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(54) **A METHOD FOR THE MANUFACTURE OF A FILLING AND EMPTYING OPENING FOR A LIQUID PACKING CONTAINER**

VERFAHREN ZUM HERSTELLEN EINER ÖFFNUNG ZUM FÜLLEN UND ENTLEEREN EINES
FLÜSSIGKEITS VERPACKUNGSBEHÄLTERS

PROCEDE DE FABRICATION D'UN ORIFICE DE REMPLISSAGE ET DE VIDAGE UTILE POUR UN
CONTENEUR DE CONDITIONNEMENT DE LIQUIDE

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Description

Background to the invention

[0001] The invention relates to a method of making a fill and/or drain opening to a packaging container intended for liquid material, which packaging container either partially or entirely is made of a packaging laminate comprising layers of fibre-based material and thermoplastic, and which opening is later equipped with a detachable pull tab, in which method

a hole of predetermined size and shape is formed on a basic laminate comprising at least one support layer of fibre-based material and at least one first thermoplastic layer,

the hole in the basic laminate and the edges of the hole are covered on the side of the basic laminate comprising at least one first thermoplastic layer with at least one second thermoplastic layer,

the surface of the basic laminate opposite to the at least one first thermoplastic layer is laminated with at least one third thermoplastic layer,

at least the second and the third thermoplastic layers attached to opposite sides of the hole in the basic laminate are joined together at the area of the hole with the help of heat and pressure, and

a fill and/or drain opening is formed centrally with respect to the hole in the basic laminate so that the opening is smaller than the hole in the basic laminate whereupon at least a part of the thermoplastic layers joined together at the area of the hole in the basic laminate is left to cover the untreated edge of said hole.

[0002] EP-A-0 686 567 discloses the features in the preamble of claim 1.

[0003] Disposable liquid packaging containers are nowadays used more and more in the packaging of liquid food stuffs, such as milk, juice and wine. Usually these packaging containers are made of a prefabricated laminated packaging material comprising a support layer of liquid packaging board which is covered on at least one side and typically on both sides with thin liquid- and gas-tight thermoplastic layers, for example polyethylene layers.

[0004] Liquid packaging containers are usually also equipped with an opening device of some type, for example a tear-off or cutoff indication or a detachable pull tab which is attached liquid- and gas-tightly on top of the drain opening. Typical examples of liquid packaging containers equipped with opening devices of this type are disclosed, for example, in the US-A-5 653 383 and SE publication 441 666.

[0005] An opening device which comprises a drain opening preperforated through the material and a detachable pull tab attached on top of the opening liquid- and gas-tightly, has several advantages since it is easy to use, it can be attached to the packaging material beforehand and it is inexpensive in costs. However, in the packaging of liquid filling materials, special attention

should be paid to an efficient isolation of the untreated edge of the packaging laminate exposed in the perforation from the filling agent, since otherwise the filling agent is absorbed to the fibrous support layer impairing the tightness, strength and appearance of the laminate. To prevent absorption it is therefore common that, in addition to the detachable pull tab, a drain opening is also equipped with an internal thermoplastic layer which is placed on the side of the packaging laminate in contact with the filling agent and which covers both the drain opening and the area surrounding the opening. The cover layer is then attached to the pull tab through the drain opening so that the cover layer is torn when the pull tab is removed enabling the discharge of the filling agent through the drain opening. However, then the previously closed untreated edge of the laminate becomes exposed again and filling agent is absorbed to the fibrous support layer during the discharge procedure. This is not desirable for hygienic and esthetic reasons.

[0006] In the packaging of sterile filling agents such as sterile milk and sterile juice, aseptic containers are used the structures of which are mainly similar to what is described above. The packaging laminate nevertheless comprises one or several additional layers to improve gas-tightness. Aluminium foil and thermoplastic, for example polyethylene, are usually used as a gas barrier. Then it becomes particularly important to avoid contact between the filling agent and metal, not only during storage in a closed container but also during the discharge phase and when storing the remaining filling agent in the opened container. This concerns especially acidic filling agents, such as juice and wine, because a contact between these filling agents and metal causes a chemical change which affects the taste of the product.

