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(54) **FLEXIBLE PACKAGING BAG HAVING A NON-RETURNING FUNCTION NOZZLE, AND LIQUID-SUBSTANCE FILLING/PACKAGING STRUCTURE**

FLEXIBLER VERPACKUNGSBEUTEL MIT RÜCKFLUSSSTOPPDÜSE UND STRUKTUR ZUR
ABFÜLLUNG/VERPACKUNG FLÜSSIGER STOFFE

SAC D'EMBALLAGE FLEXIBLE COMPRENANT UN EMBOUT PRÉSENTANT UNE FONCTION ANTI-
RETOUR, ET STRUCTURE D'EMBALLAGE/DE REMPLISSAGE D'UNE SUBSTANCE LIQUIDE

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Description

TECHNICAL FIELD

[0001] This invention relates to a flexible package bag protrusively provided with a film-shaped one-way pouring nozzle (liquid pouring nozzle) having a self-sealing non-return function and made from a pair of front and rear overlapping plastic films each having a laminate film structure as well as a liquid material-filled packaging structure in which a non-self supporting type liquid material-filled packaging body formed by packing various kinds of liquids and the like in the above flexible package bag at a deaeration state, for example, through an in-liquid seal-packing or the like is housed in a self-supporting type outer package bag.

[0002] The term "in-liquid seal-packing" used herein means that a package bag body filled with a liquid is subjected to a sealing so as to squeeze the liquid from the resulting sealed portion without incorporating a gas such as air, nitrogen gas or the like into the interior of the package bag.

BACKGROUND ART

[0003] As a flexible package bag provided with a liquid pouring nozzle of a self-sealing non-return function made from plastic films or a film-shaped one-way pouring nozzle, there are bags as disclosed in JP-A-2005-15029 and JP-A-2005-59958 (EP 1783061) proposed by the inventors. Since these flexible package bags are non-self supporting type package bags made from soft laminate films, they are inconvenient in use alone as they are and have taken a form of housing and fixing in a container as disclosed in JP-A-2004-196364.

In JP2006-264698 is shown a film-shaped package bag with a bottom seam which is partly enlarged in the vertical direction in order to keep the lower part of the package bag within a certain circumference so that it can be easily attached inside another package or cover.

JP2000-072152 shows a film-shaped package bag for a fluid which has a zigzag structure in the vertical direction in the film surfaces. Due to this structure a bending or folding of the package is prevented and the package remains straight, even if the material is poured out.

In JP 2002-362591 is shown a film-shaped package bag which may have zigzag structures of various kinds near the pouring nozzle or in the area of the pouring nozzle which allow the pouring liquid to be poured even if the two films come close to each other.

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0004] The package bags disclosed in JP-A-2005-15029 and JP-A-2005-59958 are used as a liquid-filled packaging body in which only a liquid packing material is substantially included by packing a liquid seasoning such as soy sauce or the like or a liquid substance such as salad oil or the like through, for example, in-liquid seal-packing.

[0005] Also, the liquid-filled packaging body has a characteristic that the liquid packing material does not quite contact with air inside the package bag even when the liquid packing material is poured. Therefore, the liquid packing material hermetically encapsulated in the package bag has a merit that the original state can be maintained over a long time of period because chemical change due to oxidation or the like does not occur.

[0006] In the conventional package bag, the front and rear plastic films in the film-shaped one-way pouring nozzle are closed to each other based on the wetting with the packing material to develop self-sealing non-return function, but also the inner surfaces of the package bag body are closed to each other through the wetting of the liquid packing material filled at the deaeration state in an area corresponding to a pouring amount of the packing material to cause a contraction or collapse deformed state.

[0007] As a matter of fact, it has been confirmed that smooth pouring may be sometimes obstructed due to the strong closing force between the above front and rear films in subsequent pouring of the liquid packing material from the package bag.

[0008] In the conventional package bag, only the liquid packing material is basically filled in the package bag by deaeration packing such as in-liquid seal-packing or the like. However, there are sometimes caused a case that the complete filling can not be conducted at a gas-less state and a case that a gas included in the packing material is generated after the filling and retains in the bag, and hence it has been confirmed that such a gas may be feared of obstructing the non-return function of the film-shaped one-way pouring nozzle.

[0009] Also, the conventional packaging structure disclosed in JP-A-2004-196364 has a problem that since it is required to place the non-self supporting type flexible package bag filled with the packing material into a paper box and fasten thereto, the production steps including the boxing are cumbersome and the cost becomes higher.

[0010] It is, therefore, an object of the invention to solve the aforementioned problems inherent to the conventional techniques and to propose a non-self supporting type flexible package bag particularly provided with a film-shaped one-way pouring nozzle having excellent non-return functioning property and liquid cutting property but also an excellent pouring property of a liquid packing material as a filled substance (the packing material in the bag can be poured smoothly until the end.

[0011] It is another object of the invention to propose a liquid-filled packaging structure capable of maintaining the non-self supporting type flexible package bag at a use state as it is.

MEANS FOR SOLVING PROBLEMS

[0012] The inventors have made various studies in order to achieve the above objects and discovered an inventive construction having the following summary and constitutions. That is, the invention proposes a flexible package bag as disclosed in claim 1.

[0013] In the flexible package bag according to the invention, more preferable embodiments are as follows:

(1) The irregular inner surface formed in the laminate film is formed in a partial or full pattern by subjecting to embossing, blasting, knurling, wrinkling, or vertical-horizontal striping in the form of plane, island or stripe;

[0014] (2) The film-shaped one-way pouring nozzle is formed by fusing two overlapping soft plastic films to each other at a peripheral edge portion other than a portion corresponding to a base end portion of the nozzle so as to constitute a central portion thereof as a pouring path and integrally uniting with the package bag main body, and generates a non-return function blocking penetration of ambient air by a closing action between mutual inner faces of the plastic films based on a fact that when the package bag main body is tilted to pour a liquid packing material therefrom, the pouring path is rendered into a wet state due to the passing of the liquid packing material to attach the liquid packing material to the inner face of the pouring path;

[0015] (3) The film-shaped one-way pouring nozzle has an irregular inner surface in at least one of the front-side and rear-side overlapping plastic films at a side of a base end portion of the nozzle other than a predetermined tearing position of the nozzle and a vicinity thereof;

[0016] (4) At the base end portion of the film-shaped one-way pouring nozzle are temporarily fused opposite sealant layers of the overlapping plastic films at a lower temperature to temporarily seal the inner face of the pouring path; and

[0017] (5) The package bag main body has a gas reserving space at a position of an upper and side sealing portion thereof higher than an upper edge of the film-shaped one-way pouring nozzle.

[0018] Furthermore, the invention lies in a liquid material-filled packaging structure as disclosed in claim 7.

[0019] In the liquid-filled packaging structure, more preferable embodiments are as follows:

(1) The irregular inner surface formed in the laminate film is formed in a partial or full pattern by subjecting to embossing, blasting, knurling, wrinkling, or vertical-horizontal striping in the form of plane, island or stripe;

[0020] (2) The film-shaped one-way pouring nozzle is formed by fusing two overlapping plastic films to each other at a peripheral edge portion other than a portion corresponding to a base end portion of the nozzle so as to constitute a central portion thereof as a pouring path and integrally uniting with the package bag main body, and generates a non-return function blocking penetration of ambient air by a closing action between mutual inner faces of the plastic films based on a fact that when the package bag main body is tilted to pour a liquid packing material therefrom, the pouring path is rendered into a wet state due to the passing of the liquid packing material to attach the liquid packing material to the inner face of the pouring path;

[0021] (3) The film-shaped one-way pouring nozzle has an irregular inner surface in at least one of the front-side and rear-side overlapping plastic films at a side of a base end portion of the nozzle other than a predetermined tearing position of the nozzle and a vicinity thereof;

[0022] (4) At the base end portion of the film-shaped one-way pouring nozzle are temporarily fused opposite sealant layers of the overlapping plastic films at a lower temperature to temporarily seal the inner face of the pouring path;

[0023] (5) The package bag main body has a gas reserving space at a position of an upper and side sealing portion thereof higher than an upper edge of the film-shaped one-way pouring nozzle;

[0024] (6) The non-self supporting liquid-filled packaging body is housed and kept in the self-supporting type outer package bag at a suspended state by fusing a horizontal seal portion at an upper end part of the packaging body to an upper end portion of the outer package bag; and

[0025] (7) The self-supporting outer cylindrical packaging vessel has a flat bottom portion at its lower end portion and is a flexible package bag made from an openable soft laminate film for exchanging the non-self supporting type liquid material-filled packaging body.

EFFECT OF THE INVENTION

[0026] According to the invention, by adopting a novel construction in the flexible package bag provided with a one-way pouring nozzle or a film-shaped one-way pouring nozzle having a self-sealing non-return function can be removed quality-deteriorating factors such as oxidation of a packing material filled through in-liquid seal-packing (which is basically packed so as to be only a liquid packing material at a gas-less state) and the like. Also by rendering at least a part of the soft laminate film constituting the package bag main body into the irregular inner surface can be always conducted rapid pouring smoothly in the repouring and the like.

[0027] According to the invention, the pouring can be conducted smoothly by the addition of the irregular inner surfaces formed on the package bag main body, while back-flowing of ambient air and the like into the bag (air flows into the package bag instead of pouring the packing material) can be surely prevented even after the film-shaped one-way pouring nozzle is torn at a given position (the package bag is opened), and hence the packing material retaining in the bag can be kept at a fresh state over a long time.

[0028] Also, according to the invention, the temporary sealing structure is adopted in the inner surface of the base end portion of the nozzle by the temporary fusing treatment at a lower temperature, whereby there can be provided a flexible package bag provided with a film-shaped one-way pouring nozzle without blocking the non-return functioning property by handling or the like.

[0029] Further, by giving the irregular inner surfaces to the side of the film base end portion in the film-shaped one-way pouring nozzle other than at least tear opening portion and the vicinity thereof can be provided a package bag having an excellent pouring property as a whole of the flexible package bag.

[0030] According to the invention, the non-self supporting type liquid-filled packaging body formed by deaeration-packing a liquid material into the non-self supporting type flexible package bag through the in-liquid seal-packing is housed in an outer package vessel such as a self-supporting type flexible package bag made from a soft laminate film (standing pouch: outer bag) preferably at a state capable of exchanging the used bag with a new bag without placing into a hard package, whereby the packaging body can be applied to a use form as it is but also the pouring of the liquid packing material can be stabilized.

[0031] Moreover, according to the invention, the liquid-filled packaging body obtained by in-liquid seal-filling the packing material into the flexible package bag main body having the film-shaped one-way pouring nozzle can be supported and stabilized by fixing its upper portion to an upper portion of the outer packaging vessel and can conduct the stable pouring of the packing material. Also, the invention is simple in the production and contributes to the reduction of the production cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032]

Fig. 1 is a front view illustrating an embodiment of the flexible package bag according to the invention;
 Fig. 2 is a schematic view illustrating an irregular working area in the flexible package bag according to the invention;
 Fig. 3 is an enlarged section view of a predetermined position of an opening in a film-shaped one-way pouring nozzle;
 Fig. 4 is a front view illustrating a state of disposing a coating layer on a film-shaped one-way pouring nozzle;
 Fig. 5 is a perspective view illustrating an embodiment of the liquid-filled packaging body according to the invention;
 Fig. 6 is a front view illustrating an embodiment of the liquid-filled packaging structure according to the invention; and
 Fig. 7 is a front view illustrating another embodiment of the liquid-filled packaging structure according to the invention

EMBODIMENTS OF THE INVENTION

[0033] The flexible package bag according to the invention comprises a package bag main body made from a soft laminate film having, for example, two or three layer laminate structure and a film-shaped one-way pouring nozzle (liquid pouring nozzle as disclosed in JP-A-2005-59958) fused at an upper part of either side edge portion of the main body at a state of protruding therefrom in a transverse direction, an obliquely upward direction or the like or previously united integrally with the package bag main body and basically formed by oppositely superposing two soft and thin plastic films (pair of front and rear films) in which the pouring path formed between two mutually superposed films is closed due to the interposition of the liquid material attached by the capillary action to develop the non-return function.

