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**Method for manufacturing a package, a blank and a package manufactured with said method.**

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Method for manufacturing a package with a blown foam structure and of a material at least comprising natural polymers such as starch, wherein the method comprises providing a mould with a mould cavity and inserting a starch batter in the mould cavity, moulding of a blank in said mould cavity from said starch batter, wherein the blank comprises a bottom panel and first and second side wall panels pivotally connected to the bottom panel along respective folding lines extending between said bottom panel and the respective first and second sidewall panels, removing the blank from the mould cavity, folding of the respective side wall panels along the respective folding lines in a substantially upward position such that adjacent side wall panels abut each other and form a package side wall that extends along a perimeter of said bottom, said side wall and the bottom defining a package inner space.

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Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

Title: Method for manufacturing a package, a blank and a package manufactured with said method

### Field of the invention

The present invention relates to a method for manufacturing a package, wherein the package has a blown foam structure and is of a material at least comprising natural polymers such as starch.

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### Background

It is known to manufacture a package of a material at least comprising natural polymers such as starch and having a blown foam structure. Such a package may have a minimum weight and may be used to receive and hold fragile and/or breakable products. Such packages may be manufactured by moulding such packages from a bio-polymer material from renewable resources, such as a starch based material. A method for manufacturing such a package is known from practice. Such method may for instance comprise supplying a starch based starting material comprising water as blowing agent under pressure into a mould. The mass in the mould is heated such as to give rise to gelatinization and cross-linking of the natural polymers such that the product is formed. When manufacturing the package by means of such method, the package needs to have a withdrawable shape and suitable clearance angles have to be chosen to enable removal of the package from the mould cavity without damaging the package.

Alternative packages are also known from practice such as packages made from cardboard, plastics and wood. Such packages may for instance be used to package electronics and/or luxury goods and therefore need to have an appealing character. Said packages may be manufactured by different manufacturing methods resulting in a package of which the outer corners may have substantially sharp angles. Such packages can be

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stacked on top of each other easily, which is advantageous with respect to transporting costs of products provided in such packages. However, the manufacturing costs for manufacturing such packages may be relatively high. Besides, manufacturing of a package from a bio-polymer material from renewable resources provides a more environmental friendly alternative.

In view of the above, it is an object of the invention to provide an improved method for manufacturing a package from a material at least comprising natural polymers such as starch. More in particular, it is an object of the invention to provide a method for manufacturing a package from a material at least comprising natural polymers such as starch, wherein the package characteristics, such as shape and appearance, are comparable with packages manufactured from cardboard, plastics and/or wood.

#### 15 Summary of the invention

Therefore, in a first aspect, a method according to the invention for manufacturing a package having a blown foam structure and said package being of a material at least comprising natural polymers such as starch, is provided. The method may comprise providing a mould with a mould cavity and inserting a starch batter in said mould cavity, moulding of a blank in said mould cavity from said starch batter. The blank may comprise a bottom panel and first and second side wall panels pivotally connected to the bottom panel along respective folding lines extending between said bottom panel and the respective first and second sidewall panels. The method can further comprise removing of the blank from the mould cavity and folding of the respective side wall panels along the respective folding lines in a substantially upward position such that adjacent side wall panels abut each other and form a package sidewall extending along a perimeter of said bottom, said sidewall and the bottom enclosing a package inner space.

By manufacturing a package from a bio-polymer material by first moulding a blank and subsequently folding said blank to obtain a package, the package may be provided with sharp outer corners and may have substantially flat outer surfaces. Consequently, such package may be an alternative to packages of cardboard, plastics, wood and the like material. Due to the shape of said package, the package has taut lines and may be stacked easily. Due to said manufacturing method, the side wall panels may be positioned substantially perpendicular to the bottom panel or to the other side wall panels, thus forming an angle of approximately 90 degrees. However, the panels may include any other angle, dependent on the design of the blank and the package. Besides, the package manufactured with the method according to the invention has the advantage that it is made from a biodegradable material and thus is a sustainable alternative to the packages manufactured from the above mentioned materials. Furthermore, the package manufactured by the method according to the invention has a minimum weight which is advantageous with respect to transportation costs of packaged products.

To be able to fold the side wall panels in the upright position, thus in a position in which the side wall panels extend from the bottom panel in a direction facing away from said bottom panel, the respective folding lines may be formed by providing recessed areas in the blank during moulding of the blank. The recessed areas may be formed in the blank by providing little space between the respective mould parts of the mould such that the skins that are formed on both opposing outer surfaces of the blank are provided close to each other. Consequently, little material is provided in between said skins, enabling folding of the side wall panels and at the same time thereby minimizing the risk of cracking of the skin during the folding operation.

The recessed area may be also be formed by compressing the area of the folding lines to decrease the thickness of the blank at that specific

location. Compression of the area may also be applied after providing the recessed area in the blank due to the shape of the mould.

Preferably, the density of the material at a location of the folding lines, i.e. in between the skins, is higher than the density of the material in the blank at locations other than at the folding line locations. Preferably, the thickness of the blank at a location of the folding lines is smaller than the thickness of the blank at locations other than at the folding line locations.

The side wall panels may be interconnected, at least opposing edges of adjacent side wall panels may be interconnected. By interconnecting the respective side wall panels, the package will be provided with the desired strength, such as the strength in a direction extending substantially parallel to the corners of the side wall panels.

In a further aspect, the method according to the invention can be characterized in that the blank may be provided with a laminate layer on at least one of the blank surfaces. By providing the blank with a laminate layer such that an outer surface of the package is laminated, for instance with a paper or a plastic layer, the package may be provided with a print, for instance a full color print. Such print may be provided on the laminate layer before connection of said layer to the blank surface.

