(CONVENTION. By one or more persons and/or a Company 608918 Form 4

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

CONVENTION APPLICATION FOR A PATENT

(1) Here insert (in full) Name or Names of Applicant or Applicants, followed by Address (es).

I/We (1) ROBY TEKNIK AKTIEBOLAG

of Box 61, 221 00 Lund, Sweden

(2) Here insert Title of Invention.

hereby apply for the grant of a Patent for an invention entitled: (2)

FLEXIBLE PACKING LAMINATE IN THE FORM OF SHEETS OR OF A WEB, A METHOD FOR THE MANUFACTURE OF THE LAMINATE AND PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

(3) Here insert number(s) of basic application(s)

which is described in the accompanying complete specification. This application is a Convention application and is based on the application numbered (3)

8704789-0

(4) Here insert Name of basic Country or Countries, and basic date or dates

for a patent or similar protection made in (4) Sweden

on 1st December 1987

APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 25.1.91

MD4780 30/1 MEG

Our address for service is Messrs. Edwd. Waters & Sons, Patent Attorneys, 50 Queen Street, Melbourne, Victoria, Australia.

DATED this 29th day of November 19 88

(5) Signature (or of Applicant (s) or Seal of Company and Signatures of its Officers as prescribed by its Articles of Association

(5) ROBY TEKNIK AKTIEBOLAG

by

Stephen K. Plymin

Registered Patent Attorney

To:

(CONVENTION. Company.) Form 8

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DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

(1) Here insert (in full) Name of Company.

In support of the Convention Application made by(1) ROBY TEKNIK AKTIEBOLAG

(hereinafter referred to as the applicant) for a Patent

(2) Here insert title of Invention.

for an invention entitled:(2) FLEXIBLE PACKING LAMINATE IN THE FORM OF SHEETS OR OF A WEB, A METHOD FOR THE MANUFACTURE OF THE LAMINATE AND PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

(3) Here insert full Name and Address, of Company official authorized to make declaration.

I,(3) GOSTA SEVRELL,

of Box 61, 221 00 Lund, Sweden

do solemnly and sincerely declare as follows:

1. I am authorised by the applicant for the patent to make this declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was

(4) Here insert basic Country or Countries followed by date or dates and basic Applicant or Applicants.

made in(4) Sweden

on the 1st day of December 19 88 by ROBY TEKNIK AKTIEBOLAG

~~on the day of by~~

(5) Here insert (in full) Name and Address of Actual Inventor or Inventors.

3.(5) PETER FRISK, Sodra Forstadsgatan 24, 21143 Malmo and LARS LOFGREN, Krusbarsvagen 4, 245 00 Staffanstorp, Sweden

is/~~are~~ the actual inventor~~s~~ of the invention and the facts upon which the applicant is entitled to make the application are as follow:

The applicant is the assignee of the said actual inventors

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Lund, Sweden

this 10th day of November 19 88

(6) Signature.

(6) ROBY TEKNIK AKTIEBOLAG

(12) PATENT ABRIDGMENT (11) Document No. AU-B-26364/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 608918

(54) Title
FLEXIBLE PACKING LAMINATE IN THE FORM OF SHEETS OR OF A WEB, A METHOD FOR THE MANUFACTURE OF THE LAMINATE AND PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

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(56) Prior Art Documents
GB 2163095
US 4355721
US 3949114

(57) Claim

1. A packing laminate for the manufacture of packing containers with good gasbarrier characteristics, said laminate comprising a carrier layer of paper or paperboard material and a gas-tight aluminium foil laminated against one side of the carrier layer, characterised in that the laminate comprises a layer of ethylvinyl alcohol arranged between the carrier layer and the aluminium foil.

9. A method for manufacturing a packing laminate in accordance with any one of the preceding claims, characterized in that on one side of a paper or paperboard material web is deposited an extruded coating of ethylvinyl alcohol and the extruded coating of ethylvinyl alcohol is covered by a gas-tight weblike aluminium foil, whereupon the laminate layers so deposited are compressed so as to bond them permanently to one another.

608918

Form 10

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PATENTS ACT 1952-69

COMPLETE SPECIFICATION

(ORIGINAL)

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This document contains the amendments made under Section 49 and is correct for printing

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50 QUEEN STREET, MELBOURNE, AUSTRALIA, 3000.

