a sectional view showing components in the container with pump when the installation of the pump is completed according to the fifth embodiment of the present invention;
Fig. 27 is a sectional view showing components in a container with pump in an initial stage of installing a pump according to a sixth embodiment of the present invention;
Fig. 28 is a sectional view showing components in the container with pump when the installation of the pump is completed according to the sixth embodiment of the present invention;
Fig. 29 is a half-sectional view of an inner lid of the container with pump according to the sixth embodiment of the present invention;
Fig. 30 is a front view of a pump of a container with pump according to a seventh embodiment of the present invention;
Fig. 31 is a sectional view showing the container with pump when the installation of the pump is completed according to the seventh embodiment of the present invention;
Fig. 32 is a front view of a conventional container with pump;
Fig. 33 is a half-sectional view of an inner lid of a container with pump according to an eighth embodiment of the present invention;
Fig. 34 is a sectional view showing components of a container with pump in an initial stage of installing a pump according to a ninth embodiment of the present invention;
Fig. 35 is a sectional view showing components of the container with pump when the installation of the pump is completed according to the ninth embodiment of the present invention;
Fig. 36 is a half-sectional view of an inner lid of the container with pump according to the ninth embodiment of the present invention; and
Fig. 37 is an enlarged sectional view of components of the container with pump according to the ninth embodiment of the present invention, showing the state filled with liquid content.

Best Mode for Carrying Out the Invention

[0072] Hereinafter, embodiments of the present invention will be described with reference to attached drawings.

[First Embodiment]

[0073] Fig.1 is a front view of a separable laminated container A according to a first embodiment. The separable laminated container A is made up of an outer layer I and an inner layer 2, is formed by blow molding, and comprises a drum portion 3, a neck 4, and a bottom 5.

[0074] The outer layer 1 is made of high-density pol-
yethylene to keep the profile of the container, and the inner layer 2 is an inner bag made of nylon which is separable from the outer layer and deformable. There is a separated area 8 formed between the outer layer 1 and the inner layer 2.

The neck 4 is provided with an engaging portion 10 formed at an upper end of inner layer 2 by an air blowing member during the blow molding.

The neck 4 is also provided with an air suction hole 11 formed by a punching device in a punching method. The air suction hole 11 is a hole for introducing air into a space between the inner layer 2 and the outer layer 1 in order to smoothly achieve the separation of the inner layer 2 with keeping the profile of the container A to completely pour out the content.

Hereinafter, the description will be made as regard to a possible method of punching the air suction hole and a possible punching device, with reference to Fig. 2.

The punching device B is disposed during cooling stage of the blow-molded container A and mounted on a supporting bed (not shown) capable of moving vertically and laterally.

The punching device B comprises a receiving member B1 and a cutting member B2 which are mounted on a supporting member 20.

The supporting member 20 is mounted on the supporting bed (not shown) and comprises a supporting shaft 21 and a guiding pole 22, wherein the guiding pole 22 is arranged in parallel with the supporting shaft 21 and is provided with a stopper 23 at the end thereof.

The receiving member B1 comprises a supporting pole 24, which is fixed to the supporting shaft 21 and extends downward, and a pedestal 25 disposed at an end of the supporting pole 24.

The cutting member B2 comprises a sliding member 30, which is not allowed to rotate relative to the supporting shaft 21 and the guiding pole 22 and is allowed to slide laterally, a supporting pole 31 extending downward from the sliding member 30, and a punch 32 disposed at the end of the supporting pole 31 in such a manner as to face the pedestal 25.

The punch 32 is provided with a tubulous blade 33 at the end thereof and a clearance hole 34 formed therein for discharging a chip.

The supporting pole 31 is provided with an internal thread 35 formed at the proximal end side thereof, into which a bolt 36 as a stopper is screwed and fixed by a lock nut 37 not to shift from a fixed position.

Where the distal end 38 of the bolt 36 comes into contact with the supporting pole 24 of the receiving member B1, there is a distance t between the tubulous blade 33 and the receiving face 26 of the pedestal 25. The size of the distance t is adjustable by adjusting the position of the bolt 36 relative to the internal thread 35. It should be noted that the bolt 36 and the supporting pole 24 constitute a space keeping mechanism and the internal thread 35, the bolt 36, and the lock nut 37 constitute an adjusting mechanism.

The supporting bed is provided with driving means (not shown) for moving the sliding member 30 laterally in such a manner that the sliding member 30 reciprocates between a waiting position where the sliding member 30 comes into contact with the stopper 23 disposed at the end of the guiding pole 22 and a punching position where the distal end 38 of the bolt 36 comes into contact with the supporting pole 24 of the receiving member.

A combination of an electric or mechanical driving source, which is controlled in connection with the stopping member, and suitable transmitting means can be selected as the driving means, or manual means may also be employed as the driving means.

Though the waiting position and the punching position of the sliding member 30 are defined by the stopping member in this embodiment, these may be defined by controlling the operational range of the driving means instead of the stopping member.

The description will now be made as regard to the operation of the punching device B and the punching method.

As mentioned above, the punching device B is disposed during the cooling stage and the punching is performed during the container A has a predetermined temperature before returning to the room temperature.

During the punching device B is in non-operation, the supporting bed is positioned above the container A in such a manner as to move the container A. Therefore, the receiving member B1 and the cutting member B2 are also positioned above the container A as well as the supporting member 20.

The sliding member 30 is positioned at the waiting position at a predetermined distance from the supporting member 20.

As the container A prior to punching is moved to a predetermined position, the supporting bed relatively moves downward against the container A, the supporting pole 24 mounted on the supporting member 20 is inserted into the neck 4 of the container A, and the pedestal 25 is disposed at a position being in contact with the inner layer 2.

At the same time, the cutting member B2 mounted on the sliding member 30 moves downward as well as the supporting member 20 in such a manner that the pedestal 25 and the tubulous blade 33 of the punch 32 face each other to put the inner layer 2 and the outer layer 1 of the neck 4 of the container A therebetween.

Then, the sliding member 30 is moved in the direction of X by the driving means so that the punch 32 moves until the distal end 38 of the bolt 36 comes into contact with the supporting pole 24.

At this point, the punch 32 presses the inner layer 2 of the neck 4 of the container A to the receiving face 26 of the pedestal 25 and then the tubulous blade 33 is pressed to enter into the outer layer 1 of the neck 4 of the container A so as to punch the outer layer 1,
leaving the inner layer 2 behind, thereby punching the air suction hole 11 in the outer layer 1.

[0097] Since the punching is performed during the container A has the predetermined thickness of the inner layer 2, the air suction hole can be formed only in the outer layer 1.

[0098] After the punching, the sliding member 30 moves in the direction of Y to return to the waiting position and the supporting member 20 moves upward for the next punching.

[0099] As the distance t between the tubulous blade 33 at the end of the punch 32 and the receiving face 26 is adjusted to the thickness of the inner layer 2, the air suction hole can be formed only in the outer layer 1.

[0100] Though there is a spread in the thickness of the inner layer 2 formed by blow molding, the distance t is set to the minimum thickness of the inner layer 2, thereby punching the air suction hole 11 only in the outer layer 1 even with the spread in the thickness.

[0101] In the next stage after the punching, for a pre-separation between the outer layer 1 and the inner layer 2, air is blown through the air suction hole 11 thus punched to introduce the air into a space between the inner layer 2 and the outer layer 1.