[0034] The film-shaped one-way pouring nozzle being a characteristic construction in the flexible package bag according to the invention is constituted, for example, by fusion-joining a nozzle base end portion to an inner surface of an upper side portion (sealant layer) of the package bag main body through a sealant layer as an outermost layer of the plastic film constituting the nozzle to communicate the pouring path disposed in the central portion of the pouring nozzle with the inside of the bag main body.

[0035] For example, the pouring nozzle is formed by fusion-bonding front-side and rear-side plastic films each comprising a uniaxially or biaxially oriented base film layer and inner and outer sealant layers sandwiching it from front and rear sides, for example, opposite sealant layers in the pair of the plastic films or opposed sealant layers of the single plastic film folded in a half width at a peripheral portion other than a base end portion with each other in the form of

substantially a wedge shape as a whole so as to provide a pouring path not fused in a central portion thereof.

[0036] Typically, the film-shaped one-way pouring nozzle has a protruding length from the package bag body X of about 30-100 mm and a nozzle top width Y of about 20-80 mm. For instance, the package bag main body is dependent upon the weight of the packing material but generally uses a thick and chewy laminate film made of two layers of NY 15 μm /PE 60 μm , whereas the film-shaped one-way pouring nozzle is not subjected to loading of the packing material and is preferable to be a thin laminate plastic film having a three layer structure of PE 20 μm /NY 15 μm /PE 20 μm . The thinner the thickness of the low-chewy plastic film, the better the non-return function.

[0037] The pair of front and rear superposed plastic films provide a higher non-return effect as the flatting property (flatness) becomes higher.

[0038] Such a film-shaped one-way pouring nozzle can be made by fusion-bonding peripheral edge portions of sealant layers in the pair of two superposed and laminated plastic films (opposing at front and rear sides), which are suitably made, for example, from polyethylene layer, polypropylene layer, ethylene vinyl alcohol (EVA), ionomer, EVOH or the like, other than a portion being a base end portion so as to provide a desired shape (wedge shape) through heat sealing, high frequency sealing, impulse sealing or the like.

[0039] The thus obtained film-shaped one-way pouring nozzle made of the plastic film having a laminate structure of, for example, three layers (sealant layer - base film layer - sealant layer) is attached at a state of protruding from the package bag main body by fusion-bonding the sealant layer as an outer surface of the base end portion thereof to the sealant layer (preferably, sealant layer of the same kind film) as an inner surface of an opening portion formed at one side portion of the package bag main body made from the soft laminate film (mainly two layers) through heat sealing.

[0040] In this way, there is obtained a flexible package bag provided with the film-shaped one-way pouring nozzle protruding outward from an upper part, top part or the like at the side portion of the package bag main body.

[0041] When the outer surface of the base end portion in the film-shaped one-way pouring nozzle is fusion-joined to the inner surface of the opening portion in the side portion of the package bag main body, in order to prevent non-intended mutual fusion between the sealant layers in the inner face of the film-shaped one-way pouring nozzle, it is preferable that a releasing sheet having a higher melting point or not fusion thermally is inserted into an inside of the base end portion of the nozzle connecting to the pouring path or the fusing temperatures of the sealant layers at the inner and outer surfaces of the nozzle are made different to each other, for example, by the change of the material or by changing extrusion laminating conditions so that the melting point of the sealant layer film in the inner surface of the nozzle is made higher than that of the sealant layer film in the outer surface of the nozzle, and it is more preferable to be higher by 20-30°C.

[0042] For instance, as the sealant film of inner surface side (rear side) is desirable a film of a thermoplastic resin such as polypropylene, polyethylene or the like and having a melting point higher by about 20°C than a melting point of the outer surface side (front side) material. Also, as the sealant film of outer surface side (front side) a film capable of heat-sealing at a temperature higher than the heat-sealing temperature of the sealant layer in the package bag body is preferable. This is due to the fact that the heat sealing between the mutual sealant films at the inner surface of the film-shaped one-way pouring nozzle is prevented when the film-shaped one-way pouring nozzle is fusion-joined to the bag main body through heat sealing.

[0043] At this moment, it is preferable that the packing of a liquid such as soy sauce or the like, a liquid seasoning containing a solid substance such as sesame or the like, soup or other liquid packing material (it is possible to incorporate biggish solids into such a liquid) is conducted at the step of joining (heat-sealing) the film-shaped one-way pouring nozzle to the package bag main body or after the joining step.

[0044] Such a packing of the liquid material is conducted, for example, by the in-liquid seal-packing (the in-liquid seal-packing is carried out without incorporating air, nitrogen gas or the like) or by discharging gas inside the bag after the filling of the packing material to conduct deaeration-packing of sufficiently removing the gas from the inside of the package bag main body. Because, it is necessary to airtightly seal the packing material inside the bag at a deaeration sealed state for sufficiently developing the non-return function of the film-shaped one-way pouring nozzle and also it is preferable to prevent oxidation or the like of the packing material.

[0045] The pouring of the liquid packing material packed in the flexible package bag is carried out by cutting a predetermined opening portion formed in the vicinity of the top end portion of the film-shaped one-way pouring nozzle (top end side from a position of forming tear-guide perforations or notches). That is, after the opening of the nozzle, the required pouring of the packing material is conducted by tilting the main body of the liquid-filled packaging body so as to be a downward posture of the nozzle opening (pouring port).

[0046] In this case, the film-shaped one-way pouring nozzle made from the soft laminate plastic films separates away toward front and rear sides based on the action of water head pressure of the packed material or pressurization of hand

and fingers to a base portion of the liquid-filled packaging body to allow for the pouring of the packing material.

[0047] Moreover, when the packing material is poured through the nozzle opening (pouring port) of the film-shaped one-way pouring nozzle, the package bag main body made from the soft laminate films does not perform intake of ambient air based on the non-return function inherent to the film-shaped one-way pouring nozzle irrespectively of the pouring of the packing material, so that the package bag main body is shrunk or collapse-deformed by a quantity corresponding to the poured volume.

[0048] Thus, the liquid-filled packaging body formed by packing the liquid material into the flexible package bag can pour a required quantity of the packing material from the bag by tilting the pouring nozzle under an opening thereof. The pouring of the packing material from the nozzle opening is stopped by restoring the packaging body to the original standing posture. Since the inside of the pouring path in the film-shaped one-way pouring nozzle is at a state wetted with the liquid packing material attached thereto by the stop of the pouring, the opposed plastic films at the inner surface of the pouring nozzle are strongly closed to each other through the capillary action, and hence the nozzle opening disposed on the top end portion of the nozzle is at a closed state, whereby the invasion of ambient air into the inside of the package bag main body can be blocked surely.

[0049] In the package bag provided with such a film-shaped one-way pouring nozzle, the liquid material packed in the bag is protected at a state of completely blocking ambient air even before, during and after the pouring, whereby the oxidation, contamination and the like of the packing material inside the bag are prevented effectively.

[0050] As the film construction of the package bag main body according to the invention, the base film layer located at the outer surface thereof and the sealant layer located at the inner surface may be the same kind as in the base film layer and sealant layer of the film-shaped one-way pouring nozzle.

[0051] However, when the film-shaped one-way pouring nozzle and the package bag main body are formed separately, the film construction of the package bag body is different from the film for the nozzle, wherein a middle layer may be interposed between the base film layer and the sealant layer.

[0052] Preferably, the sealant layer constituting the inner surface of the package bag main body made from the soft laminate film is made from the same resin material as in the outermost sealant layer of the pouring nozzle. Thus, the fusion-joining strength of the pouring nozzle to the package bag main body can be enhanced sufficiently.

[0053] Moreover, when the package bag main body is made from a laminate film of two- or three-layer structure, it is preferable that the uniaxially or biaxially oriented base film layer in the laminate film is constituted with a polyethylene terephthalate film layer (PET layer), nylon resin film layer (NY layer) or ethylene vinyl alcohol (EVOH) or the like having a thickness of 8-30 μm .

[0054] Also, the sealant layer of the laminate film used in the package bag main body may be constituted with a non-oriented PE layer, PP layer, EVA layer, ionomer layer, EVOH layer or the like having a thickness of 10-60 μm .

[0055] When the thickness of the base film layer is less than 8 μm , there is a fear that steam impermeability, gas barrier property and the like become lacking, while when it exceeds 30 μm , the bending strength of the laminate film is too large, and hence there is a fear that the adhesion between the inner surfaces in the nozzle is damaged after the pouring stop of the packing material.

[0056] On the other hand, when the thickness of the sealant layer is less than 10 μm , it is feared that the sufficient sealing strength can not be ensured, while when it exceeds 60 μm , there is a fear that the bending strength of the laminate film becomes too large. Moreover, the sealant layer may be constituted with two or more layers as long as the thickness of the sealant layer is within the above range in total.

[0057] As the laminate film used in the package bag main body are required chewy ones because a constant quantity of liquid material is filled therein. In the invention, it is preferable that the bending strength per unit width (15 mm), or nerve of the laminate film is about 40-300 mN as a value measured using a nerve measuring device as disclosed in Fig. 10 of JP-A-2005-59958. When the nerve is less than 40 mN, the stability of the pouring direction or the like in the pouring of the packing material from the package bag is poor but also the chewy feeling of the package bag main body is weak and there is a fear that shortage in the strength of the package bag itself is actualized. While, when it exceeds 300 mN, there is a fear that the non-return function of the whole including the film-shaped one-way pouring nozzle is deteriorated irrespectively of the lamination structure of the laminate film.

[0058] In the flexible package bag according to the invention formed by protruding the film-shaped one-way pouring nozzle from the package bag main body having such a film construction, it is desirable that the pouring of a controlled and predetermined quantity can be made smoothly even in repetitive pouring case, particularly re-pouring case likewise the first pouring case.

[0059] In the invention, therefore, as shown in Fig. 1, a portion of at least one of front-side and rear-side laminate films in at least package bag main body 2 other than a seal portion of the bag (lateral seal, vertical seal, joint seal between nozzle and main body) is used to have irregular inner surfaces 14 formed by subjecting to embossing, blasting, knurling, wrinkling, or vertical-horizontal striping. The reason why the seal portion is removed is due to the fact that poor sealing is caused if irregularity is existent in the seal portion.

[0060] The reason why the irregular inner surfaces are formed in the package bag body is mainly as follows. That is,

in the flexible package bag according to the invention, after the liquid packing material is poured through the film-shaped one-way pouring nozzle, both the front-side and rear-side laminate films are strongly closed to each other (non-return action) not only by the non-return function of the film-shaped one-way pouring nozzle but also by preventing the penetration of ambient air into the inside of the package bag main body (back flow) to cause capillary action between these laminate films under interposition of the liquid material. Particularly, the package bag body becomes at a state of generating the shrinkage of the film or collapse deformation of the bag main body by a volume corresponding to the amount of the liquid material poured.

[0061] As a result, when the liquid packing material filled is again poured through the film-shaped one-way pouring nozzle, if sufficient liquid quantity (liquid height) is existent in the package bag main body (hydraulic pressure is large), smooth pouring is compensated to a certain level, but as the quantity of the liquid in the bag becomes small, the hydraulic pressure becomes small and hence the pouring pressure is get beaten by the closing force between the laminate films to obstruct the smooth pouring or liquid returning.