Additionally or alternatively, at least one of the outer surfaces of the blank may be provided with a text and/or image, for instance by means of printing. Due to the material of the blank, the outer surface may be substantially smooth which enables direct printing thereon.

The blank may, alternatively or additionally, comprise a laminate layer on the other one of the blank surfaces, for instance on the inner surface of the package. The side wall panels may be interconnected by means of the at least one laminate layer, for instance by means of adhering part of the laminate layer to another, opposing part of said laminate layer.

In another aspect of the method according to the invention, at least one of the bottom panel and/or the first side wall panels may be provided with a protrusion in the same method step in which the blank is moulded. The at least one protrusion is integrally formed with the blank. In this description, integrally formed is understood to mean formed with material common to the rest of the blank and the connection of respective parts having no mechanical joints. Thus, the blank is a single integrally formed piece. In this description, single integrally formed piece is understood to mean having no parts that separate from the blank during normal operation and containing no parts that are not integrally formed.

The method according to the invention thus enables providing the package with one or more corner reinforcements, product retainers, package inner space dividers and the like, formed by the protrusions, in the moulding step of the manufacturing method. Consequently, the amount of method steps used for manufacturing said package is minimized, which is advantageous in view of the manufacturing costs.

A further advantage of the fact that the protrusions are provided on the blank is that the product to be packaged can be positioned with respect to the bottom panel, or if applicable with respect to any other panel of the blank, before folding of the side panels in the upright position. After positioning of the product, the package may be formed by folding of the blank and fixating of the respective panels to each other, thereby enclosing and/or fixating the product in the package. Such a package may thus have a tamper evident construction.

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The invention also relates to a blank for forming a package and to a package set up from a blank, wherein the package is manufactured by means of the above described manufacturing method.

The aforementioned and other features and advantages of the invention will be more fully understood from the following detailed

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description of certain embodiments of the invention, taken together with the accompanying drawings, which are meant to illustrate and not to limit the invention.

5 Brief description of the drawings

Fig. 1 shows a schematic perspective view of a blank according to an embodiment of the invention;

Fig. 2 shows a cross sectional view of the blank according to Fig. 1;

10 Fig. 3 shows a schematic perspective view of a package according to an embodiment of the invention set up from the blank according to Fig. 1;

Fig. 4 shows a schematic perspective view of a blank according to a further embodiment of the invention;

15 Fig. 5 shows a cross sectional view of the blank according to Fig. 4;

Fig. 6 shows a schematic perspective view of a package according to a second embodiment of the invention set up from the blank according to Fig. 4;

20 Fig. 7 shows a schematic perspective view of a blank according to a third embodiment of the invention;

Fig. 8 shows a schematic perspective view of a package according to a third embodiment of the invention set up from the blank according to Fig. 7;

25 Fig. 9 shows a schematic perspective view of a blank according to a fourth embodiment of the invention; and

Fig. 10 shows a schematic perspective view of a package according to a fourth embodiment of the invention set up from the blank according to Fig. 9.

30 In this specification, identical or corresponding parts may have identical or corresponding reference numerals. Where required, for a better

understanding of a Figure, reference is made to the description of other Figures. Combinations of (parts of) the embodiments shown are expressly understood to also be incorporated and described herein.

5 Detailed description

Figure 1 shows in a schematic perspective view a blank 1 according to a first embodiment of the invention. The blank 1 comprises a quadrangular bottom panel 2 and first and second side wall panels 3, 4 mutually opposed, in pairs. The first and second side wall panels 3, 4 are connected to the bottom panel 2 via folding lines 5 and are configured to be pivoted along said folding lines 5 to be brought in an upright position. The blank 1 has a blown foam structure and is of a material at least comprising natural polymers such as starch. The folding lines 5 are formed by a longitudinally extending recessed area in the blank 1 in which area the thickness  $t$  of the blank 1 is smaller than the thickness  $d$  outside said area (see Figure 2 in which a cross section is shown of the blank 1 according to Figure 1, according to line I-I in Figure 1). The thickness  $t$  may be between 0.1-0.5 mm, preferably between 0.2 and 0.4 mm. The blank 1 is manufactured by means of an injection moulding process. A starch batter is introduced into a mould cavity. Preferably, the starch batter is heated in the mould to dry the mass to form the blank 1. At the contact surface of the starch batter and the mould cavity, a skin is formed, thus on all outer surfaces of the blank 1. In the mould cavity, the distance between the mould parts is smaller at the location of the folding lines than at any other location on the blank. Due to said smaller opening between the mould parts, recessed lines are formed in the blank, at least in one of the blank outer surfaces 6, 7. These recessed lines 5 enable the first and second side wall 3, 4 panels to be pivotally connected to the bottom panel 2. After removal of the blank 1 from the mould cavity, the first and second side wall panels 3, 4 are pivoted in a substantially upward direction  $R_u$  (see Figure 2), i.e. a

direction facing away from the bottom panel 2. The respective side wall panels 3, 4 are interconnected, at least at opposing edges 8 of the respective side wall panels 3, 4. In the upright position, see Figure 3, the first and second side wall panels 3, 4 together form a side wall 9 of a package 10 according to an embodiment of the invention. The side wall panels 3, 4 are connected to the bottom via connections that are formed by the folding lines 5. The side wall 9 and the bottom panel 2 define a package inner space 12. The package 10 as shown in Figure 3 is of a material having a foam blown structure and thus is a relatively light weight package 10. The package 10 may be provided with a laminate layer 11 that is provided on one of the outer surfaces 7 of the blank, and thus on the outer surface 7 of the package 10. Such a laminate layer 11 may for instance be a paper layer or a plastic layer and may provide a suitable basis for applying a print onto said package 10. Additionally or alternatively, a print may be provided directly onto the outer surfaces of the package, thus on surface of the package formed out of the starch based material. Additionally or alternatively, a laminate layer (not shown) may be provided on an inner surface 6 of the package 10. Furthermore, such a laminate layer 11 may enable easy connection of the respective opposing edges 8 of the side wall panels 3, 4, for instance by means of an adhesive.

