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(54) **METHOD OF FILLING A PACKAGING CONTAINER**

VERFAHREN ZUM FÜLLEN EINES VERPACKUNGSBEHÄLTERS

PROCEDE DE REMPLISSAGE D'UN RECIPIENT D'EMBALLAGE

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- **PATENT ABSTRACTS OF JAPAN vol. 13, no. 274 (M-841) [3622], 23 June 1989 & JP 01 070306 A (NIKKO NYUGYO), 15 March 1989**
- **PATENT ABSTRACTS OF JAPAN vol. 13, no. 274 (M-841) [3622], 23 June 1989 & JP 01 070305 A (NIKKO NYUGYO), 15 March 1989**

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Description

Field of the Invention

[0001] This invention relates to a method of filling a packaging container according to the features of the precharacterizing part of claim 1.

Background and Summary

[0002] Conventional packaging containers formed of a resin are often charged with a liquid, e.g., a liquid food, and the filled container is then sealed with a lid. A filling apparatus of a rotary type is generally used for this purpose. Such filling apparatus include a turntable on which the container is placed and is displaced by rotation of the turntable. The filling apparatus also includes a charging station and a sealing station. In the charging station, a liquid food is charged in the container through a top opening of the container. In the sealing portion, the top end of the container is sealed with a lid.

[0003] The container on the turntable, after having been filled with the liquid food in the charging station, is displaced to the sealing station with the top end remaining opened. Since the turntable rotates at a relatively high speed to accelerate the filling operation, the liquid food contained in the container is sometimes spilled from the opening due to vibration, etc.

[0004] To avoid spillage and related problems, it is a general practice to use a container having a top end that is located at a predetermined height above the level of the liquid food charged in the container so that a head space is defined in an upper portion of the container. It is typical to use an intruding lid member, i.e., a lid having a portion that intrudes into the packaging container, to effect full filling.

[0005] In the above-described conventional method for filling a packaging container, however, a high charging accuracy is required to perform the full filling. Additionally, in sealing the container with the intruding lid member in the full filled state, the pressure inside the container is increased by the liquid food which is urged to overflow. Moreover, during sealing with the intruding lid member, the resin forming the container is often melted so that the volume of the container is reduced. This also results in the increase of the internal pressure of the container. As a consequence, great forces are imposed on the sealed portion and the rest of the container.

[0006] US-A-3,590,557 discloses a method of filling a packaging container with the features of the precharacterising part of claim 1. It discloses an apparatus for closing packaging containers with elastically deformable walls. Such a packaging container is filled with a liquid and push-in rollers are used for raising the level of the liquid filled in the container. Overflow should be avoided. By the push-in roller a container wall is deformed to temporarily reduce the volume of the container and to reduce the content of oxygen.

[0007] The deformation or depression of the container wall is maintained, at least in part, concurrently with the heat-sealing step in which step a heat seal device produces a seal seam when the temporary depression of the packaging container has reached an upper limit. After the push-in rollers have been turned away, a slight under pressure in the container effects that during the cooling of the closing seam the cover rim is also pressed against the container rim.

[0008] JP 01070305 discloses a sealing method and device for a container. The bending portion as part of a bottom of the container is deformed inwardly. Accordingly, the inside volume of the container body is decreased compared with the original form. In such condition the container body is sealed by a lid. When the container body is taken out a decompressed condition in its inside results because of recovery to the original form due to the restoring force of the formally inwardly bent portion.

[0009] With respect to US-A-3,590,557 it is an object of the present invention to provide a method of filling the packaging container which can reduce costs and which does not cause excessive force to be applied to the sealed portion and to the whole of the container and which provides a means for checking if the sealing works properly.

[0010] This object is solved by a method as outlined in the precharacterising part of claim 1 with the additional features of its characterising part. According to the invention the deformable wall portion includes a bellows portion preferably in the form of a plurality of curved wave forms or a plurality of saw teeth wave forms and the deformation of the deformable wall portion includes inwardly pressing a substantially flat portion of the container which is provided inside of the deformable wall portion.

[0011] Correspondingly, mechanical stress is not applied to portions of the walls not possessing the deformable portion. Further, because only a portion of the container wall constitutes this deformable portion, it can be relatively easily deformed. Additionally, the rather clear or apparent deformation of the deformable portion makes it possible to easily determine whether or not the sealing of the container is proper. The realisation of the deformable portion by a bellows portion in the form of a plurality of wave forms reduces the costs and at the same time no excessive force must be applied for deforming this portion.

[0012] During sealing the deformable portion of the container is deformed to elevate the surface of the liquid food to a level adjacent to the top end of the container.

[0013] When the container is disposed at a filling station of a turntable and is filled with for example a liquid food the deformable portion has not been deformed to decrease the volume of the container, for example by pushing upward a substantially flat portion in the bottom of the container, a space is defined between the liquid

level of the liquid food and the top end of the container. The container is then displaced on the turntable to a sealing station where the top end of the container is sealed with a lid. Since the space defined between the liquid level of the liquid food and the top end of the container is retained during the displacement of the container from the filling station to the sealing station, the liquid food does not overflow from the opening by vibration etc., even when the turntable is rotated at a relatively high speed. As a consequence, the overall filling operation can be performed at a high speed.

[0014] In the sealing stage, the deformable portion is deformed, for example pushed upward, and thereby elevates the level of the liquid food to a level adjacent to the top end of the container, and is also urged in the opposite direction, for example downward, as the container is sealed with the lid. However, since a negative pressure is created in the container, the deformable portion is maintained in the deformed position, for example the bottom portion is maintained in the upwardly displaced position. When the container is not completely sealed with the lid, the negative pressure in the container is lost so that the deformable portion is moved to the undeformed position, for example the bottom portion is moved to a lowered position. Thus, whether the container is properly sealed can be determined by checking whether or not the deformable portion is in the deformed position, for example the bottom portion is the upwardly displaced position.

