



(51) International Patent Classification:

A61F 13/47 (2006.01) D04H 1/4258 (2012.01)

A61F 13/51 (2006.01) D04H 1/4382 (2012.01)

A61F 13/551 (2006.01) D04H 1/732 (2012.01)

D04H 1/425 (2012.01)

(21) International Application Number:

PCT/EP2023/068029

(22) International Filing Date:

30 June 2023 (30.06.2023)

(25) Filing Language:

English

(26) Publication Language:

English

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO,

RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

— with international search report (Art. 21(3))

(54) Title: RELEASE LINER AND WRAPPER FOR A SANITARY ARTICLE

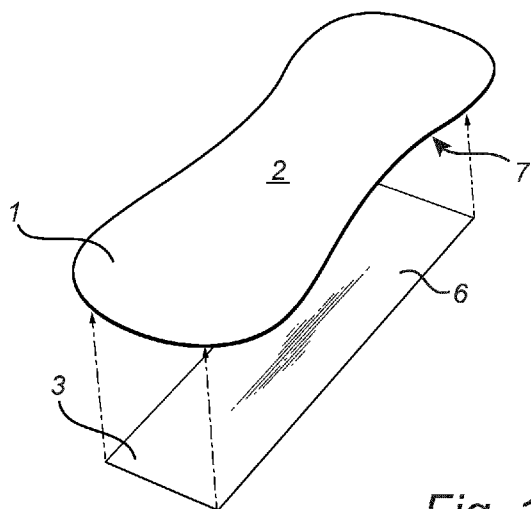


Fig. 1

(57) **Abstract:** A sanitary article (1), such as a sanitary napkin or a pantliner, comprising a topsheet (2) and a backsheet (7), and extending in a longitudinal direction (L) and in a transverse direction (T). The sanitary article (1) having a first and a second longitudinal side edge, a front edge and a rear edge, the backsheet (7) being provided with a coated adhesive region, the coated adhesive region being releasably attached to a release liner (6). The release liner (6) comprising a sheet of material, wherein the sheet of material (2) comprises natural fibres in mixture with reinforcing fibres, the reinforcing fibres having a greater length-weighted average fibre length than the natural fibres.

RELEASE LINER AND WRAPPER FOR A SANITARY ARTICLE

Technical field

5 The present application relates to a release liner and a wrapper for a sanitary article, such as a sanitary napkins or panty liner.

Background

10 Disposable sanitary articles, such as sanitary napkins and panty liners, are intended to be worn in underwear. To avoid the disposable sanitary article to move around in the underwear during use the disposable sanitary article is commonly provided with adhesive region(s) on the backsheet, to attach the sanitary article to the underwear. The adhesive region(s) provided on the disposable sanitary article is protected by a release liner covering the adhesive regions during manufacturing,
15 storage, and handling of the sanitary article. Release liners are commonly made of plastic material. There is however a need for more sustainable solutions.

Summary of the invention

20 It is an object of the present invention to provide a solution to the above-mentioned needs.

 This object, as well as other objects being apparent to a skilled person studying the present description, are achieved by a a sanitary article, such as a sanitary napkin or a pantliner, the sanitary article comprising a topsheet and a backsheet, the sanitary article extending in a longitudinal direction and in a transverse direction, the sanitary
25 article having a first and a second longitudinal side edge, a front edge and a rear edge, the backsheet being provided with a coated adhesive region, the coated adhesive region being releasably attached to a release liner and the release liner comprising a sheet of material, wherein the sheet of material comprises natural fibres in mixture with reinforcing fibres, the reinforcing fibres having a greater length-weighted average fibre
30 length than the natural fibres.

 It has thus been found that a release liner made from a sheet of material comprising natural fibres in mixture with reinforcing fibres, wherein the reinforcing fibres have a greater length-weighted average fibre length than the natural fibres, provides a sustainable solution to the above-mentioned needs.

