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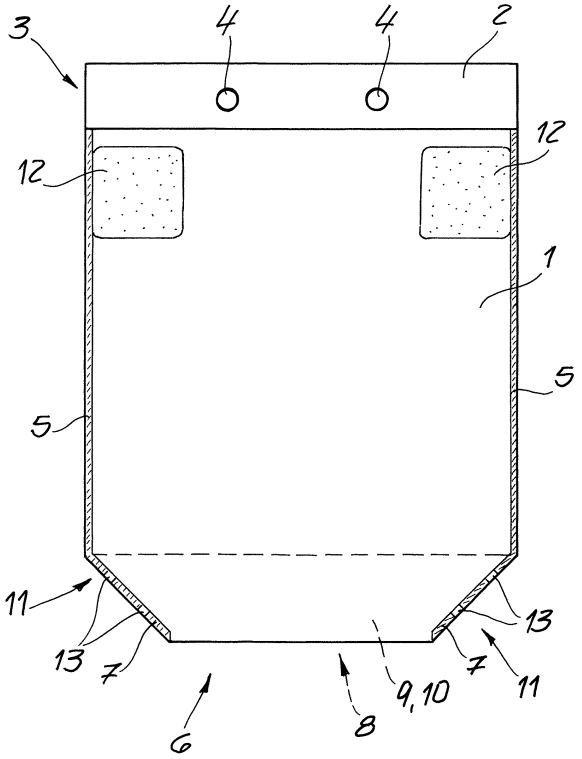
(54) PACKAGING BAG AND USE OF THE PACKAGING BAG

(57) The invention relates to a Packaging bag comprising a web having a front wall (1), a rear wall (2) projecting beyond the front wall (1) on an open top bag edge, stacking openings (4) disposed in the section of the rear wall (2) projecting beyond the front wall (1), the web being formed at least in part of paper. The front wall (1) and the rear wall (2) have chamfered corners (7) at a bottom bag edge (6) opposite the top bag edge.

Fig. 1A



EP 4 201 832 A1

Description

[0001] The present invention relates to a packaging bag comprising a web having a front wall, a back wall projecting beyond the front wall on an open top edge of the bag, wherein stacking openings are disposed in the section of the back wall projecting beyond the front wall, and wherein the web is formed at least partially of paper.

[0002] Packaging bags of the type described above are usually also referred to as 'wicketed bags', wherein several such packaging bags can be combined into a stack through the stacking openings and the individual packaging bags can be removed from the stack for their filling. Such packaging bags are usually used as packaging for sanitary articles, e.g. for diapers or other hygiene articles. When diapers are packed, they are pressed before being inserted into the film bag, so that the diapers expand in the packaging bag and then lie tightly against the inside of the bag, whereby the packaging bag is formed as a package in a largely rectangular shape.

[0003] Such packaging bags are basically known from the prior art and are described, for example, in DE 1 291 280 B and DE 23 12 143 C2. According to such an embodiment, the filling takes place via the open bag edge, at which the stacking openings in the rear wall are also provided. After the bag has been filled, it is sealed, whereupon the section provided with the stacking openings can be separated and disposed of.

[0004] Such packaging bags are usually made of a heat-sealable material. In particular, these are thermoplastic films, such as polyethylene films, which have a thickness of between 40 and 80 micron, depending on the size of the bag.

[0005] Increasingly, however, the packaging industry is striving to use packaging materials which are largely made from renewable raw materials and which are also easy to recycle. Against this background, paper is increasingly being used as a material for such wicketed bags, since the fibres required for the production of paper are based on renewable raw materials.

[0006] EP 3 687 914 A teaches a packaging bag of the type described above, which is formed at least from a layer of paper and a sealing layer of polyethylene arranged thereon. A three-layer structure is also preferred, the outer layers being formed from paper and the inner layer from polyethylene. A recess is then being provided in the inner paper layer in the region of the heat-sealing seams, so that the heat-sealing seams can be formed via the sealing layer.

[0007] When incorporating paper layers to increase recyclability, the special feature arises that the recyclability is considerably improved with an increasing proportion of paper, since the residual polyethylene can then be recycled together with the paper layers. Overall, a proportion of paper of at least 80% by weight is aimed at here, whereby the packaging bag is then designed to be comparatively stiff due to the high proportion of paper. Since the corners of such packaging bags are usually folded in at the bottom, however, the high paper content leads to high restoring forces which impair the dimensional stability of the packaging.

[0008] Against this background, the present invention is based on the task of providing a packaging bag which, on the one hand, can be produced with a high proportion of paper and which, at the same time, has a high dimensional stability.

[0009] The object of the invention and the solution to the problem is a packaging bag according to patent claim 1 and the use of a packaging bag according to the invention according to patent claim 14.

[0010] Accordingly, it is important to the invention that the front wall and the rear wall have chamfered corners at a bottom bag edge opposite the top bag edge. In an unfilled state of the packaging bag, this results in a substantially trapezoidal configuration of the packaging bag at the lower end, the chamfered corners being exposed after filling and forming two triangular sections of the stand-up bottom.

[0011] The trimming of the corners ensures that no excess material is arranged in the stand-up bottom in a filled state, whereby on the one hand the dimensional stability of the packaging bag and on the other hand the functionality of the stand-up bottom is considerably improved.

[0012] Such an embodiment is of particular advantage if the front wall and the rear wall are connected to each other at the bottom edge of the bag via a bottom gusset. According to such an embodiment, the packaging bag can be formed by folding over only one web. For this purpose, the bottom gusset is first introduced into the web and then the front wall is joined to the rear wall. The inclusion of a bottom gusset ensures that the front wall and the rear wall are joined together at the bottom edge of the bag without a seam, resulting in a particularly high bond strength between the front wall and the rear wall. The combination of a bottom gusset and the integration of chamfered corners creates a bottom which is on the one hand dimensionally stable and at the same time stable against the loads generated by the packaged goods. At the bottom of the bag, the front and rear walls then merge into the bottom gusset via a crease line. In addition, a cross seam can also be provided at the crease line to reinforce the bottom of the bag.

[0013] Instead of forming the bottom fold integrally with the front wall and the rear wall, a separate bottom panel can also be provided, which is joined to the front wall and the rear wall by means of joining seams, in particular heat-sealing seams, regions of the bottom panel then forming regions of the front wall and the rear wall in a joining section.

[0014] Although an embodiment with a bottom gusset is a preferred embodiment of the invention, the invention is not limited thereto. It is of course also within the scope of the invention that the front wall and the rear wall are joined together at the bottom edge by a closing seam.

[0015] According to a further embodiment the front and/or the rear front wall are connected to the bottom gusset

sections of the bottom gusset via a transversely extending secondary cross seam, wherein the secondary cross seam is spaced from a lower bag end or the cross seal seam such that a compensation chamber is formed in each case. The secondary cross seam has a number of breakthroughs through which air can be transported outwards to the bag edges. This greatly simplifies the packing process, since there is usually sufficient space available at the edges. This helps to avoid excessive pressure in the center of the bottom, which could cause the seams or the creased edges to burst. Equally, however, pressure peaks can also occur on the outside, so that the air can then flow in the opposite direction to the center, thus relieving the corners of the base.

[0016] According to a preferred embodiment, the proportion of paper is at least 90% by weight, preferably at least 95% by weight. By incorporating such a high proportion of paper, the recyclability can be substantially improved, whereby the special design of the packaging bag is then of course also particularly effective, since the stiffness of the front wall and the rear wall also increases with increasing proportion of paper.

[0017] According to a particularly preferred embodiment of the invention, the web comprises a layer of paper, which is at least partially coated with a sealing layer made of a heat sealable material on a side adjacent to the packaging space.

[0018] Correspondingly, the front wall and the rear wall have a corresponding coating on an inner side. Although in principle a multilayer design with several layers of paper is conceivable, a preferred design is limited to a combination of only one layer of paper with the sealing layer of heat-sealable material arranged thereon.

[0019] A heat-sealable material is a thermoplastic material which melts under the influence of heat and then hardens when it cools down. This makes it possible to join the front wall and the rear wall by heat sealing. This would not be possible without a corresponding coating.

[0020] The sealing layer can be applied in the form of an extrusion lamination (extrusion coating), which can be single-layered or multilayered, in which case different polymers can be used in the individual layers, e.g. a three-layer PE/EVOH/PE structure.