[0015] Further, the creation of the negative pressure in the container can prevent an excessive force to be applied to the sealed portion and to the container upon the sealing of the lid to the container, such as where resins are fused.

[0016] Advantageous embodiments of the invention are disclosed by the subclaims.

Brief Description of the Drawings

[0017] The features and advantages of the present invention are well understood by reading the following detailed description in conjunction with the drawings in which like numerals indicate similar elements and in which:

FIG. 1 is a perspective view of a step of sealing a container with a lid according to a first embodiment of the present invention;

FIG. 2 is an exploded, perspective view of a packaging container according to an embodiment of the present invention;

FIG. 3 is a perspective view of a packaging container according to an embodiment of the present invention;

FIG. 4 is a sectional view of a bottom portion of a packaging container according to an embodiment of the present invention. in which a deformable portion is formed in the bottom portion;

FIG. 5 is a view of a liquid food charging step according to the first embodiment of the present invention;

FIG. 6 is a partially sectional view of a lid setting step according to the first embodiment of the present invention;

FIG. 7 is a partially sectional view of a first stage of the step of sealing the container with the lid according to the first embodiment of the present invention;

FIG. 8 is a partially sectional view of a second stage of the step of sealing with the container with the lid according to the first embodiment of the present invention;

FIG. 9 is a partially sectional view of a container according to the first embodiment of the present invention;

FIG. 10 is a sectional view of a bottom portion of a packaging container according to a second embodiment of the present invention;

FIG. 11 is a sectional view of a bottom portion of a packaging container according to a third embodiment of the present invention;

FIG. 12 is a sectional view of a bottom portion of a packaging container according to a fourth embodiment of the present invention;

FIG. 13 is a sectional view of a bottom portion of a packaging container according to a fifth embodiment of the present invention; and

FIGS. 14A-14C and 15A-15C are schematic views of steps in the method of filling a packaging container according to embodiments of the present invention in which packaging container according to different embodiments of the invention are filled.

Detailed Description

[0018] A packaging container according to a preferred embodiment of the present invention is shown in FIGS. 2-4 and includes a container 11 that may be used for containing, e.g, a liquid food. The container 11 is preferably formed of a transparent thermoplastic material having good gas barrier properties and having a cup-like shape which is open at its upper end. The container 11 is preferably formed by deforming a multilayer resin sheet by a tip expanding method (Cuspation Dilation forming method) involving thermal molding of the sheet into the cup-like shape. The container 11 is preferably bonded to a substantially cylindrical sleeve 12 during the tip expansion forming of the container. The multilayer sheet is formed by an appropriate method such as co-extrusion molding, blown film molding, etc. The container 11 is preferably composed of a body portion 11a having a cylindrical cross-section, a radially outwardly extending flange portion 11b provided at an upper end of the body portion 11a and a bottom portion 11c formed at a lower end of the body portion 11a. The container 11 preferably has a wall provided with a deformable portion so that the inside volume thereof can be changed. In the

embodiment shown in FIG. 4, the bottom portion 11c includes a bellows portion P1 formed at a position adjacent to the lower end of the body portion 11a and a flat portion P2 formed at a position radially inward of the bellows portion P1. Thus, by deforming the bellows portion P1, the inside volume of the container 11 may be changed.

[0019] The bellows portion P1 includes curved wave forms P1a and P1b which extend obliquely such that the curved wave form on the radially inward side is positioned at a level higher than the radially outward side wave form. As a consequence, when sealing of the container 11 with a lid 13 is completed, the position of the flat portion P2 is higher than that of the lower end of a sleeve 12 defining a lowest point of the packaging container. Therefore, when the packaging container is placed on a table (not shown) or other flat surface, there is defined a heat insulating space between the bottom portion 11c and the table.

[0020] In the above-described tip expansion method, the multilayer sheet is preferably molded after having been heated to about 180°C, which is higher than the melting point of at least one layer of the sheet. It is therefore not necessary to sterilize the container 11 before filling the liquid food therein. Further. the container 11 is not shrunk or deformed due to molecular orientation during the retort stage. The thermal molding method is any suitable method such as a vacuum blow molding method or a pressure blow molding method. The structure of the multilayer sheet may be, for example, as shown below:

PP(polypropylene)/adhesive layer/EVOH (copolymer of ethylene vinyl alcohol)/adhesive layer/regenerated PP.

[0021] Alternatively, the following structures may also be adopted:

PP/regenerated PP/adhesive layer/EVOH/adhesive layer/ regenerated PP/PP;
PP/regenerated PP/adhesive layer/EVOH/adhesive layer/APET (amorphous polyethylene teraphthalate);
EVA/EVOH/EVA;
PS (polystyrene) /EVOH/PE(polyethylene);
PS/EVOH/PS;
PP/EVOH/PP.

[0022] The use of EVOH in the layer structure can improve the gas barrier property of the multilayer sheet. The following layer structures may also be adopted:

PS/PE;
PS/PETG(APET);
PS/PE/PS.

[0023] The sleeve 12, which is preferably formed of a material having greater rigidity and a better heat insulating properties than the container 11 is preferably provided around the outer side of the container 11. The sleeve 12 has a cylindrical shape and serves to retain the shape of the container 11 and to function as a heat insulator for preventing heat transfer between the liquid food contained in the container 11 and the outside atmosphere.