[0062] In the flexible package bag according to the invention, as the amount of the liquid in the bag becomes small, wrinkles are generated in the package bag main body to form a dam, and as a result, the liquid flow is stagnant and the path of the liquid is shielded to make the smooth pouring difficult. In this case, if a pressure applied to the bag body is increased, there is caused a fear of discharging the unintended excessive amount and the stable pouring can not be ensured.

[0063] According to the invention, in order to remove these bad effects, the closing force between the laminate films in the package bag main body at least based on the longitudinal and horizontal capillary actions in the vicinity of the film-shaped one-way pouring nozzle is somewhat alleviated to prevent the backset, stagnation and clogging of the liquid flow to thereby ensure the path.

[0064] That is, the closing force caused in the pouring path of the film-shaped one-way pouring nozzle and in the package bag main body through the capillary action is alleviated without deteriorating the non-return action of the film-shaped one-way pouring nozzle. For this end, according to the invention, at least one of the overlapped front and rear laminate films in the package bag main body is subjected to embossing, blasting or the like to form irregular inner surface, whereby the capillary action is eliminated or weakened.

[0065] The closing force based on the capillary action is caused when the gap between the front and rear laminate films in the package bag main body (other than longitudinal seal, horizontal seal and joint sealing portion between the nozzle and the main body) or thickness of liquid layer is typically about 2-5 μm . According to the invention, as the irregular inner surface to be formed in the laminate film, irregularity is given so as to render the gap between the mutual films into not less than 20 μm , preferably not less than 30 μm , more preferably not less than 50 μm , for example, by subjecting one or both of the laminate films to embossing.

[0066] In this case, the capillary action is eliminated completely or weakened, resulting in the decrease of the closing force between the laminate films. As a result, at least places provided with the irregular inner surface are at a state of constantly ensuring the flow path. Even if the amount of the liquid in the bag is extremely small, the smooth pouring of the liquid packing material along the irregular inner surface 14 is ensured constantly.

[0067] The irregular work is preferable to be carried out by using an emboss roll of a cylindrical or rectangular form having irregular pattern (JP-A-2008-12669) or the like to give irregular pattern in addition to regular pattern.

[0068] Also, the irregular inner surface 14 may be realized even by subjecting to random wrinkle working, blasting, knurling, longitudinal and horizontal striping or the like instead of the embossing as desirable irregularity. These irregularities are desirable to be combined by shifting the irregular positions from each other so as to form a gap of not less than 20 μm between the opposed laminate films.

[0069] For example, these irregularities can be formed with hot rolls (70-80°C) in a bag-forming machine before the formation of the bag (before the longitudinal seal) or after the formation of the bag.

[0070] The inventors conducted an experiment that soy sauce is filled as a packing material in a package bag main body having a laminate film structure of TECKBARRIER NY 15 μm deposited face/deposited face TECKBARRIER PET 12 μm /XA-HD 40 μm through in-liquid seal packing and then the package bag main body or liquid filled package bag is tilted till the liquid is not poured to measure a remaining liquid amount. As seen from the results shown in Table 1, in case of using the laminate film subjected to irregular work, the remaining amount in the bag is smallest and the effect is remarkable.

[0071] In this experiment, a case of forming irregular pattern and a case of forming longitudinal stripe pattern on the package bag main body in the vicinity of the film-shaped one-way pouring nozzle through the embossing are compared with a package bag main body not subjected to irregular work.

[0072] As a result, in the cases adaptable to the invention, the amount of the packing material in the bag is less and can be finished up until the end, and the pouring is smooth.

[0073]

Table 1

Package bag main body	Remaining amount of soy sauce (g)
not worked	48.7
longitudinal stripe pattern	24.7
embossed pattern	30.1

[0074] According to the invention, when the irregular inner surface is formed as one to plural patterns in at least a part or an upper part of a non-seal portion of the package bag main body or in a longitudinal direction along a side edge facing to the film-shaped one-way pouring nozzle, it is effective for ensuring the path in the re-pouring. Also, various patterns as exemplified in Figs. 2(a)-(f) are effective, and they are formed in the form of a partial pattern or full pattern as a face, island or stripe.

[0075] A concrete form of the flexible package bag according to the invention will be described with reference to the drawings below.

[0076] The flexible package bag shown in Fig. 1 is an example that a film-shaped one-way pouring nozzle 1 is protruded, for example, from an upper part of a left-side edge in a package bag main body 2 made from a soft laminate film. To a sealant layer side an inner surface in a joint portion of the bag main body 2 is fusion-joined an outermost sealant layer at a base end portion of the film-shaped one-way pouring nozzle 1, preferably a sealant layer made from the same resin material as the sealant layer of the package bag body 2 through heat-sealing.

[0077] As the case may be, a sealant resin at the inner surface of the pouring path in the film-shaped one-way pouring nozzle 1 is a high melting point resin and it is preferable that a portion corresponding to the fusion-joined portion between the bag body 2 and the film-shaped one-way pouring nozzle 1 is temporarily fused at a low temperature to form a temporary sealing portion 12.

[0078] The film-shaped one-way pouring nozzle 1 can be constructed mutually fusing a pair of front-side and rear-side disposed three-layer laminate plastic film, each of which comprising a thermoplastic base film layer such as biaxially oriented PET or NY layer of 5-40 μm , preferably 10-30 μm in thickness and sealant layers laminated on both surfaces of the base film layer such as non-oriented PE or PP layer of 5-80 μm , preferably 10-60 μm in thickness, i.e. a pair of front and rear laminate plastic films having the same profile form such as wedge form or the like or the single laminate plastic film folded at its central portion toward front and rear sides to each other as shown by oblique lines in the figure so as to join side portions other than a base end side at an opposite postures of inner surface sealant layers, preferably through heat sealing.

[0079] As shown in FIG. 1, it is preferable that the film-shaped one-way pouring nozzle 1 is provided at a predetermined tear-opening position of an upper edge portion thereof with tear guide perforations 1a made from opening means such as 1-notch, V-notch, U-notch, base notch, diamond cut or the like. The nozzle is made to a use state by opening the tear guide perforations 1a.

[0080] Also, it is preferable that a spiry projection 1b for prevention of liquid dripping is disposed at a position somewhat biased from the predetermined opening position of the lower edge portion of the film-shaped one-way pouring nozzle 1 toward the base end portion thereof. This projection 1b can more effectively prevent the flowing down of the liquid dripping generated at the opening end of the one-way pouring nozzle from the lower edge portion of the one-way pouring nozzle 1 to the package bag body 2.

[0081] The film-shaped one-way pouring nozzle 1 can be manufactured simply and quickly by mutually fusing front and rear laminate plastic films 3,4 as shown in FIG. 3 by an enlarged section view taken along a III-III line of FIG. 1 in a widthwise direction of the nozzle, each having a three-layer structure comprising base film layers 5, 5' and sealant layers 6, 6', 7, 7' laminated on both surfaces of the base film layer 5, 5' so that the sealant layers 6, 6' facing to each other at the inner face sides are fused in their peripheral portions other than a base end side at a given width, for example at a width of 0.5-3.0 mm, preferably 1.0-2.0 mm so as to shape into a required form (wedge form) through, preferably, heat sealing.

[0082] It is preferable that the film-shaped one-way pouring nozzle 1 is formed by laminating flat sheets as far as possible for giving the excellent non-return function.

[0083] At the base end portion of the nozzle, the sealant layers 7, 7' located at the outer face side are fused to the inner face of the package bag body 2 (sealant layers) through, preferably, heat sealing, whereby the nozzle can be joined to the package bag body 2 adequately, surely and simply.

[0084] It is preferable that a coating layer of a water repellant agent or an oil repellant agent (water-repellant, oil-repellant coating layer) 10 for preventing liquid dripping to improve liquid cutting property is provided on the outer surface of the film-shaped one-way pouring nozzle 1 or an outer surface extending from the predetermined tear lines (predeter-

mined opening portion) of the outer sealant layers 7, 7' toward the side of the base end portion along at least opening end and lower edge portion as shown by dotted lines in Fig. 4.

[0085] Further, wet-treated layers 18, 18' for promoting the non-return function are disposed on the inner faces of the inner sealant layers 6, 6' in the film-shaped one-way pouring nozzle 1, particularly the inner faces of portions forming the pouring path 13.

[0086] As shown in FIG. 1, the film-shaped one-way pouring nozzle 1 having the above construction is protruded laterally from the upper end portion of the package bag body 2 made of soft laminate films, for example, by fusion-joining the outer sealant layers 7, 7' in the base end portion of the nozzle 1 to the inner surfaces of the package bag body 2 at the mutually fused portions of the sealant layers side the deaeration packing of the package bag body 2 and the like to integrally unite with the package bag at the same time of deaeration-packing the packing material into the package bag body through in-liquid seal packing or prior to the in-liquid seal packing of the packing material or the like.

[0087] Moreover, in the liquid-filled packaging body 8 according to the invention, it is required that the liquid packing material is deaeration-packed through in-liquid seal packing or the like so as not to leave gas in the bag in view of developing the self-seal non-return function of the film-shaped one-way pouring nozzle 1.

[0088] In some cases, a slight amount of ambient air may be invaded into the package bag during the pouring, and gas involved in the packing material itself may be generated ex-post. In order to reserve these gases to ensure the one-way pouring of the film-shaped one-way pouring nozzle, it is preferable that one or more gas reserving spaces 11 as shown in Figs. 1 and 4 are disposed in an upper part of the package bag main body 2 or an upper lateral seal portion located above the film-shaped one-way pouring nozzle 1, if necessary.

[0089] Into such a flexible package bag is deaeration-packed the liquid packing material, preferably, through the in-liquid seal packing to form the liquid-filled packaging body 8 of a distended form as shown in FIG. 5. However, the soft, flexible package bag itself typically does not have a self-standing property or a fixing property, so that it is preferable that the bag is housed in a self-standing outer package bag 9 (a hard vessel or a standing pouch) as shown in FIG. 6 and mentioned in detail later to bring about the self-standing property and the fixing property so as to render into use form in case of transporting, storing, displaying, using the packing material and the like.

[0090] In the latter case, the pouring is carried out making a tilting angle of the self-standing type outer package bag (mentioned in a case of "standing pouch" hereinafter) 9 large in accordance with the reduction of the packed material in the bag.

[0091] The use of the flexible package bag is conducted by tearing or cutting the top end side of the predetermined tear portion of the film-shaped one-way pouring nozzle 1 to ensure the nozzle opening or pouring port and then pouring the liquid packing material inside the flexible package bag from the pouring port formed in the film-shaped one-way pouring nozzle 1 at a posture of tilting the standing pouch 9 without invasion and suction of ambient air. On the other hand, the invasion of ambient air into the inside of the package bag body 2 is surely obstructed by restoring the standing pouch 9 to the standing position to stop the pouring and closely adhering the inner faces of the film-shaped one-way pouring nozzle 1 over the whole thereof in the presence of a liquid film made from the liquid packing material wetting the inner faces in association therewith.

[0092] Thus, the package body obtained by deaeration-packing the liquid packing material into the package bag body 2 through in-liquid seal packing can pour the packing material corresponding to a quantity to be poured under a shrunk or collapsed deformation without taking ambient air into the inside of the package bag body 2. After the pouring stop of the packing material, the invasion of ambient air into the package bag body 2 is prevented by the closing seal of the inner faces in the pouring path of the film-shaped one-way pouring nozzle 1 owing to its non-return function, whereby contamination, oxidation or the like of the packing material retaining in the package bag body 2 through ambient air can be prevented sufficiently.