Due to the construction of the package 10 according to the invention, it is possible to set up a package 10 from the blank 1 which package has substantially sharp outer corners 14. Said outer corners 14 extend between the side wall panels 3, 4 and/or between the side wall panels 3, 4 and the bottom panel 2. Since the outer corners 14 are sharp and thus have a very small radius, the package 10 has an appearance that matches packages of other material, such as plastic packages or wooden packages. Therefore, the package 10 according to the invention provides a suitable alternative for the above mentioned packages. The package 10 may for instance be used to package electronic devices, such as telephones, or other

fragile and/or breakable products. Due to the laminate layer 11 that is provided on an outer surface 8 of the package 10, the starch batter to be used to mould the blank 1 may comprise fewer fibres than without using said laminate layer. Besides, the starch batter may be a relatively thin  
5 batter. This is advantageous in view of the costs of the starting material.

In Figures 4-10, further embodiments of blanks 1', 1'', 1''' and packages 10', 10'', 10''' according to the invention have been shown. In Figures 4-6 a second embodiment of a blank 1' according to the invention and a package 10' according to the invention have been shown. Since the  
10 blank 1' and the package 10' resemble the blank 1 and the package 10 as described with Figures 1-3, a detailed description of the said blank 1' and package 10' is omitted. Only the differences with respect to the first embodiment of the blank 1 and package 10 will be described. The blank 1' as shown in Figure 4 is provided with a protrusion 15 that extends from the  
15 upper surface of the bottom panel 2 in a direction away from the bottom panel 2. The protrusion 15 has a substantially rectangular shape and extends along the entire width W of the bottom panel 2 and along part of the length L of the bottom panel 2. The protrusion 15 is integrally formed with the blank 1' during moulding of the blank 1'. Thus in fact, the bottom panel  
20 2, the side wall panels 3, 4 and the protrusion 15 together form a single piece product. As is visible in Figure 5 (in which a cross section is shown of the blank 1 according to Figure 4, according to line II-II in Figure 4), the protrusion 15 is substantially hollow and the wall thickness D of the protrusion 15 is similar to the wall thickness d of the remainder of the blank  
25 1'. After folding the respective side wall panels 3, 4 in the upward direction Ru, the protrusion 15 forms a product retainer that is configured for receiving and/or holding a product in the inner space 12 of the package 10'. Since the protrusion 15 is formed during moulding of the blank 1', no additional manufacturing steps are necessary to obtain the package 10'  
30 having a product retainer. Furthermore, since the material of the protrusion

15 is the same as the material of the remainder of the blank 1' the package 10' is a light weight package. The outer surface 7 and/or the inner surface 6 of the package 10' may be provided with a laminate layer 11 that preferably is connected to the blank 1' before folding of the side wall panels 3, 4. The  
5 side wall panels 3, 4 may be interconnected at the respective side edges 8 (see Figure 4) thereof by means of an adhesive. In another embodiment (not shown, the laminate layer 11 may be provided on the outer surface 7 and/or inner surface 6 of the package 10' after setting up the package 10' from the blank 1'. It is noted that the laminate layer may cover the entire outer  
10 surface of the blank 1 or part of the outer surface of the blank 1. For instance, a laminate layer can be provided on the outer surface of the blank and at the same time does not cover the protrusions.

Figure 7 and 8 show a third embodiment of the blank 1'' and the package 10'' according to the invention. In this embodiment, the blank 1'' is  
15 provided with multiple protrusions 15' that extend from two opposing first side wall panels 3 substantially upward, i.e. a direction substantially perpendicular to the upper surface 6 of the blank 1''. The protrusions 15' are provided in the respective corners of the side wall panels 3 such that after setting up the package 10'' from the blank 1'', the protrusions 15' form  
20 corner reinforcements. In the package 10'' shown in Figure 8, the corner reinforcements 15' are provided in the inner corners of the side wall 9 of the package remote from the bottom panel 2. In different words, the corner reinforcements extend from an open end of the package 10'' towards the bottom panel 2 along part of the inner corner of the side wall 9. In a  
25 different embodiment of the package according to the invention, the corner reinforcements may extend along the entire inner corner of the side wall 9 or may extend from the bottom panel 2 towards the open end of the package 10'' along part of the inner corner. The latter configuration of the corner reinforcements may be configured to hold a further bottom panel at a short  
30 distance of the bottom panel 2 of the package 10''.

In Figures 9 and 10 a fourth embodiment of the blank 1” and the package 10” is shown. The blank 1” as shown in Figure 9 comprises multiple protrusions 15” that extend from the first and second side wall panels 3, 4 in a direction away from said respective panel 3, 4. As mentioned before, the protrusions 15” are substantially hollow and are formed during the moulding step of the blank. Since the protrusions 15” can be formed during moulding, the protrusions may have different shapes, sizes and be located on different positions on the blank 1”. In the shown embodiment, the protrusions 15” are configured for retaining a product in the package inner space 12. After moulding the blank 1”, the product is placed on top of the bottom panel 2 (not shown). Subsequently, the side wall panels 3, 4 are pivoted along the folding lines 5 and brought in an upright position such that the opposing side edges 8 of the respective side wall panels 3, 4 are in abutment. As the side wall panels 3, 4 are pivoted, the protrusions 15” are displaced to a position in which said protrusions 15” partly enclose the product inside the package inner space 12. After interconnecting the respective side edges 8, the product can not be removed from the package without breaking the package 10”. Thus, the package 10” is tamper evident.