[0024] The container 11 and the sleeve 12 form a double wall structure. The sleeve 12 is preferably first prepared and the container 11 is then formed by the tip expansion method within the sleeve 12. The liquid food is then filled in the container 11 and the container is sealed with the lid 13. Alternatively, the container 11 may be first formed by a thermal molding method and then be fitted into the sleeve 12. The liquid food is then filled in the container 11 and the container is sealed with the lid 13. Further, the container 11 may be first formed by a thermal molding method, the liquid food may then be filled in the container 11, the container may then be sealed with the lid 13, and the container may then be fitted into the sleeve 12.

[0025] The sleeve 12 is preferably formed of expanded polypropylene. The diameter of pores formed by expansion is about 150 μm. According to another embodiment, the expanded polypropylene may be substituted by a laminate having a polypropylene layer and an expanded polypropylene layer or by a paper material. In this case, printing may be provided on the surface of the polypropylene layer or paper material. The sleeve 12 is preferably formed of a transparent material so that the liquid food contained in the container 11 can be viewed.

[0026] After the liquid food has been filled in the container 11, the lid 13 is fixed on the upper surface of the flange portion 11b by sealing means such as heat sealing or ultrasonic sealing to seal the container 11. The resin film constituting the lid member 13 is preferably molded by the coextrusion method or the blown film molding method to have a thickness of 30-50 μm. The layer structure of the resin film is preferably formed by the coextrusion method may be, for example, as follows:

PP/adhesive layer/EVOF/adhesive layer/PP.

[0027] The lid 13 may, according to another embodiment, be in the form of a transparent resin plate having a high gas barrier property. Such a resin plate may be formed by a suitable method such as molding by a hot press method, an injection molding method or the like.

[0028] A pour opening 13a for pouring the liquid food contained in the container 11 therethrough is formed in a predetermined portion of the lid 13 and is sealed with a pull tab 15. The pull tab 15 is preferably formed of a material having good gas barrier properties and high rigidity and tensile strength. The pull tab 15 may be colored. The layer structure of the pull-tab 15 may be, for example, as follows:

Biaxially oriented PP/peelable adhesive layer.

[0029] On an outer surface of the sleeve 12, a glossy film 16 formed of a heat-shrinkable material is preferably provided. The film is printed with desired letters and patterns. The film 16 is preferably a stretched PP film hav-

ing a thickness of less than 20 μm. When prints are formed on the surface of the sleeve 12, the film is not required.

[0030] The packaging container according to one embodiment has a double wall structure composed of the container 11 and the sleeve 12, however, the packaging container may be formed by the container 11 only, if desired.

[0031] A method of filling a packaging container according to the present invention is seen with reference to FIGS. 1 and 5-9. FIG. 1 shows a step of sealing a container 11 with a lid 13 according to a first embodiment of the present invention. FIG. 5 shows a liquid food charging step according to the first embodiment of the present invention. FIG. 6 shows a lid setting step according to the first embodiment of the present invention. FIG. 7 shows the first stage of the step of sealing the container with the lid according to the first embodiment of the present invention. FIG. 8 shows the second stage of the step of sealing the container with the lid according to the first embodiment of the present invention. FIG. 9 is a sectional view of a container in the first embodiment of the present invention. For convenience of explanation, the sleeve 12 (FIG. 2) is not illustrated in the Figures showing the steps in the performance of the method.

[0032] According to the method, the container 11 is fed to a feeding station of a turntable (not shown) and is transferred to a charging station by the rotation of the turntable. As shown in FIG. 5, in the charging station, a feeding pipe 31 of a charger (not shown) for feeding a measured amount of liquid food to the container 11 is disposed above the container. The liquid food is preferably charged so that there is defined a space δ between the liquid level and an upper end of the container 11.

[0033] The container is then transferred to a lid setting station where a lid applicator (not shown) operates to set a lid 13 above the container 11 as shown in FIG. 6.

[0034] Subsequently, the container 11 is transferred to a sealing station where, as shown in FIG. 7, the lid 13 is placed on an upper edge (preferably the flange portion 11b as seen in FIG. 2) of the container 11, or the sleeve 12, if provided. In the sealing station, a sealing device 32 is disposed above the lid 13 and a pusher 33 is disposed beneath the lid 13. During the passage of the container from the charging station to the seal setting station, the head space is defined in the upper part of the container so that, even when the turntable is rotated at a relatively high speed, the overflowing of the liquid food contained therein from the opening due to vibration, etc. is prevented. Thus, the filling operation can be performed at a high speed.

[0035] The sealing device 32 is then lowered, as shown in FIGS. 1 and 8, to press the peripheral edge of the lid 13 to an upper edge of the container 11 and to seal the container 11 with the lid 13. In this case. the pusher 33 is moved upward to push the flat portion P2 of the bottom portion 11c of the container 11. Thus. the bellows portion P1 is extended to move the flat portion P2 upward, so that the liquid level of the liquid food is elevated to the upper end of the container 11.

[0036] The sealing device is then moved upward and the pusher 33 is moved downward, whereby the sealing of the container 11 with the lid 13 is completed as shown in FIG. 9. Upon moving the pusher 33 downward, the flat portion P2 of the bottom portion 11c is urged to move downward. However, since the container 11 is sealed with the lid and a negative pressure is generated within the container 11, the flat portion P2 is maintained in the upwardly displaced position. When, however, the sealing of the container 11 with the lid 13 is not perfect, the negative pressure within the container 11 is not established so that the flat portion P2 is displaced downward. Therefore, by checking whether or not the flat portion P2 is maintained in the upwardly displaced position, it is possible to determine whether or not the sealing of the container is appropriate.

[0037] Because of the generation of the negative pressure within the container 11, an excessive force is prevented from acting on the sealed portion and on the container during the melting of the resin forming the lid or the container during sealing.