[0093] After the required quantity of the liquid packing material is poured, the pouring port located at the top portion of the film-shaped one-way pouring nozzle 1 is automatically closed, and the standing pouch as a self-standing type outer package bag is restored to the standing posture under such a state.

[0094] As previously mentioned, the closing seal of the film-shaped one-way pouring nozzle 1 producing the non-return function is conducted by releasing the film-shaped one-way pouring nozzle 1 from water head pressure to restore the front and rear laminate films 3, 4 to the original form in the production of the film-shaped one-way pouring nozzle 1 and placing the front and rear plastic films 3, 4 in an atmosphere of a reduced pressure when the packing material inside the film-shaped one-way pouring nozzle is flown back to the package bag body 2 to thereby adsorb the inner faces (sealant layers 6, 6') of the soft plastic films 3, 4 to each other through a capillary action over a full nozzle width in the presence of the liquid packing material attached to these faces, and so on.

[0095] The mutual closing between the films based on such a self-seal non-return function is maintained more surely when the package bag body 2 after the collapse deformation or the like tends to reduce the interior of the package bag body 2 based on its elastic restoring force.

[0096] Also, the invention proposes a liquid material-filled packaging structure wherein a liquid packing material is filled into the aforementioned flexible package bag having no self-standing property nor shapable property to form a

liquid material-filled packaging body 8 of a use state as it is.

[0097] That is, the flexible package bag provided with the aforementioned film-shaped one-way pouring nozzle protruded is made from a soft laminate film as a raw material and has no self-standing property even if the packing material is filled therinto, so that in order to use the bag as it is, it is necessary to combine with the other self-standing type vessel or standing pouch 9 in use.

[0098] In the film-shaped one-way pouring nozzle 1 used in the invention, it is preferable that the outer sealant layer is made to a low melting point and the base end portion thereof is fusion-joined to the inner sealant layer of the package bag body 2 at a posture of protruding from the side portion of the soft package bag body 2, mostly the side portion of its upper end part, while the inner sealant layer of the film-shaped one-way pouring nozzle 1 is made to a high melting point and forms a temporarily sealed portion 12 of a state of temporarily fusing at a relatively low temperature and at an adhesion strength corresponding to a half or less than of its heat-sealing strength, for instance, when the base end portion of the one-way pouring nozzle 1 is fusion-joined at its pouring nozzle 1 to the inner face of the package bag main body 2.

[0099] At this moment, the temporarily sealed portion 12 through a low-temperature temporary fusion can be realized by reducing at least one of a heating temperature, pressurizing pressure and pressurizing time in the heat-sealing means as compared with the case of forming a complete fusion-joint portion.

[0100] In the formation of the temporarily sealed portion 12, the forming position may be a position corresponding to a fusion-joining position of the film-shaped one-way pouring nozzle 1 to the package bag body 2 but also may be a position somewhat biased from the corresponding position toward the inside of the package bag body 2 or inversely a position somewhat biased from the corresponding position toward the inside of the package bag body. In any cases, it is necessary that a portion forming the pouring path for the packing material having a length (about 5-8 mm) enough to develop the function inherent to the film-shaped one-way pouring nozzle is retained outside the low-temperature temporarily fused portion or temporarily sealed portion 12.

[0101] Further, in the formation of the temporarily sealed portion 12, it is required to use a high melting point sealant layer and a low melting point sealant layer in the film-shaped one-way pouring nozzle 1, but these sealant layers are preferable to be made from a low density polyethylene containing a straight, low density polyethylene, or it is preferable that the high melting sealant layer is made from a middle density or high density polyethylene and the low melting sealant layer is made from a low density polyethylene.

[0102] Moreover, the selection of high and low melting points in the same material of polyethylene can be realized, for example, by mutually changing extrusion laminating conditions and the like in the lamination of the sealant layers.

[0103] The temporarily sealed portion 12 as mentioned above is disposed in the base end portion of the film-shaped one-way pouring nozzle at the fusion-joining position of the film-shaped one-way pouring nozzle 1 to the package bag body 2 or its vicinity. Thus, the flowing of the liquid packing material filled in the package bag toward the top of the nozzle from the temporarily sealed portion 12 is prevented surely. Even if the packing material is heated to 50-100°C, a greater part of the pouring path for the packing material in the film-shaped one-way pouring nozzle 1 is sufficiently protected from the permanent deformation of inflating the pouring path.

[0104] Therefore, the top portion from the temporarily sealed portion 12 in the film-shaped one-way pouring nozzle 1 can always develop the function of the film-shaped one-way pouring nozzle sufficiently. That is, when the packing material is poured from the package bag, the invasion of ambient air into the interior of the package bag body can be prevented sufficiently, while the self-seal non-return function in the pouring stop of the packing material can be surely developed.

[0105] When the packing material after the cooling to about room temperature in the bag is poured from the package bag, the temporarily sealed portion 12 is opened by applying a load to the package bag in a thickness direction but also the top end portion of the film-shaped one-way pouring nozzle is broken or cut to form a pouring port, and the package bag is tilted under such a state to render the pouring port into a downward directing posture.

[0106] Moreover, the fusion-joined portion of the package bag other than the temporarily sealed portion 12 is heat-sealed at a strength higher by 2 times or more than that of the temporarily sealed portion 12, so that accidental breakage is never caused even when applying a load required for opening the temporarily sealed portion 12.

[0107] Thus, the portion of the film-shaped one-way pouring nozzle 1 not subjected to expansion plastic deformation by the heated packing material can effectively prevent the invasion of ambient air into the interior of the package bag main body 2 associated with the pouring of the packing material in the bag under a necessary and sufficient opening of the pouring nozzle under a collapse deformation of the package bag main body 2. Also, when the pouring is stopped based on the returning of the package bag to its standing posture, the invasion of ambient air into the package bag main body can be surely prevented by the self-seal non-return function based on the returning of the pouring nozzle portion wetted with the packing material into the original form.

[0108] When each of the high melting sealant layer and low melting sealant layer in the film-shaped one-way pouring nozzle is made from a low density polyethylene, or when the high melting sealant layer is made from a middle density or high density polyethylene and the low melting sealant layer is made from a low density polyethylene, a temporary sealing having a sealing strength as is expected and a required fusion joining of the film-shaped one-way pouring nozzle

1 can be realized simply and easily.

[0109] The heat-sealing strength of the temporarily sealed portion 12 is preferable to be within a range of 0.3-3 (N/15 mm), particularly 0.7-1 (N/15 mm) in view that the accidental opening of the temporarily sealed portion 12 is prevented and also the temporarily sealed portion 12 is non-randomly opened without exerting on the other fusion-joined portion.

[0110] When the heat-sealing strength is less than 0.3 (N/15 mm), there is fear of causing the unintended opening of the temporarily sealed portion 12 in connection with the volume and the like of the liquid packing material in the bag at a heating state, while when it exceeds 3 (N/15 mm), there is a fear of accidentally exerting the load required for the opening of the temporarily sealed portion 12 upon the other fusion-joined portion and so on (breakage or opening).

[0111] The load for opening the temporarily sealed portion 12 is preferable to be 50-350 (N), particularly 80-300 (N), most preferably 100-200 (N), which does not cause the breakage of other places including the sealed portion but also can not wrongly open the portion in the transportation or operation.

[0112] When the opening load is less than 50 (N), it is feared that the temporarily sealed portion 12 is opened at a lower stage side package bag when package bags each filled with the packing material are piled one upon the other. While when it exceeds 350 (N), or when the heat-sealing strength is too high, there is a fear that the other fusion-joined portion is affected by the load required for opening the temporarily sealed portion 12.

[0113] According to the inventors' studies, for instance, when a base end portion of a film-shaped one-way pouring nozzle 1 as shown in FIG. 1 is temporarily sealed by a low-temperature temporary fusion to a side portion of an upper part of a soft package bag body 2 (NY 15 μ m/PET 12 μ m/LLDPE 40 μ m), if a plastic film laminate structure of the film-shaped one-way pouring nozzle 1 is straight-chain low density polyethylene layer (low melting sealant layer)/biaxially oriented polyethylene terephthalate layer/straight-chain low density polyethylene layer (high melting sealant layer), the heat-sealing strength (N/15 mm) of the temporarily sealed portion when the plastic laminate film is heated and pressurized by means of a heat sealer provided with a cylinder under a cylinder pressure of 300 kPa for 3 seconds using the heat-sealing temperature as a parameter is measured by a tensile testing machine (TENSILON RTG-1300) under conditions that a tensile rate is 200 mm/min and a film width is 15 mm. The results are shown in Table 2.

[0114]

Table 2

Sealing temperature (°C)	106	108	110	112	114	116
Average sealing strength (N/15 mm)	0.27	0.36	0.44	0.64	1.79	4.61
* Measuring method: according to JIS E0236 (1996)						

[0115] Then, the invention proposes a liquid material-filled packaging structure constituted by housing a non-self standing type liquid material-filled packaging body 8, which is formed by filling a liquid or viscous packing material in the non-self standing type flexible package bag provided with the film-shaped one-way pouring nozzle 1 protruding from a side upper position of the package bag main body 2 made from a soft laminate film through in-liquid seal-packing, in a self-standing type outer cylindrical package bag 9, for example, a bag-shaped vessel such as standing pouch for assisting the self-standing of the packaging body.

[0116] As the self-standing type outer packaging vessel 9 used for housing the aforementioned non-self standing type liquid material-filled packaging body 8 according to the invention, ones made from a laminate film at least having a cylindrical bag-shaped form in its bottom portion as shown in Fig. 6 are preferably used, and more preferably a self-standable vessel having a flat bottom portion at its lower end is used. As the outer packaging vessel 9, vessel is preferably provided with an overhang small bag 9a protruded at a position of an upper side portion corresponding to the film-shaped one-way pouring nozzle 1 and having the same form as the film-shaped one-way pouring nozzle so as to surround the nozzle. For example, the standing pouch is used.

[0117] Also, it is preferable that the outer packaging vessel 9 is heat-sealed at its top portion together with a top portion of the liquid material-filled packaging body 8 to be housed as shown in Fig. 6, or can exchangeably house the liquid material-filled packaging body by rendering the top portion into closable state with a chuck 17 or the like as shown in Fig. 7.

[0118] In the invention a combination of the aforementioned non-self standing type flexible package bag and standing pouch is preferable. A liquid material-filled packaging structure 20 is obtained by such a combination.

[0119] In the liquid material-filled packaging structure 20 according to the invention, the self-standing type outer packaging vessel 9 is preferably used in the form of standing pouch, for example, by using a laminate film comprising a uniaxially or biaxially oriented base film layer and a sealant layer in which the base film is a polyethylene terephthalate film layer or a nylon resin film layer and the sealant layer is a polyethylene layer or a polypropylene layer.

[0120] In the invention, however, at least a main body portion of the outer packaging vessel 9 may be another self-standing cylindrical plastic vessel in addition to the bag-shaped standing pouch made from the soft film.

[0121] In the overhang small bag 9a located at an upper and side portion of the self-standing type outer packaging

vessel 9 and surrounding the nozzle 1 are disposed tear guide perforations 15 made from opening means such as 1-notch, V-notch, U-notch, base notch, diamond cut or the like at a position corresponding to the tear-opening portion of the film-shaped one-way pouring nozzle to form a cut-removing portion 19 for exposing the film-shaped pouring nozzle 1 as shown in Figs. 6 and 7. The cut-removing portion 19 is cut off for opening, whereby the non-self standing type flexible package bag housed in its interior or the protruding portion of the film-shaped one-way pouring nozzle 1 protruded from the liquid material-filled packaging body 8 can be exposed, and further the pouring nozzle 1 is opened to provide in use.