[0007] Prior art solutions to avoid the aforesaid problems in aseptic packaging containers equipped with detachable pull tabs have been quite complicated and comprised an internal cover layer the function of which has been to prevent contact of filling agent with the untreated edge of the pour spout and to ensure that an adequate gas barrier is formed between the filling agent and said untreated edge. A substantial limitation of the prior art solutions has also been that the drain opening equipped with an internal cover layer can not be used as the fill opening of the packaging container since the cover layer has to be attached to the laminate already during its manufacturing stage thus closing the opening. This type of a structure is presented, for example in the SE publication 441 666 already mentioned above.

[0008] From the above-mentioned US-A-5 653 383 on the other hand, opening arrangements are known which at least in principle would be suitable for use as fill openings as well, since in them the pull tab is located only on the external surface of the packaging container. The solutions described nevertheless involve certain problems related both to the opening arrangement itself and the general structure of the packaging material.

When both the closing of the untreated edge and the closing flap itself are realised with the help of separate flaps fitted only at the area of the hole in the basic laminate, the opening when closed is formed so much thicker than the rest of the packaging laminate that the rolls used in the storage of packaging material are no longer usable. On the other hand, the closing of the untreated edge with a separate flap means that the packaging laminate through which a hole for the manufacture of the drain opening is perforated must already as such meet the requirements set in relation to gas- and liquid-tightness at least as far as the outer surface of the container is concerned, since the flap in question does not contribute to the meeting of these requirements. Such a flap used in the closing of the untreated edge also has to be separately aligned in relation to the hole in the packaging laminate and attached to the edges of the hole, which makes the manufacture also in this part a complex process demanding precision.

Brief description of the invention

[0009] The purpose of this invention is to provide a method for making a fill and/or drain opening that involves none of the problems mentioned above. A method according to the invention is characterized in that said at least one second thermoplastic layer, which is used to close the untreated edge of the hole in the basic laminate on the side of the basic laminate which already has at least one thermoplastic layer, is laminated over the entire basic laminate. With this method several substantial advantages are achieved. One of the most central of these advantages is that the thermoplastic layer already in the basic laminate and the thermoplastic layer laminated on top of it and used in the closing of the untreated edge can be optimized in relation to properties. Thus the thermoplastic layer already in the basic laminate can be selected as such that it has optimal adherence to the basic layer of fibre-based material even at the expense of other properties such as gas- and liquid-tightness. These properties can then be taken care of with the help of a thermoplastic layer used in the closing of the untreated edge. It is known that foils with the best barrier properties adhere best to thermoplastic layers and not so much to layers of fibre-based material such as board. On the other hand, the foil used in the closing of the untreated edge can now be selected better also in relation to the properties important in view of closing the untreated edge of the fibre layer as gas- and liquid-tightly as possible. Furthermore the layer used in the closing of the untreated edge can be laminated in an entirely conventional manner since it is now intended to cover the entire basic laminate and no special solutions are required to align it in relation to the hole in the basic laminate.

[0010] The third thermoplastic layer to be laminated on the surface of the basic laminate opposite to the first thermoplastic layer forming a part of the basic laminate

is extruded as a barrier multi layer foil comprising ethylene alpha olefin. Preferably at least one layer of the barrier multi layer foil settling against the support layer of fibre-based material comprises over 50%, such as 80% ethylene alpha olefin. This way an optimal adherence to the support layer of fibre-based material is achieved and also good barrier properties so that the thermoplastic creating the barrier properties is not the outermost layer.

[0011] To improve barrier properties or to create them, if other thermoplastic layers do not have this property, the first thermoplastic layer forming a part of the basic laminate can comprise ethylene alpha olefin.

[0012] To achieve barrier properties it is also possible to proceed so that at least one second thermoplastic layer to be laminated on top of the first thermoplastic layer forming a part of the basic laminate is extruded as a barrier multi layer foil.