[0038] FIG. 10 shows a bottom portion of a packaging container of a second embodiment of the present invention, FIG. 11 is a sectional view of a bottom portion of a packaging container of a third embodiment of the present invention, FIG. 12 is a sectional view of a bottom portion of a packaging container of a fourth embodiment of the present invention and FIG. 13 is a sectional view of a bottom portion of a packaging container of a fifth embodiment of the present invention. In the second embodiment, as shown in FIG. 10, the bellows portion P1 includes a plurality of curved wave forms P1c and P1d which extend obliquely such that the curved wave form on the radially inward side is positioned at a level slightly higher than the outward side one. As a consequence, when the sealing of the container 11 with the lid 13 (FIG. 2) is completed, the position of the flat portion P2 is slightly higher than that of the lower end of a sleeve 12. Therefore, when the packaging container is placed on a table or other flat surface, there is defined a heat insulating space between the bottom portion P1c and the table.

[0039] In the third embodiment, as shown in FIG. 11, the bellows portion P1 includes a plurality of saw teeth wave forms P1e and P1f which extend obliquely such that the saw tooth wave form on the radially inward side is positioned at a level higher than the outward side one. As a consequence, when the sealing of the container 11 with the lid 13 is completed, the position of the flat portion P2 is higher than that of the lower end of a sleeve 12. Therefore. when the packaging container is placed on a table or other flat surface, there is defined a heat insulating space between the bottom portion llc and the table.

[0040] In the fourth embodiment, as shown in FIG. 12,

the bellows portion P1 includes a plurality of curved wave forms P1g and P1h which extend horizontally in the radially inward direction. As a consequence, when the sealing of the container 11 with the lid 13 (FIG. 2) is completed, the height of the flat portion P2 is nearly the same as that of the lower end of a sleeve 12. Therefore, the packaging container may be placed on a table or other flat surface in a stable state.

[0041] In the fifth embodiment, as shown in FIG. 13, the bellows portion P1 includes a plurality of saw teeth wave forms P1i and P1j which extend obliquely such that the saw tooth wave form on the radially inward side is positioned at a level slightly higher than the outward side one. As a consequence, when the sealing of the container 11 with the lid 13 is completed, the position of the flat portion P2 is slightly higher than that of the lower end of a sleeve 12. Therefore, when the packaging container is placed on a table or other flat surface, there is defined a heat insulating space between the bottom portion 11c and the table.

[0042] FIGS. 14A-14C illustrate steps in sealing of a container 11' in which the container has a deformable portion 14' in the side wall. FIG. 15 illustrate steps in sealing of a container 11" in which the container has a deformable portion 14" in the side wall. As with the embodiment of the invention discussed with regard to FIGS. 1 and 5-9, the methods of sealing a container shown in FIGS. 14A-14C and 15A-15C all involve a first step (not shown) of filling a container to a level below the top of the container at a filling station, moving the container to a sealing station where a lid is positioned above the container (FIGS. 14A, 15A), deforming the deformable portions of the packaging containers so that the liquid level in the containers is raised (FIGS. 14B, 15B), and sealing the lids to the containers (FIGS. 14C, 15C).

[0043] The present invention is not limited to the foregoing embodiments but can be modified in various ways within the scope of the present invention as defined in the appended claims.

Claims

1. A method of filling a packaging container comprising the steps of:

charging a liquid in a container (11) through an opening at a top end of the container to a first level below the top end of the container, the container having a deformable wall portion (P1; 11'; 11") that is deformable and restorable so that the container is able to assume a deformed condition in which the wall portion is deformed and is restorable towards an undeformed condition in which the wall portion is undeformed to permit adjustment of an inside volume of the container;

deforming the deformable wall portion (P1; 11'; 11") of the container to elevate the liquid above the first level; and

sealing a lid (13) on the opening of the container while the deformable wall portion (11a, 11c) is deformed, with a negative pressure being created in the container after the lid is sealed to the container, the deformable wall portion being provided in a portion of a wall of the container, characterized in that the deformable wall portion includes a bellows portion preferably in the form of a plurality of curved wave forms (P1a, P1b; P1c, P1d; P1g, P1h; 14'; 14") or a plurality of saw teeth wave forms (P1e, P1f; P1i, P1j; 14'; 14"), and the deforming of the deformable wall portion includes inwardly pressing a substantially flat portion of the container which is provided inside of the deformable wall portion.

2. The method as set forth in claim 1, wherein the deforming step is performed during the sealing step.

3. The method as set forth in claim 1, wherein the deforming step is performed before the sealing step.

4. The method as set forth in claim 1, wherein the container is deformed to elevate the liquid to the top end of the container (11).

5. The method as set forth in claim 1, wherein, during the deforming step, a deforming member (33) contacts the substantially flat portion of the container to deform the deformable portion.

6. The method as set forth in claim 5, wherein the deforming member (33) contacts a bottom portion of the container (11) to deform the deformable portion in a bottom wall of the container.

7. The method as set forth in claim 5, wherein the deforming member (33) contacts a bottom portion of the container (11) to deform the deformable portion in a side wall of the container.

8. The method as set forth in claim 5, wherein the deforming member (33) contacts a side portion of the container (11) to deform the deformable portion in a side wall of the container.

9. The method as set forth in claim 1, wherein the container (11) is attached to a sleeve (12) having a bottom end, the flat portion and the plurality of curved or saw teeth wave forms being at substantially a level of the bottom end of the sleeve prior to deformation of the deformable portion.

10. The method as set forth in claim 9, wherein the flat

portion (P2) and the plurality of curved or saw teeth wave forms (P1a,b) are arranged such that, when the lid (13) is sealed on the containers (11), the flat portion is above the bottom end of the sleeve.

11. The method as set forth in claim 9, wherein the flat portion (P2) and the plurality of curved or saw teeth wave forms (P1a,b) are arranged such that, when the lid (13) is sealed on the container (11), the flat portion is at substantially the level of the bottom of the sleeve.