Although illustrative embodiments of the present invention have been described above, in part with reference to the accompanying drawings, it is to be understood that the invention is not limited to these embodiments. Variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. It will be clear, for example, that the products that are manufactured by means of the method according to the invention can be of different shapes and dimensions. The blanks can be provided with different protrusions, i.e. protrusions placed on different locations on the respective panels and/or protrusions having different shapes dependent on the function of such protrusions. For instance

packages intended for receiving electronic products may have a different kind of protrusions than packages intended for receiving food products or other kinds of products. Furthermore, the starch batter used for moulding of the blank may comprise different ingredients. The laminate layer may be of  
5 different materials and may be, for instance in dependence of the product to be packaged, provided on a desired location on the blank and thus on the package.

Reference throughout this specification to “one embodiment” or “an embodiment” means that a particular feature, structure or characteristic  
10 described in connection with the embodiment is included in at least one embodiment in the present invention. Thus, the appearances of the phrases “in one embodiment” or “in an embodiment” in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, it is noted that particular features, structures or  
15 characteristics of one or more embodiments may be combines in any suitable manner to form new, not explicitly described embodiments

## Conclusies

1. Werkwijze voor het vervaardigen van een verpakking, welke verpakking een geblazen schuimvormige structuur heeft en van een materiaal is dat ten minste natuurlijke polymeren zoals zetmeel omvat, waarbij de werkwijze omvat:
  - 5 • het verschaffen van een matrijs met een matrijsholte en het inbrengen van een zetmeelbeslag in de matrijsholte;
  - het gieten van een plano in de genoemde matrijsholte van het genoemde zetmeelbeslag, waarbij de plano een bodempaneel omvat en eerste en tweede zijwandpanelen die scharnierend bevestigd zijn aan  
10 het bodempaneel langs respectieve vouwlijnen die zich tussen het bodempaneel en de respectieve eerste en tweede zijwandpanelen uitstrekken;
  - het verwijderen van de plano uit de matrijsholte;
  - het vouwen van de respectieve zijwandpanelen langs de respectieve  
15 vouwlijnen in een in hoofdzaak opstaande positie zodat nabijgelegen zijwandpanelen tegen elkaar aan liggen en een verpakkingszijwand vormen, welke zijwand zich rond een omtrek van de genoemde bodem uitstrekt, waarbij de zijwand en de bodem een verpakkingsbinnenruimte definiëren.
- 20 2. Werkwijze volgens conclusie 1, waarbij de respectieve vouwlijnen gevormd zijn door het verschaffen van verdiepte gebieden in de plano gedurende het gieten van de plano.
3. Werkwijze volgens één van de voorgaande conclusies, waarbij de plano, ten minste het gebied van de vouwlijnen, wordt samengedrukt om een dikte  
25 van de plano lokaal te verminderen.

4. Werkwijze volgens één van conclusies 1-3, waarbij een vorm van de matrijsholte zodanig is dat een dikte van de plano ter plaatse van een respectieve vouwlijn kleiner is dan de dikte van het bodempaneel en/of de zijwandpanelen van de plano.
- 5 5. Werkwijze volgens één van de voorgaande conclusies, waarbij een dichtheid van het materiaal ter plaatse van een respectieve vouwlijn hoger is dan de dichtheid van het materiaal in het bodempaneel en/of de zijwandpanelen van de plano.
6. Werkwijze volgens één van de voorgaande conclusies, waarbij de  
10 werkwijze verder het onderling verbinden van nabijgelegen zijwandpanelen, ten minste tegenoverliggende zijranden van nabijgelegen zijwandpanelen, omvat.
7. Werkwijze volgens één van de voorgaande conclusies, waarbij de  
15 plano is voorzien van een laminaatlaag, bijvoorbeeld een papier- of kunststoflaag, op ten minste één van de plano-oppervlakken.
8. Werkwijze volgens conclusie 7, waarbij de aangrenzende zijwandpanelen onderling verbonden zijn door middel van de laminaatlaag.
9. Werkwijze volgens één van de voorgaande conclusies, waarbij op ten  
20 minste één van de plano-oppervlakken of op een laminaatlaag die is voorzien op één van de plano-oppervlakken een tekst en/of een beeld wordt voorzien, bijvoorbeeld door middel van printen.
10. Werkwijze volgens één van de voorgaande conclusies, waarbij  
gedurende het gieten van de plano op ten minste één van het bodempaneel en/of de eerste en tweede zijwandpanelen ten minste één uitsteeksel wordt  
25 verschaft.
11. Werkwijze volgens conclusie 10, waarbij het ten minste ene uitsteeksel één vormt van een hoekversteving, een producttegenhoudorgaan en een verpakkingsbinnenruimteverdeler.

12. Werkwijze volgens één van de voorgaande conclusies, waarbij de eerste en tweede zijwandpanelen worden gevouwen en/of onderling verbonden nadat een product in de verpakkingsbinnenruimte is gebracht.
13. Een plano voor het vormen van een verpakking, waarbij de plano een  
5 ten minste in hoofdzaak rechthoekig bodempaneel heeft, en eerste en tweede zijwandpanelen die onderling in paren tegenoverelkaar zijn gelegen, welke zijn bevestigd aan het bodempaneel om scharnierbaar te zijn langs vouwlijnen, waarbij de plano een geblazen schuimvormige structuur heeft en van een materiaal is dat ten minste natuurlijke polymeren omvat zoals  
10 zetmeel.
14. Een plano volgens conclusie 13, waarbij een dikte van de plano ter plaatse van de vouwlijnen kleiner is dan een dikte van het bodempaneel en/of de zijwandpanelen.
15. Een plano volgens conclusie 13 en 14, waarbij de plano is voorzien van  
15 ten minste één uitsteeksel dat zich van een eerste plano-oppervlakte uitstrekt in een richting van het plano-oppervlak af, waarbij het uitsteeksel een integraal gevormd deel van de plano is.
16. Een plano volgens één van de conclusies 13-15, waarbij de plano, op ten minste één van de plano-oppervlakken, een laminaatlaag omvat,  
20 bijvoorbeeld een papierlaag of een kunststoflaag.
17. Een plano volgens één van de conclusies 13-16, waarbij de plano een enkel integraal gevormd onderdeel is.
18. Een verpakking met een geblazen schuimvormige structuur en waarbij de verpakking van een materiaal is dat ten minste natuurlijke polymeren  
25 zoals zetmeel omvat, waarbij de verpakking een bodem omvat die is gevormd door een bodempaneel en een zijwand die een omtrek van de bodem omringt, waarbij de bodem en de zijwand een verpakkingsbinnenruimte definiëren, waarbij de zijwand eerste en tweede