35 The disposable sanitary article may be a sanitary napkin or panty liner. The sanitary article may comprise an absorbent core between the topsheet and the

backsheet. Disposable sanitary articles are well known in the art and therefore not described more in detail herein. Any disposable sanitary article could be used with the release liner of the present invention. The coated adhesive region may cover all or part(s) of an outer surface, i.e., a garment-facing surface, of the disposable sanitary article, for example in the form of stripes across said surface.

The material may comprise 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt%, of the natural fibres and 1 to 50 wt%, preferably 1 to 30 wt%, more preferably 1 to 20 wt%, of the reinforcing fibres.

The natural fibres may be natural cellulosic fibres, preferably wood fibres, wheat straw fibres or bamboo fibres, more preferably wood fibres. Alternatively or additionally, the natural fibres may originate from wood pulp, non-wood plant material, and combinations thereof.

The origin of the natural fibres may for example be selected from chemical pulp, such as sulphate and sulphite pulp, organosolv pulp; recycled fibres; and/or mechanical pulp including e.g. refiner mechanical pulp (RMP), pressurized refiner mechanical pulp (PRMP), pretreatment refiner chemical alkaline peroxide mechanical pulp (P-RC APMP), thermomechanical pulp (TMP), thermomechanical chemical pulp (TMCP), high-temperature TMP (HT-TMP) RTS-TMP, alkaline peroxide pulp (APP), alkaline peroxide mechanical pulp (APMP), alkaline peroxide thermomechanical pulp (APTMP), thermopulp, groundwood pulp (GW), stone groundwood pulp (SGW), pressure groundwood pulp (PGW), super pressure groundwood pulp (PGW-S), thermo groundwood pulp (TGW), thermo stone groundwood pulp (TSGW), chemimechanical pulp (CMP), chemirefinermechanical pulp (CRMP), chemithermomechanical pulp (CTMP), high-temperature CTMP (HT-CTMP), sulphite- modified thermomechanical pulp (SMTMP), reject CTMP (CTMPR), groundwood CTMP (G- CTMP), semichemical pulp (SC), neutral sulphite semi chemical pulp (NSSC), high-yield sulphite pulp (HYS), biomechanical pulp (BRMP), pulps produced according to the OPCO process, explosion pulping process, Bi-Vis process, dilution water sulfonation process (DWS), sulfonated long fibres process (SLF), chemically treated long fibres process (CTLF), long fibre CMP process (LFCMP), Kraft wood pulp, and modifications and combinations thereof. The pulp may be a bleached or non-bleached pulp.

The wood fibres or wood pulp may originate from hardwood or softwood, including birch, beech, aspen such as European aspen, alder, eucalyptus, maple, acacia, mixed tropical hardwood, pine such as loblolly pine, fir, hemlock, larch, spruce such as Black spruce or Norway spruce, and mixtures thereof. Suitably fibres or pulp originating from eucalyptus or pine is used.

Non-wood plant material, such as seed hair fibres, leaf fibres, bast fibres, plant fibres can be provided from e.g. straws of grain crops, wheat straw, reed canary grass, reeds, flax, hemp, kenaf, jute, ramie, seed, sisal, abaca, coir, bamboo, bagasse, cotton kapok, milkweed, pineapple, cotton, rice, reed, esparto grass, *Phalaris arundinacea*, or combinations thereof.

Any combinations of wood pulp and non-wood plant material may be used.

The fibres or a portion of the fibres may be recycled fibres, which may belong to any or all of the above categories. The fibres may have a natural staple length, such as cotton or may be cut to a desired staple length.

The material may comprise 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt% of the natural fibres.

The natural fibres may have a length-weighted average fibre length of 0.5 to 5.0 mm, preferably 0.8 to 3.5 mm. The material may comprise 50 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm.

The material may comprise 70 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm. The material may comprise 85 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm.

The reinforcing fibres may be of non-fossil origin. The reinforcing fibres may be renewable fibers from a renewable feedstock.

The reinforcing fibres may be selected from polylactide (PLA) fibres, glycolic acid polymer (PGA) fibres, polyvinyl alcohol (PVA) fibres, bicomponent fibres comprising thermoplastic polymers, non-wood natural fibres, manmade cellulosic fibres, and combinations thereof. Bicomponent fibres are comprised of two polymers of different chemical and/or physical properties, extruded from the same spinneret with both polymers in the same filament. The non-wood natural fibres originate from non-wood plant materials as described above.