[0122] In the invention, the liquid material-filled packaging body 8 is housed in the standing pouch 9 and, if necessary, the horizontal seal portion 8a of its upper end part is fused to an upper side portion 9b of the standing pouch 9 partially (spot) or over full width through heat sealing as shown in Fig. 6, whereby the packaging body is housed at a suspension state. In this case, the liquid material-filled packaging body 8 filled with the liquid material can be kept in the standing pouch 9 at a firmly fixed state but also the smooth pouring of the liquid packing material is promoted.

[0123] In the liquid material-filled packaging structure 20 of Fig. 6, the liquid material-filled packaging body 8 can be protected sufficiently from various shocks during the handling or transportation, while the position shifting of the liquid material-filled packaging body 8 is not caused and the occurrence of pinhole and the like or the deformation, breakage and further miss-opening of the film-shaped one-way pouring nozzle 1 can be prevented.

[0124] After the liquid material-filled packaging body 8 is housed in the standing pouch 9, it is preferable to fix or attach one or more places of the vicinity of the film-shaped one-way pouring nozzle 1, the vicinity of the bottom portion or upper portion of the packaging body 8 or the upper portion of the package bag main body 2 and further the bottom portion thereof to the standing pouch 9, which is effective for smoothly pouring the liquid packing material until the end.

INDUSTRIAL APPLICABILITY

[0125] The technique of the invention is applicable to not only the package bag provided with the film-shaped one-way pouring nozzle but also usual liquid material-filled packaging bodies, especially a packaging structure formed by housing a refill soft package bag integrally united with a usual liquid pouring port in a package bag main body.

Claims

1. A flexible package bag provided with a nozzle (1) of a non-return function comprising a package bag main body (2) formed by seal-joining front-side and rear-side flexible laminate films, and a film-shaped one-way pouring nozzle (1) protruded from a side portion of the package bag main body (2) and formed by closing a pair of overlapping plastic films (3, 4) to each other in the presence of a liquid packing material, **characterized in that** at least an upper part of a non-sealed portion of at least one of the front-side and rear-side laminate films in the package bag main body (2) or a part thereof in the vicinity of a side edge of the film-shaped one-way pouring nozzle (1) is constructed with a laminate film having irregular inner surfaces (14), and that wet-treated layers (18, 18') are disposed on inner faces of inner sealant layers (6, 6') in the film-shaped one way pouring nozzle (1).
2. A flexible package bag provided with a nozzle (1) of a non-return function according to claim 1, wherein the irregular inner surface (14) formed in the laminate film is formed in a partial or full pattern by subjecting to embossing, blasting, knurling, wrinkling, or vertical-horizontal striping in the form of plane, island or stripe.
3. A flexible package bag provided with a nozzle (1) of a non-return function according to claim 1 or 2, wherein the film-shaped one-way pouring nozzle (1) is formed by fusing two overlapping soft plastic films (3, 4) to each other at a peripheral edge portion other than a portion corresponding to a base end portion of the nozzle (1) so as to constitute a central portion thereof as a pouring path (13) and integrally uniting with the package bag main body (2), and generates a non-return function blocking penetration of ambient air by a closing action between mutual inner faces of the plastic films (3, 4) based on a fact that when the package bag main body (2) is tilted to pour a liquid packing material therefrom, the pouring path (13) is rendered into a wet state due to the passing of the liquid packing material to attach the liquid packing material to the inner face of the pouring path (13).
4. A flexible package bag provided with a nozzle (1) of a non-return function according to any one of claims 1 to 3, wherein the film-shaped one-way pouring nozzle (1) has an irregular inner surface (14) in at least one of the front-side and rear-side overlapping plastic films (3, 4) at a side of a base end portion of the nozzle (1) other than a predetermined tearing position of the nozzle (1) and a vicinity thereof.

5. A flexible package bag provided with a nozzle (1) of a non-return function according to any one of claims 1 to 4, wherein at the base end portion of the film-shaped one-way pouring nozzle (1) are temporarily fused opposite sealant layers of the overlapping plastic films (3, 4) at a lower temperature to temporarily seal the inner face of the pouring path (13).
6. A flexible package bag provided with a nozzle (1) of a non-return function according to any one of claims 1 to 5, wherein the package bag main body (2) has a gas reserving space (11) at a position of an upper and side sealing portion thereof higher than an upper edge of the film-shaped one-way pouring nozzle (1).
7. A liquid material-filled packaging structure comprising
a non-self supporting type liquid material-filled packaging body (8) formed by deaeration-packing a liquid or viscous packing material into a non-self supporting type flexible package bag comprised of a package bag main body (2) formed by seal-joining front-side and rear-side flexible laminate films and a film-shaped one-way pouring nozzle (1) protruded from a side portion of the package bag main body (2) and formed by closing a pair of overlapping plastic films (3, 4) to each other in the presence of a liquid packing material,
characterized in that
at least an upper part of a non-sealed portion of at least one of the front-side and rear-side laminate films in the package bag main body (2) or a part thereof in the vicinity of a side edge of the film-shaped one-way pouring nozzle (1) is constructed with a laminate film having irregular inner surfaces (14),
and a self-supporting type outer cylindrical packaging vessel (9) for housing the non-self supporting type liquid material-filled packaging body (8) which is provided at its one-side portion with tear-guide perforations (15) for nozzle (1) drawing for exposablely housing the film-shaped one-way pouring nozzle (1) and exposing a tip portion of the nozzle (1) to protrude an openable overhang small bag (9a) and dispose a self-supportable bottom plate, and that wet-treated layers (18, 18') are disposed on inner faces of inner sealant layers (6, 6') in the film-shaped one way pouring nozzle (1).
8. A liquid material-filled packaging structure provided with a nozzle (1) of a non-return function according to claim 7, wherein the irregular inner surface (14) formed in the laminate film is formed in a partial or full pattern by subjecting to embossing, blasting, knurling, wrinkling, or vertical-horizontal striping in the form of plane, island or stripe.
9. A liquid material-filled packaging structure provided with a nozzle (1) of a non-return function according to claim 7 or 8, wherein the film-shaped one-way pouring nozzle (1) is formed by fusing two overlapping plastic films (3, 4) to each other at a peripheral edge portion other than a portion corresponding to a base end portion of the nozzle (1) so as to constitute a central portion thereof as a pouring path (13) and integrally uniting with the package bag main body (2), and generates a non-return function blocking penetration of ambient air by a closing action between mutual inner faces of the plastic films (3, 4) based on a fact that when the package bag main body (2) is tilted to pour a liquid packing material therefrom, the pouring path (13) is rendered into a wet state due to the passing of the liquid packing material to attach the liquid packing material to the inner face of the pouring path (13).
10. A liquid material-filled packaging structure provided with a nozzle (1) of a non-return function according to any one of claims 7 to 9, wherein the film-shaped one-way pouring nozzle (1) has an irregular inner surface (14) in at least one of the front-side and rear-side overlapping plastic films (3, 4) at a side of a base end portion of the nozzle (1) other than a predetermined tearing position of the nozzle (1) and a vicinity thereof.
11. A liquid material-filled packaging structure provided with a nozzle (1) of a non-return function according to any one of claims 7 to 10, wherein at the base end portion of the film-shaped one-way pouring nozzle (1) are temporarily fused opposite sealant layers of the overlapping plastic films (3, 4) at a lower temperature to temporarily seal the inner face of the pouring path (13).
12. A liquid material-filled packaging structure provided with a nozzle (1) of a non-return function according to any one of claims 7 to 11, wherein the package bag main body (2) has a gas reserving space (11) at a position of an upper and side sealing portion thereof higher than an upper edge of the film-shaped one-way pouring nozzle (1).
13. A liquid material-filled packaging structure according to any one of claims 7 to 12, wherein the non-self supporting liquid-filled packaging body (8) is housed and kept in the self-supporting type outer package bag (9) at a suspended state by fusing a horizontal seal portion (8a) at an upper end part of the packaging body (8) to an upper end portion of the outer package bag (9b).

14. A liquid material-filled packaging structure according to any one of claims 7 to 12, wherein the self-supporting outer cylindrical packaging vessel (9) has a flat bottom portion (16) at its lower end portion and is a flexible package bag made from an openable soft laminate film for exchanging the non-self supporting type liquid material-filled packaging body (8).

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Patentansprüche

1. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, umfassend einen Verpackungsbeutel-Hauptkörper (2), der durch dichtendes Verbinden einer vorderseitigen und rückseitigen flexiblen Laminatfolie ausgebildet ist, und eine folienförmige Einweg-Ausgießdüse (1), die von einem Seitenabschnitt des Verpackungsbeutel-Hauptkörpers (2) hervorragt und durch Verschließen zweier überlappender Kunststofffolien (3, 4) miteinander in Gegenwart eines flüssigen verpackten Materials ausgebildet ist,
- dadurch gekennzeichnet, dass
- wenigstens ein oberer Teil eines nicht abgedichteten Abschnittes der vorderseitigen und/oder der rückseitigen Laminatfolie in dem Verpackungsbeutel-Hauptkörper (2) oder ein Teil desselben in der Nähe eines Seitenrandes der folienförmigen Einweg-Ausgießdüse (1) aus einer Laminatfolie aufgebaut ist, die unregelmäßige Innenflächen (14) hat,
- und dass benetzte Schichten (18, 18') auf den Innenflächen innerer Dichtungsschichten (6, 6') in der folienförmigen Einweg-Ausgießdüse (1) angeordnet sind.
2. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach Anspruch 1, bei dem die unregelmäßige Innenfläche (14), die in der Laminatfolie ausgebildet ist, in einem partiellen oder vollständigen Muster durch Prägen, Strahlen, Rändeln, Falten oder vertikal-horizontales Abstreifen in Gestalt einer Ebene, einer Insel oder eines Streifens ausgebildet ist.
3. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach Anspruch 1 oder 2, bei dem die folienförmige Einweg-Ausgießdüse (1) durch Verschmelzen zweier überlappender weicher Kunststofffolien (3, 4) miteinander an einem anderen Umfangsrandabschnitt als einem Abschnitt ausgebildet ist, der einem Basisendabschnitt der Düse (1) entspricht, um so aus einem zentralen Abschnitt desselben einen Ausgießweg (13) zu bilden und mit dem Verpackungsbeutel-Hauptkörper (2) integral zu vereinigen, und eine Rücklaufstoppfunktion erzeugt, die das Eindringen von Umgebungsluft durch eine Schließfähigkeit zwischen wechselseitigen Innenflächen der Kunststofffolien (3, 4) auf der Basis der Tatsache verhindert, dass, wenn der Verpackungsbeutel-Hauptkörper (2) geneigt wird, um ein flüssiges verpacktes Material aus diesem auszugießen, der Ausgießweg (13) in einen benetzten Zustand infolge des Durchgangs des flüssigen verpackten Materials versetzt wird, um das flüssige verpackte Material an der Innenfläche des Ausgießweges (13) anhaften zu lassen.
4. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 1 bis 3, bei dem die folienförmige Einweg-Ausgießdüse (1) eine unregelmäßige Innenfläche (14) auf den vorderseitigen und/oder den rückseitigen überlappenden Kunststofffolien (3, 4) auf einer anderen Seite eines Basisendabschnittes der Düse (1) als einer vorbestimmten Auftrennposition der Düse (1) und einer Nähe derselben hat.
5. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 1 bis 4, bei dem an dem Basisendabschnitt der folienförmigen Einweg-Ausgießdüse (1) gegenüberliegende Dichtungsschichten der überlappenden Kunststofffolien (3, 4) mit einer geringeren Temperatur vorübergehend verschmolzen sind, um die Innenfläche des Ausgießweges (13) vorübergehend abzudichten.
6. Flexibler Verpackungsbeutel, der mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 1 bis 5, bei dem der Verpackungsbeutel-Hauptkörper (2) einen Gasaufnahmeaum (11) an einer Position eines oberen und seitlichen Dichtungsabschnittes desselben aufweist, die höher gelegen ist als ein oberer Rand der folienförmigen Einweg-Ausgießdüse (1).
7. Mit flüssigem Material gefüllte Verpackungsstruktur, umfassend:
- einen nicht selbsttragenden, mit einem flüssigen Material gefüllten Verpackungskörper (8), der durch Verpacken eines flüssigen oder viskosen zu verpackenden Materials unter Luftausschluss in einem nicht selbsttragenden