[0102] Since the layers have been separated at the periphery of the air suction hole 11 during the punching, the separation throughout the layers can be easily made only by introducing a small amount of air.

[0103] According to the punching method and the punching device described, the air suction hole 11 can be quite easily formed in the outer layer 1 of the neck 4 of the container A. Further, the air suction hole can be formed in a predetermined configuration by the tubulous blade, that is, the hole is neatly made only by the punching so that no finishing after the punching is required. In addition, the punching device can be easily structured.

[Second Embodiment]

[0104] Fig. 3 is a perspective view of a separable laminated container A according to a second embodiment, Fig. 4 is a plan view of the same, and the Fig. 5 is a cross-sectional view of a drum portion thereof.

[0105] The container A comprises a drum portion 102 having an elliptical section, a shoulder 103 continuously connected to the upper part of the drum portion 102, and a cylindrical neck 104 extending upward from the centre of the shoulder 103. The container A is made up of an outer layer 111 and an inner layer 112 overall from the neck 104 to a bottom 105 of the drum portion 102. Fig. 5 shows a state before the inner layer 112 is separated from the outer layer 111.

[0106] The neck 104 of the container A is provided with an air suction hole 114 formed in the outer layer 111. The air suction hole 114 is pierced only in the outer layer 111, not in the inner layer 112.

[0107] In the container A, a pump not shown is mounted in the neck 104 with the suction tube inserted into the container A through the neck 104 so that the content filled inside the inner layer 112 is pumped up and poured out through the pump.

[0108] According to the decrease of the content within the inner layer 112, the inner layer 112 is separated from the outer layer 111 and shrinks. Where in the inner layer 112 the separation and shrinkage are started is dependent on the thickness distribution of the inner layer 112 or the like. When the pre-separation between the outer layer 111 and the inner layer 112 was made before filling the content, the separation and the shrinkage are started from the pre-separated portion.

[0109] During the shrinkage of the inner layer 112, air is introduced between the outer layer 111 and the inner layer 112 through the air suction hole 114, thereby making the shrinkage of the inner layer 112 secure and smooth.

[0110] The container A is made as follows. First, a laminated parison or laminated preform (hereinafter, referred to as the laminated parison) having a laminated structure corresponding to the separable laminated container to be manufactured is molded by extrusion molding or the like.

[0111] Then, the laminated parison is set in the mold and molded into a desired bottle-like configuration by blow molding in such a manner as to have an air suction hole in the outer layer.

[0112] Though the air suction hole 114 may be punched in the neck 104 of the container A by the punching device as mentioned in the first embodiment, the air suction hole 114 may be formed by any other hole-forming device than the punching device as mentioned in the first embodiment or welding means.

[Third Embodiment]

[0113] Fig. 6 is a front view of a separable laminated container A according to a third embodiment wherein parts being broken away and Fig. 7 is a longitudinal section view of the same, as seen from the side.

[0114] The separable laminated container A is made up of an outer layer 201 and an inner layer 202 and comprises a drum portion 203, and a neck 204, and a bottom 205.

[0115] With reference to Fig. 8 through Fig. 13, a pre-separation device C used in the pre-separation.

[0116] The pre-separation device C comprises a first air supply member 220 for introducing pre-separating air through the air suction hole 210 and a second air supply member 230 for pressing the container A at a predetermined position and introducing air into the container A through the neck 204.

[0117] The first air supply member 220 has a cylindrical body 221 which is provided with a through hole 222 inside thereof, a nozzle 223 at the front end of the cylindrical body 221, and a mounting portion 224 at the rear end of the cylindrical body 221, wherein the mounting portion 224 is provided with an internal thread 225
into which an air supply pipe is screwed.

[0118] As shown in Fig. 10 and Fig. 11, the nozzle 223 has an opening 222a at the front end thereof and an opening 222b formed in the end face for communicating the through hole 222 and the side of the nozzle 223.

[0119] The cylindrical body 221 is provided with a cylindrical portion 226 at the rear end of the cylindrical body 221. The cylindrical portion 226 holds an engaging end 227a at an end of a piston rod 227 of a cylinder C2, so as to communicate the first air supply member 220 and the cylinder C2. In the cylindrical portion 226, a spring 228 is disposed between the cylindrical body 221 and the engaging end 227a and acts as an absorber when the nozzle 223 is inserted into the air suction hole 210.

[0120] The second air supply member 230 has a cylindrical block 231 provided with a through hole 232 wherein the through hole 232 is bent in such a manner as to have a horizontal portion and a vertical portion.

[0121] The block 231 has an engaging portion 233 formed at the lower end thereof which engages the neck 204 of the container A and presses the upper end of the container A so as to prevent the leakage of air. An opening 232a of the through hole 232 is formed in the center of the engaging portion 233.

[0122] The block 231 has a mounting portion 234 at the side thereof, the mounting portion 234 being provided with an internal thread 235 into which an air supply pipe is screwed.

[0123] The block 231 is provided with a cylindrical portion 236 on the upper face thereof. The cylindrical portion 236 holds the engaging end 237a at the end of the piston rod 237 of the cylinder C1 and connects the second air supply member 230 and the cylinder C1. In the cylindrical portion 236, a spring 238 is disposed between the block 231 and the engaging end 237a and presses the engaging portion 233 of the block 231 to the neck 204 of the container A with a constant biasing force at the lower position of the piston rod 237, as well as acting as an absorber. In Fig. 8, Fig. 9, and Fig. 12, X, Y stand for the air supply directions.

[0124] With reference to Fig. 12, the description will now be made as regard for an air supply system.

[0125] The cylinder C1 for reciprocating the second air supply member 230 up and down comprises a cylinder member and a piston P1. The end of the piston rod 237 extending from the piston P1 is connected to the second air supply member 230 through the spring 238. The cylinder member of the cylinder C1 is provided with limit switches LS3, LS4 for detecting the forward position and the backward position of the piston P1.

[0126] The cylinder C1, is connected to an isopiestic air tank (pressurized air supplier) 240 through 4-port solenoid valve V4 for operation. The air tank 240 supplies air to either one of two inlets of the cylinder C1 corresponding to ON/OFF of the solenoid valve V4.

[0127] The cylinder C2 for horizontally reciprocating the first air supply member 220 comprises a cylinder member and a piston P2. The end of the piston rod 227 extending from the piston P2 is connected to the first air supply member 220 through the spring 228. The cylinder member of the cylinder C2 is provided with limit switches LS3, LS4 for detecting the forward position and the backward position of the piston P2.

[0128] The cylinder C2 is connected to the air tank 240 through 4-port solenoid valve V3 for operation. The air tank 240 supplies air to either one of two inlets of the cylinder C2 corresponding to ON/OFF of the solenoid valve V3.

[0129] The first air supply member 220 is connected to the isopiestic air tank 240 through a pressure reducing valve 242, 2-port solenoid valve V1, a volume controller 250, and 3-port solenoid valve V2.

[0130] When the solenoid valve V1 is turned on, air depressurized to a predetermined pressure by the pressure reducing valve 242 is introduced from the air tank 240 to the volume controller 250. When the solenoid valve V1 is turned off and the solenoid valve V2 is turned on, the air introduced into the volume controller 250 is supplied to the first air supply member 220.

[0131] The second air supply member 230 is connected to the air tank 240 through a pressure reducing valve 243 and the 3-port solenoid valve V3.

[0132] When the solenoid valve V3 is turned on, air depressurized to a predetermined pressure by the pressure reducing valve 243 is introduced from the air tank 240 to the second air supply member 230.