[0013] Since gas- and liquid-tightness thus is now achieved at least for the outer surface of the packaging laminate with the help of at least two thermoplastic layers, the properties of the thermoplastic layer participating in the closing of the untreated edge can be optimised also in relation to a procedure where a fill and/or drain opening is formed by bringing the thermoplastic layers covering the hole in the basic laminate to purse up to the edges of the hole and by treating them so that they are shaped and will close gas- and liquid-tightly the untreated edge of the hole in the basic laminate between them. This way all the plastic around the area of the hole is brought to participate in the closing of the untreated edge which makes the closing extremely reliable. The pursing up can be encouraged by blowing hot air to the centre of the hole in the basic laminate.

[0014] It is also possible to proceed more conventionally to form the opening so that the opening is formed by punching and that the remaining parts of at least the second and third thermoplastic layers joined together and bordering the formed opening are heated to a plasticizing temperature and treated so that they are shaped and will close gas- and liquid-tightly the untreated edge of the hole in the basic laminate between them.

[0015] According to the invention, the closing of the opening is carried out with a detachable pull tab attached from the outside and therefore the opening can preferably be used both as a fill opening and as a drain opening.

Brief description of the figures

[0016] In the following, the invention is described more closely with reference to the attached drawing the figure of which shows a cross-section of one example embodiment of a fill and/or drain opening according to the invention.

Detailed description of a preferred embodiment

[0017] In the figure, a packaging laminate 1 is shown,

through the layer 3 of fibre-based material and the first thermoplastic layer 4 laminated on top of it forming the basic laminate 2 of said packaging laminate a hole is opened, the untreated edge of the basic laminate bordering the hole being marked with a reference number 5. After this, the basic laminate 2 is covered on opposite sides with a second and a third thermoplastic layer 6 and 7, the latter of which is thus located on top of the first thermoplastic layer 4. After this the layers 6 and 7 are joined together at the area of the hole with the help of heat and pressure. After this the forming of the actual fill and/or drain opening follows. The opening is formed preferably between the broken lines 8 in the figure by bringing the thermoplastic layers 6 and 7 covering the hole in the basic laminate 2 to purse up to the edges of the hole and by treating them so that they are shaped and will close gas- and liquid-tightly the untreated edge 5 of the hole in the basic laminate between them. This way it is possible to avoid air bubbles being entrapped in between the thermoplastic layers 6 and 7. The pursing up can be effected by different types of known heating methods. It can also be effected or it can be otherwise encouraged by blowing hot air to the centre of the hole in the basic laminate. Naturally the opening between the broken lines 8 can be opened also by punching but in that case not all of the plastic at the area of the hole can be used in the closing of the untreated edge, as in the method described earlier.

[0018] The third thermoplastic layer 6 to be laminated on the surface of the basic laminate opposite to the first thermoplastic layer 4 forming a part of the basic laminate 2 is extruded as a barrier multi layer foil comprising ethylene alpha olefin, such as the Dow Chemical Company's AFFINITY ® PT 1450 polyolefin plastomer. This multi layer foil can comprise, for example, five layers extruded simultaneously with the same extruder. Then for example two of the layers settling against the support layer 3 of fibre-based material can comprise over 50%, such as 80%, of said polyolefin plastomer, the rest being LDPE. The rest of the layers of the barrier multi layer foil in question can be for example LDPE. This way an optimal adherence to the support layer of fibre-based material is achieved and also good barrier properties so that the thermoplastic creating the barrier properties is not the outermost layer to be in contact with the product to be packaged.

[0019] To improve the barrier properties or to create them, if other thermoplastic layers do not have this property, the first thermoplastic layer 4 forming a part of the basic laminate can comprise a suitable barrier plastic, such as ethylene alpha olefin mentioned above.

[0020] To achieve barrier properties it is also possible to proceed so that the at least one second thermoplastic layer 7 to be laminated on top of the first thermoplastic layer 4 forming a part of the basic laminate is extruded as a barrier multi layer foil in the same way as described above with respect to layer 6.