opstaande zijwandpanelen omvat die aan de bodem zijn bevestigd, waarbij respectieve bevestigingen tussen de respectieve zijwandpanelen en de bodem verpakkingsbuitenhoeken definiëren, waarbij aangrenzende zijwandpanelen onderling zijn verbonden aan tegeoverliggende randen  
5 daarvan, daarbij tweede verpakkingsbuitenhoeken definiërend.

19. De verpakking volgens conclusie 18, waarbij de verpakking is vervaardigd met de werkwijze volgens één van de conclusies 1-12, waarbij de verpakking is opgezet uit een plano volgens één van de conclusies 13-17, waarbij de opstaande zijwandpanelen zijn verbonden met de bodem via  
10 eerste en tweede vouwlijnen, waarbij de vouwlijnen de respectieve eerste verpakkingsbuitenhoeken definiëren.

20. De verpakking volgens conclusie 17 of 18, waarbij de eerste en tweede verpakkingsbuitenhoeken in hoofdzaak scherpe hoeken zijn.

21. De verpakking volgens één van de conclusies 17-20, waarbij op ten  
15 minste één van een binnenoppervlak en een buitenoppervlak van de verpakking een laminaatlaag is voorzien.

22. De verpakking volgens één van de conclusies 18-21, waarbij de verpakking ten minste één uitsteeksel omdat dat zich van een binnenoppervlak van ten minste één van het bodempaneel en de eerste en  
20 tweede zijwandpanelen uitstrekt.

23. De verpakking volgens conclusie 22, waarbij het ten minste éne uitsteekstel ten minste één vormt van een hoekversteviging, een verpakkingsbinnenruimteverdeler en een producttegenhoudorgaan.

24. De verpakking volgens conclusie 23, waarbij in de binnenruimte van de  
25 verpakking een product is verschaft, welk product ten minste gedeeltelijk wordt omsloten en vastgehouden door het ten minste ene producttegenhoudorgaan, zodat het product slechts uit de verpakking kan worden gehaald door de verpakking te scheuren.

25. De verpakking volgens één van de conclusies 17-24, waarbij de verpakking een enkel integraal gevormd onderdeel is.

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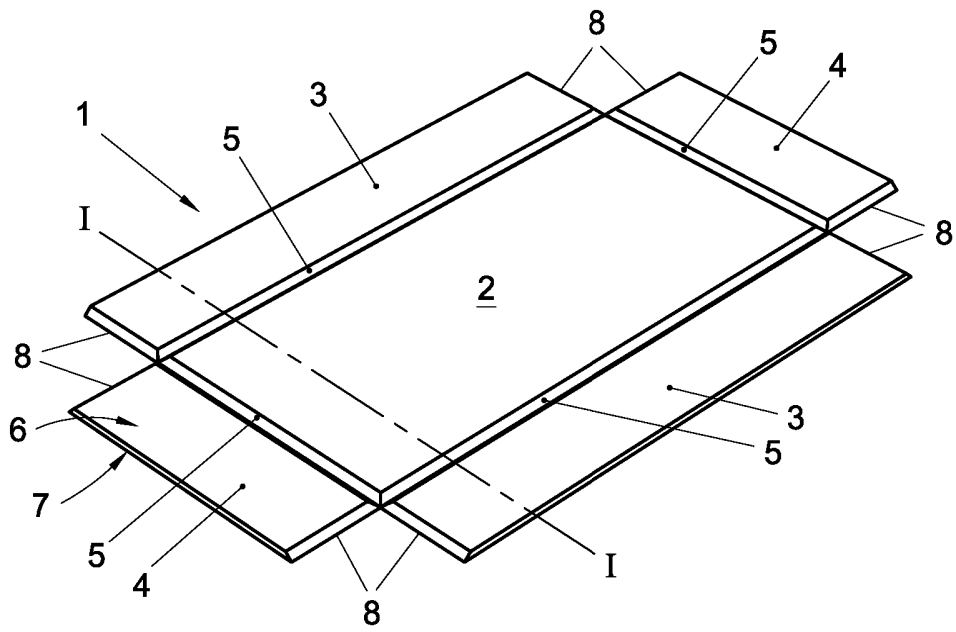