[0021] Alternatively the sealing layer can also be applied as a dispersion coating of a heat-sealable lacquer particularly using a printing process. In the context of the invention, a lacquer is preferably understood to mean a liquid coating material which is applied in a thin layer and built up by chemical or physical processes to form a continuous, solid film.

[0022] In principle, it is sufficient within the scope of the invention if only a partial or non-full-surface sealing layer is provided on the front wall and/or the rear wall. The heat sealable material is then only applied where a corresponding formation of heat-sealing seams is required.

[0023] Alternatively, it is also conceivable that the sealing layer covers said layer of paper completely on a side adjacent to the packaging space. Such an embodiment offers the advantage that then no particularly high accuracy must be placed on the positioning of the heat-sealing seams. Even small positional deviations still lead to a firm formation of heat-sealing seams. On the other hand, the water vapour barrier is also considerably increased by binding a complete layer of heat-sealable material. This is of particular advantage when used as diaper packaging, since diapers are formed with a super absorbent material to allow absorption of body fluids. If the packaging bag had only a low water vapour barrier, this would have the consequence that the super absorbent materials would absorb the air humidity with increasing storage time. This would then place high demands on storage and necessitate prompt sale and consumption. A gas, aroma or odor barrier can also be additionally incorporated above this. This is necessary, for example, if the diapers are perfumed or soaked with a lotion. The corresponding barrier layer is formed in particular from EVOH.

[0024] However, a full-surface sealing layer also leads to the problem that a substantially higher proportion of a polymeric portion would have to be provided on the layer of paper than would be the case with only a partial coating. Accordingly, the sealing layer should be much thinner than would be necessary with only a partial coating.

[0025] In order to enable heat-sealing seams that are resistant to bonding despite the thinner coating, these are then preferably formed wider than in the case of a thicker coating, whereby the bonding area is increased. Alternatively, a combination of both forms is also possible. In this case, a full-surface sealing layer and an additional layer of a heat-sealable material would then be applied to the paper layer. Such an embodiment serves primarily to increase the water vapour barrier. In the areas where the formation of heat-sealing seams is then envisaged, the additional layer thickens the layer made of heat-sealable material in order to increase the bond strength. Furthermore, it is also conceivable to provide an additional layer in particularly stressed areas, e.g. in corner areas. The width of the heat-sealable seams is between 2 and 10 mm, in particular between 4 and 6 mm, irrespective of the positioning.

[0026] The heat-sealable material for the sealing layer can be applied via an extrusion lamination and the heat-sealable material for the additional layer can be applied via an extrusion lamination or a dispersion coating. The last variant in particular can be of advantage in keeping the proportion of foreign substances low, since the dispersions can be applied very thinly, especially with a basis weight of between 1 gsm and 3 gsm. In addition, typical barrier materials can also be used in such an embodiment. The barrier layer can then be formed from a material or materials from a group comprising acrylic polymers, acrylic copolymers, polyvinyl acetate, polyvinyl alcohol, ethylene vinyl acetate, polyvinyl chloride, styrene butadiene copolymers, polyvinylidene chloride, polyacrylonitrile, polyacrylic acid ester, natural wax, synthetic wax, starch, chalk, talc.

[0027] Based on such an embodiment, the invention preferably provides that the front wall and the rear wall are

connected to one another at the lateral edges via longitudinal sealing seams. Accordingly, a bottom gusset can first be formed from the web by folding it over and then the front wall and the rear wall can each be joined to one another at the lateral edges by means of a longitudinal seal seams. Accordingly, a heat-sealable coating must then have been applied beforehand in the region of these.

[0028] In the bottom area it is also preferably provided that the bottom gusset sections, which are separated from each other by the bottom gusset, are connected in the corners to the adjacent front wall or to the adjacent rear wall via inclined sealing seams. Starting from an unfilled, flat packaging bag, heat-sealing seams thus extend along the lateral edges and in the region of the chamfered corners, no heat-sealing seam being provided only in a bottom edge because of the bottom gusset provided there and at a top edge because of the bag opening provided.

[0029] The chamfered corners preferably have an angle of between 40 and 50°, particularly preferably 45°, so that the longitudinal sealing seams and the adjacent inclined sealing seams accordingly enclose an angle of 130 to 140°, preferably 135°.

[0030] In principle, any material can be used as a heat-sealable material for the coating. Polyolefins are primarily used, preferably polyethylene or polyethylene copolymers such as HDPE, LLDPE, LDPE or EVA or mixtures thereof.

[0031] The paper used is also basically not limited to any particular. Preferably it is a kraft paper. Kraft paper is understood to be a packaging paper which is formed from bleached or unbleached sulphate pulp and has high static and dynamic strengths.

[0032] According to a preferred embodiment, the layer of paper has a basis weight between 60 and 120 gsm, preferably between 70 and 90 gsm. The basis weight of the heat sealable material is preferably between 1 and 16 gsm, preferably between 3 and 10 gsm. Where a full surface coating is provided, the basis weight of the heat-sealable material may be between 2 and 8 gsm, preferably between 3 and 7 gsm. Where thicker areas of the coating are provided for the formation of heat-sealable seams in the case of a full-surface coating, the weight per unit area is preferably between 8 and 16 gsm, more preferably between 10 and 14 gsm. This also applies to non-full-surface coatings.

[0033] According to a preferred embodiment, the packaging bag has ventilation openings. These ventilation openings are of particular advantage since the goods to be packed, in particular diapers, are introduced into the packaging bag in a tight-fitting manner, so that the air initially contained in the packaging bag must escape. On the one hand, this enables a rapid filling and, on the other hand avoids excessive stress on the heat-sealing seams due to the increased internal pressure caused by the compressed air.

[0034] Preferably, these vents are formed by unsealed portions in the heat-sealing seams. In particular, the ventilation openings are arranged in the diagonal seal seams. Accordingly, each diagonal seal seam has one, two or more unsealed sections through which air can escape from the packaging bag. Such an embodiment is of particular advantage since no breakthroughs have to be made in the material of the web. This is advantageous since paper is generally very susceptible to tearing if there are already material weakenings in the web. The inclusion and connected sections in the heat seal seams allows the formation of ventilation openings without weakening the material at the front wall or the rear wall. In addition, the openings close as soon as the bag has been filled and assumes an essentially cuboid shape.

[0035] Accordingly, the web has a heat-sealable area not only on an inner side but also on an outer side. In contrast to the inner side, however, this area is not arranged over the entire surface of the outer side and serves in particular to form a flat head area. In the course of sealing, the front walls are usually joined together by a transverse sealing seam, whereby a corresponding fold must be made in order to form a cuboid shape, in which sections of the front wall and the rear wall are folded onto themselves. The heat-sealable areas on the outer side can also be applied via a dispersion lamination with a heat-sealable lacquer.

[0036] The areas with the heat sealable material are arranged to be folded over on themselves and then sealed together by the application of heat. The sealed areas provide additional bond strength and dimensional stability to the top of the packaging bag when filled.

[0037] The packaging bag according to the invention preferably has a width of between 150 and 500 mm and a length of between 200 and 700 mm.

[0038] According to another aspect having independent meaning, it is also possible that instead of chamfered corners, the bottom gusset parts are fixed together at the side edges. For example, the bottom gusset sections may also be formed with an at least partial coating of a heat-sealable material so that they can be joined together by a heat-sealable seam.

[0039] Alternatively, it is also possible for one or more openings to be arranged in the bottom gusset, in which case the front wall and the rear wall can be joined together through the bottom gusset. This then also fixes the bottom portions together. There is no need for additional coating of the bottom gusset with the heat-sealable material.

[0040] In addition, substantially all of the previously mentioned features can be related to such an embodiment.

[0041] It is further an object of the invention to use a packaging bag according to any one of claims 1 to 13 for packaging diapers. Typically, for this purpose, a plurality of diapers are placed one on top of the other in a folded state and are inserted together into the film packaging .

[0042] According to a further development, the packaging bag is then sealed at a head region with a transverse sealing

seam. According to the previous description, the areas provided with a heat-sealing lacquer can then also be placed and sealed to one another.