Complete Specification for the invention entitled:

FLEXIBLE PACKING LAMINATE IN THE FORM OF SHEETS OR OF A WEB, A METHOD FOR THE MANUFACTURE OF THE LAMINATE AND PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

The following statement is a full description of this invention, including the best method of performing it known to :- us

FLEXIBLE PACKING LAMINATE IN THE FORM OF SHEETS OR OF A WEB, A METHOD FOR THE MANUFACTURE OF THE LAMINATE AND PACKING CONTAINERS MANUFACTURED FROM THE LAMINATE

The present invention relates to a flexible packing laminate in the form of sheets or of a web intended for the manufacture of packing containers with good gas barrier characteristics, this laminate comprising a carrier layer of paper or paperboard ~~dimensionally rigid, but foldable~~ material, and a gas-tight aluminium ~~metal~~ foil laminated to one side of the carrier layer. The invention also relates to a method for the manufacture of the laminate and to packing containers manufactured from the laminate. Moreover the invention relates to the utilization of such a laminate for the manufacture of packing containers.

In the technology of packaging the use of consumer packages of non-returnable character has been known for a long time for the packaging and handling of, among other things, liquid foodstuffs such as milk, juice etc. A very prevalent group of these so-called non-returnable packages is manufactured from a material consisting of a carrier layer of paper or cardboard and outer and inner liquid-tight coatings of plastics, usually thermoplastics. In many cases, depending on the product which is to be packed, the material in these packages is also provided with further layers of other material, e.g. aluminium foil or plastic layers other than those mentioned here.

The composition of the packing material is aimed at creating the best possible protection for the product which is to be packed, but also at providing the packages with sufficient mechanical strength and dimensional stability so as to make possible a convenient handling. To bring about mechanical rigidity which for one thing provides mechanical protection for the product and for another makes the packages dimensionally stable so that it can be readily transported and gripped by hand the material in these packages is provided often with a relatively thick carrier layer of paper or cardboard. Such a material, however, has

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no tightness properties in respect of liquids or gas and the good rigidity in the material is rapidly lost, if it is subjected to moisture or liquid which is absorbed into the material. To impart liquid-tightness to the material the carrier layer is provided, therefore, most frequently on both sides, with a plastic coating, and if this coating is thermo-plastic it can be used for sealing plastic layers to one another through so-called heat-sealing. In this manner packing containers can be sealed and made permanent in their intended shape in lasting fashion by heat-sealing thermoplastic-coated, overlapping material panels to one another in a tight and durable sealing joint.

Packing containers of the type mentioned here are manufacture either from blanks punched out in advance or from a web which has been proposed with appropriate decoration and with a crease line pattern facilitating the golding. Packing containers are manufactured from such a web by joining together the longitudinal edges of the web in an overlap joint so as to form a tube which subsequently is filled with the intended contents and divided into closed container units through repeated transverse seals of the tube at right angles to the longitudinal axis of the tube. After suitable folding of the packing material into the tube, the material in the container units is converted to the desired geometrical shape, generally a parallelepiped, in that the tube is provided with longitudinal folding lines and with double-walled, triangular folding lugs at the corner of the packing container.

During the forming of the packing container the laminated packing material is subjected to stresses which become especially great during the folding of the material, since owing to the relatively great material thickness of the carrier layer, the folding implies that the one plastic coating is subjected to a strong stretching at the same time as the other plastic coating is compressed to a corresponding degree along the folding line. Because of the considerable extensibility of the plastic coatings such a

material folding only rarely causes the plastic coating extended through stretching to break or be damaged in some other manner and lose its liquid-tightness, but the situation is aggravated if the packing material also comprises an aluminium foil which by comparisons with the plastic coatings has a very low extensibility and thus tends to crack during folding of the material.

Even though a single 180° folding of the packing material normally will not have any serious consequences regarding liquid-tightness and gas-permeability, considerable difficulties arise, however, when the material is to be folded along two crossing crease lines (so-called crossings). This is often the case in external sealing regions which always occur on this particular type of packing container. The seals in general are carried out in that plastic coatings facing towards the inside of the packing container are heated to melting along the edge zones which are to be sealed to one another, whereupon the heated plastic layers are pressed against one another to form a sealing fin, held together through material fusion on the outside of the packing container. Such a sealing fin comprises double material layers, and so as not to be an obstacle, the sealing fin often is folded down to lie flat against the outside of the packing container, which means that one of the material layers of the sealing fin undergoes a 180° folding and that the container wall in the region of the folded down sealing fin comprises three material layers, that is to say has a threefold material thickness. Such a sealing fin often runs along one or more lateral surfaces of the packing container, and since these lateral surfaces during the forming of, for example, parallelepipedic packages from cushionlike packages are subjected to a 180° folding along a crease line at right angles to the sealing fin, the material thickness in certain regions of the packing container will amount to six times the thickness of the laminate. During such a 180° folding transversely to the sealing region the outermost coated material layer will be

subjected to very strong tensile stresses with subsequent extensions and crack formations in the material. These tensile forces often are so great that not only the aluminium foil included in the laminate, but also the thermoplastic coatings crack, with the consequence that the packing container wall loses its tightness characteristics in these particularly exposed regions of the packing container.