[0133] The volume controller 250 comprises, as shown in Fig. 13, a cylinder 251, a lid 252 of the cylinder 251 a plate-like flow setting member 253, a ring-like-sealing member 254 fixed to the flow setting member 253, a positioning screw 255 screwed to an internal thread formed in the lid 252 and having an end connected to the flow setting member 253, a knob-mounting end 256, and a lock nut 257. There is a pressurized air storage 258 formed between a bottom wall of the cylinder 251 and the flow setting member 253.

[0134] As mentioned above, the air in the predetermined pressure is introduced into the pressurized air storage 258 of the volume controller 250 and a pipe line corresponding to ON/OFF of the solenoid valves V1, V2 and then introduced, as pre-separating air, between the outer layer 201 and the inner layer 202 of the container A through the first air supply member 220.

[0135] Though the volume of the pre-separating air depends on the volume of the container A, the pre-separating air between 1 cc and 3 cc may be enough. Therefore, a small volume controller may be enough as the volume controller 250.

[0136] The volume of air is controlled by turning the knob-mounting end 256 of the positioning screw 255 to control the position of the flow setting member 253. Since a separated area 215 made by the pre-separation is disposed in a small range between the neck 204 and the shoulder of the container A, it is not necessary to control the size of the separated area.
215 depending on the volume of the container A. Once the separated area 215 is set to a predetermined size, it is not necessary to change the size even with containers A of somewhat different volumes.

[0137] Hereinafter, the pre-separation device C will be described.

[0138] The pre-separation device C is provided with an electric controller (not shown) as control means for controlling the opening and closing of the respective solenoid valves \( V_1 \) through \( V_5 \). The controller includes two timers \( T_1, T_2 \) inside thereof and inputs a positional signal \( S \), for detecting that the container A carried by a conveyer is held at a predetermined position and outputs an operational signal \( S_2 \) for commanding to carry out the outer layer A when the pre-separation is completed.

[0139] With reference to the timing chart of Fig. 14, the operation and the pre-separation method of the pre-separation device C will be described.

[0140] As a power source is turned on, the solenoid valve \( V_1 \) is also turned on so that the depressurized air is introduced into the volume controller 250 so that a fixed volume of air at a fixed pressure is stored.

[0141] As the positioning signal \( S_1 \) is then inputted, the solenoid valve \( V_1 \) is turned off, the solenoid valve \( V_4 \) is turned on, the piston \( P_1 \) of the cylinder \( C_1 \) moves down to the stroke end where the second air supply member 230 engages and presses the neck 204 of the container A and the limit switch \( LS_1 \) is turned on. The tuning-on of the limit switch \( LS_1 \) turns on the solenoid valve \( V_2 \) so as to move the piston \( P_2 \) of the cylinder \( C_2 \) forward to the stroke end where the nozzle 223 of the first air supply member 220 is inserted into the air suction hole 210 of the neck 204 so that the inner layer 202 is pressed by the distal end of the nozzle 223 and thus separated from the outer layer 201 and the limit switch \( LS_3 \) is turned on.

[0142] The turning-on of the limit switch \( LS_3 \) turns on the solenoid valve \( V_3 \) and the timer \( T_2 \), so that the air stored in the volume controller 250 is introduced between the outer layer 201 and the inner layer 202 through the openings 222a, 222b of the nozzle 223 of the first air supply member 220 so as to separate a part of the outer layer 202 to form the separated area 215. At this point, the distal end of the nozzle 223 moves forward according to the separation of the inner layer 202 around the air suction hole 210 in such a manner that the opening 222b on its side is completely communicated with the separated area 215 as shown in Fig. 9.

[0143] As the timer \( T_1 \) times out, the solenoid valve \( V_2 \) is turned off and the solenoid valve \( V_3 \) and the timer \( T_2 \) are turned on so that the air at the fixed pressure is blown into the container A from the second air supply member 230, the air previously introduced into the separated area 215 is discharged from the opening 222b on the side of the nozzle 223 through the first air supply member 220, and the end of the nozzle 223 is eventually moved backward to the outer layer 201 to completely return the inner layer 202 to the original state.

[0144] As the timer \( T_2 \) times out, the solenoid valve \( V_4 \) and the solenoid valve \( V_3 \) are turned off so as to stop the blowing of the air by the second air supply member 230, move the piston \( P_2 \) of the cylinder \( C_2 \) backward and move the first air supply member 220 backward.

[0145] When the piston \( P_2 \) of the cylinder \( C_2 \) is moved backward to the stroke end, the limit switch \( LS_2 \) is turned on and the solenoid valve \( V_4 \) is thus turned off so as to move the piston \( P_1 \) of the cylinder \( C_1 \) upward and move the second air supply member 230 upward. When the piston \( P_1 \) reaches the upper position of the stroke end, the limit switch \( LS_2 \) is turned on so as to turn on the solenoid valve \( V_4 \) and output the operational signal \( S_2 \) to carry out the container A from the position for the pre-separation.

[0146] As stated above, the container A with the air suction hole 210 is held in the position for the pre-separation, after that, the pre-separating air is introduced between the outer layer 201 and the inner layer 202 through the air suction hole 210 by the first air supply member 220, and then the air is blown into the container A through the neck 204 by the second air supply member 220 so as to discharge the pre-separating air previously introduced to return the inner layer 202 to the original state. In this manner, the pre-separation is finished.

[0147] In addition, by previously separating only a part of the inner layer 202 around the air suction hole 10 from the outer layer 201, the air is smoothly introduced between the outer layer 201 and the inner layer 202 even in the initial stage of pouring out the liquid content when the separable container is in use, thereby facilitating the separation of the inner layer 202.

[0148] Since only a part of the inner layer 202 is separated in the pre-separation, a small amount of pre-separating air is enough. In addition, it is not necessary to control the volume of the air even with separable laminated containers A of somewhat different volumes so that the operation is easy.

[0149] Though the air suction-hole 210 is formed in the neck 204 in the separable laminated container A of this embodiment, the air suction hole 210 may be formed in the drum portion 203. Though the air suction hole 210 is punched by the punching means, the air suction hole 210 may be punched by welding means.

[Fourth Embodiment]

[0150] Fig. 15 is a front view of showing a separable laminated container A according to a fourth embodiment wherein parts being broken away, Fig. 16 is a plan view of the same, and Fig. 17 is a side view of the same.

[0151] The separable laminated container A is made up of an outer layer 301 and an inner layer 302 and comprises a drum portion 303, a shoulder 304, a neck 305, and a bottom 313.

[0152] The outer layer 301 is made of high-density polyethylene to keep the profile of the container A.

[0153] The inner layer 302 is an inner bag which is separable from the outer layer and deformable and is
made of flexible resin such as nylon or EVOH (ethylene-acetic acid vinyl copolymer emulsion).

[0154] It should be understood that the materials of the outer layer 301 and the inner layer 302 are not limited to the resin of this embodiment so that the materials may be any resin having the aforementioned characteristics.

[0155] The outer layer 301 and the inner layer 302 of the container A are made by blow molding of a laminated parison which is formed by co-extrusion.

[0156] The neck 305 is provided with an air suction hole 306 punched in the outer layer 301. The air suction hole 306 is a hole for introducing the atmospheric air into a space between the outer layer 301 and the inner layer 302 in order to smoothly achieve the separation of the inner layer 302 with keeping the profile of the container A to completely pour out the liquid content. The air suction hole 306 may be punched by using the punching device described in the aforementioned first embodiment.