flexiblen Verpackungsbeutel ausgebildet ist, der aus einem Verpackungsbeutel-Hauptkörper (2), der durch dichtendes Verbinden einer vorderseitigen und rückseitigen flexiblen Laminatfolie ausgebildet ist, und einer folienförmigen Einweg-Ausgießdüse (1) besteht, die von einem Seitenabschnitt des Verpackungsbeutel-Hauptkörpers (2) hervorragt und durch Verschließen zweier überlappender Kunststofffolien (3, 4) miteinander in

dadurch gekennzeichnet, dass

wenigstens ein oberer Teil eines nicht abgedichteten Abschnittes der vorderseitigen und/oder der rückseitigen Laminatfolie in dem Verpackungsbeutel-Hauptkörper (2) oder ein Teil desselben in der Nähe eines Seitenrandes der folienförmigen Einweg-Ausgießdüse (1) aus einer Laminatfolie aufgebaut ist, die unregelmäßige Innenflächen (14) hat,

ein selbsttragender, äußerer zylindrischer Verpackungsbehälter (9) für die Aufnahme des nicht selbsttragenden, mit dem flüssigen Material gefüllten Verpackungskörpers (8) vorgesehen ist, der an seinem Abschnitt der einen Seite mit Reißführungsp perforationen (15) versehen ist, um die Düse (1) herauszuziehen und so die filmförmige Einweg-Ausgießdüse (1) freiliegend aufzunehmen und einen Spitzenabschnitt der Düse (1) freizulegen, damit diese über einen offenbaren auskragenden kleinen Beutel (9a) hervorragt und eine selbsttragende Bodenplatte einrichtet, und

die benetzten Schichten (18, 18') auf Innenflächen innerer Dichtungsschichten (6, 6') in der folienförmigen Einweg-Ausgießdüse (1) angeordnet sind.

8. Mit flüssigem Material gefüllte Verpackungsstruktur, die mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach Anspruch 7, bei der die unregelmäßige Innenfläche (14), die in der Laminatfolie ausgebildet ist, in einem partiellen oder vollständigen Muster durch Prägen, Strahlen, Rändeln, Falten oder vertikal-horizontales Abstreifen in Gestalt einer Ebene, einer Insel oder eines Streifens ausgebildet ist.

9. Mit flüssigem Material gefüllte Verpackungsstruktur, die mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach Anspruch 7 oder 8, bei der die folienförmige Einweg-Ausgießdüse (1) durch Verschmelzen zweier überlappender Kunststofffolien (3, 4) miteinander an einem anderen Umfangsrandabschnitt als einem Abschnitt ausgebildet ist, der einem Basisendabschnitt der Düse (1) entspricht, um so aus einem zentralen Abschnitt desselben einen Ausgießweg (13) zu bilden und mit dem Verpackungsbeutel-Hauptkörper (2) integral zu vereinigen, und eine Rücklaufstoppfunktion erzeugt, die das Eindringen von Umgebungsluft durch eine Schließfähigkeit zwischen wechselseitigen Innenflächen der Kunststofffolien (3, 4) auf der Basis der Tatsache verhindert, dass, wenn der Verpackungsbeutel-Hauptkörper (2) geneigt wird, um ein flüssiges verpacktes Material aus diesem auszugießen, der Ausgießweg (13) in einen benetzten Zustand infolge des Durchgangs des flüssigen verpackten Materials versetzt wird, um das flüssige verpackte Material an der Innenfläche des Ausgießweges (13) anhaften zu lassen.

10. Mit flüssigem Material gefüllte Verpackungsstruktur, die mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 7 bis 9, bei der die folienförmige Einweg-Ausgießdüse (1) eine unregelmäßige Innenfläche (14) auf den vorderseitigen und/oder den rückseitigen überlappenden Kunststofffolien (3, 4) auf einer anderen Seite eines Basisendabschnittes der Düse (1) als einer vorbestimmten Reißposition der Düse (1) und einer Nähe derselben hat.

11. Mit flüssigem Material gefüllte Verpackungsstruktur, die mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 7 bis 10, bei der an dem Basisendabschnitt der folienförmigen Einweg-Ausgießdüse (1) gegenüberliegende Dichtungsschichten der überlappenden Kunststofffolien (3, 4) bei einer geringeren Temperatur vorübergehend verschmolzen sind, um die Innenfläche des Ausgießweges (13) vorübergehend abzudichten.

12. Mit flüssigem Material gefüllte Verpackungsstruktur, die mit einer Düse (1) einer Rücklaufstoppfunktion versehen ist, nach einem der Ansprüche 7 bis 11, bei der der Verpackungsbeutel-Hauptkörper (2) einen Gasaufnahme-raum (11) an einer Position eines oberen und seitlichen Dichtungsabschnittes desselben aufweist, die höher gelegen ist als ein oberer Rand der folienförmigen Einweg-Ausgießdüse (1).

13. Mit flüssigem Material gefüllte Verpackungsstruktur nach einem der Ansprüche 7 bis 12, bei der der nicht selbsttragende, mit Flüssigkeit gefüllte Verpackungskörper (8) in dem selbsttragenden äußeren Verpackungsbeutel in einem aufgehängten Zustand aufgenommen und gehalten ist, indem ein horizontaler Dichtungsabschnitt (8a) an einem oberen Endteil des Verpackungskörpers (8) an einen oberen Endabschnitt des äußeren Verpackungskörpers (9b) geschmolzen ist.

14. Mit flüssigem Material gefüllte Verpackungsstruktur nach einem der Ansprüche 7 bis 12, bei der der selbsttragende,

äußere, zylindrische Verpackungsbehälter (9) einen flachen Bodenabschnitt (16) an seinem unteren Endabschnitt hat und ein flexibler Verpackungsbeutel ist, der aus einer öffenbaren weichen Laminatfolie besteht, um den nicht selbsttragenden, mit einem flüssigen Material gefüllten Verpackungskörper (8) zu wechseln.

5

Revendications

1. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour, comprenant
un corps principal de sac d'emballage (2) formé par l'assemblage par scellage de films stratifiés flexibles avant et
arrière, et
un embout verseur unidirectionnel en forme de film (1) qui dépasse d'une partie latérale du corps principal de sac
d'emballage (2) et qui est formé grâce à la fermeture, l'un sur l'autre, de deux films en matière plastique se recouvrant
(3, 4), en présence d'un produit liquide emballé,
caractérisé en ce qu'au moins une partie supérieure d'une partie non scellée du film stratifié avant et/ou arrière
dans le corps principal de sac d'emballage (2) ou une partie de celui-ci située près d'un bord latéral dudit embout
verseur unidirectionnel en forme de film (1) est construite avec un film stratifié présentant des surfaces intérieures
irrégulières (14),
et en ce que des couches traitées par voie humide (18, 18') sont disposées sur les faces intérieures de couches
d'étanchéité intérieures (6, 6') dans l'embout verseur unidirectionnel en forme de film (1).
2. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour selon la revendication 1, étant précisé que la
surface intérieure irrégulière (14) formée dans le film stratifié est formée suivant un motif partiel ou entier par
gaufrage, soufflage, moletage, plissage ou striage vertical-horizontale sous la forme d'un plan, d'un îlot ou d'un bande.
3. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour selon la revendication 1 ou 2, étant précisé
que l'embout verseur unidirectionnel en forme de film (1) est formé par la fusion, l'un sur l'autre, de deux films en
matière plastique souple se recouvrant (3, 4), sur une partie de bord périphérique autre qu'une partie correspondant
à une partie d'extrémité de base de l'embout (1), de manière à concevoir une partie centrale de celui-ci comme une
voie d'écoulement (13) et à relier ledit embout (1) d'une seule pièce au corps principal de sac d'emballage (2), et
produit une fonction antiretour qui empêche la pénétration d'air ambiant, grâce à une action de fermeture entre les
faces intérieures mutuelles des films en matière plastique (3, 4), sur la base du fait que lorsqu'on incline le corps
principal de sac d'emballage (2) pour verser à partir de celui-ci un produit emballé liquide, la voie d'écoulement (13)
retrouve un état humide en raison du passage du produit emballé liquide, pour fixer ledit produit à la face intérieure
de la voie d'écoulement (13).
4. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 1
à 3, étant précisé que l'embout verseur unidirectionnel en forme de film (1) a une surface intérieure irrégulière (14)
dans l'un au moins des films en matière plastique se recouvrant avant et arrière (3, 4), sur un côté d'une partie
d'extrémité de base de l'embout (1) autre qu'un point de déchirement prédéterminé de l'embout (1) et proche de
celui-ci.
5. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 1
à 4, étant précisé que sur la partie d'extrémité de base de l'embout verseur unidirectionnel en forme de film (1), des
couches d'étanchéité opposées des films en matière plastique se recouvrant (3, 4) sont temporairement fondues
à une température plus basse, pour sceller temporairement la face intérieure de la voie d'écoulement (13).
6. Sac d'emballage flexible pourvu d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 1
à 5, étant précisé que le corps principal de sac d'emballage (2) a un espace de réserve de gaz (11) à un endroit
d'une partie d'étanchéité supérieure et latérale du corps (2) qui est situé plus haut qu'un bord supérieur de l'embout
verseur unidirectionnel en forme de film (1).
7. Structure d'emballage remplie d'un produit liquide, comprenant
un corps d'emballage du type non autoportant (8) rempli de produit liquide, que l'on forme en emballant, avec
élimination de l'air, un produit liquide ou visqueux dans un sac d'emballage flexible du type non autoportant formé
d'un corps principal de sac d'emballage (2) formé par l'assemblage par scellage de films stratifiés avant et arrière,
et d'un embout verseur unidirectionnel en forme de film (1) qui dépasse d'une partie latérale du corps principal de
sac d'emballage (2) et qui est formé grâce à la fermeture, l'un sur l'autre, de deux films en matière plastique se
recouvrant (3, 4), en présence d'un produit liquide emballé,

caractérisée en ce qu'au moins une partie supérieure d'une partie non scellée du film stratifié avant et/ou arrière dans le corps principal de sac d'emballage (2) ou une partie de celui-ci située près d'un bord latéral dudit embout verseur unidirectionnel en forme de film (1) est construite avec un film stratifié présentant des surfaces intérieures irrégulières (14),

et un récipient d'emballage cylindrique extérieur du type autoportant (9) pour recevoir le corps d'emballage de type non autoportant (8) rempli de produit liquide, qui est pourvu sur un côté de perforations de déchirement (15) pour enlever l'embout (1) afin de loger ledit embout (1) de manière à pouvoir le dégager, et pour dégager une partie de pointe de l'embout (1) de telle sorte qu'un petit sachet saillant apte à être ouvert (9a) dépasse, avec une plaque inférieure autoportante, et

en ce que des couches traitées par voie humide (18, 18') sont disposées sur les faces intérieures de couches d'étanchéité intérieures (6, 6') dans l'embout verseur unidirectionnel en forme de film (1).