In accordance with the present invention it has been found, however, that the risk of a packing laminate of the type described here losing its barrier characteristscs, especially its gas-tightness, because of such crack formations in the metal foil of the laminate, can be substantially reduced, or even be wholly eliminated, if the packing laminate between the carrier layer and the metal foil is provided with a lay,r of ethylvinyl alcohol.

In accordance with one aspect of the present invention, there is provided a packing laminate for the manufacture of packing containers with good gasbarrier characteristics, said laminate comprising a carrier layer of paper or paperboard material and a gas-tight aluminium foil laminated against one side of the carrier layer, characterised in that the laminate comprises a layer of ethylvinyl alcohol arranged between the carrier layer and the aluminium foil.

In another aspect of the present invention, there is provided a method for manufacturing a packing laminate as described, characterised in that on one side of a paper or paperboard material web is deposited an extruded coating of ethylvinyl alcohol and the extruded coating of ethylvinyl alcohol is covered by a gas-tight weblike aluminium foil, whereupon the laminate layers so deposited are compressed so as to bond them permanently to one another.

It is appreciated that the ethylvinyl alcohol layer can be made sufficiently durable so as to resist the strong stresses in connection with the folding of the laminate and

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have sufficiently good gas barrier characteristics to compensate effectively for the loss of gas-tightness which arises if cracking occurs in the main gas barrier of the packing laminate, that is to say the aluminium foil. A further valuable property of such an ethylvinyl alcohol layer is that it can be laminated directly between such layers by extrusion without the use of intermediate extra adhesive.

The present invention will now be described with reference to the attached drawings by way of illustration and example only, wherein:

Fig. 1 shows schematically a cross-section through a packing laminate in the form of sheets or of a web in accordance with the invention;

Fig. 2 shows a corresponding section through a packing laminate in accordance with a preferred embodiment of the invention; and

Fig. 3 shows schematically an arrangement by means of which a packing laminate of the type which is shown in Fig. 2 can be manufactured.

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The packing laminate 1 in Fig. 1 comprises in conformity with a conventional packing laminate a relatively thick carrier layer 2 of paper or cardboard imparting rigidity, and outer coatings 3 and 4 of plastics, preferably thermoplastics. Between the carrier layer 2 and the one outer plastic layer 4 which is intended so as to face towards the inside of the packing container there is a thin aluminium foil 5 which constitutes the main gas barrier of the laminate. With the object of improving the gas barrier characteristics of the material, the laminate 1 in accordance with the invention has laminated between the carrier layer 2 and the aluminium foil 5 a layer 6 of ethylvinyl alcohol which can be made durable to resist the external stresses to which the packing laminate is subjected in connection with being converted to packing containers, and which at the same time has sufficiently good gas barrier characteristics to compensate for the loss in gas tightness which the laminate experiences if small crack formations or corresponding leakage were to occur in the aluminium foil.

Fig. 2 shows a packing laminate 1' in accordance with a preferred embodiment of the invention. To achieve greater clarity the same reference designations have been used as in Fig. 1 for identical material layers. The packing laminate 1' in Fig. 2 differs from the laminate according to Fig. 1 in that it is provided between the said layer of ethylvinyl alcohol 6 and the carrier layer 2 with a layer 7 of moisture-permeable material. The material layer 7 serves to absorb the moisture which might be able to penetrate into the ethylvinyl alcohol layer 6 through crack formations in the aluminium foil 5 and the inner plastic coating 4 and which otherwise, if present in sufficiently large quantities, could impair the gas barrier characteristics of the ethylvinyl alcohol layer, and thereby cause it to be less effective as an extra gas protection in the laminate in accordance with the invention. The material layer 7 is in general not necessary, but is preferred if the

packing laminate is in danger of being subjected to such strong external stresses, that not only the aluminium foil 5, but also the inner plastic coating 4 are liable to undergo crack formations. The material layer 7 preferably consists of a polyamide, e.g. nylon 6, which possesses good adhesive powers in respect of the ethylvinyl alcohol layer 6 as well as the paper or cardboard layer 2 and, therefore, is easy to laminate between these two layers through extrusion without the use of extra intermediate adhesive layers.