[0157] The neck 305 is provided with an engaging portion 307 formed at an upper end of inner layer 202 by a mandrel of an air blowing device during the blow molding, thereby preventing the dip of the inner layer 302.

[0158] The inner layer 302 has an expanded portion 309 separated from the outer layer 301 and projecting inwardly which is formed close to the air suction hole 306 by air blown for a pre-separation so that, next to the extended portion 309, there is a space 308 formed between the outer layer 301 and the inner layer 302.

[0159] As for the pre-separation, the pre-separation is made before filling the liquid content into the container A.

[0160] The pre-separation is made by using a pre-separation device 310 as shown in Fig. 18. As shown in Fig. 19, the pre-separation device 310 is provided with a through hole 311 inside thereof and a nozzle 312 at the front end thereof.

[0161] The nozzle 312 is provided with an opening 311 a at the front end thereof and an opening 311 b communicating with the side of the nozzle 312 wherein air is blown downward from the opening 311 b.

[0162] In the pre-separation, the nozzle 312 of the pre-separation device 310 is inserted into the air suction hole 306 of the neck 305 and a fixed amount of pre-separating air is blown so that the separation of the inner layer 302 starts from a portion around the neck 305 and then travels to the shoulder 304 and an upper portion of the drum portion 303 until a portion of the inner layer 302 separated from the outer layer 301 is formed by blowing such an amount of air as to extend the separated inner layer 302a at least to the inside of the neck 305.

[0163] In the pre-separation, the extended portion 309 is formed by blowing such an amount of air as to extend the separated inner layer 302a to at least the inside of the neck 305.

[0164] After the inner layer is separated from the outer layer, while the separated inner layer is returned to the original state to come in contact with the outer layer by blowing air into the container A through the neck to discharge the pre-separating air in the third embodiment mentioned above, the extended portion 309 of the separated inner layer 302a is held in this state in this fourth embodiment.

[0165] After the pre-separation, it is checked whether the pre-separation was securely made or not by observing the extended portion 309 from an upper position over the neck 305 with a telecamera or the like. Then, the container A is carried out.

[0166] The description will now be made as regard to the filling of the liquid content into the container A.

[0167] The upper space in the container A filled with the liquid content is generally dependent on the volume of the container A and the amount of the filled liquid content. When a fixed amount of liquid content is filled into the container A having such an extended portion 309 as this embodiment, however, the upper space after filling is reduced according to the size of the extended portion 309 so that the level La of the liquid content at this point is risen by the volume excluded by the extended portion 309 as compared with the level Lb in case of no extended portion 309 as shown in Fig. 18.

[0168] Since the hydraulic pressure at the extended portion 309 is quite small and the inner layer 302 has somewhat form-retentivity even when the inner layer is flexible, little amount of pre-separating air is discharged even after filling the liquid content so that the form of the extended portion 309 is substantially kept even after filling the liquid content.

[0169] When a cap is fitted to the neck 305, the level La is kept constant because no air is entered into the container A so that no pre-separating air is discharged.

[0170] According to this embodiment, the upper space in the container A and the level of the liquid content after filling the liquid content can be controlled by the size of the extended portion 309 or the volume of the space 308. Therefore, the level of the liquid content can be easily risen to near the neck 305 even with the same amount of liquid content by controlling the volume of the pre-separating air.

[0171] The same is true for the container A with large volume. Conventionally, in case of the container A with large volume, the level of the liquid content is lowered below the neck 305 or to the lower portion of the shoulder and near the upper end of the drum portion 303 so as to make the upper space after filling the liquid content wider so that the water face of the liquid content waves, thereby bubbling the liquid content during the container is transported. In case of the container A with the extended portion 309 of this embodiment, however, the level of the liquid content can be risen to the neck 305 by setting the extended portion 309 to a predetermined size, thereby decreasing the waves of the water face of the liquid content and the swing of the liquid content during the container A is transported.
[0172] In addition, as the upper space after filling the liquid content is small, this gives a consumer the impression of fulfillment when the consumer has the container A in his/her hand.

[0173] Further, the step for blowing air into the container A in order to discharge the pre-separating air is not necessary in the pre-separation process, thereby facilitating the manufacturing process.

[0174] Furthermore, the inner layer 302 and the outer layer 301 are not connected by blowing the air into the container A, thereby improving the separability of the inner layer 302 when the container A is in use.

[0175] Moreover, the state of the pre-separation can be inspected just by observing the inside of the container A from the upper side of the neck 305 of the container A.

[Fifth Embodiment]

[0176] Fig. 20 is a front view showing a container with a pump according to a fifth embodiment wherein parts being broken away. The container with a pump comprises a container body (separable laminated container) D made up of an outer layer 401 and an inner layer 402, and a pump E fitted to the container body D.

[0177] First, the container body D will be described. As shown in Fig. 23 and Fig. 24, the container body D comprises a drum portion 403, a shoulder 404, a neck 405, and a bottom 413.

[0178] The outer layer 401 is made of high-density polyethylene to keep the profile of the container body D.

[0179] The inner layer 402 is an inner bag which is separable from the outer layer 401 and deformable and is made of flexible resin such as nylon or EVOH (ethylene-acetic acid vinyl copolymer emulsion).

[0180] It should be understood that the materials of the outer layer 401 and the inner layer 402 are not limited to the resin of this embodiment so that the materials may be any resin having the aforementioned characteristics.

[0181] The outer layer 401 and the inner layer 402 of the container body D are made by blow molding of a laminated parison which is formed by co-extrusion.

[0182] The neck 405 is provided with an air suction hole 406 punched in the outer layer 401. The air suction hole 406 is a hole for introducing the atmospheric air into a space between the outer layer 401 and the inner layer 402 in order to smoothly achieve the separation of the inner layer 402 with keeping the profile of the container body D to completely pour out the liquid content. The air suction hole 406 may be punched by using the punching device described in the first embodiment.

[0183] The neck 405 is provided with an engaging portion 407 formed at an upper end of inner layer 402 by a mandrel of an air blowing device during the blow molding, thereby preventing the dip of the inner layer 402.

[0184] The inner layer 402 has an expanded portion 409 separated from the outer layer 401 and projecting inwardly which is formed close to the air suction hole 406 by air blown for a pre-separation so that, next to the extended portion 409, there is a space 408 formed between the outer layer 401 and the inner layer 402.

[0185] As for the pre-separation, the pre-separation is made before filling the liquid content into the container body D.

[0186] The pre-separation is made by using a pre-separation device 410 as shown in Fig. 21. As shown in Fig. 22, the pre-separation device 410 is provided with a through hole 411 inside thereof and a nozzle 412 at the front end thereof.

[0187] The nozzle 412 is provided with an opening 411a at the front end thereof and an opening 411b communicating with the side of the nozzle 412 wherein air is blown downward from the opening 411b.

[0188] In the pre-separation, the nozzle 412 of the pre-separation device 410 is inserted into the air suction hole 406 of the neck 405 and a fixed amount of pre-separating air is blown so that the separation of the inner layer 402 starts from a portion around the neck 405 and then travels to the shoulder 404 and an upper portion of the drum portion 403 until a portion of the inner layer 402 surrounded by the line 402b as shown in Fig. 23 and Fig. 24 is separated from the outer layer 401, thereby forming the extended portion 409.

[0189] The pre-separation device 410 is connected to an air supplying device with a volume controller which facilitates the control of the amount of the supplied pre-separating air in a fixed range.