Patentansprüche

1. Verfahren zum Befüllen eines Verpackungsbehälters mit den folgenden Schritten:

Einfüllen einer Flüssigkeit in einen Behälter (11) durch eine Öffnung am oberen Ende des Behälters bis zu einem Pegel unterhalb des oberen Endes des Behälters, wobei der Behälter einen deformierbaren Wandbereich (P1; 11'; 11") aufweist, der deformierbar und wiederherstellbar ist, so dass der Behälter einen deformierten Zustand einnehmen kann, in dem der Wandbereich deformiert ist, und in einen undeformierten Zustand rückstellbar ist, in dem der Wandbereich undeformiert ist, um eine Justierung des Innenvolumens des Behälters zu ermöglichen;

Deformieren des deformierbaren Wandbereichs (P1; 11'; 11') des Behälters zum Anheben der Flüssigkeit über den ersten Pegel; und

Abdichten eines Deckels (13) auf der Öffnung des Behälters, während der deformierbare Wandbereich (11a, 11c) deformiert ist, wobei ein Unterdruck in dem Behälter nach Abdichten des Deckels am Behälter erzeugt wird, und der deformierbare Wandbereich in einem Bereich einer Wand des Behälters vorgesehen ist,

dadurch gekennzeichnet,
dass der deformierbare Wandbereich einen Balgbereich vorzugsweise in Form einer Vielzahl von gekrümmten Wellenformen (P1a, P1b; P1c, P1d; P1g, P1h; 14'; 14") oder eine Vielzahl von Sägezahnformen (P1e, P1f; P1i, P1j; 14'; 14") aufweist und das Deformieren des deformierbaren Wandbereichs ein Einwärtsdrücken eines im wesentlichen flachen Bereichs des Behälters umfasst, der innerhalb des deformierbaren Wandbereichs vorgesehen ist.

2. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass der Deformierschritt während des Abdichtschrittes durchgeführt wird.

3. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass der Deformierschritt vor dem Abdichtschritt durchgeführt wird.

4. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass der Behälter zum Anheben der Flüssigkeit bis zum oberen Ende des Behälters (11) deformiert wird.

5. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass während des Deformierschritts ein Deformierbauteil den im wesentlichen flachen Bereich des Behälters zum Deformieren des deformierbaren Bereichs kontaktiert.

6. Verfahren nach Anspruch 5.
dadurch gekennzeichnet,
dass das Deformierbauteil (33) einen Bodenbereich des Behälters (11) zum Deformieren des deformierbaren Bereichs in einer Bodenwand des Behälters kontaktiert.

7. Verfahren nach Anspruch 5,
dadurch gekennzeichnet,
dass das Deformierbauteil (33) einen Bodenbereich des Behälters (11) zum Deformieren des deformierbaren Bereichs in einer Seitenwand des Behälters kontaktiert.

8. Verfahren nach Anspruch 5,
dadurch gekennzeichnet,
dass das Deformierbauteil (33) einen Seitenbereich des Behälters (11) zum Deformieren des deformierbaren Bereichs in einer Seitenwand des Behälters kontaktiert.

9. Verfahren nach Anspruch 1,
dadurch gekennzeichnet,
dass der Behälter (11) an einer Hülse (12) befestigt ist mit einem Bodenende, einem flachen Bereich und einer Vielzahl von gekrümmten oder Sägezahnformen, die im wesentlichen in Höhe eines Bodenendes der Hülse vor Deformation des deformierbaren Bereichs angeordnet sind.

10. Verfahren nach Anspruch 9,
dadurch gekennzeichnet,
dass der flache Bereich (P2) und die Vielzahl von gekrümmten oder Sägezahnformen (P1a,b) so angeordnet sind, dass bei Abdichten des Deckels (13) auf dem Container (11) der flache Bereich oberhalb des Bodenendes der Hülse angeordnet ist.

11. Verfahren nach Anspruch 9,
dadurch gekennzeichnet,
dass der flache Bereich (P2) und die Vielzahl von gekrümmten oder Sägezahnformen (P1a,b) so angeordnet sind, dass bei Abdichten des Deckels (13) auf dem Behälter (11) der flache Bereich im wesentlichen in gleicher Höhe wie der Boden der Hülse angeordnet ist.

Revendications

1. Procédé de remplissage d'un récipient d'emballage comprenant les étapes consistant à :

introduire un liquide dans un récipient (11) par une ouverture située à l'extrémité supérieure du récipient jusqu'à un premier niveau situé sous l'extrémité supérieure du récipient, le récipient comportant une partie déformable (P1, 11', 11") de paroi, qui peut être déformée et reprendre sa forme de façon telle que le récipient peut se trouver dans un état déformé dans lequel la partie de paroi est déformée et peut être ramenée à un état non-déformé dans lequel la partie de paroi n'est pas déformée, afin de permettre une adaptation du volume intérieur du récipient ;
déformer la partie déformable (P1, 11', 11") de paroi du récipient afin de faire monter le liquide au-dessus du premier niveau ;
et boucher de façon hermétique avec un couvercle (13) l'ouverture du récipient pendant que la partie déformable (11a, 11c) de paroi est déformée, une pression négative étant créée dans le récipient après que le couvercle a été scellé sur le récipient, la partie déformable de paroi étant ménagée dans une zone de la paroi du récipient, caractérisé en ce que la partie déformable de paroi comporte un soufflet se présentant de préférence sous l'aspect d'une pluralité de formes d'ondes courbes (P1a, P1b, P1c, P1d ; P1g, P1h ; 14' ; 14") ou d'une pluralité de formes d'ondes en dents-de-scie (P1e, P1f ; P1i, P1j ; 14', 14"), et en ce que la déformation de la partie déformable de paroi comprend une poussée vers l'intérieur exercée sur une zone sensiblement plate du récipient qui est ménagée à l'intérieur de la partie déformable de paroi.