Fig. 1

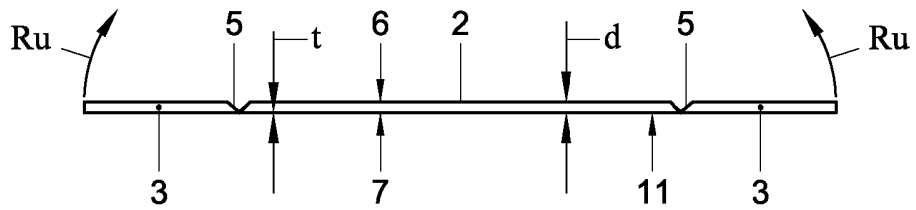


Fig. 2

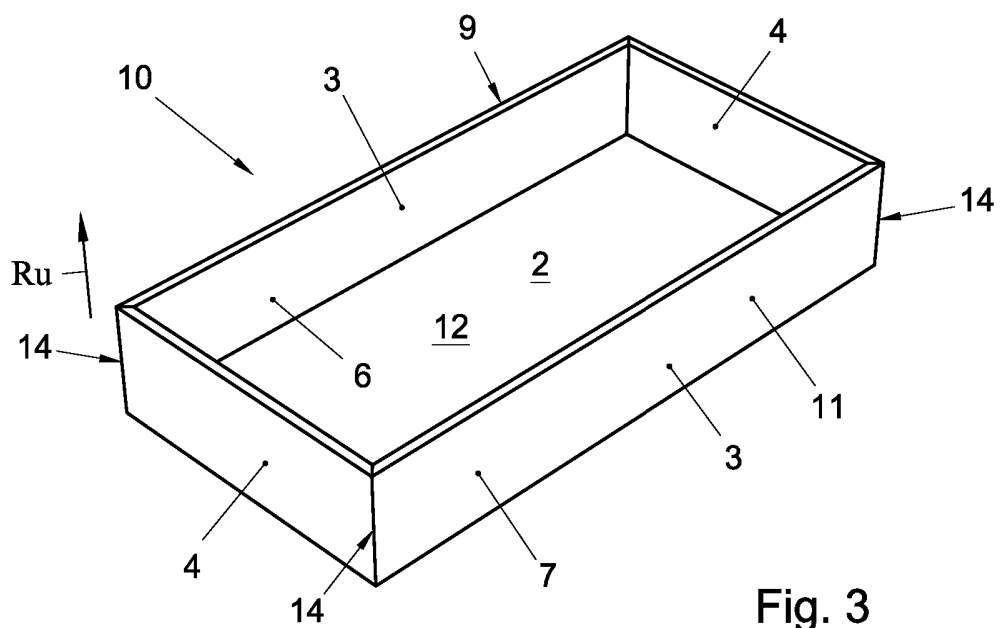


Fig. 3



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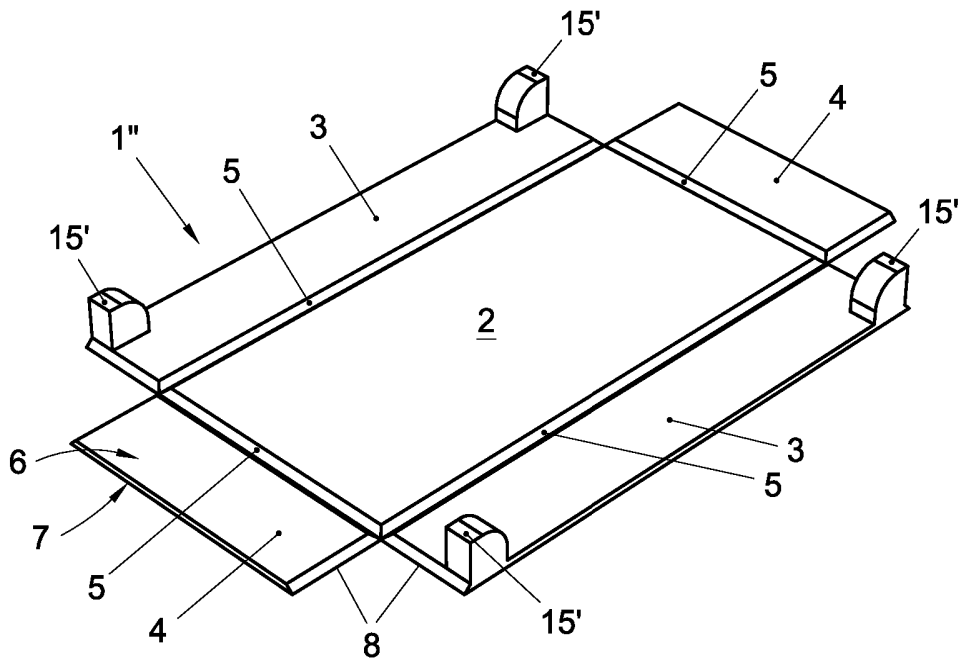