8. Structure d'emballage remplie d'un produit liquide pourvue d'un embout (1) à fonction antiretour selon la revendication 7, étant précisé que la surface irrégulière (14) formée dans le film stratifié est formée suivant un motif partiel ou entier, par gaufrage, soufflage, moletage, plissage ou striage vertical-horizontale sous la forme d'un plan, d'un îlot ou d'un bande.

9. Structure d'emballage remplie d'un produit liquide pourvue d'un embout (1) à fonction antiretour selon la revendication 7 ou 8, étant précisé que l'embout verseur unidirectionnel en forme de film (1) est formé par la fusion, l'un sur l'autre, de deux films en matière plastique se recouvrant (3, 4) sur une partie de bord périphérique autre qu'une partie correspondant à une partie d'extrémité de base de l'embout (1), de manière à concevoir une partie centrale de celui-ci comme une voie d'écoulement (13) et à relier ledit embout (1) d'une seule pièce au corps principal de sac d'emballage (2), et produit une fonction antiretour qui empêche la pénétration d'air ambiant, grâce à une action de fermeture entre les faces intérieures mutuelles des films en matière plastique (3, 4), sur la base du fait que lorsqu'on incline le corps principal de sac d'emballage (2) pour verser à partir de celui-ci un produit emballé liquide, la voie d'écoulement (13) retrouve un état humide en raison du passage du produit emballé liquide, pour fixer ledit produit à la face intérieure de la voie d'écoulement (13).

10. Structure d'emballage remplie d'un produit liquide, pourvue d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 7 à 9, étant précisé que l'embout verseur unidirectionnel en forme de film (1) a une surface intérieure irrégulière (14) dans l'un au moins des films en matière plastique se recouvrant avant et arrière (3, 4), sur un côté d'une partie d'extrémité de base de l'embout (1) autre qu'un point de déchirement prédéterminé de l'embout (1) et proche de celui-ci.

11. Structure d'emballage remplie d'un produit liquide pourvue d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 7 à 10, étant précisé que sur la partie d'extrémité de base de l'embout verseur unidirectionnel en forme de film (1), des couches d'étanchéité opposées des films en matière plastique se recouvrant (3, 4) sont temporairement fondues à une température plus basse, pour sceller temporairement la face intérieure de la voie d'écoulement (13).

12. Structure d'emballage remplie d'un produit liquide pourvue d'un embout (1) à fonction antiretour selon l'une quelconque des revendications 7 à 11, étant précisé que le corps principal de sac d'emballage (2) a un espace de réserve de gaz (11) à un endroit d'une partie d'étanchéité supérieure et latérale du corps (2) qui est situé plus haut qu'un bord supérieur de l'embout verseur unidirectionnel en forme de film (1).

13. Structure d'emballage remplie d'un produit liquide selon l'une quelconque des revendications 7 à 12, étant précisé que le corps d'emballage autoportant (8) rempli de liquide est logé et maintenu dans le sac d'emballage extérieur du type autoportant (9) dans un état suspendu, grâce à la fusion d'une partie d'étanchéité horizontale (8a), au niveau d'une partie d'extrémité supérieure du corps d'emballage (8), sur une partie d'extrémité supérieure du sac d'emballage extérieur (9b).

14. Structure d'emballage remplie d'un produit liquide selon l'une quelconque des revendications 7 à 12, étant précisé que le récipient d'emballage cylindrique extérieur autoportant (9) a une partie formant fond plat (16) sur sa partie d'extrémité inférieure, et est constitué par un sac d'emballage flexible composé d'un film stratifié souple apte à être ouvert, pour échanger le corps d'emballage du type non autoportant (8) rempli de produit liquide.

Fig. 1

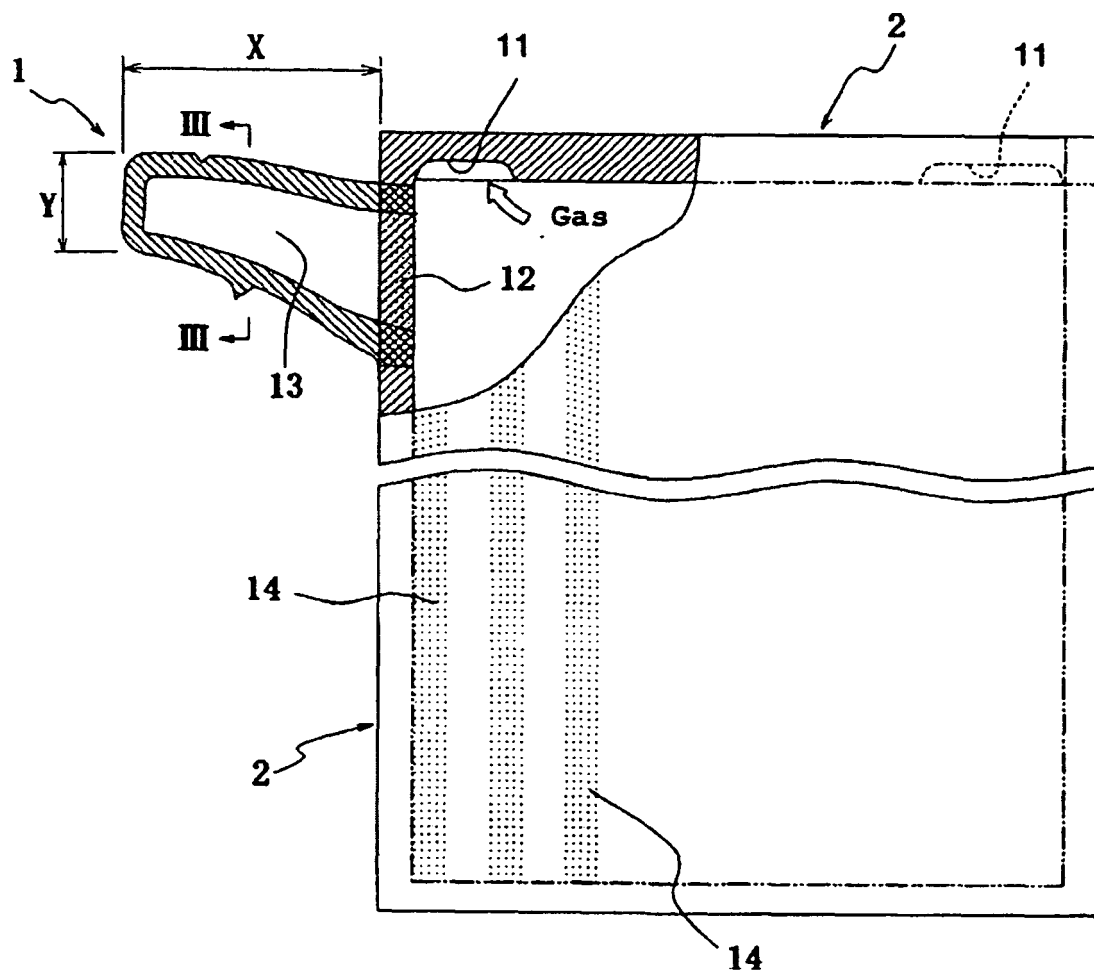


Fig. 2(a)

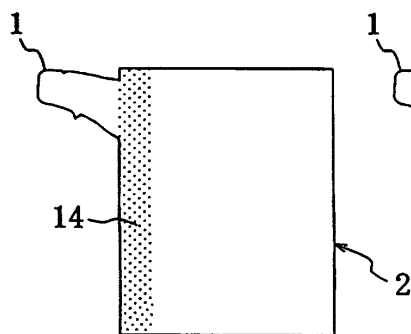


Fig. 2(b)

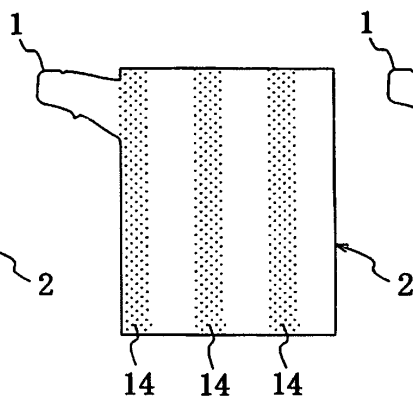


Fig. 2(c)

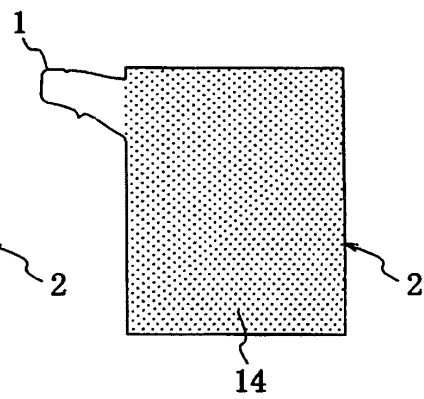


Fig. 2(d)

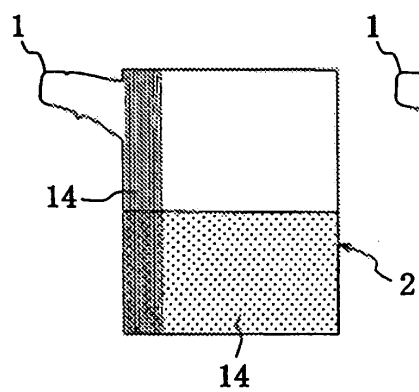


Fig. 2(e)

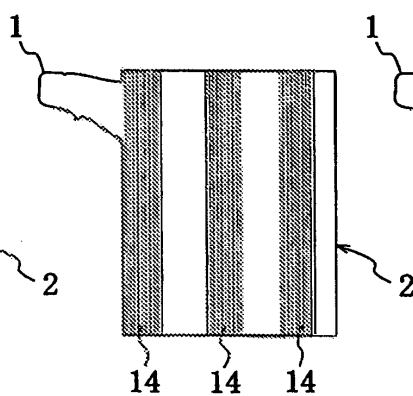


Fig. 2(f)