2. Procédé selon la revendication 1, dans lequel l'opération de déformation est exécutée pendant l'étape de bouchage.

3. Procédé selon la revendication 1, dans lequel l'opération de déformation est exécutée avant l'étape de bouchage.

4. Procédé selon la revendication 1, dans lequel le récipient est déformé afin de faire monter le liquide jusqu'à l'extrémité supérieure du récipient (11).

5. Procédé selon la revendication 1, dans lequel au cours de l'étape de déformation, un élément (33) de déformation vient en contact avec la partie sensiblement plate du récipient, afin de déformer la partie déformable.

6. Procédé selon la revendication 5, dans lequel l'élément de déformation (33) vient en contact avec une partie du fond du récipient (11) afin de déformer la partie déformable située dans la paroi formant le fond du récipient.

7. Procédé selon la revendication 5, dans lequel l'élément de déformation (33) vient en contact avec une partie du fond du récipient (11) afin de déformer la partie déformable située dans une paroi latérale du récipient.

8. Procédé selon la revendication 5, dans lequel l'élément de déformation (33) vient en contact avec une partie latérale du récipient (11) afin de déformer la partie déformable située dans une paroi latérale du récipient.

9. Procédé selon la revendication 1, dans lequel le récipient (11) est fixé à un manchon (12) comportant une extrémité de base, la partie plate et la pluralité de formes d'ondes courbes ou en dents-de-scie étant sensiblement au niveau de l'extrémité de base du manchon avant la déformation de la partie déformable.

10. Procédé selon la revendication 9, dans lequel la partie plate (P2) et la pluralité de formes d'ondes courbes ou en dents-de-scie (P1a, b), sont agencées de façon telle que lorsque le couvercle (13) est placé de façon à boucher le récipient (11), la partie plate est située au-dessus de l'extrémité du bas du manchon.

11. Procédé selon la revendication 9, dans lequel la partie plate (P2) et la pluralité de formes d'ondes courbes ou en dents-de-scie (P1a, b) sont agencées de façon telle que lorsque le couvercle (13) est placé de façon à boucher le récipient (11), la partie plate se trouve sensiblement au niveau de la base du manchon.