[0190] In this embodiment, the neck 405 is provided with the air suction hole 406 punched in the outer layer 401 so that the air suction hole 406 is covered by a cap 420 of the pump E when the pump E is fitted to the container body D. However, the air suction hole 406 may be formed in an upper end of the shoulder 404, or any suitable portion of the shoulder 404 or drum portion 403.

[0191] After the inner layer is separated from the outer layer, while the separated inner layer is returned to the original state to come in contact with the outer layer by blowing air into the container body D through the neck to discharge the pre-separating air in the third embodiment mentioned above, the extended portion 409 of the separated inner layer 402a is held in this state in this fifth embodiment.

[0192] When a fixed amount of liquid content is filled into the container body D, the upper space after filling is reduced according to the size of the extended portion 409 so that the level Lb of the liquid content at this point is risen by the volume excluded by the extended portion 409 as compared with the level La in case of no extended portion 409 as shown in Fig. 21.

[0193] Since the hydraulic pressure at the extended portion 409 is quite small and the inner layer 402 has somewhat form-retentivity even when the inner layer is flexible, little amount of the pre-separating air is discharged even after filling the liquid content so that the
The pump E is fitted to the container body D filled with the liquid content as mentioned above. The description will be first made as regard to the pump E with reference of Fig. 20 and Fig. 26.

The pump E comprises the cap 420, a cylinder 421 provided with a piston and a valve mechanism inside thereof, and an operational member 422 for the piston.

The cylinder 421 is provided with a lid 423, having a through hole into which a piston rod is inserted, at the upper end thereof and a mounting flange 424 around an upper portion thereof.

The cylinder 421 is provided with a flange-like seal 425 extended outwardly at the lower end thereof. The seal 425 comes in contact with the inner circumference 405a of the neck 405 of the container body D tightly during fitting the pump E in order to keep the airtightness with the neck 405.

The cylinder 421 is provided with a valve seat cylinder 426, a suction pipe 427 extending downward from the valve seat cylinder 426. The operational member 422 is provided with a discharge pipe 428 extending therefrom for discharging the liquid content.

Since the internal structure of the pump E is well known in the art, the detailed description with reference to the drawings will be omitted. The piston reciprocates up and down by pushing operation of the operational member 422 and the restoring force of a compressed spring disposed in the cylinder 421 so as to discharge a fixed amount of liquid content according to the operation of the operational member 422.

The piston is held at the lowest position and a valve member disposed in the bottom of the cylinder 421 is fixed to the closed position by rotating the operational member 422 at the lower position to engage the lid 423, thereby preventing the flow of the liquid content between the suction pipe 427 and cylinder 421 for fitting the pump E or when the container is not in use.

The pump E is fitted in the same manner as that of a common container with a pump. The cap 420 is fitted to the neck 405 in such a manner as to dispose the mounting flange 424 of the cylinder 421 and a packing 430 between the cap 420 and the neck 405.

Hereinafter, the function of the seal 425 when the pump E is mounted and the level of the liquid content will be described with reference to Fig. 25 and Fig. 26.

Fig. 25 shows a state where the suction pipe 427 and the valve seat cylinder 426 are inserted into the container body D and the seal 425 of the cylinder 421 is in contact with the upper inner edge 405b of the neck 405 to compress the upper edge 405b so that the container body D is sealed. Fig. 26 shows a state where the installation of the pump E is completed.

In the sealed state as shown in Fig. 25, the upper space in the container body D is reduced by the volume of pumping member (the valve seat cylinder 426 and the suction pipe 427) inserted into the container body D as compared with the same before the insertion of the pump and the level L1 is slightly higher than the level La (see Fig. 21) before the insertion by the volume of the suction pipe 427.

As the pump E is pushed downward from the state as shown in Fig. 25, the seal 425 moves downward along the inner circumference 405a of the neck 405 so as to discharge the pre-separating air in the space 408 and make the level lower until reaching a position corresponding to the air suction hole 406.

Once the seal 425 reaches the position corresponding to the air suction hole 406, the air suction hole 406 is stopped up by the inner layer 402 so as to stop the discharge of the pre-separating air.

After that, the pre-separating air does not discharged and the air in the container body D is just compressed until the seal 425 reaches a lower inner edge 405c of the neck 405.

As the seal 425 moves downward apart from the lower edge 405c, the airtightness of the container body D is released and the compressed air in the container body D is discharged through a space between the cylinder 421 and the neck 405.

When the air suction hole 406 is formed in any other place than the neck 405, the pre-separating air in the space 8 is discharged according to the descent of the pump E until the seal 425 reaches the lower edge 405c. As the seal 425 moves downward apart from the lower edge 405c, the airtightness of the container body D is released and the discharge of the pre-separating air is stopped.

As the pump E is further pushed downward after the seal 425 reaches the lower edge 405c of the neck 405, the level of the liquid content is risen by the volume of the cylinder 421 submerged into the liquid content and becomes the level L2 when the cap 420 is fitted to the neck 405.

Since the container body D is tightly sealed after the installation of the pump, the pre-separating air is no longer discharged and the upper space in the container body D and the level of the liquid content are kept constant.

The description will now be made as regard to the relation between the upper space in the container body D and the volume of pre-separating air.

Assuming that Qa is the initial volume of the pre-separating air filled into the space 408 during the pre-separation before the installation of the pump,

Qb is the volume of the air discharged from the space 408 during the installation of the pump, and

Qc is the volume of residual air remaining in the space 408 after the installation of the pump, the following expression holds for the volume of the pre-separating air:

\[ V = Q_a - Q_b - Q_c \]
The initial volume $Q_a$ can be controlled by the volume controller of the air supplying device connected to the pre-separation device 410.

The discharged volume $Q_b$ is found form the configuration and the dimensions of the container body $D$.

The air in the container body $D$, which is sealed during the installation of the pump, is compressed according to the elevation of the cylinder 421. When the air suction hole 406 is not stopped up, the air in the container body $D$ has a pressure equal to the atmospheric pressure because of the deformation of the inner layer 402. Therefore, the compression of the air in this case is negligible.

The discharged volume $Q_b$ is given by the following expression:

$$Q_b = \pi r^2 h$$

where $r$ is the radius of the inner circumference 405a of the neck 405, and $h$ is the height from the upper edge 405b of the neck 405 to the air suction hole 406.

When the air suction hole 406 is formed in any other place than the neck 405, the discharged volume $Q_b$ is given by the following expression:

$$Q_b = \pi r^2 ha$$

where $r$ is the radius of the inner circumference 405a of the neck 405, and $ha$ is the height from the upper edge 405b to the lower edge 405c of the neck 405.

At this point, the radius $r$, the height $h$, $ha$ are fixed values defined from the design of the container body $D$ so that the discharge amount $Q_b$ is a constant value.

The residual volume $Q_c$ of the residual air in the space 408 is found from a difference between the initial volume $Q_a$ and the discharged volume $Q_b$ ($Q_c=Q_a - Q_b$). Since the $Q_b$ is a constant value, the residual volume $Q_c$ can be freely set by controlling the initial volume $Q_a$.

The description will now be made as regard to the upper space in the container body $D$ after the installation of the pump.

Though it is possible to quantitatively analyze the variation in the upper space and the level of the liquid content, the analyses are complex and the detailed analyses are not necessary. Therefore, the action and effect of this embodiment with regard to the upper space after the installation of the pump will be apparent from comparison between the container of this embodiment and the conventional container.