[0043] Since the protruding section of the back wall is intended solely for securing the unfilled packaging bags, it is usually detached from the packaging bag after a transverse sealing seam has inserted, since it is of no further use.

[0044] According to a particularly preferred embodiment of the invention, the packaging bag filled with the diapers has a substantially cuboid shape after closing.

[0045] In the following, the invention is explained in more detail with reference to an example of an embodiment. It shows:

Fig. 1A, 1B	a packaging bag according to the invention in an unfilled state
Fig. 2A, 2B, 2C	the essential steps for producing a packaging bag according to Figure 1
Fig. 3A, 3B	a sectional view through a packaging bag according to the invention in the region of a longitudinal seam
Fig. 4	the packaging bag according to the invention in a filled state with a view of the base of the stand
Fig. 5, 6	alternative designs of the packaging bag
Fig. 7A, 7B	designs of the bottom with a separate bottom panel
Fig. 8	a further design of the bottom

[0046] Fig. 1A, 1B show a packaging bag according to the invention in a laid-flat and unfilled state with a front wall 1 and a rear wall 2, which protrudes with a section 3 opposite the front wall 1 and wherein stacking openings 4 are arranged in the protruding section 3.

[0047] The stacking openings 4 are provided so that several packaging bags arranged one above the other can be gripped by bars in order to be able to simplify the packaging process considerably.

[0048] The front wall 1 and the rear wall 2 are connected to each other at the lateral edges by longitudinal sealing seams 5, which merge into inclined sealing seams 7 in a bottom bag edge 6. The special feature here is that the inclined sealing seams 7 do not connect the front wall 1 to the rear wall 2. Rather, a bottom gusset 8 with bottom gusset sections 9, 10 is provided, the bottom gusset section 9 being connected to the front wall 1 via the inclined sealing seam 7 and the bottom gusset section 10, which is not shown in greater detail in Fig. 1A and 1B, being connected to the rear wall 2. In contrast to Fig. 1A, Fig. 1B shows an embodiment in which the front wall 1 and the rear wall 2 are connected not only by the inclined sealing seam 7 but also by a cross seam 19 to the bottom gusset section 10.

[0049] By means of the inclined sealing seams 7 it is possible for the packaging bag to be formed with chamfered corners 11 at the bottom bag edge 6. Its special feature becomes clear in particular from the further figures.

[0050] With reference to Fig. 1A and 1B, it is further possible to identify regions 12 with a heat seal lacquer, which are applied to the outer surface of the front wall 1 and also to the outer surface of the rear wall 2. Furthermore, ventilation openings 13 are provided which are arranged in the inclined sealing seams 7 according to Fig. 1A and in the cross seams 19 according to Fig. 1B.

[0051] Figs. 2A, 2B, 2C show the manufacturing process for forming a packaging bag according to Fig. 1A. For this purpose, an endless web 14 is provided, which extends in machine direction MD and is already provided with the bottom gusset sections 9, 10 for the formation of the front wall 1, the rear wall 2 and the bottom gusset 8. In addition, the stacking openings 4 are already located in the web 14. Figures 2A, 2B, 2C describe the transport and the production of the packaging bag in machine direction MD. According to Fig. 2B, the web 14 is folded over, whereby the bottom gusset 8 is formed. In addition, the areas 12 with the heat-seal lacquer are now also shown at least on the front wall 1. Then, according to Fig. 2C, the longitudinal sealing seams 5 and the diagonal sealing seams 7 are heat-sealed and then individual packaging bags are separated from the web 14. In a final step, the corners of the bottom bag edge 6 can then be chamfered.

[0052] The packaging bag according to the invention is a packaging bag which is at least partially formed from paper. In particular, the aim is to create a packaging bag which is formed from at least 80% by weight, particularly preferably 90% by weight, very particularly preferably 95% by weight, of paper. Paper is a renewable raw material. In addition, a good recyclability can be ensured by the highest possible proportion of paper. Figs. 3A, 3B show a section through the packaging bag in the region of the longitudinal sealing seams 5, whereby a closer representation of the regions 12 with the heat-sealing lacquer on the outer sides has been omitted. The bag consists in particular of a layer 15 of paper. Although multilayer designs are also conceivable, only one layer of paper 15 is provided in the example shown.

[0053] Since paper itself has no heat-sealing capability, it is necessary to apply a heat-sealable material in the form of a sealing layer 16 to the layer of paper 15. There are various possibilities for this. Polyethylene in particular is used

as the heat-sealable material for the sealing layer 16, whereby the proportion of this polymer should be kept as low as possible due to the previously mentioned aim of a high paper content.

[0054] According to Fig. 3A, the coating 16 is therefore only provided in areas in which heat-sealing seams, e.g. longitudinal sealing seams 5 or inclined sealing seams 7, are subsequently to be made. Since the packaging bag is also to be finally closed with a transverse sealing seam, the application of a sealing layer 16 is also necessary there. In areas where no heat sealing is to be carried out, a sealing layer 16 can generally be dispensed with.

[0055] However, paper has only a very poor water vapor barrier, so it may be useful to provide a full-surface sealing layer 16 as shown in Fig. 3B. It should be noted here that such packaging bags are frequently used for packaging diapers. This use is also within the scope of the present invention. Diapers in particular but also other hygiene articles have a high proportion of super absorbent material, which tends to absorb moisture from the environment due to its hydrophilic property. Accordingly, by applying a thin sealing layer 16, the water vapor barrier can be considerably.

[0056] Due to the full-surface arrangement, however, a comparatively thin sealing layer 16 is aimed for in order to keep the proportion of polymeric materials as low as possible. At the same time, however, this also impairs the heat-sealability or the stability of the heat-sealing seams to be applied. In principle, this can be compensated for by wider heat-sealing seams. The embodiment according to Fig. 3B, however, provides for an embodiment in which an additional layer 20 made of heat-sealable material is coated on the sealing layer only in sections. This leads to regions with a thicker layer of heat-sealable material, which are designed for a heat-sealing seam, and regions with a thinner layer of heat-sealable material in which no heat-sealing seam is to be introduced. According to Fig. 3B, this is the case, for example, in the protruding section 3.

[0057] Accordingly, a packaging bag is formed which can nevertheless be closed to a large extent by heat-sealing seams. Only at a bottom edge 6 are the front wall 1 and the rear wall 2 joined by a bottom gusset 8. The advantage of the chamfered corners 11 with the inclined sealing seams 7 can be seen in particular in Fig. 4. Fig. 4 shows an embodiment of the packaging bag in accordance with Fig. 1B. The omission of the excess material results in the formation of a bottom 17 which, despite the use of a relatively stiff paper, permits an essentially cuboid configuration. The packaging bag according to Fig. 4 has been filled with diapers stacked one on top of the other and closed in the top area 18 by a transverse seal seam.

[0058] The following table shows a comparison between a conventional packaging bag formed entirely of polyethylene and a packaging bag according to the invention formed of a kraft paper having a thickness of 80 gsm and provided with a sealing layer 16 of polyethylene having a basis weight of 4 gsm. The sealing layer 16 extends over the entire layer of kraft paper. In the areas of the heat-sealing seams, no additional material was applied for the sealing layer 16. Instead, correspondingly wide heat-sealing seams were formed.

Table

		Method	PE bag	Paper-Bag
Thickness	micron	ASTM E 252	75	109
Base weight	gsm	ASTM D 1505	80	84
Tensile strength (MD)	N/inch	ASTM D 882	68	224
Tensile strength (CD)	N/inch	ASTM D 882	66	107
Elongation at break (MD)	%	ASTM D 882	758	3
Elongation at break (CD)	%	ASTM D 882	817	7
Gloss at 60°	GU	ISO 2813	60	13
Bag seal strength 2 ply	N/25mm	ASTM F 88	44	8
Seam width	mm		1	5

[0059] On the basis of the comparative values, it is clear that the bags have a similar material thickness, but differ substantially from one another, particularly with regard to strength, toughness and also with regard to the sealing seam strength. Despite the advantages of a bag made entirely of polyethylene, it was possible within the scope of the invention to provide a packaging bag which has sufficiently good material properties and, in contrast to a bag made of polyethylene, was produced to a substantial extent from renewable raw materials. The disadvantages of using paper, in particular the high stiffness has been eliminated with respect to the desired dimensional stability by the use of chamfered corners 11. The regions 12 with the heat-seal lacquer also contribute in an advantageous manner to the fact that the head area 18 can be closed securely and with a constant shape.