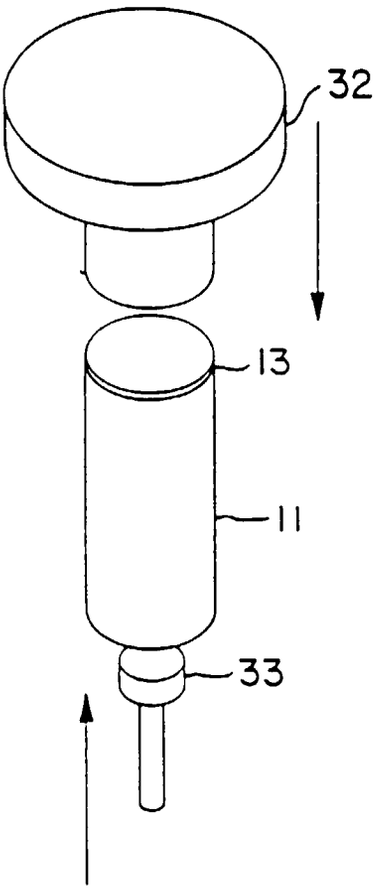

FIG. 1

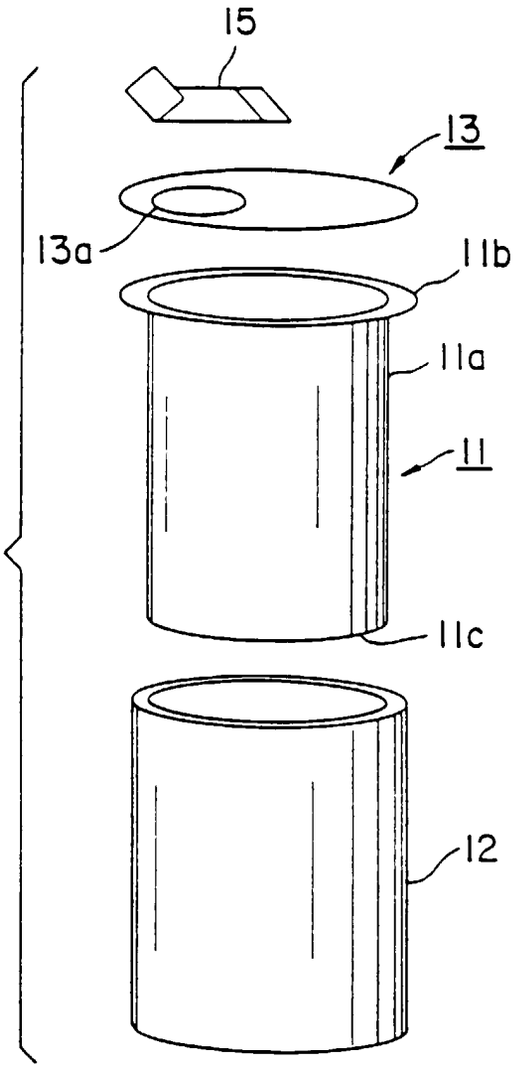

FIG. 2

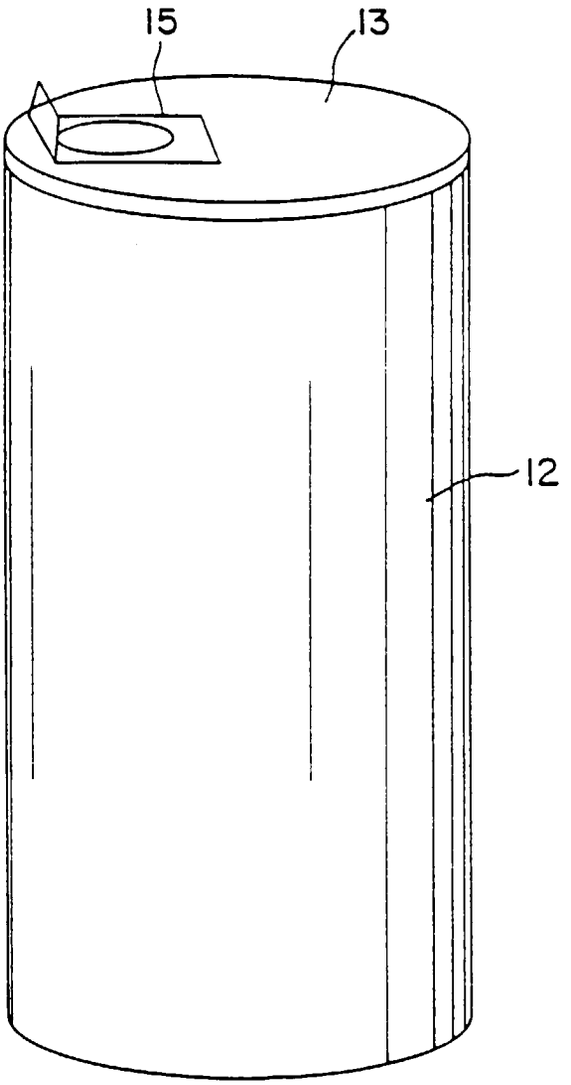

FIG. 3

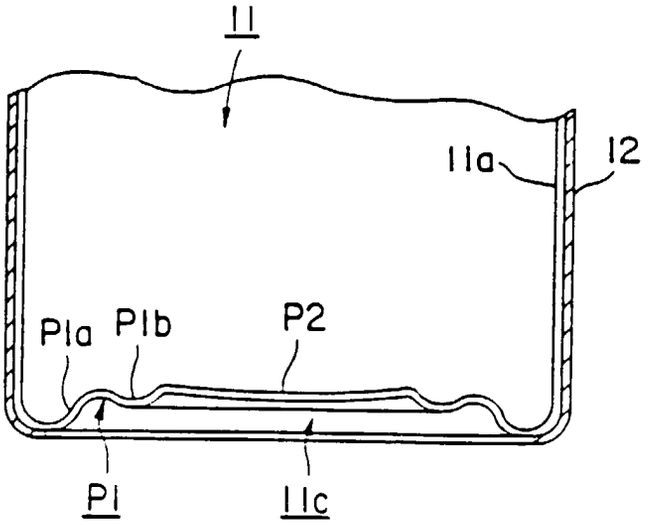

FIG. 4

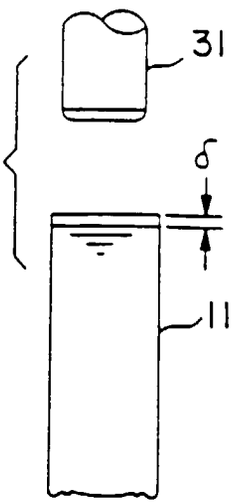

FIG. 5

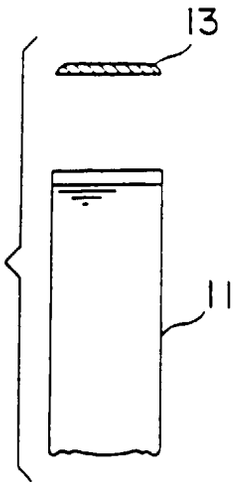

FIG. 6

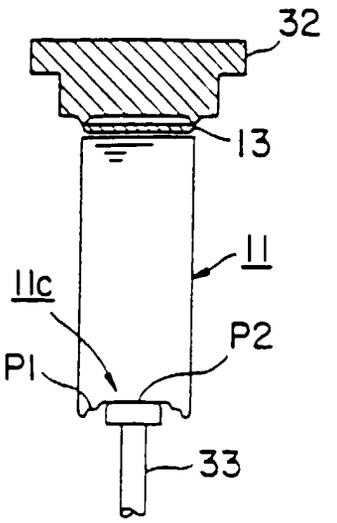

FIG. 8

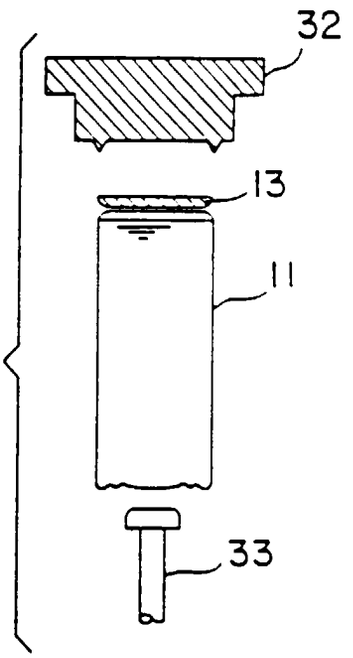

FIG. 7

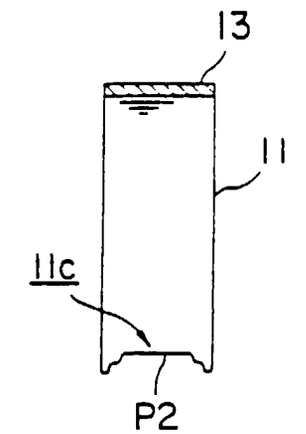

FIG. 9

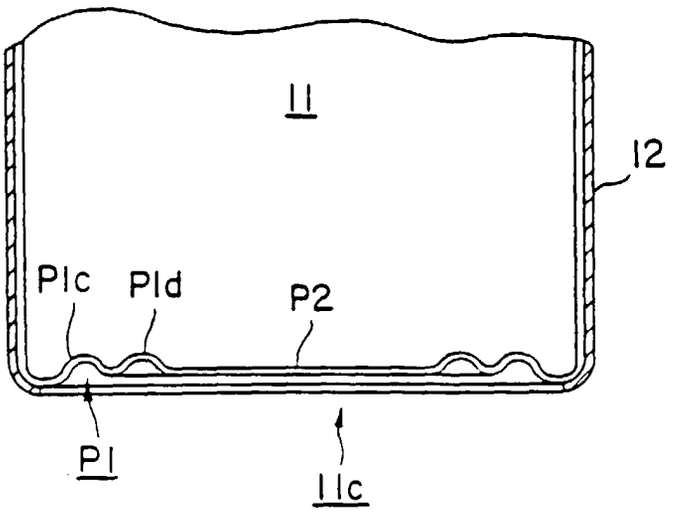