The volume of the upper space after the installation of the pump is found by subtracting the volume of the filled liquid content and the volume of the pumping member (the cylinder 421, the valve seat cylinder 426, and the suction pipe 427) which are inserted into the container body $D$ from the volume of the container body $D$.

Letting the volume of the container body without the extended portion 409 or the container body in which the inner layer is returned to the original state is $V_0$, the volume $V$ of the upper space of this embodiment is reduced by the residual volume $Q_c$ of the pre-separating air in the space 408 because of the extended portion 409 because the volume of the liquid content and the volume of the pumping member inserted into the container body $D$ are the same as those of the conventional container.

Therefore, the volume $V$ of the upper space of this embodiment is found by the following expression:

$$V = V_0 - Q_c$$

In the above expression, since $V_0$ is a constant value and $Q_b$ is also a constant value, it is found that the volume $V$ of the upper space is variable corresponding to the initial value $Q_a$.

When the volume $V$ of the upper space becomes negative, it means that the content overflows from the neck 405. Therefore, it should be understood that $Q_a$ should be set in such a manner as to holding $V > 0$.

The air is just compressed from a point in time when the volume of the air discharged from the space 408 becomes equal to the initial volume $Q_a$ while the cylinder 421 descends, to a point in time when the seal 425 reaches the lower edge 405c of the inner surface of the neck 405. Therefore, to set $Q_a < Q_b$, the volume of the upper space during inserting the pump should be larger than a value found by subtracting the initial volume $Q_a$ from the volume of the neck because the liquid content is incompressible.

The action and effect of this embodiment will be described hereinafter.

Since, as described above, the initial volume $Q_a$ is controllable by the volume controller of the air supplying device, the volume of the upper space after the pump E is installed and the level of the liquid content

$$Q_a = Q_b + Q_c.$$
can be easily controlled by controlling $Q_a$.

When the initial volume $Q_a$ is set to be equal to the discharged volume $Q_b$, the pre-separating air within the space $408$ is completely discharged and the separated portion $402a$ of the inner layer $402$ is returned to the original state so as to bring the separated portion $402a$ of the inner layer $402$ in contact with the outer layer.

Therefore, in this case, the inner layer $402$ can be returned to the original state during the installation of the pump without blowing air into the container body $D$ through the neck $405$ in the pre-separation process after the pre-separating air is introduced between the outer layer $401$ and the inner layer $402$.

As the initial volume $Q_a$ increases, the residual volume $Q_{c}$ of the air remaining in the space $408$ increases, and the upper space reduces and the level of the liquid content rises as compared with a case where the separated portion $402a$ of the inner layer $402$ is returned in the original state.

By setting the initial volume $Q_a$ into a predetermined value, the level can be positioned in the neck $405$ when the volume $V$ of the upper space is set to be equal to or less than the value found by subtracting the volume of the cylinder $421$ of the pump $E$ inserted in the neck $405$ from the volume of the neck $405$.

Therefore, even with the container with a pump of which the volume of the container body $D$ is large so that the upper space is large and the level of the liquid content is lowered to the lower portion of the shoulder $404$, the level of the liquid content can be easily risen to the neck $405$ after the installation of the pump, thereby decreasing the waves of the water face of the liquid content and the swing of the liquid content during the container body $D$ is transported and thus preventing the bubbling and the generation of gases.

[Sixth Embodiment]

With reference to Fig. 27 through Fig. 29, a container with a pump according to a sixth embodiment will be described.

The difference between the container with a pump of the sixth embodiment and that of the fifth embodiment is that a seal is formed in an inner lid $F$ fitted to the neck $405$ of the container body $D$ instead of providing the seal $425$ formed in the lower end of the peripheral of the cylinder $421$ of the pump $E$.

The inner lid $F$ is made of synthetic resin and comprises a cylindrical portion $432$ provided with a flange $431$ at the upper edge thereof and a ring-like seal $433$ disposed on the lower end of the cylindrical portion $432$ and projecting inward.

The seal $433$ has a contact surface $434$ around the inner circumference thereof which comes in contact with the outer surface of the cylinder $421$ to compress the outer surface in such a manner as to seal the container body $D$ during the installation of the pump.

The pump $E$ is installed by fitting the inner lid $F$ to the neck $405$ and then inserting the cylinder $421$ of the pump $E$ into the inner lid $F$.

As the lower end of the cylinder $421$ is in contact with the seal $433$, the inside of the container body $D$ is sealed. As the pump $E$ is further pushed down, the pre-separating air within the space $408$ is discharged through the air suction hole $406$ corresponding to the volume of the cylinder $421$ inserted through the seal $433$.

Since the inside of the container body $D$ is in the sealed state, the level of the liquid content is lowered corresponding to the descent of the pump $E$ so that the level becomes $L_2$ from $L_1$. Once the cylinder $421$ reaches the level, the volume of the cylinder $421$ submerged into the liquid content is replaced by the volume of air discharged from the space $408$ so that the level does not change.

The pump $E$ is installed to the container body $D$ by pushing down the cylinder $421$ to the lowest position and then fitting the cap $420$ to the neck $405$.

Since the container body $D$ is tightly sealed after the installation of the pump, the air within the space $408$ is no longer discharged and the upper space in the container body $D$ and the level of the liquid content are kept constant.

The description will now be made as regard to the relation between the upper space in the container body $D$ and the volume of pre-separating air.

Assuming that $Q_a$ is the initial volume of the pre-separating air filled into the space $408$ during the pre-separation before the installation of the pump,

$Q_b$ is the volume of the air discharged from the space $408$ during the installation of the pump,

$Q_{c}$ is the volume of residual air remaining in the space $408$ after the installation of the pump,

$V_o$ is the volume of the upper space in the container body $D$ after the installation of the pump in case of the container body $D$ without the extended portion $409$.

$V$ is the volume of the upper space in the container body $D$ after the installation of the pump in case of the container body $D$ with the extended portion $409$ of this embodiment (the upper space in case of the sixth embodiment indicates a space under the seal $433$ of the inner lid $F$),

$s$ is the length between the seal $433$ and the lower end of the cylinder $421$ when the pump $E$ is fitted to the container body $D$, and

$r_c$ is the radius of the cylinder $421$,

the following expression holds for the volume of the discharged air:

$Q_b = \pi r_c^2 s$

when the compression of the air within the container body $D$ is neglected.
The discharged volume \( Q_b \) is a constant value because it is found from the dimensions of the pumping member (the cylinder 421).

As well as the case of the fifth embodiment, the following expression holds with regard to the relation between the volumes \( V, V_0 \):

\[
V = V_0 - Q_c = V_0 - (Q_a - Q_b).
\]

In the above expression, since \( V_0 \) is a constant value and \( Q_b \) is also a constant value, it is found that the volume \( V \) of the upper space in case of this embodiment having the extended portion 409 is variable corresponding to the initial value \( Q_a \).

Therefore, the sixth embodiment has also the same effects as the fifth embodiment by controlling the initial value \( Q_a \).

In addition, since the inner lid \( F \) is fitted into the neck 405 in the sixth embodiment, the upper space can be further reduced than the fifth embodiment.

As mentioned above, during pushing down the pump \( E \) for installing the pump, while the level of the liquid content is lowered from the point where the lower end of the cylinder 421 comes in contact with the ring-like seal 433 to the point where the cylinder 421 reaches the level, the level does not change after that.

When the liquid content is filled close to the neck 405, the upper space can be further reduced than the fifth embodiment.