[0060] According to Figs. 5 and 6, the packaging bags do not have chamfered corners 7. Rather, the bottom gusset

8 is reinforced by connecting the bottom gusset 8 portions together. According to Fig. 5, openings 21 are provided in the bottom gusset 8 portions so that the front wall 1 and the rear wall 2 are sealed together through the bottom gusset. According to Fig. 6, the bottom gusset sections 9, 10 have a coating of a heat-sealable material and can thus be joined to one another via sealing seams 22.

[0061] Figs. 7A, 7B show an alternative embodiment of the bottom gusset 6, which is not integrally formed with the front wall 1 and the rear wall 2 but rather is formed via a separate bottom panel 25. The connection is made via joining seams 23, wherein according to Fig. 7A the front wall 1 and the rear wall 2 are formed straight at a lower joining portion 24, while according to Fig. 7B the front wall 1 and the rear wall 2 are folded over at the lower joining portion 24.

[0062] According to Fig. 7A, the joining seams 23 are stressed in shear, and according to Fig. 7B, the joining seams 23 are stressed in peel. Stressing in shear is particularly advantageous for the joining seams 23, since higher loads can be absorbed. In addition, the design according to Fig. 7A also produces a rounder bottom shape.

[0063] According to Fig. 8 a different embodiment of the bottom gusset is provided, wherein the front and/or the rear walls 1, 2 are connected to the bottom gusset sections 9, 10 via a transversely extending secondary cross seam 26, wherein the secondary cross seam 26 is spaced from the cross seam 19 such that a compensation chamber 27 is formed in each case. The secondary cross seam 26 has a number of breakthroughs through which air can be transported outwards to the bag edges. This greatly simplifies the packing process, since there is usually sufficient space available at the edges. This helps to avoid excessive pressure in the center of the bottom, which could cause the seams or the creased edges to burst. Equally, however, pressure peaks can also occur on the outside, so that the air can then flow in the opposite direction to the center, thus relieving the corners of the base.

Claims

1. Packaging bag comprising a web having a front wall (1), a rear wall (2) projecting beyond the front wall (1) on an open top bag edge, stacking openings (4) disposed in the section of the rear wall (2) projecting beyond the front wall (1), the web being formed at least in part of paper,
   characterized in that
   the front wall (1) and the rear wall (2) have chamfered corners (7) at a bottom bag edge (6) opposite the top bag edge.

2. Packaging bag according to claim 1, **characterised in that** the front wall (1) and the rear (2) wall are joined together at the bottom edge of the bag by a bottom gusset (8).

3. Packaging bag according to claim 1 or 2, **characterized in that** the proportion of paper is at least 90% by weight.

4. Packaging bag according to any one of claims 1 to 3, **characterized in that** the web comprises a layer (15) of paper at least partially coated with a sealing layer (16) made of a heat sealable material on a side adjacent to the packaging space.

5. Packaging bag according to claim 4, **characterized in that** the sealing layer covers said layer (15) of paper completely on a side adjacent to the packaging space.

6. Packaging bag according to claim 5, **characterized in that** an additional layer (20) made of a heat sealable material is coated only in sections on the sealing layer (16).

7. Packaging bag according to claim 6, **characterized in that** the sealing layer (16) is applied via an extrusion lamination and the additional layer (20) is applied via an extrusion lamination or a dispersion coating.

8. Packaging bag according to any one of claims 4 to 7, **characterized in that** the front wall (1) and the rear wall (2) are connected to one another at the lateral edges via longitudinal sealing seams (5).

9. Packaging bag according to any one of claims 4 to 8, **characterised in that** bottom gusset (8) portions of the bottom gusset (8) are joined at the corners (11) to the adjacent front wall (1) or to the adjacent rear wall (2) via inclined seal seams (7).

10. Packaging bag of claim 9, **characterized in that** the inclined seal seams (7) comprise unsealed portions.

11. Packaging bag according to any one of claims 4 to 10, **characterised in that** the heat sealable material is polyethylene.

12. Packaging bag according to any one of claims 1 to 11, **characterised in that** the paper is kraft paper.

13. Packaging bag according to any one of claims 4 to 12, **characterised in that** the layer (15) of paper has a basis weight of between 60 and 120 gsm.

14. Packaging bag of any one of claims 4 to 13, **characterized in that** the sealing layer has a basis weight between 1 and 16 gsm is applied to the layer (15) of paper.

15. Packaging bag according to any one of claims 1 to 14, **characterised in that** a heat seal lacquer is applied to the front wall (1) and/or the rear wall (2) in at least one region (12) adjacent the top edge of the bag below the protruding section (3) on an outer side.

16. Packaging bag comprising a web having a front wall (1), a rear wall (2) projecting beyond the front wall (1) on an open top bag edge, stacking openings (4) disposed in the section of the rear wall (2) projecting beyond the front wall (1), the web being formed at least in part of paper and wherein the front wall (1) and the rear (2) wall are joined together at the bottom edge of the bag by a bottom gusset (8),
characterized in that
bottom gusset (8) portions of the bottom gusset (8) are at least partially joined together at side edges of the bottom gusset (8).

17. Use of a packaging bag according to any one of claims 1 to 16 for packaging diapers.

18. The use according to claim 17, subject to the condition that the packaging bag is closed at a head region with a transverse sealing seam.

19. The use according to claim 17 or 18, subject to the condition that the packaging bag filled with the diapers has a cuboid shape.