[0021] Above the invention is described only on the

basis of one example embodiment and it is understandable that the structure described can to some extent be modified without deviating from the scope of protection defined by the attached claims. Thus the basic laminate used can contain before perforation also more than one thermoplastic layers or also for example a barrier layer of aluminium. The number and nature of the layers included in the basic laminate is defined primarily on the basis of the intended use of the packaging container. Similarly the nature and number of the layers to be laminated on top of the basic laminate and thus participating in the closing of the untreated edge of the hole is defined primarily on the basis of the desired properties of the packaging container in each case. The layer composition of a ready-made packaging laminate is naturally optimized so that it meets the desired requirements with respect to both the packaging laminate itself and the closing of the untreated edge of the hole made in the basic laminate. In a method according to the invention, the layers essential for the closing of the untreated edge are utilized optimally also in other parts of the packaging laminate whereupon extra thermoplastic layers unnecessary with respect to each intended use can be avoided.

Claims

1. A method for making a fill and/or drain opening on a packaging container intended for liquid materials, which either partially or entirely is made of a packaging laminate comprising layers of fibre-based material and thermoplastic, and which opening is later equipped with a detachable pull tab, in which method a hole of predetermined size and shape is formed in a basic laminate (2) of the packaging laminate (1), comprising at least one support layer (3) of fibre-based material and at least one first thermoplastic layer (4), the hole and its edges (5) in the basic laminate are covered on the side of the basic laminate comprising at least one first thermoplastic layer (4) with at least one second thermoplastic layer (7), the surface of the basic laminate opposite to at least one first thermoplastic layer (4) is laminated with at least one third thermoplastic layer (6), at least the second and the third thermoplastic layers (6, 7) attached to opposite sides of the hole in the basic laminate are joined together at the area of the hole with the help of heat and pressure, and a fill and/or drain opening is formed centrally with respect to the hole in the basic laminate so that the opening is smaller than the hole in the basic laminate whereupon at least a part of the thermoplastic layers (6, 7) joined together at the area of the hole in the basic laminate are left to cover the untreated edge (5) of said hole, wherein said at least one second thermoplastic layer (7) is laminated over the en-

tire basic laminate (2), and

characterized in that said at least one third thermoplastic layer (6) is extruded as a barrier multi layer foil comprising ethylene alpha olefin.

2. A method according to claim 1, **characterized in that** at least one layer of the barrier multi layer foil settling against the support layer (3) of fibre-based material comprises over 50 %, such as 80 %, ethylene alpha olefin.
3. A method according to claim 1 or 2, **characterized in that** said at least one first thermoplastic layer (4) comprises ethylene alpha olefin.
4. A method according to one of the claims 1-3, **characterized in that** said at least one second thermoplastic layer (7) is extruded as a barrier multi layer foil.
5. A method according to one of the claims 1-4, **characterized in that** the opening is formed by bringing the thermoplastic layers (6, 7) covering the hole in the basic laminate (2) to purse up to the edges of the hole and by treating them so that they are shaped and will close gas- and liquid-tightly the untreated edge (5) of the hole in the basic laminate (2) between them.
6. A method according to claim 5, **characterized in that** the pursing up is encouraged by blowing hot air to the centre of the hole in the basic laminate.
7. A method according to one of the claims 1-4, **characterized in that** the opening is formed by punching and that the remaining parts of the at least second and third thermoplastic layers (6, 7) joined together and bordering the opening formed are heated to a plasticizing temperature and they are treated so that they are shaped and will close gas- and liquid-tightly the untreated edge of the hole in the basic laminate between them.

Patentansprüche

1. Verfahren zur Herstellung einer Füll- und/oder Ausgussöffnung an einem für Flüssigkeiten bestimmten Verpackungsbehälter, der entweder teilweise oder ganz aus einem Verpackungslaminat mit Schichten aus einem Material auf Faserbasis und Thermoplast hergestellt ist, und dessen Öffnung später mit einer lösbaren Aufreißlasche versehen wird, wobei in dem Verfahren ein Loch vorbestimmter Größe und Form in ein Basislaminat (2) des Verpackungslaminats (1) geformt wird, das zumindest eine Stützschiicht (3) aus einem Material auf Faserbasis und zumindest eine erste thermoplastische Schicht