Since the air within the space 408 is discharged by installing the pump \( E \) to the container body \( D \), the step for blowing air into the container \( A \) in order to discharge the pre-separating air is not necessary in the pre-separation process, thereby facilitating the manufacturing process.

Moreover, the state of the pre-separation can be inspected just by observing the inside of the container body \( D \) from the upper side of the neck 305 of the container \( A \).

In addition, as the upper space in the upper space is small so that the liquid content does not splash when the consumer has the container \( A \) in his/her hand, this gives a consumer the impression of fulfillment, thereby improving the value as a commercial product.

With reference to Fig. 30 and Fig. 31, a container with a pump according to a seventh embodiment will be described.

In the container with a pump of the sixth embodiment, as mentioned above, the level of the liquid content rises according to the descent of the cylinder 421 after \( Q_a = Q_b \) and the air within the container body \( D \) is compressed when the initial volume \( Q_a \) is set to be smaller than the discharged volume \( Q_b \) (\( Q_a < Q_b \)).

In the container with a pump of the fifth embodiment, since the sealed state of the container body is released when the seal 425 of the cylinder 421 is lowered below the lower edge 405 of the neck 405, the compressed air is discharged into the atmosphere so that there is no problem.

On the other hand, in case of the sixth embodiment, since the seal 434 of the inner lid \( F \) is in contact with the outer surface of the cylinder 421 to compress the outer surface and the sealed state is kept to the end, the air within the container body \( D \) is compressed so that there is a problem of rise in the inner pressure of the container body \( D \).

To overcome this problem, it is needed, of course, to control of the initial volume \( Q_a \) not to make the upper space negative and, additionally, to provide means for allowing the releases of the compressed air.

The seventh embodiment is a container with a pump provided with such a compressed air releasing means.

Conventionally, as shown in Fig. 32, there is a pump which is provided with narrow grooves 421a through which air flows formed in the outer surface of the cylinder 421 in order to completely pour out the liquid content. However, the upper ends of the grooves 421a of the conventional container does not reach the seal 433 of the inner lid \( F \).

In the container with a pump of the seventh embodiment, as shown in Fig. 31, the cylinder 421 between the lower edge thereof and at least to a position where the grooves reach the seal 433. The grooves constitute the compressed air releasing means.

The contact surface 434 of the ring-like seal 433 of the inner lid \( F \) is compressing the outer surface of the grooves 421a, thereby allowing the flow of air between the cylinder 421 and the seal 433 and preventing the flow of the liquid content therebetween because of its viscosity.

Therefore, when the air within the container body \( D \) is compressed after \( Q_a \leq Q_b \), the compressed air is discharged through the grooves 421a, thereby preventing the rise in the inner pressure of the container body \( D \).

Though the compressed air releasing means is made up of the narrow grooves 421a formed in the outer surface of the cylinder 421 in this embodiment, the compressed air releasing means may be made up of the roughed surface made by blasting the outer surface of the cylinder 421.
قويم من جاذبية للماء في الحاوية مع مضخة E. الرسالة المضخة المعمول بها كمضخة في الحاوية، المضخة المختصة في تدفق المحتوى. على الرغم من أن مضخة عمومًا تستخدم ، فإن مضخة Qb (Qa \geq Qb).

[0270] في هذه الحالة، هناك ميزة في استخدام مضخة متصلة

[Ninth Embodiment]

[0271] بالنسبة لـ Fig. 34 عبر Fig. 37، حاوية مع مضخة حسب ت عرف من المجموعة الحادية عشر لم تم وصف.

[0272] الحاوية السميكة هي أيضاً الحاوية ذات مضخة واحدة من مضخة المجموعة الحادية عشر.

[0273] كما هو الحال في Fig. 36، الحافة F المستخدمة كمضخة في الحاوية ذات المجموعة الحادية عشر تتألف من ك طبقة غطاء 431، بقعة قطرية 432، ونطاق حلقي 435 في الاتجاه الأفقي، وفجعًا من الاتجاه الأساسية 432، حيث تأتي الحافة 435 في الاتصال مع السطح الخارجي من مضخة E.

[0274] الحافة F السميكة مصنوعة من مواد البلاستيك. عندما يكون الضغط الداخلي للحوامل D، فإن الحافة 435 تتأرجح ونهاية 435a تتماشى بهما بناءً على المساحة بين الحافة 435 والمضخة D. ونهاية 435a ومضخة E.

[0275] لذلك، فإن الهواء داخل الحاوية D يتآكل لأنه التراكم Qa هو أقل من التراكم Qb (Qa < Qb)، الذي يتم إطلاقه داخل المساحة.

[0276] في المجموعة الحادية عشر، حيث أن العلامة يعوض عن الهواء في المساحة، هو مزيج بسيط وعابر للضغط.

[0277] في هذه الحالة، حيث يغمر مستوى المحتوى ينشط الجدار 435 على السطح، فإن مستوى المحتوى يرتفع عند المخزن Qb (Qa \geq Qb).

[0278] تم استخدام مضخة متصلة للحالة المتصلة في المجموعة الحادية عشر، يتم استخدامها كحالة متصلة في الحاوية المتصلة في المجموعة الحادية عشر وعاء يمكن أن يستخدم كحالة متصلة في الحاوية المتصلة في المجموعة الحادية عشر وعاء يمكن أن يستخدم كحالة متصلة في الحاوية المتصلة في المجموعة الحادية عشر.

[0279] على الرغم من أن مضخة عمومًا تستخدم، فإن مضخة E في الحاوية مع مضخة Qb (Qa \geq Qb).

1. حاوية متصلة (A) تتكون من:

(a) طبقة خارجية (1) مصنوعة من البوليستر، وله منفعة نفخ(11)، و
(b) طبقة داخلية (2) مصنوعة من البوليستر، ومحالفة في الطرق من داخل طبقة خارجية، وعاء معطر للطبيعة في حالة أنه عاء。

2. حاوية متصلة كما ذكرت في كل الالوان، وهي تشمل على سبيل المثال عاء (4)، حيث تكون طبقة نفخ (11) وهو موجود في عاء خارجي معتدل بواسطة رذاذ (B) من الخارج من طبقة خارجية، وتفريغ العاء.

3. حاوية متصلة كما ذكرت في كل الالوان، وهي تشمل على سبيل المثال عاء (4)، حيث تكون طبقة نفخ (11) وهو موجود في عاء خارجي معتدل بواسطة رذاذ (B) من الخارج من طبقة خارجية، وتفريغ العاء.

4. حاوية متصلة كما ذكرت في كل الالوان، وهي تشمل على سبيل المثال عاء (4)، حيث تكون طبقة نفخ (11) وهو موجود في عاء خارجي معتدل بواسطة رذاذ (B) من الخارج من طبقة خارجية، وتفريغ العاء.

5. حاوية متصلة كما ذكرت في كل الالوان، وهي تشمل على سبيل المثال عاء (4)، حيث تكون طبقة نفخ (11) وهو موجود في عاء خارجي معتدل بواسطة رذاذ (B) من الخارج من طبقة خارجية، وتفريغ العاء.

[0280] المخططة المتصلة في المجموعة الحادية عشر تسمح للطبقة الداخلياً يتم تثبيتها في مكان آمن والعاء يمكن أن يستخدم كحالة متصلة في الحاوية المتصلة في المجموعة الحادية عشر وعاء يمكن أن يستخدم كحالة متصلة في الحاوية المتصلة في المجموعة الحادية عشر.