FIG. 10

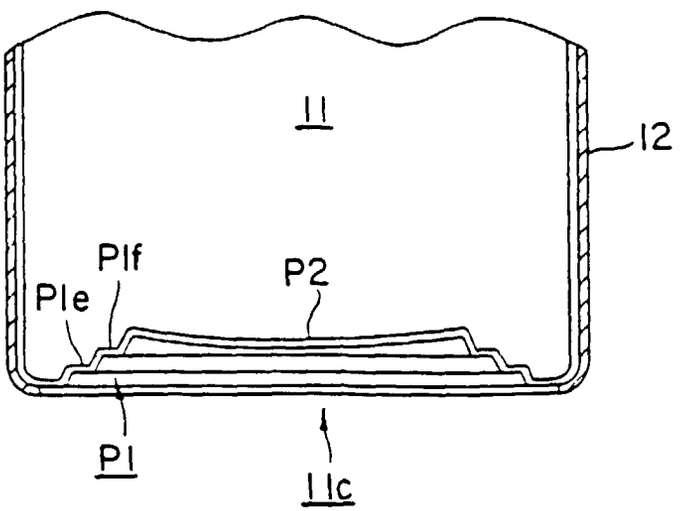

FIG. 11

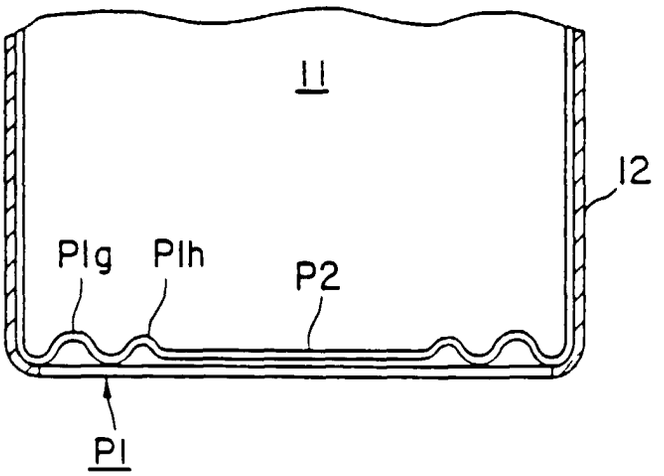

FIG. 12

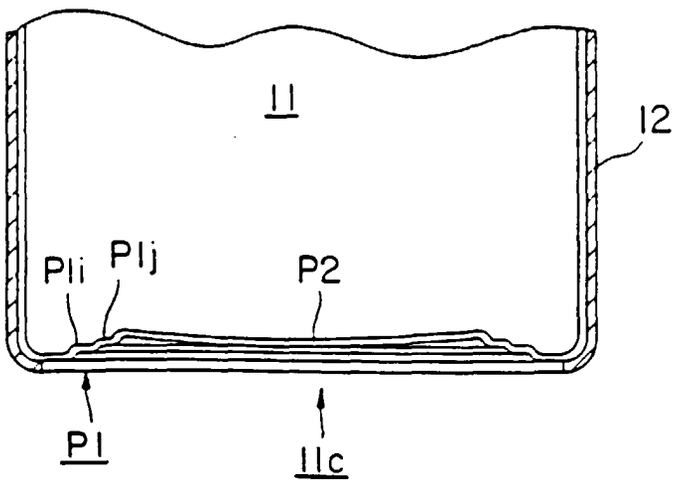

FIG. 13

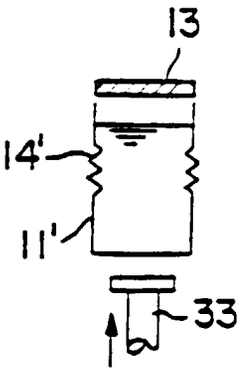

FIG. 14A

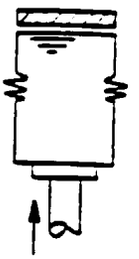

FIG. 14B

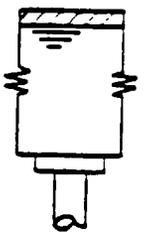

FIG. 14C

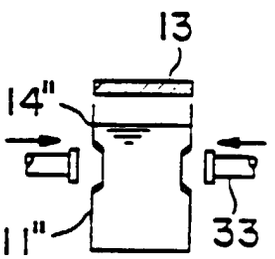

FIG. 15A

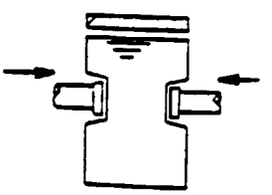

FIG. 15B

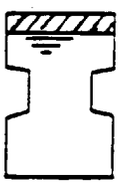

FIG. 15C