Fig. 1A

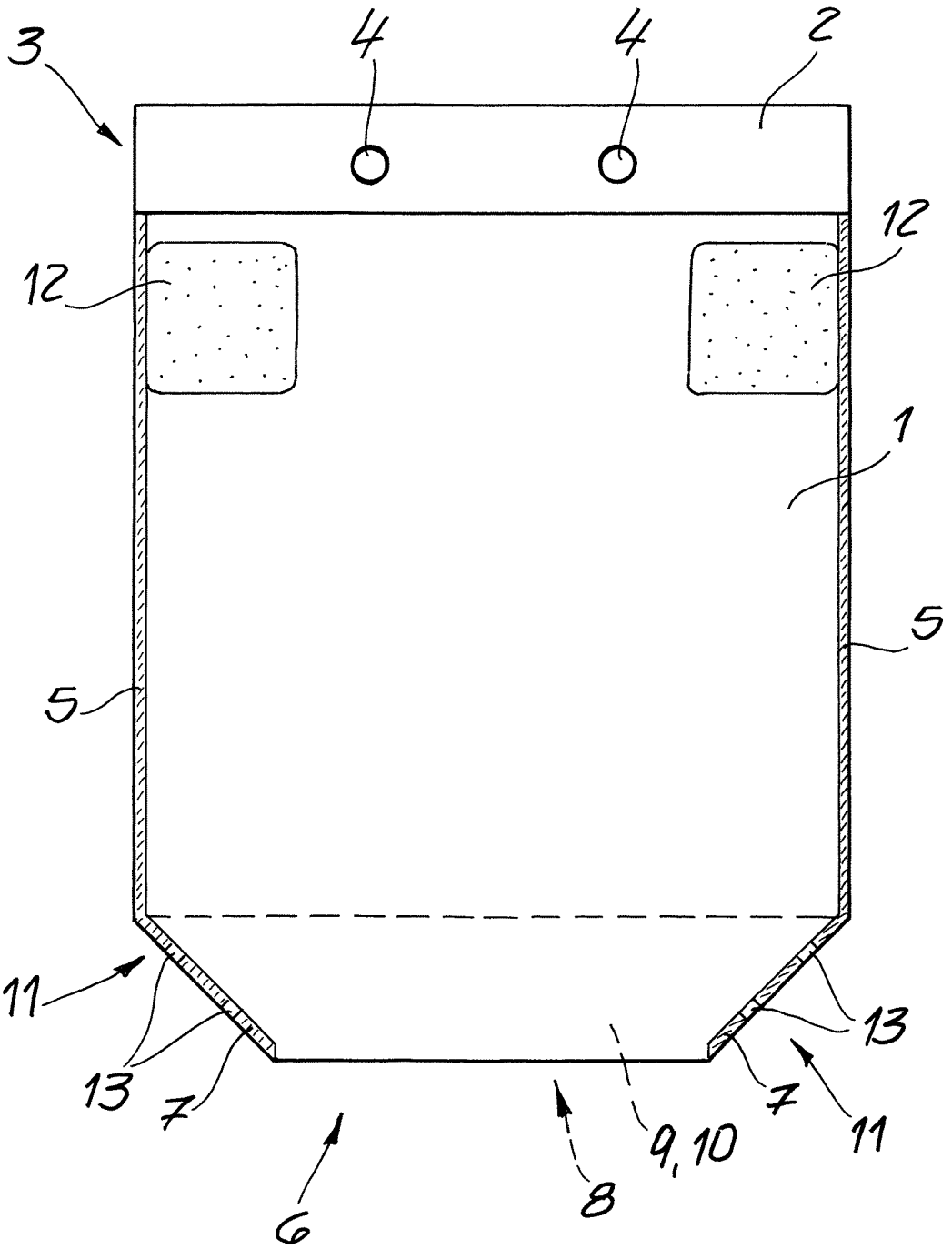


Fig. 1B

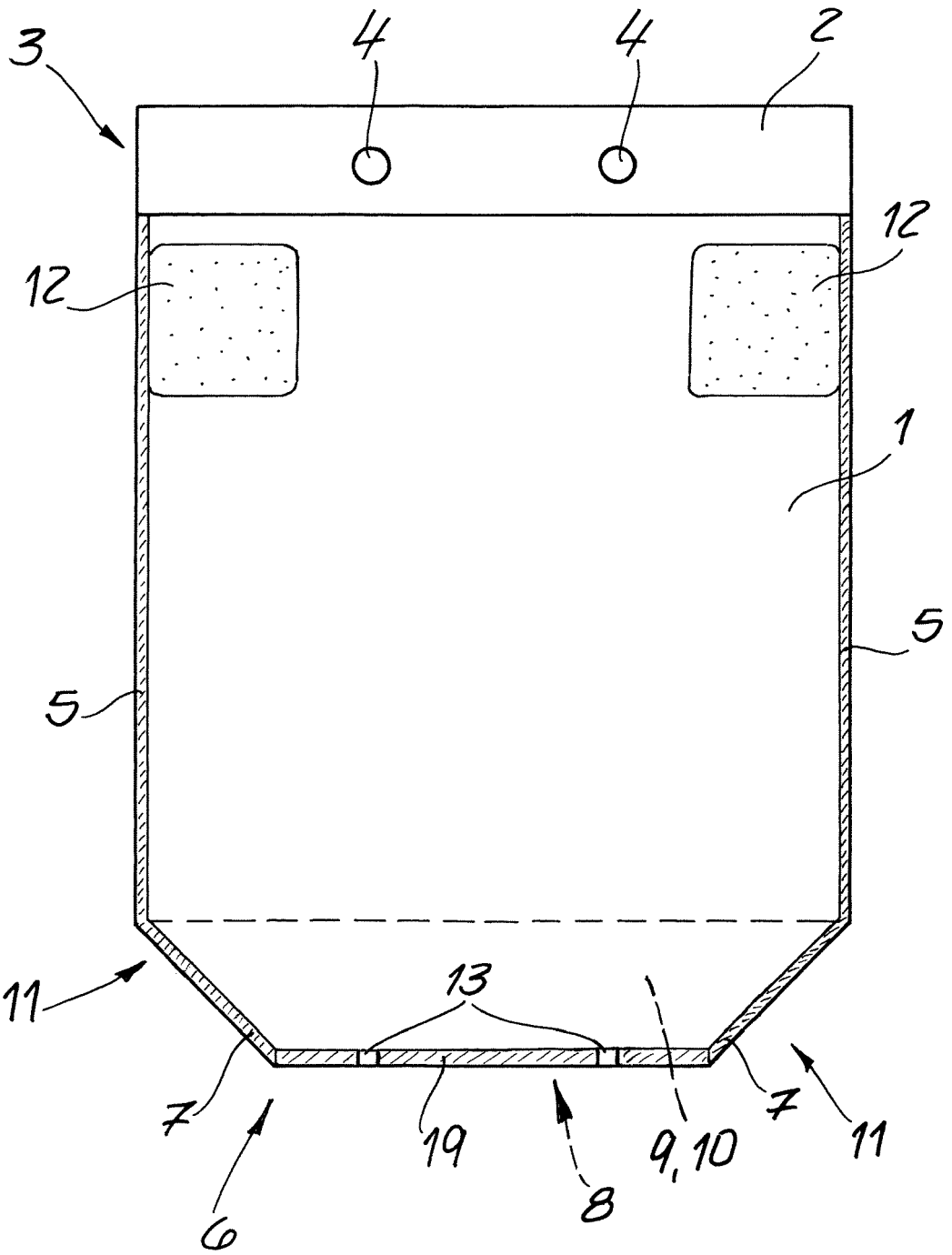
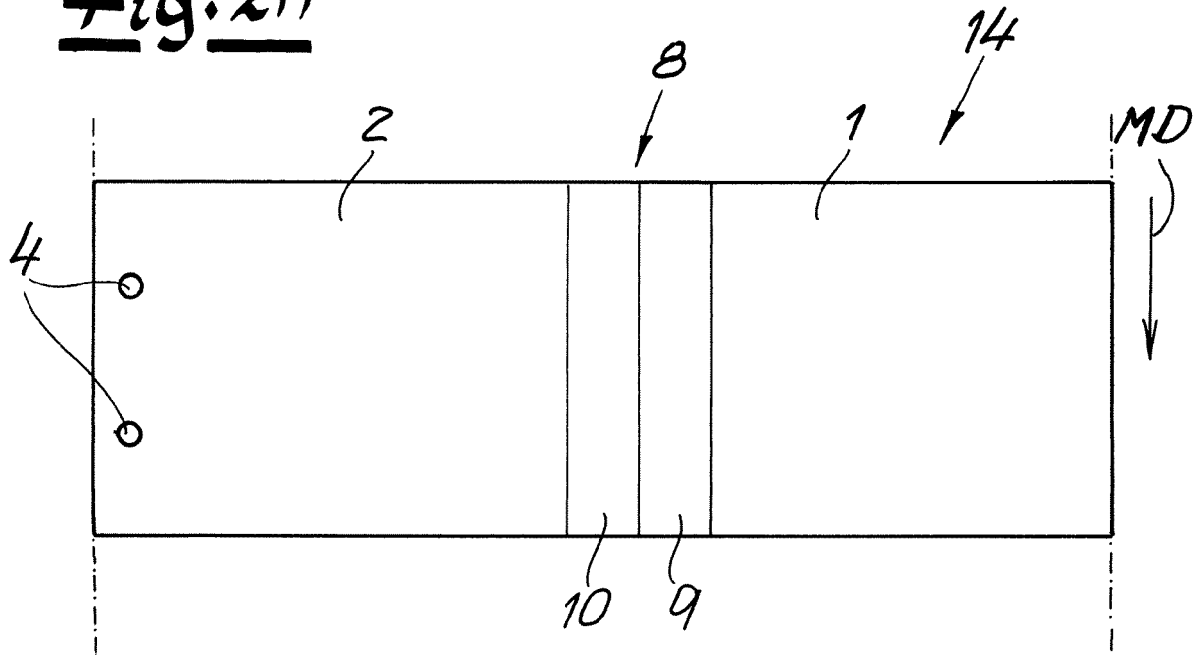