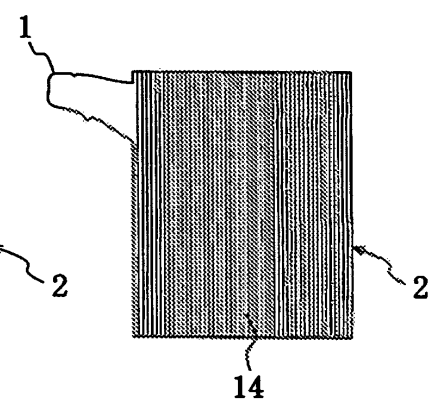


Fig. 3

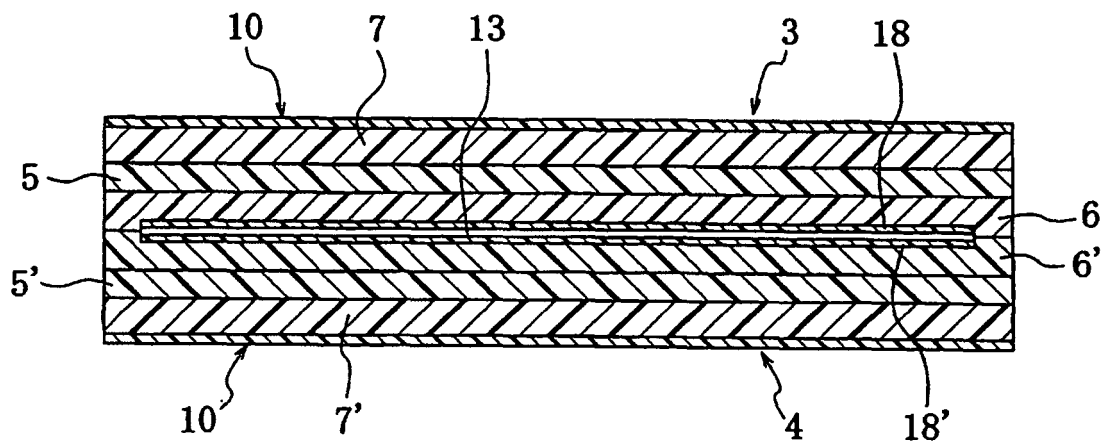


Fig. 4

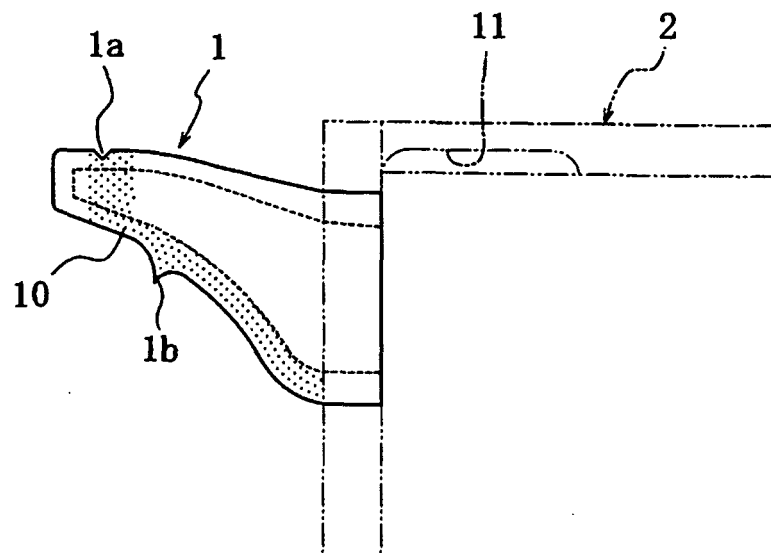


Fig. 5

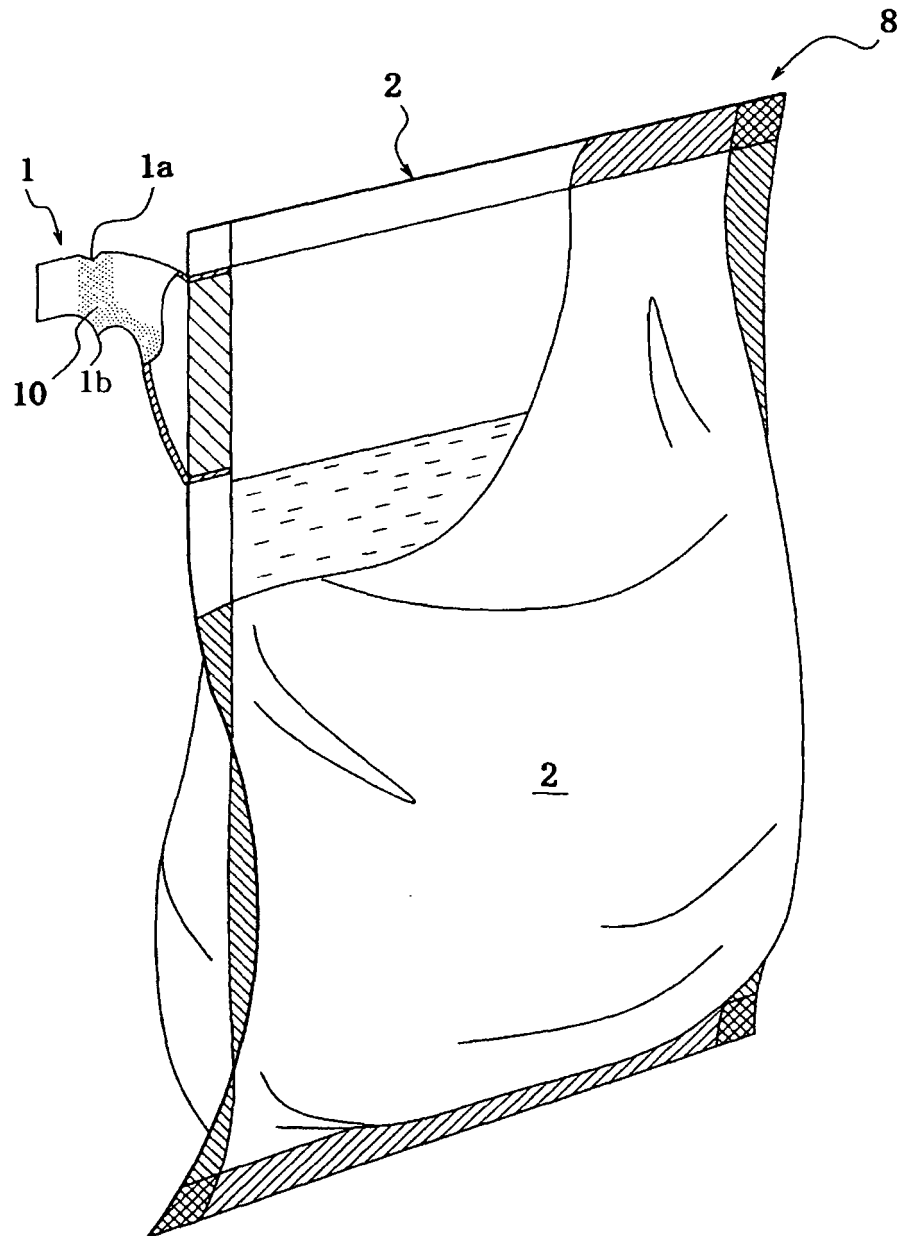


Fig. 6

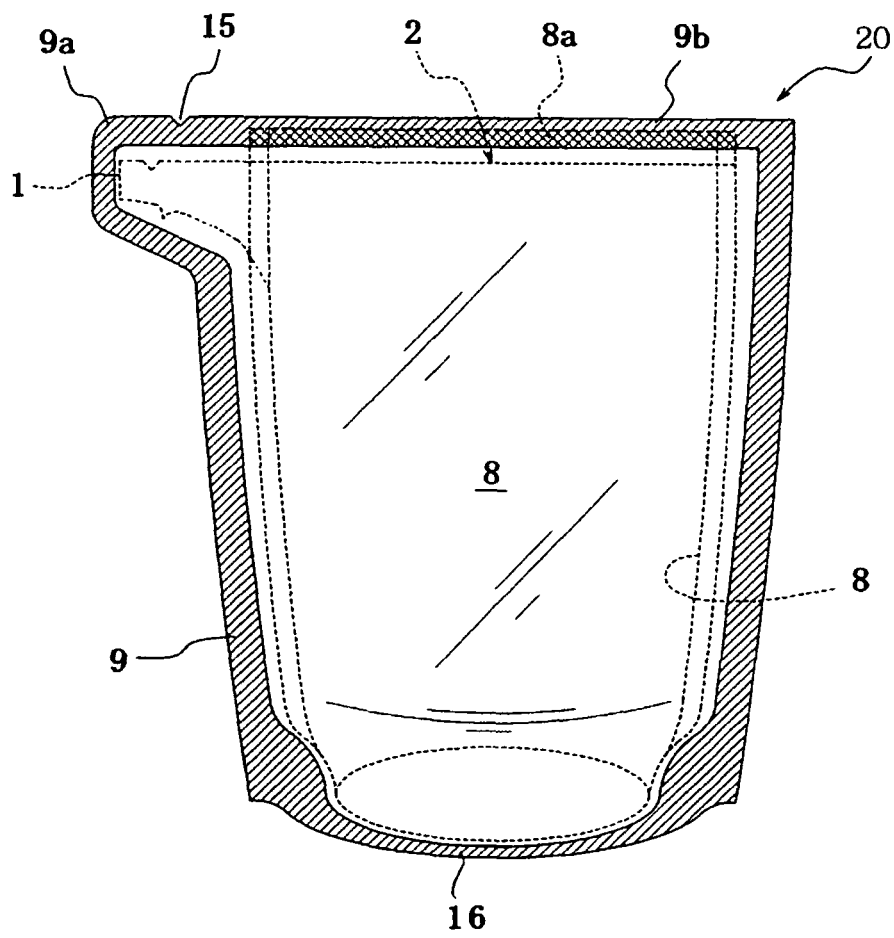
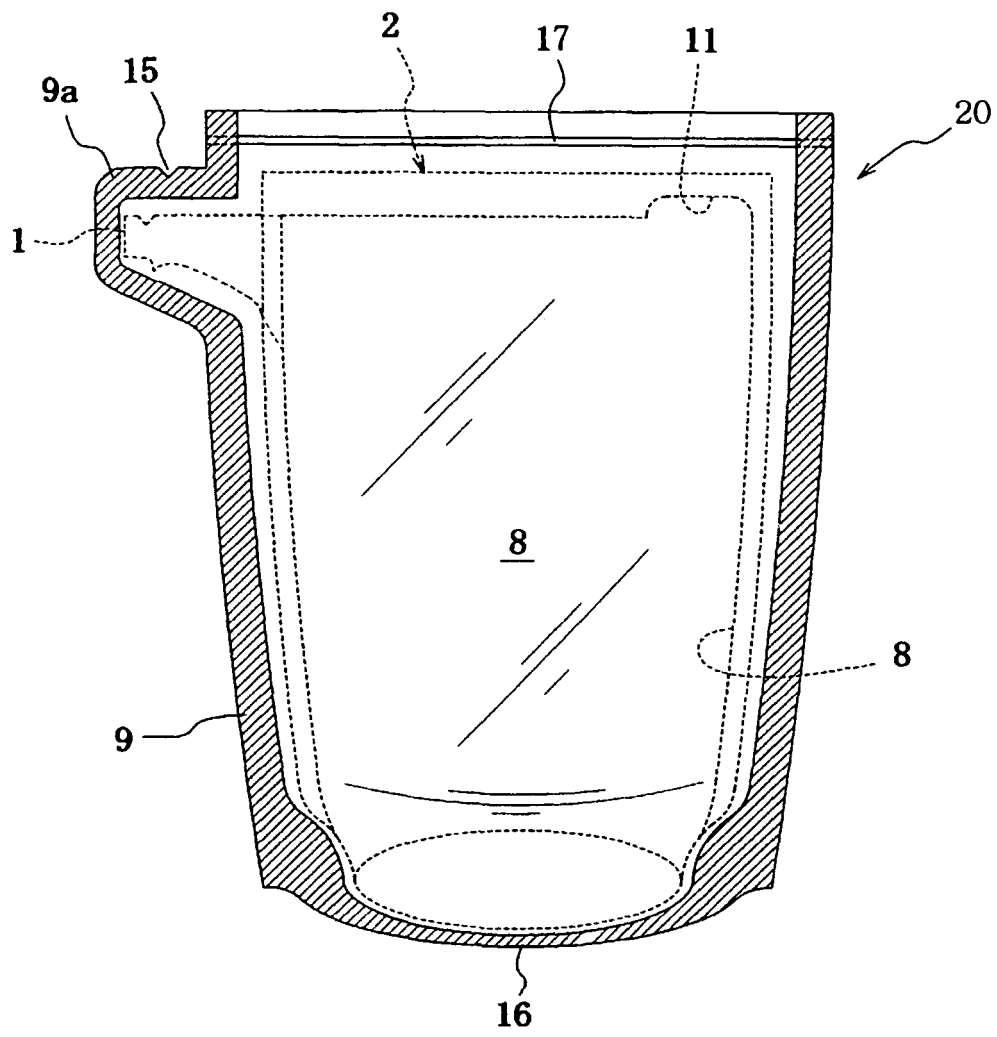


Fig. 7



REFERENCES CITED IN THE DESCRIPTION

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