The reinforcing fibres may be manmade cellulosic fibres, preferably manmade fibres formed of cellulose of natural origin, more preferably manmade fibres formed of cellulose that has not been chemically modified, such as viscose, rayon or lyocell, most preferably viscose. Alternatively, the reinforcing fibres may be manmade fibres formed of cellulose that has been chemically modified.

A bio-degradable release liner can be achieved by adjusting the choice of fibers in the wrapping material. A plastic-free release liner can be achieved by adjusting the choice of fibers in the sheet of material.

The reinforcement fibres, having a greater length-weighted average fibre length than the natural fibres, add flexibility, stretch, strength and functional properties, to the sheet of material.

The reinforcing fibres may have a length-weighted average fibre length of 3 to 100 mm, preferably 5 to 30 mm, more preferably 6 to 15 mm. The material may comprise 1 to 50 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm. The material may comprise 1 to 30 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm. The material may comprise 1 to 20 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm.

The natural fibres and reinforcing fibres may be randomly oriented. As an example this can be achieved by foam formation.

The sheet of material may be being a foam-formed fibrous web.

The sheet of material may further comprise a binder selected from the group consisting of polyvinyl alcohols, polyvinyl acetate dispersions, ethyl vinyl alcohol dispersions, polyurethane dispersions, acrylic latexes, styrene butadiene dispersions, binders based on finely divided cellulose, binders based on cellulose derivatives, biopolymers and combinations thereof, preferably acrylic latexes. The binder is preferably selected from acrylic latexes, such as polyacrylate latexes or polyacrylic acid latexes, and combinations thereof, optionally in combination with polyvinylalcohol. A latex binder may provide heat-sealability to the wrapping material. The biopolymers may suitably be based on starch derivatives, natural gum latexes, alginates, guar gum, hemicellulose derivatives, chitin, chitosan, pectin, agar, xanthan, amylose, amylopectin, alternan, gellan, mutan, dextran, pullulan, fructan, locust bean gum, carrageenan, glycogen, glycosaminoglycans, murein, bacterial capsular polysaccharides, and the like and combinations thereof. The wrapping material may comprise a binder in an amount of 0.005 to 10 wt%, preferably 0.05 to 5 wt%, more preferably 1 to 5 wt%.

The material may further comprise 0.1 to 10 wt% of a foaming agent. The foaming agent may act as a surface-active agent, in the manufacture of the sheet of wrapping material, as set out below. The foaming agent additionally provides strength to the wrapping material formed. The foaming agent may be selected from water soluble foaming polymeric agents and water dispersible foaming polymeric agents, and combinations thereof. Preferably the foaming agent is selected from water soluble glycans, water dispersible glycans, water soluble hydrophilic polymers and water dispersible hydrophilic polymers, and combinations thereof. Preferably the water

soluble glycans and water dispersible glycans are selected from polysaccharides and derivatives thereof. Preferably the water soluble hydrophilic polymers and water dispersible hydrophilic polymers are selected from poly(vinyl alcohol)s and poly(vinyl acetate)s and copolymers thereof.

5 The material may further comprise additives modifying the functional properties of the sheet, such as nanofibrillated cellulose, microfibrillated cellulose, starch, resins etc., as well as colorants etc.

 The sheet of material may have a basis weight of 20 to 40 g/m², preferably 25 to 35 g/m².

10 The sheet of material may have an air permeability of 0 to 1000 l/m²/s, i.e up to 1000 l/m²/s.

 The sheet of material may have a stretch, in other words elongation at break, of 0,5 to 7 %. Stretch is measured using the method ISO 1924-2:2008.

 The sheet of material may have a friction coefficient of 0,1-0,2.

15 The sheet of material may have a release coating, the adhesive coating of the disposable hygiene article being releasably attached to the release coating. When the sheet of wrapping material is removed, the adhesive layer will be exposed so that the article is ready to be affixed to a garment. The release force of the release coating may be 4.5 to 5.0 N/m as determined with the method described below.