Fig.2A



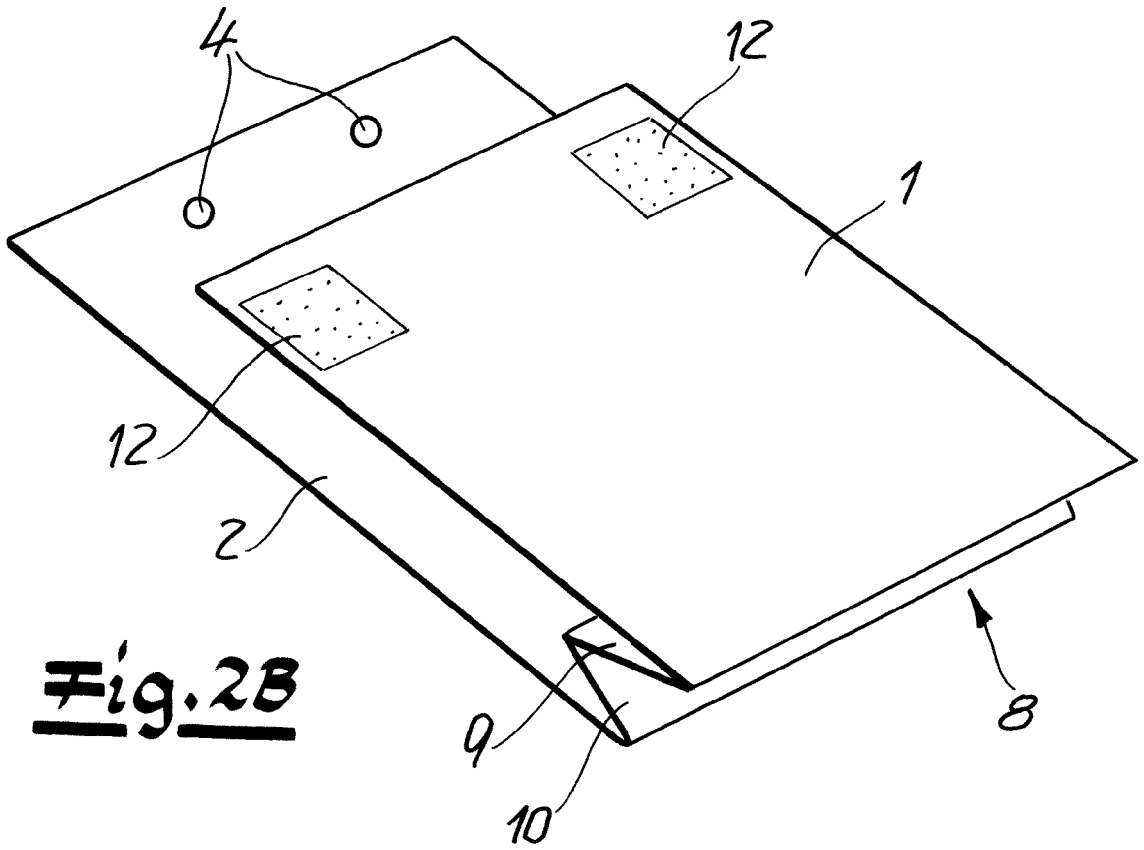
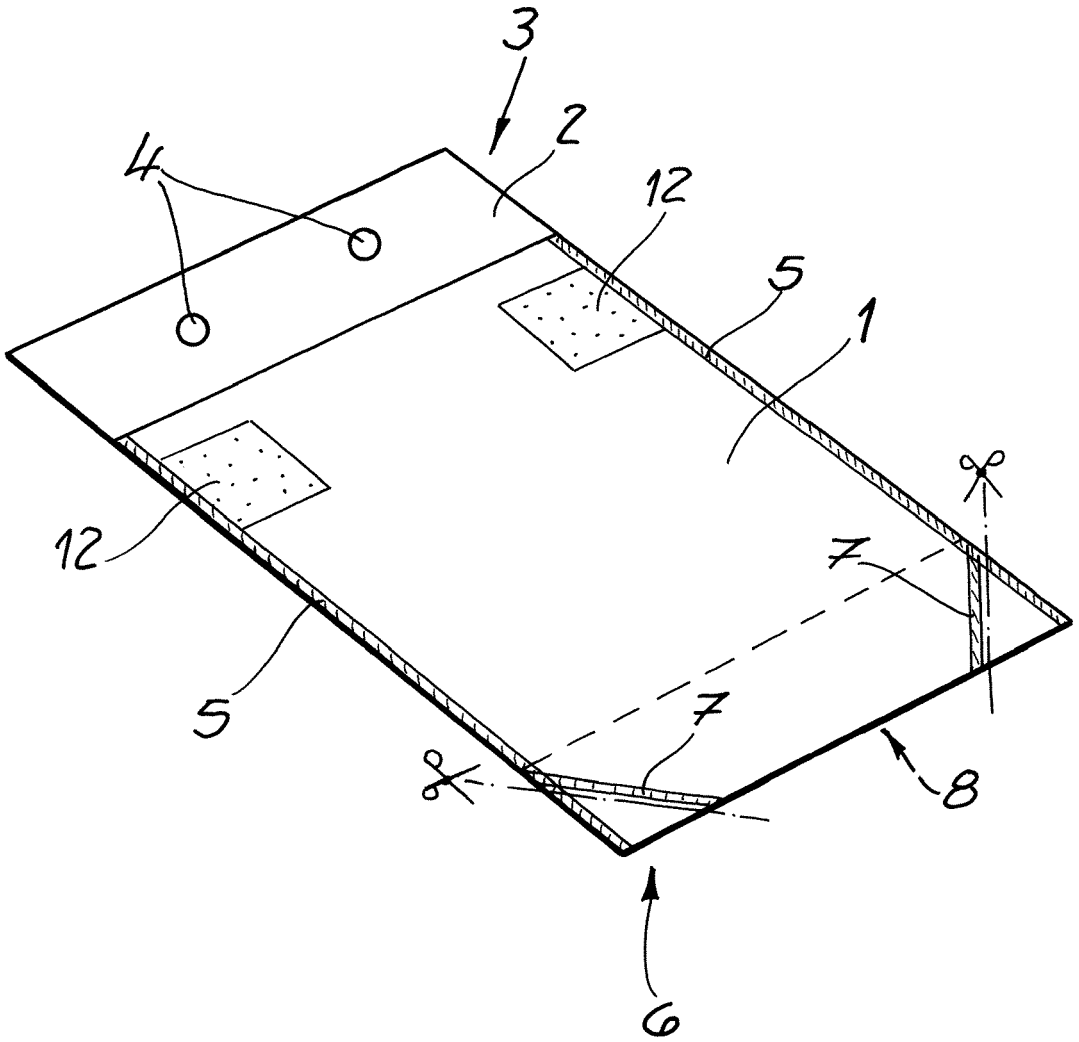