Fig. 7

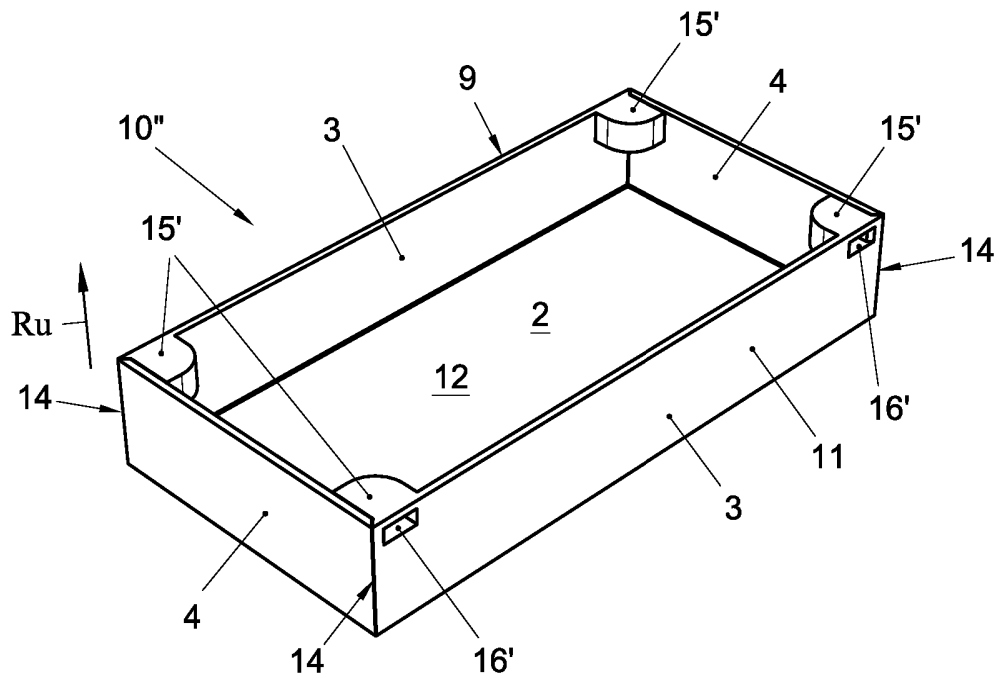


Fig. 8

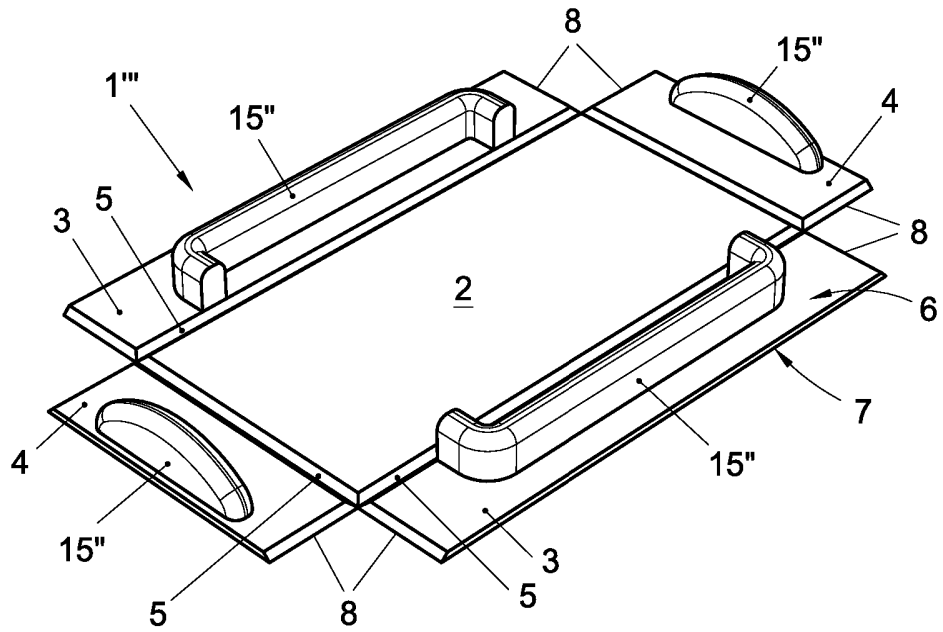


Fig. 9

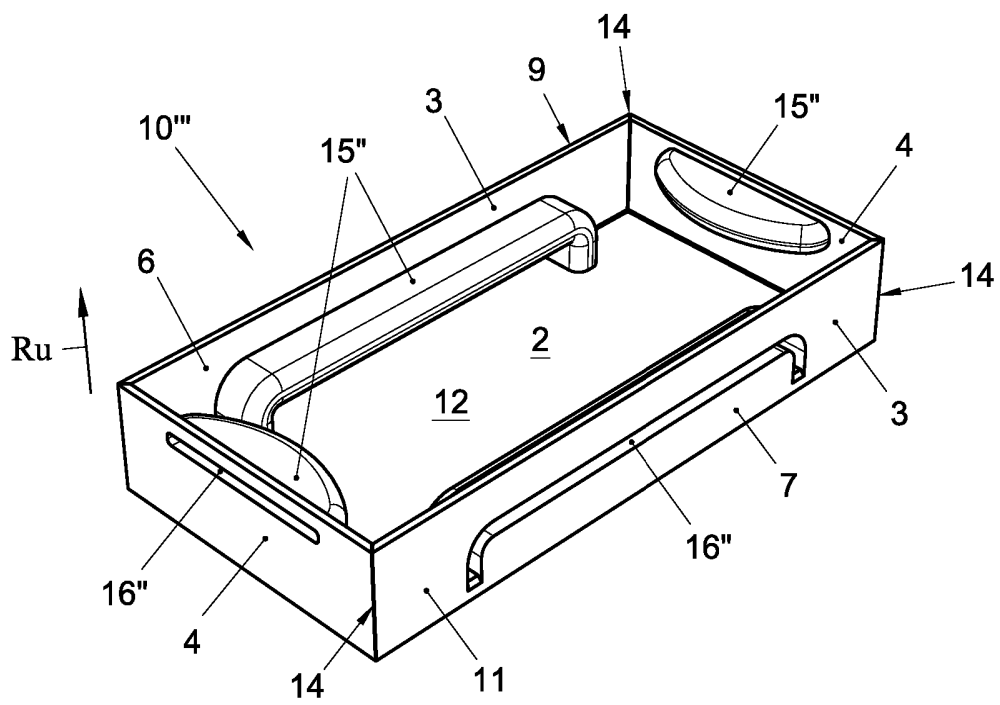


Fig. 10

# SAMENWERKINGSVERDRAG (PCT)

## RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE  <b>P100972NL00</b>	
Nederlands aanvraag nr.  <b>2010835</b>	Indieningsdatum  <b>22-05-2013</b>	
	Ingeroepen voorrangsdatum	
Aanvrager (Naam)  <b>PaperFoam Holding B.V.</b>		
Datum van het verzoek voor een onderzoek van internationaal type  <b>05-10-2013</b>	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.  <b>SN 60784</b>	
<b>I. CLASSIFICATIE VAN HET ONDERWERP</b> (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)		
Volgens de internationale classificatie (IPC)		
<b>B65D6/18</b> <b>B65D65/46</b> <b>B65D25/10</b> <b>B65B5/04</b>		
<b>II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK</b>		
Onderzochte minimumdocumentatie		
Classificatiesysteem	Classificatiesymbolen	
<b>IPC</b>	<b>B65D</b>	<b>B65B</b>
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen		
III. <input type="checkbox"/>	<b>GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES</b> (opmerkingen op aanvullingsblad)	
IV. <input type="checkbox"/>	<b>GEBREK AAN EENHEID VAN UITVINDING</b> (opmerkingen op aanvullingsblad)	