A packing laminate which works well according to the invention can be built up of material layers laminated to one another of the material thicknesses given below:
outer plastic coating 3 approx. 10 μm
paper or cardboard layer 2 approx. 300 μm
polyamide layer 7, 15-25, preferably 20μm
ethylvinyl alcohol layer 6,3-10, preferably 5 μm
aluminium foil 5 approx. 5 μm
one or more outer plastic coatingfs 4 each approx. 10 μm

The packing laminate in accordance with the invention can be manufactured in the manner which is illustrated in Fig. 3. A web 2 of paper or cardboard, which on one side (Fig. 3 bottom) is coated with an extruded plastic layer 3, is reeled off a magazine roll 8 and is guided past a first extruder 9, which deposits a layer 7 of molten polyamide on the free side of the web, and further past a second extruder 10, which deposits a layer of molten ethylvinyl alcohol on top of the polyamide layer, and further past a deflection roller 11, lightly pressed against the web, which guides an aluminium foil 5, reeled off a magazine roll 12, to lie flat against the web travelling past. In accordance with the invention the said two layers 6 and 7 may be applied, of course, at the same time by means of co-extrusion, which has been found to give advantageous results. From the deflection roller 11 the web so laminated is advanced to, and through the nip between, two co-rotational cooling rolls 13, pressed against each other with a light pressure, which compress and cool the

previously deposited layers so that they are lastingly joined together. From the cooling rolls 13 the laminated is advanced further past one or several further extruders 14 which bring on one or more further plastic coats 4. The laminate so coated with plastics finally is passed through the nip between a further pair of co-rotational cooling reels 15 which compress the laminated material layer to form the finished, well-coherent packing laminate 1' which thereafter is wound up on a magazine roll 16.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A packing laminate for the manufacture of packing containers with good gasbarrier characteristics, said laminate comprising a carrier layer of paper or paperboard material and a gas-tight aluminium foil laminated against one side of the carrier layer, characterised in that the laminate comprises a layer of ethylvinyl alcohol arranged between the carrier layer and the aluminium foil.

2. A packing laminate in accordance with claim 1, characterized in that the ethylvinyl alcohol layer is produced through extrusion and is attached directly to the aluminium foil.

3. A packing laminate in accordance with claim 1 or 2, characterized in that the laminate has a layer of moisture-permeable material between the ethylvinyl alcohol layer and the carrier layer.

4. A packing laminate in accordance with claim 3, characterized in that the moisture-permeable layer is formed from a polyamide.

5. A packing laminate in accordance with claim 3 or 4, characterized in that the moisture-permeable layer is produced by extrusion and is attached directly to the surrounding ethylvinyl alcohol layer and the carrier layer.

6. A packing laminate in accordance with any one of the preceding claims, characterized in that the free side of the aluminium foil has one or more coatings of liquid-tight material.

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7. A packing laminate in accordance with claim 6, characterized in that the siad coatings are extruded thermoplastics.

8. A packing laminate in accordance with any one of the preceding claims, characterized in that the side of the carrier layer facing away from the ethylvinyl alcohol layer has a thin coating of liquid-tight material.

9. A method for manufacturing a packing laminate in accordance with any one of the preceding claims, characterized in that on one side of a paper or paperboard material web is deposited an extruded coating of ethylvinyl alcohol and the extruded coating of ethylvinyl alcohol is covered by a gas-tight weblike aluminium foil, whereupon the laminate layers so deposited are compressed so as to bond them permanently to one another.

10. A packing container for liquid, oxygen-sensitive contents, characterized in that it is manufactured from a packing laminate according to any one of claims 1 to 8.

11. Utilization of a packing laminate in accordance with any one of claims 1 to 8 for the manufacture of packing containers intended primarily for liquid, oxygen-sensitive contents.

DATED this 3rd day of January, 1991.

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Fig. 1

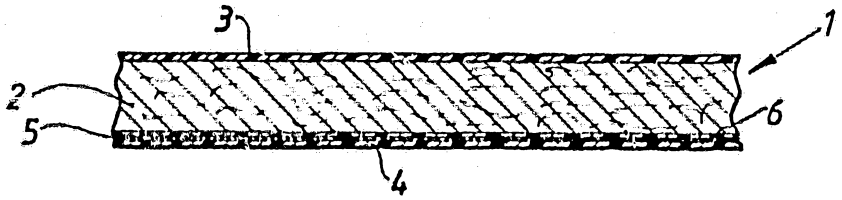

Fig. 2

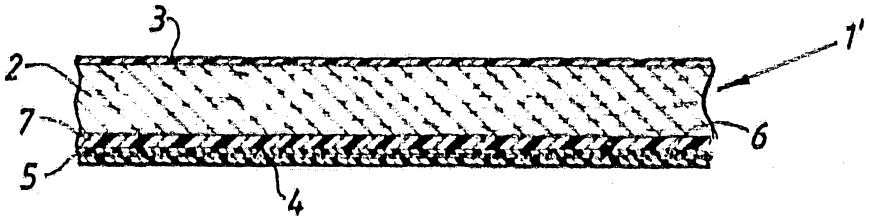

Fig. 3