Fig.2B

Fig.2C



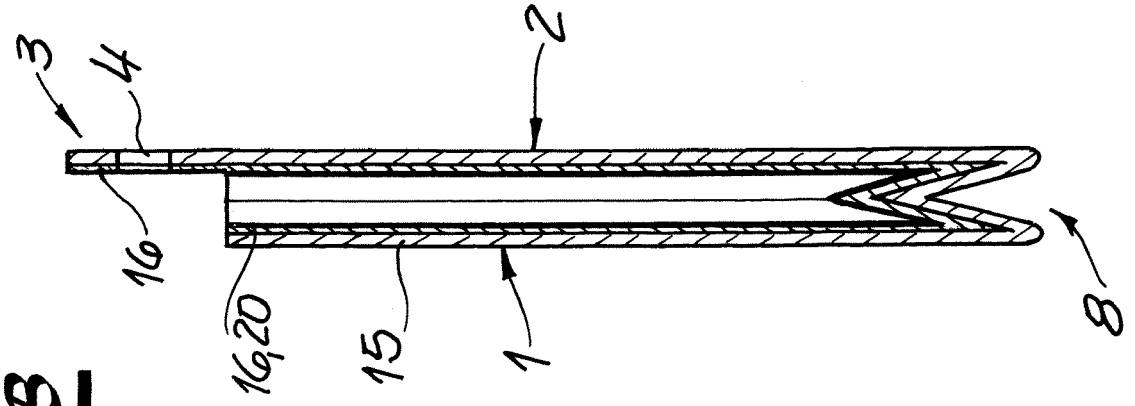


Fig.3B

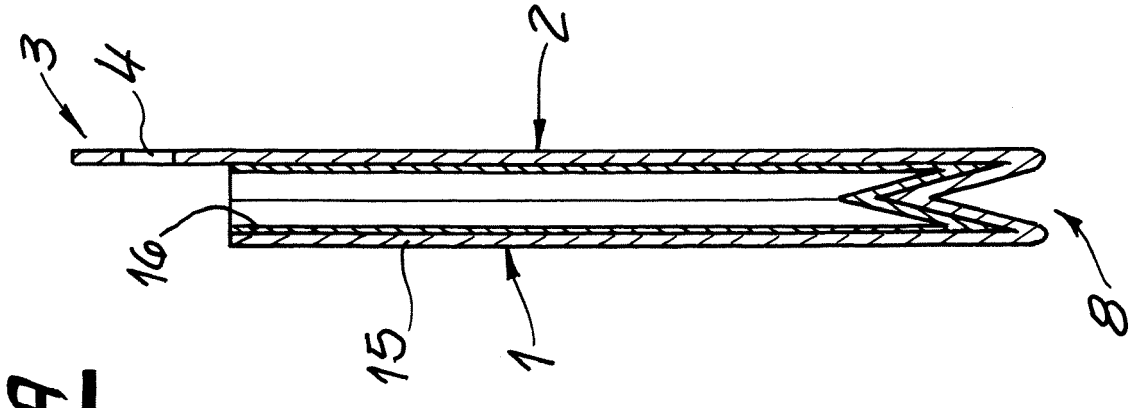


Fig.3A

Fig.4

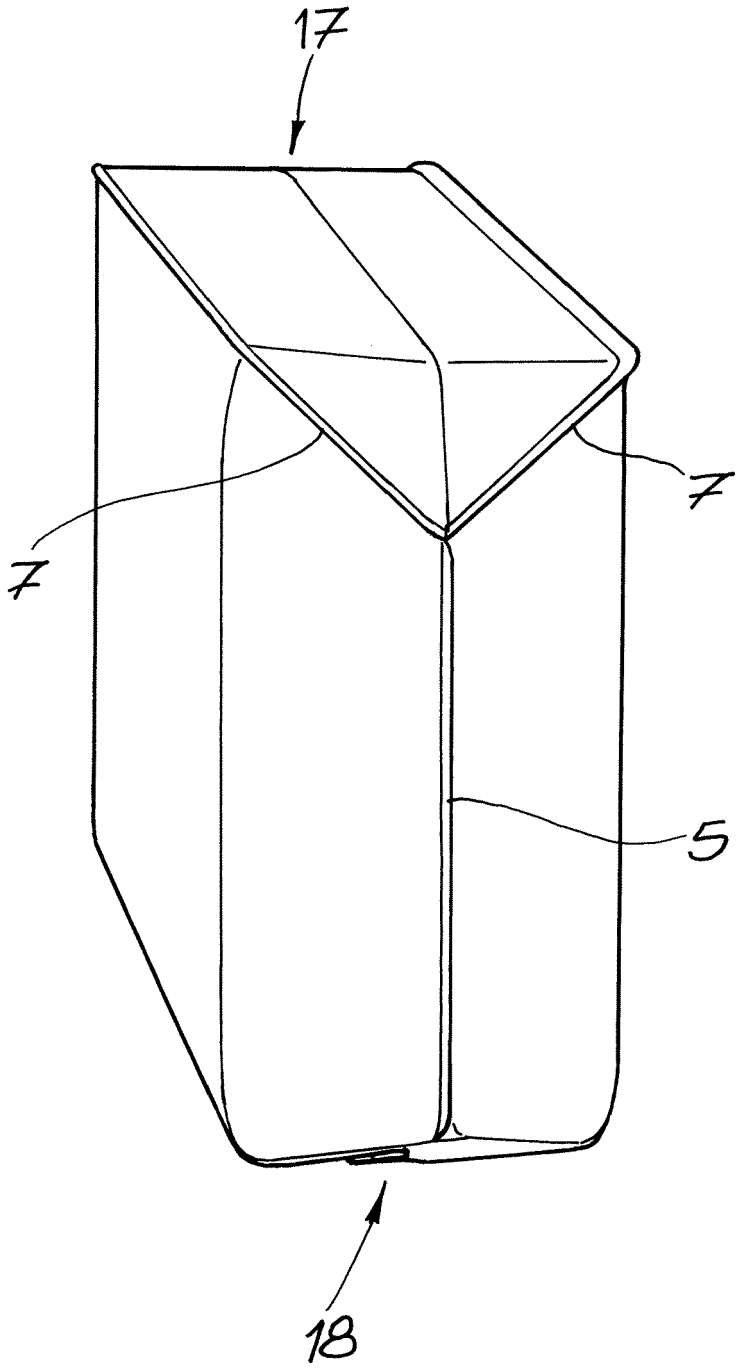


Fig. 5

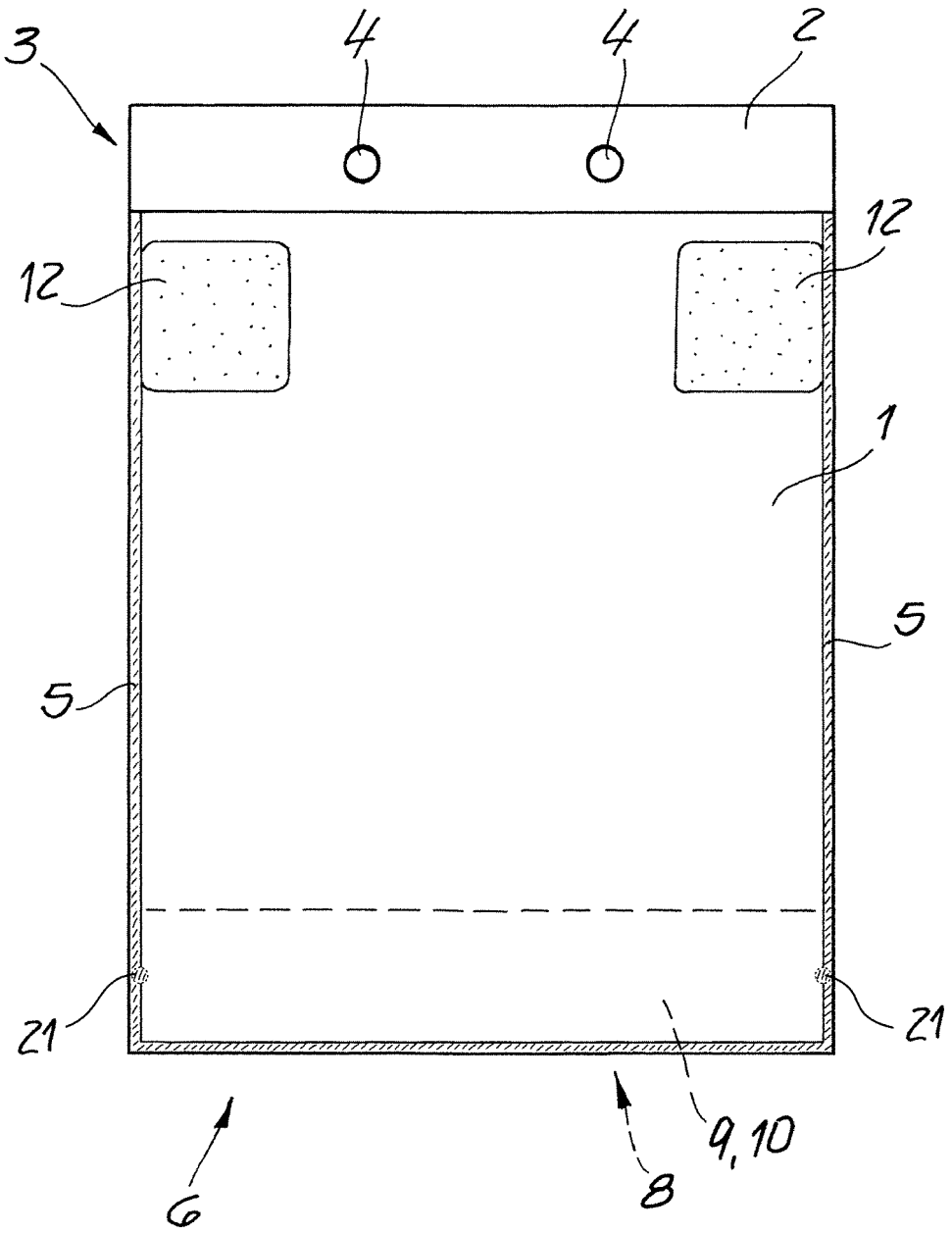


Fig. 6

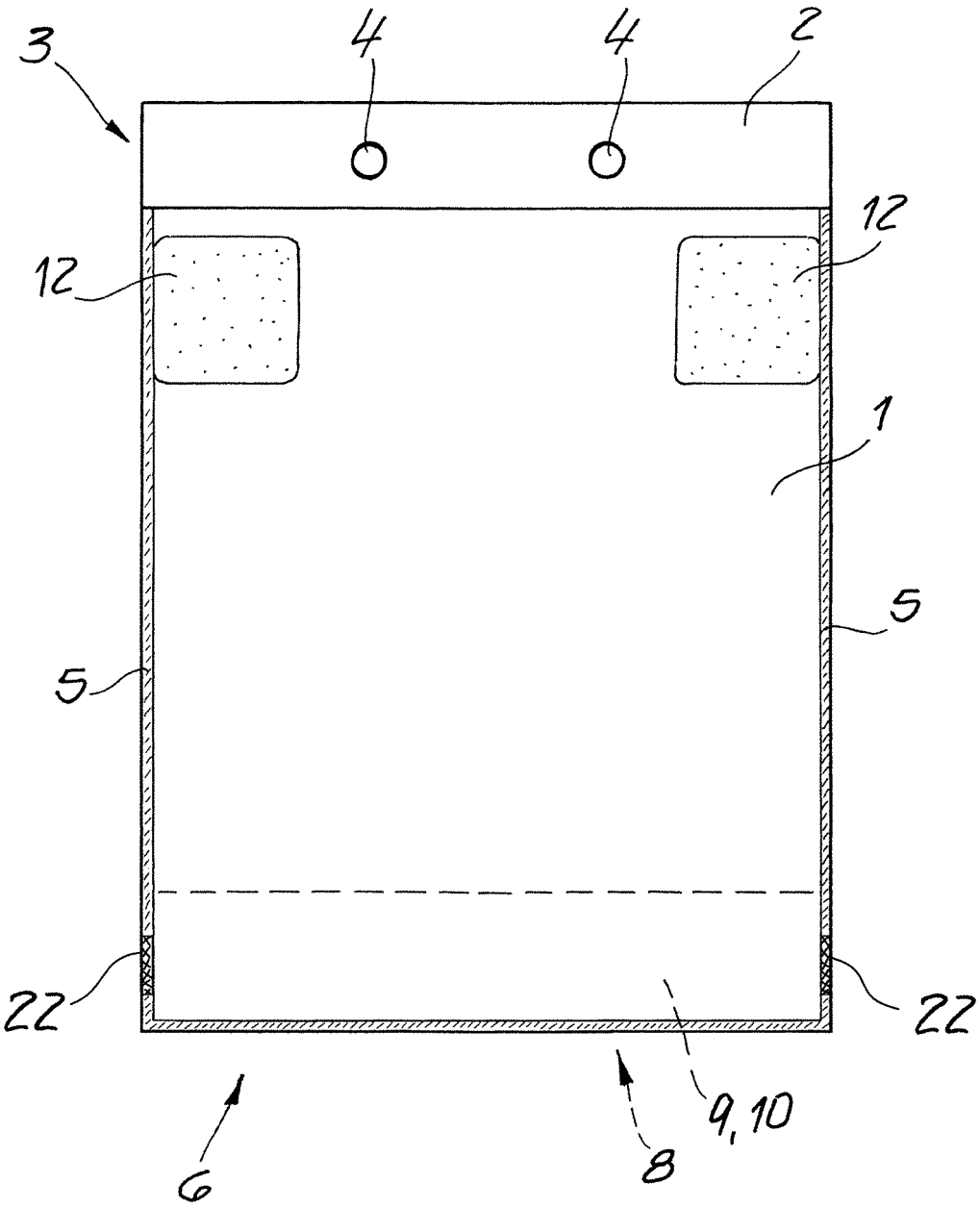


Fig.7A

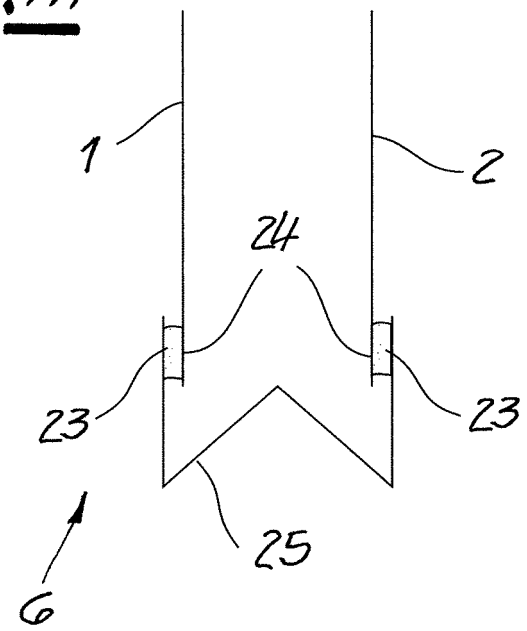