**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek  
NL 2010835

**A. CLASSIFICATIE VAN HET ONDERWERP**

INV. B65D6/18 B65D65/46 B65D25/10 B65B5/04  
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

**B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK**

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)  
B65D B65B

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

**C. VAN BELANG GEACHTE DOCUMENTEN**

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
Y	WO 2009/088289 A1 (PAPERFOAM B V [NL]; HUISMAN JAN WIETZE [NL]; GROENEVELT MENNO EDUARD []) 16 juli 2009 (2009-07-16)	18,20-24
A	* bladzijde 8, regel 8 - regel 11 * * bladzijde 3, regel 3 - regel 10 *	1-17,19,25
Y	US 2007/145052 A1 (STEINHAUSER MARK R [US]) 28 juni 2007 (2007-06-28)	18,20-24
A	* alinea [0038]; figuren 8,9 *	1,13

Verdere documenten worden vermeld in het vervolg van vak C.

Leden van dezelfde octroofamilie zijn vermeld in een bijlage

**° Speciale categorieën van aangehaalde documenten**

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"X" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"Y" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octroofamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

16 december 2013

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040,  
Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Sundell, Olli

**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek

NL 2010835

In het rapport genoemd octrooi geschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie	
WO 2009088289	A1	16-07-2009	NL 2001164 C2	08-07-2009
			WO 2009088289 A1	16-07-2009
-----				
US 2007145052	A1	28-06-2007	CA 2635749 A1	12-07-2007
			CN 101365628 A	11-02-2009
			EP 1973786 A1	01-10-2008
			US 2007145052 A1	28-06-2007
			US 2010313529 A1	16-12-2010
			WO 2007079018 A1	12-07-2007
-----				



File No. SN60784	Filing date ( <i>day/month/year</i> ) 22.05.2013	Priority date ( <i>day/month/year</i> )	Application No. NL2010835
International Patent Classification (IPC) INV. B65D6/18 B65D65/46 B65D25/10 B65B5/04			
Applicant PaperFoam Holding B.V.			

This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the application
- Box No. VIII Certain observations on the application

	Examiner Sundell, Olli
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## WRITTEN OPINION

Application number  
NL2010835

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### Box No. I Basis of this opinion

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1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - a sequence listing
    - table(s) related to the sequence listing
  - b. format of material:
    - on paper
    - in electronic form
  - c. time of filing/furnishing:
    - contained in the application as filed.
    - filed together with the application in electronic form.
    - furnished subsequently for the purposes of search.
3.  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

---

### Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

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#### 1. Statement

Novelty	Yes: Claims	1-25
	No: Claims	
Inventive step	Yes: Claims	1-17, 19, 25
	No: Claims	18, 20-24
Industrial applicability	Yes: Claims	1-25
	No: Claims	

#### 2. Citations and explanations

**see separate sheet**

**WRITTEN OPINION**

Application number  
NL2010835

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**Box No. VII Certain defects in the application**

see separate sheet

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**Box No. VIII Certain observations on the application**

see separate sheet

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1 Reference is made to the following document:

D1 WO 2009/088289 A1 (PAPERFOAM B V [NL]; HUISMAN JAN WIETZE [NL]; GROENEVELT MENNO EDUARD []) 16 juli 2009 (2009-07-16)

D2 US 2007/145052 A1 (STEINHAUSER MARK R [US]) 28 juni 2007 (2007-06-28)

2 Document D1 is regarded as being the prior art closest to the subject-matter of claims 1 and 13, and discloses a method and a blank, from which the subject-matter of these claims differs in that the method and the blank comprise a blank comprising fold lines.

The subject-matter of claims 1 and 13 is therefore new.

The problem to be solved by the present invention may be regarded as finding alternative materials for hinged blanks, or finding new uses for e.g. Paperfoam®.

No prior art suggests fold lines, in particular living hinges made of blown foam structure comprising natural polymers.

The subject-matter of claims 1 and 13 therefore involves an inventive step.

3 Claims 2-12 and 14-17 are dependent on claims 1 and 13, respectively, and as such also meet the requirements of novelty and inventive step.

4 The present application does not meet the criteria of patentability, because the subject-matter of claim 18 does not involve an inventive step. Document D2, paragraph [0038], which is considered to represent the most relevant state of the art, discloses a package from which the subject-matter of claim 18 differs in that the material is made of blown foam structure comprising natural polymers.

The problem to be solved by the present invention may therefore be regarded as finding alternative materials for the side panels\*.

Document D1, page 4, lines 3-9, discloses a package constructed from blown foam structure comprising natural polymers.

This material is merely one of numerous straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to find an alternative packaging material for the individual panels of the package of D2.

\*Claim 18 is not restricted blanks made in one piece.

- 5 The dependent claims 20-24 appear not to claim any additional features which render them non obvious with respect to the available prior art.

In particular the following is noted:

Packages comprising means for supporting contents and packages that have to be torn to gain access to the product are commonplace (claims 22-24).

### **Re Item VII**

#### **Certain defects in the application**

- 6 Claims 20 and 21 refer to "the package" and were thus interpreted as not being dependent on claim 17.
- 7 The relevant background art disclosed in documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.
- 8 The features of the claims are not provided with reference signs placed in parentheses.

### **Re Item VIII**

#### **Certain observations on the application**

- 9 Claims 1, 13 and 18 are not clear, because it is not clear what constitutes a fold line. Claims 2-4 and 14 comprise features clarifying the nature of the fold line.