20 The release coating typically comprises silicone, for example in the form of a polyorganosiloxane-polyamide copolymer or a polydimethylsiloxane-urea copolymer. A primer may be present between the sheet of material and the release coating. The release coating may cover all or part(s) of the sheet of material.

 The release liner may have a rectangular shape. A rectangular release liner is more cost efficient and puts less requirement on positioning of the release liner onto the backsheet of the sanitary article.

 The adhesive coating on the backsheet of the sanitary article may be a pressure sensitive adhesive.

30 This disclosure also covers a sanitary article, wherein the sanitary article is folded along at least one transversal folding axes, and the folded sanitary article is arranged in a wrapper, the wrapper comprising a sheet of wrapping material being folded such as to enclose the sanitary article, and wherein the sheet of wrapping material comprises natural fibres in mixture with reinforcing fibres, the reinforcing fibres
35 having a greater length-weighted average fibre length than the natural fibres.

The wrapper is sealed to enclose the sanitary article by means of mechanical sealing, such as embossing or ultrasonic welding, by heat sealing, by an adhesive, or by a combination thereof.

The sheet of wrapping material is the same as the sheet of material used as a release liner as disclosed above.

The material may comprise 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt%, of the natural fibres and 1 to 50 wt%, preferably 1 to 30 wt%, more preferably 1 to 20 wt%, of the reinforcing fibres.

The natural fibres may be natural cellulosic fibres, preferably wood fibres, wheat straw fibres or bamboo fibres, more preferably wood fibres. Alternatively or additionally, the natural fibres may originate from wood pulp, non-wood plant material, and combinations thereof.

The origin of the natural fibres may for example be selected from chemical pulp, such as sulphate and sulphite pulp, organosolv pulp; recycled fibres; and/or mechanical pulp including e.g. refiner mechanical pulp (RMP), pressurized refiner mechanical pulp (PRMP), pretreatment refiner chemical alkaline peroxide mechanical pulp (P-RC APMP), thermomechanical pulp (TMP), thermomechanical chemical pulp (TMCP), high-temperature TMP (HT-TMP) RTS-TMP, alkaline peroxide pulp (APP), alkaline peroxide mechanical pulp (APMP), alkaline peroxide thermomechanical pulp (APTMP), thermopulp, groundwood pulp (GW), stone groundwood pulp (SGW), pressure groundwood pulp (PGW), super pressure groundwood pulp (PGW-S), thermo groundwood pulp (TGW), thermo stone groundwood pulp (TSGW), chemimechanical pulp (CMP), chemirefinermechanical pulp (CRMP), chemithermomechanical pulp (CTMP), high-temperature CTMP (HT-CTMP), sulphite- modified thermomechanical pulp (SMTMP), reject CTMP (CTMPR), groundwood CTMP (G- CTMP), semichemical pulp (SC), neutral sulphite semi chemical pulp (NSSC), high-yield sulphite pulp (HYS), biomechanical pulp (BRMP), pulps produced according to the OPCO process, explosion pulping process, Bi-Vis process, dilution water sulfonation process (DWS), sulfonated long fibres process (SLF), chemically treated long fibres process (CTLF), long fibre CMP process (LFCMP), Kraft wood pulp, and modifications and combinations thereof. The pulp may be a bleached or non-bleached pulp.

The wood fibres or wood pulp may originate from hardwood or softwood, including birch, beech, aspen such as European aspen, alder, eucalyptus, maple, acacia, mixed tropical hardwood, pine such as loblolly pine, fir, hemlock, larch, spruce such as Black spruce or Norway spruce, and mixtures thereof. Suitably fibres or pulp originating from eucalyptus or pine is used.

Non-wood plant material, such as seed hair fibres, leaf fibres, bast fibres, plant fibres can be provided from e.g. straws of grain crops, wheat straw, reed canary grass, reeds, flax, hemp, kenaf, jute, ramie, seed, sisal, abaca, coir, bamboo, bagasse, cotton kapok, milkweed, pineapple, cotton, rice, reed, esparto grass, *Phalaris arundinacea*, or combinations thereof.