Fig.7B

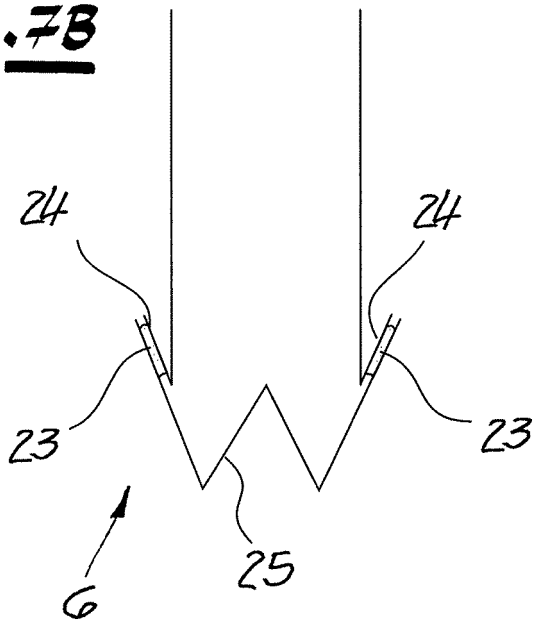
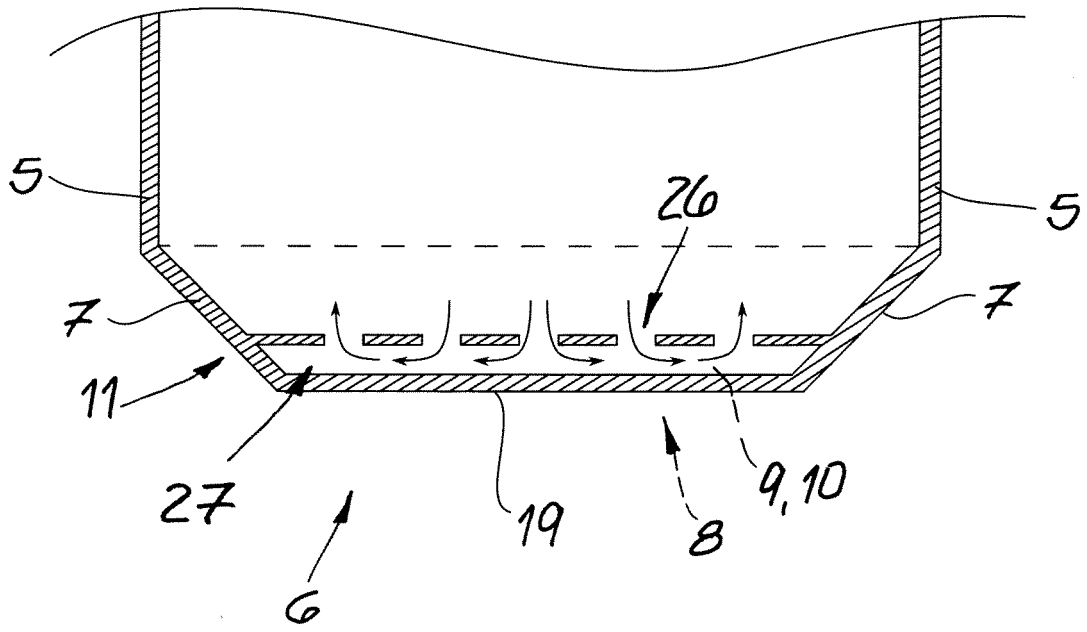


Fig. 8



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Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 June 2022	Duc, Emmanuel

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