(4) aufweist,

das Loch und seine Ränder (5) in dem Basislaminat auf der Seite des Basislaminats mit zumindest einer ersten thermoplastischen Schicht (4) mit zumindest einer zweiten thermoplastischen Schicht (7) bedeckt sind,

die Oberfläche des Basislaminats, die gegenüber der zumindest einen ersten thermoplastischen Schicht (4) liegt, mit zumindest einer dritten thermoplastischen Schicht (6) laminiert ist,

zumindest die zweiten und die dritten thermoplastischen Schichten (6,7), die an den gegenüberliegenden Seiten des Loches in dem Basislaminat angebracht sind, im Bereich des Loches unter Zuhilfenahme von Hitze und Druck zusammengefügt sind, und

eine Füll- und/oder Ausgussöffnung zentral hinsichtlich des Loches in dem Basislaminat geformt ist, so dass die Öffnung kleiner als das Loch in dem Basislaminat ist, worauf zumindest ein Teil der thermoplastischen Schichten (6, 7), die im Bereich des Loches in dem Basislaminat zusammengefügt sind, übrigbleibt, um den unbehandelten Rand (5) des Loches zu bedecken, wobei die zumindest eine zweite thermoplastische Schicht (7) über das gesamte Basislaminat (2) laminiert ist, und

dadurch gekennzeichnet, dass zumindest eine dritte thermoplastische Schicht (6) als eine mehrschichtige Sperrfolie, mit Ethylen/Alpha-Olefin, extrudiert ist.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** zumindest eine Schicht der mehrschichtigen Sperrfolie, die an der Stützschiicht (3) aus einem Material auf Faserbasis platziert ist, über 50% Ethylen/Alpha-Olefin, wie z.B. 80%, aufweist.
3. Verfahren nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** zumindest eine erste thermoplastische Schicht (4) Ethylen/Alpha-Olefin aufweist.
4. Verfahren nach einem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** zumindest eine zweite thermoplastische Schicht (7) als eine mehrschichtige Sperrfolie extrudiert ist.
5. Verfahren nach einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** die Öffnung dadurch geformt ist, dass die thermoplastischen Schichten (6, 7), die das Loch in dem Basislaminat (2) bedecken, dazu gebracht werden, sich um die Ränder des Loches zu falten und sie formgebend behandelt werden und den unbehandelten Rand (5) des Loches in dem Basislaminat zwischen ihnen, luft- und flüssigkeitsdicht schließen werden.
6. Verfahren nach Anspruch 5, **dadurch gekenn-**

zeichnet, dass das Umfalten durch Blasen von heißer Luft auf die Mitte des Loches in dem Basislaminat unterstützt wird.

7. Verfahren nach einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** die Öffnung durch Stanzen geformt ist und dass die verbleibenden Teile der zumindest zweiten und dritten thermoplastischen Schichten (6, 7), die zusammengefügt sind und an die geformte Öffnung grenzen, auf eine Plastifizierungstemperatur erhitzt werden und sie behandelt werden, so dass sie geformt sind und den unbehandelten Rand des Loches in dem Basislaminat zwischen ihnen luft- und flüssigkeitsdicht schließen werden.