Any combinations of wood pulp and non-wood plant material may be used.

The fibres or a portion of the fibres may be recycled fibres, which may belong to any or all of the above categories. The fibres may have a natural staple length, such as cotton or may be cut to a desired staple length.

The material may comprise 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt% of the natural fibres.

The natural fibres may have a length-weighted average fibre length of 0.5 to 5.0 mm, preferably 0.8 to 3.5 mm. The material may comprise 50 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm.

The material may comprise 70 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm. The material may comprise 85 to 99 wt% of natural fibres having a length-weighted average fibre length of 0.5 to 5 mm or 0.8 to 3.5 mm.

The reinforcing fibres may be of non-fossil origin. The reinforcing fibres may be renewable fibers from a renewable feedstock.

The reinforcing fibres may be selected from polylactide (PLA) fibres, glycolic acid polymer (PGA) fibres, polyvinyl alcohol (PVA) fibres, bicomponent fibres comprising thermoplastic polymers, non-wood natural fibres, manmade cellulosic fibres, and combinations thereof. Bicomponent fibres are comprised of two polymers of different chemical and/or physical properties, extruded from the same spinneret with both polymers in the same filament. The non-wood natural fibres originate from non-wood plant materials as described above.

The reinforcing fibres may be manmade cellulosic fibres, preferably manmade fibres formed of cellulose of natural origin, more preferably manmade fibres formed of cellulose that has not been chemically modified, such as viscose, rayon or lyocell, most preferably viscose. Alternatively, the reinforcing fibres may be manmade fibres formed of cellulose that has been chemically modified.

A bio-degradable wrapper can be achieved by adjusting the choice of fibers in the wrapping material. A plastic-free wrapper can be achieved by adjusting the choice of fibers in the sheet of material.

The reinforcement fibres, having a greater length-weighted average fibre length than the natural fibres, add flexibility, stretch, strength and functional properties, to the sheet of material.

The reinforcing fibres may have a length-weighted average fibre length of 3 to 100 mm, preferably 5 to 30 mm, more preferably 6 to 15 mm. The material may comprise 1 to 50 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm. The material may comprise 1 to 30 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm. The material may comprise 1 to 20 wt% of reinforcing fibres having a length-weighted average fibre length of 3 to 100 mm or 5 to 30 mm or 6 to 15 mm.

The natural fibres and reinforcing fibres may be randomly oriented. As an example this can be achieved by foam formation.

The sheet of material may be being a foam-formed fibrous web.

The sheet of material may further comprise a binder selected from the group consisting of polyvinyl alcohols, polyvinyl acetate dispersions, ethyl vinyl alcohol dispersions, polyurethane dispersions, acrylic latexes, styrene butadiene dispersions, binders based on finely divided cellulose, binders based on cellulose derivatives, biopolymers and combinations thereof, preferably acrylic latexes. The binder is preferably selected from acrylic latexes, such as polyacrylate latexes or polyacrylic acid latexes, and combinations thereof, optionally in combination with polyvinylalcohol. A latex binder may provide heat-sealability to the wrapping material. The biopolymers may suitably be based on starch derivatives, natural gum latexes, alginates, guar gum, hemicellulose derivatives, chitin, chitosan, pectin, agar, xanthan, amylose, amylopectin, alternan, gellan, mutan, dextran, pullulan, fructan, locust bean gum, carrageenan, glycogen, glycosaminoglycans, murein, bacterial capsular polysaccharides, and the like and combinations thereof. The wrapping material may comprise a binder in an amount of 0.005 to 10 wt%, preferably 0.05 to 5 wt%, more preferably 1 to 5 wt%.