Industrial Applicability

Claims
(a) a pump (E) comprising a cylinder (421) inserted into the container body (D) through a neck (405) of said container body and a cap (420) whereby the pump is hermetically fitted to said neck; and
(b) an inner lid (F) having a ring-like seal (433) coming in contact with the outer surface of the cylinder (421) of said pump tightly, and fitted in the neck (405) of said container body.

6. A separable laminated container as claimed in claim 5, wherein said cylinder has a narrow grooves (421a) or a roughened surface on the outer surface thereof extending from the lower edge thereof to a position above the seal (433) of the inner lid after installation of the pump.

7. A separable laminated container as claimed in claim 5, wherein said seal of said inner lid has a narrow groove (434a) or a roughened surface formed in a sealing surface (434) thereof.

8. A separable laminated container as claimed in claim 5, wherein said seal (435) of said inner lid protrudes inward and upward in such a manner as to elastically expand and contract in the radial direction.

Patentansprüche

1. Trennbarer laminierter Behälter (A) mit:

(a) einer äußeren Schicht (1), die aus synthetischem Harz gefertigt ist und eine Luftansaugöffnung (11) aufweist; sowie
(b) einer inneren Schicht (2), die aus synthetischem Harz gefertigt ist und auf der Innenseite der äußeren Schicht separierbar laminiert ist, dadurch gekennzeichnet, dass die innere Schicht einen Abschnitt aufweist, der vorhergehend nur um die Luftansaugöffnung herum von der äußeren Schicht getrennt ist.

2. Trennbarer laminierter Behälter nach Anspruch 1, der des Weiteren einen Hals (4) aufweist, wobei der Hals mit der Luftansaugöffnung (11) versehen ist, die in der äußeren Schicht durch Treiben eines Stanzwerkzeuges (B) von der Außenseite der äußeren Schicht und Ausstanz der äußeren Schicht gebildet wird, wobei die innere Schicht zurückgelassen wird.

3. Trennbarer laminierter Behälter nach Anspruch 1, der des Weiteren einen Hals (305) aufweist, wobei der Hals mit der in der äußeren Schicht gebildeten Luftansaugöffnung (306) versehen ist, und wobei die innere Schicht (302) einen sich erstreckenden Bereich (309) aufweist, der sich in Richtung des Inneren des Halses zu dem vorhergehend von der äußeren Schicht (301) getrennten Teil (302a) erstreckt.

4. Trennbarer laminierter Behälter nach Anspruch 1, der des Weiteren eine Pumpe (E) mit einem Zylinder (421) aufweist, der in den Behälterkörper (D) durch einen Hals (405) des Behälterkörpers eingesetzt ist, und wobei eine Kappe (420) vorgesehen ist, wodurch die Pumpe luftdicht an dem Hals angesetzt ist, wobei der Zylinder um seinen äußeren Umfang herum mit einer Flansch ähnlichen Dichtung (425) versehen ist, wobei die Flansch ähnliche Dichtung dicht in Kontakt mit der inneren Oberfläche (405a) des Halses kommt.

5. Trennbarer laminierter Behälter nach Anspruch 1, des Weiteren mit

(a) einer Pumpe (E) mit einem Zylinder (421), der in den Behälterkörper (D) durch einen Hals (405) des Behälterkörpers eingesetzt ist, und einer Kappe (420), wodurch die Pumpe luftdicht in den Hals eingepasst ist; sowie
(b) einem inneren Deckel (F), der eine ringförmige Dichtung (433) aufweist, wobei die Dichtung dicht in Kontakt mit der äußeren Oberfläche des Zylinders (421) der Pumpe kommt, und in den Hals (405) des Behälterkörpers eingespannt ist.

6. Trennbarer laminierter Behälter nach Anspruch 5, wobei der Zylinder eine schmale Nut (421a) oder eine aufgeraute Oberfläche auf seiner äußeren Oberfläche aufweist, die sich nach der Installation der Pumpe von einer unteren Kante desselben bis zu einer Position oberhalb der Dichtung (433) des inneren Deckels erstreckt.

7. Trennbarer laminierter Behälter nach Anspruch 5, wobei die Dichtung des inneren Deckels eine schmale Nut (434a) oder eine aufgeraute Oberfläche aufweist, die in einer dichtenden Oberfläche (434) des inneren Deckels gebildet ist.

8. Trennbarer laminierter Behälter nach Anspruch 5, wobei die Dichtung (435) des inneren Deckels so nach innen und nach oben ragt, dass sie sich in radialer Richtung elastisch ausdehnt und zusammenzieht.

Revendications

1. Récipient (A) à couches séparables comprenant :

(a) une couche externe (1) en résine synthétique.
que ayant un orifice d'aspiration d'air (11) ; et
(b) une couche interne (2) en résine synthétique laminée en couches séparables sur la face intérieure de ladite couche externe, caractérisé en ce que ladite couche interne comporte une partie séparée au préalable de ladite couche externe juste autour dudit orifice d'aspiration d'air.

2. Récipient à couches séparables selon la revendication 1, comprenant en outre un col (4), dans lequel ledit col est doté de l'orifice d'aspiration d'air (11) formé dans ladite couche externe en faisant pénétrer un poinçon (B) par l'extérieur de la couche externe et en poinçonnant la couche externe, en ne touchant pas à la couche interne.

3. Récipient à couches séparables selon la revendication 1, comprenant en outre un col (305), dans lequel ledit col est doté de l'orifice d'aspiration d'air (306) formé dans ladite couche externe, et dans lequel ladite couche interne (302) a une partie (309) qui s'étend vers l'intérieur dudit col à la partie (302a) préalablement séparée de ladite couche externe (301).

4. Récipient à couches séparables selon la revendication 1, comprenant en outre une pompe (E) comprenant un cylindre (421) inséré dans le corps (D) du récipient via un col (405) dudit corps du récipient et un bouchon (420) grâce auquel la pompe est hermétiquement montée sur ledit col, dans lequel le cylindre est doté d'un joint (425) en forme de bride autour de la périphérie extérieure de celui-ci, le joint en forme de bride venant en contact étroit avec la surface interne (405a) dudit col (405).

5. Récipient à couches séparables selon la revendication 1, comprenant en outre

(a) une pompe (E) comprenant un cylindre (421) inséré dans le corps (D) du récipient via un col (405) dudit corps du récipient et un bouchon (420) grâce auquel la pompe est hermétiquement montée sur ledit col ; et
(b) un couvercle intérieur (F) ayant un joint (433) en forme d'anneau venant en contact étroit avec la surface externe du cylindre (421) de ladite pompe et mis en place dans le col (405) dudit corps du récipient.

6. Récipient à couches séparables selon la revendication 5, dans lequel ledit cylindre a des gorges rapprochées (421a) ou une surface rugosifiée sur la surface externe de celui-ci, s'étendant du bord inférieur de celui-ci jusqu'à un point au dessus du joint (433) du couvercle intérieur après installation de la pompe.

7. Récipient à couches séparables selon la revendication 5, dans lequel ledit joint dudit couvercle intérieur a des gorges rapprochées (434a) ou une surface rugosifiée formées dans une surface d'étanchéité (434) de celui-ci.

8. Récipient à couches séparables selon la revendication 5, dans lequel ledit joint (435) dudit couvercle intérieur dépasse vers l'intérieur et vers le haut de telle manière qu'il s'étend et se contracte élastiquement dans la direction radiale.
FIG. 3