Revendications

1. Procédé de fabrication d'un orifice de remplissage et/ou de vidage sur un conteneur de conditionnement destiné à des matériaux liquides, lequel est partiellement ou entièrement constitué d'un stratifié d'emballage comprenant des couches de matériau à base de fibres et de thermoplastique, et lequel orifice est ultérieurement doté d'une languette détachable, dans lequel procédé un trou de taille et forme prédéterminées est formé dans un stratifié de base (2) du stratifié d'emballage (1), comprenant au moins une couche support (3) de matériau à base de fibres et au moins une première couche de thermoplastique (4),
le trou et ses rebords (5) dans le stratifié de base sont recouverts sur le côté du stratifié de base comprenant au moins une première couche de thermoplastique (4) avec au moins une deuxième couche de thermoplastique (7),
la surface du stratifié de base opposée à au moins une première couche de thermoplastique (4) est stratifiée avec au moins une troisième couche de thermoplastique (6),
au moins la deuxième et la troisième couches de thermoplastique (6, 7) attachées aux côtés opposés du trou dans le stratifié de base sont jointes l'une à l'autre dans la zone du trou à l'aide de la chaleur et la pression, et
un orifice de remplissage et/ou de vidage est formé au centre par rapport au trou dans le stratifié de base de sorte que l'orifice est plus petit que le trou dans le stratifié de base suite auquel au moins une partie des couches de thermoplastique (6, 7) jointes l'une à l'autre dans la zone du trou dans le stratifié de base est laissée pour couvrir le rebord non traité (5) dudit trou, dans lequel ladite au moins une deuxième couche de thermoplastique (7) est stratifiée sur l'ensemble du stratifié de base (2), et
caractérisé en ce que ladite au moins une troisième couche de thermoplastique (6) est extru-

dée sous la forme d'une feuille barrière multicouche comprenant de l'éthylène alpha-oléfine.

2. Procédé selon la revendication 1, **caractérisé en ce que** au moins une couche de la feuille barrière multicouche s'opposant à la couche support (3) du matériau à base de fibres comprend plus de 50 %, tel que 80 %, d'éthylène alpha-oléfine.
3. Procédé selon la revendication 1 ou 2, **caractérisé en ce que** au moins une première couche de thermoplastique (4) comprend de l'éthylène alpha-oléfine.
4. Procédé selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** ladite au moins une deuxième couche de thermoplastique (7) est extrudée sous la forme d'une feuille barrière multicouche.
5. Procédé selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** l'orifice est formé en amenant les couches de thermoplastique (6, 7) couvrant le trou dans le stratifié de base (2) afin de serrer les rebords du trou et en les traitant de sorte qu'ils soient formés et qu'ils ferment de manière à être étanche pour les gaz et les liquides le rebord non traité (5) du trou dans le stratifié de base (2) entre ceux-ci.
6. Procédé selon la revendication 5, **caractérisé en ce que** le serrage est facilité en soufflant de l'air chaud au centre du trou dans le stratifié de base.
7. Procédé selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** l'orifice est formé par serrage et **en ce que** les parties restantes d'au moins les deuxième et troisième couches de thermoplastique (6, 7) jointes l'une à l'autre et bordant l'orifice formé sont chauffées à une température de plastification et elles sont traitées de sorte d'être formées et de fermer de manière à être étanche pour les gaz et les liquides le rebord non traité du trou dans le stratifié de base entre celles-ci.

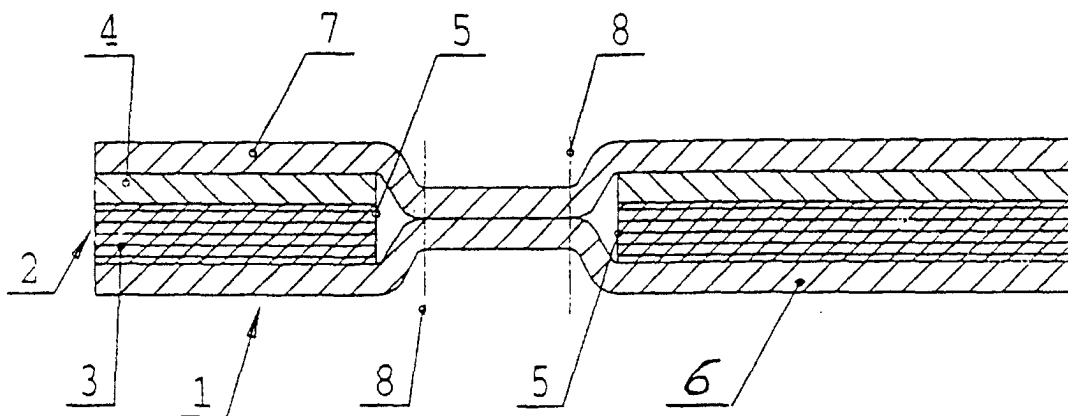


Fig. 1