The material may further comprise 0.1 to 10 wt% of a foaming agent. The foaming agent may act as a surface-active agent, in the manufacture of the sheet of wrapping material, as set out below. The foaming agent additionally provides strength to the wrapping material formed. The foaming agent may be selected from water soluble foaming polymeric agents and water dispersible foaming polymeric agents, and combinations thereof. Preferably the foaming agent is selected from water soluble glycans, water dispersible glycans, water soluble hydrophilic polymers and water dispersible hydrophilic polymers, and combinations thereof. Preferably the water

soluble glycans and water dispersible glycans are selected from polysaccharides and derivatives thereof. Preferably the water soluble hydrophilic polymers and water dispersible hydrophilic polymers are selected from poly(vinyl alcohol)s and poly(vinyl acetate)s and copolymers thereof.

5 The material may further comprise additives modifying the functional properties of the sheet, such as nanofibrillated cellulose, microfibrillated cellulose, starch, resins etc., as well as colorants etc.

 The sheet of wrapping material, suitable for a wrapper, may have a basis weight of 10 to 50 g/m², preferably 15 to 30 g/m².

10 The sheet of wrapping material may have an air permeability of 0 to 1000 l/m²/s.

 The sheet of wrapping material may have a stretch, in other words elongation at break, of 0,5 to 7 %. Stretch is measured using the method ISO 1924-2:2008.

 Preferably, the sheet of wrapping material has an elongation at break of 0,5 to 7 %.

15 The sheet of wrapping material may have a friction coefficient of 0,1-0,2.

 The wrapper typically has two longitudinal edges and two transversal folding axes, the transversal folding axes dividing the wrapper into a first region, a second region and a third region, and the wrapper being folded about said folding axes with the first region, the second region and the third region in an overlapping configuration.

20 Overlapping regions of the wrapper are typically joined by seals along the longitudinal edges of the wrapper. The seals may be formed by mechanical sealing, such as embossing or ultrasonic welding, by heat sealing, by an adhesive, or by a combination thereof. When seals are formed by ultrasonic welding or heat sealing, a heat-sealing agent is suitably present along the longitudinal edges of the wrapper, preferably
25 between the sheet of wrapping material and any release coating.

 The wrapper may be provided with a heat-seal coating, being provided fully or partially to the inner surface of the wrapper.

30 Manufacture of the sheet of material

 The sheet of material may be obtained by a method utilizing foam-based production technology. Preferably the sheet of material may be obtained by a method utilizing foam-based production technology, followed by finalizing by a method utilizing surface treating technology.

35 Particularly, the sheet of material may be manufactured by a method comprising the steps of

- forming at least one foamed dispersion by dispersing fibres comprising natural fibres and reinforcement fibres in a foam or foamable liquid comprising water and at least one foaming agent to obtain fibre-foam,
- conveying the formed fibre-foam to a foraminous support and draining liquid
- 5 trough the foraminous support to form a sheet,
- drying and calendering the sheet, and

wherein the foam or foamable liquid comprises at least one binder; or the formed sheet is finalized before or after drying by treating the surface of the sheet with at least one binder; or the foam or foamable liquid comprises at least one binder, and the formed

10 sheet is finalized before or after drying by treating the surface of the sheet with at least one binder.

The manufacturing of the sheet of wrapping material used as a wrapper is the same as described above.

Brief description of the drawings

Figure 1 shows a sanitary article and a release liner, and

Figure 2 shows a wrapper comprising a sanitary article.

Detailed description

Figure 1 shows a sanitary article 1 having a top topsheet 2 and a backsheet 7. The backsheet 7 is provided with a coated adhesive region, the coated adhesive region being releasably attached to a release liner 6. The release liner 6, made of a sheet of material as described herein, has a top surface 3 facing the sanitary article 1. The top

25 surface 3 has a release coating, and the coated adhesive region of the sanitary article 1 is releasably attached to the release coating. The release liner is rectangular in this example but may also be the size of the backsheet 7 such as to fully cover the backsheet 7, i.e. have the same outer contour as the backsheet.

Figure 2 shows a wrapper without showing the sanitary article enclosed by the wrapper. The wrapper 4 is shown after folding of the wrapper 4 in an overlapping configuration and after overlapping regions of the wrapper 4 have been joined along the longitudinal edge zones 5 of the wrapper 4.

The wrapper 4 comprises a sheet of wrapping material 21 as disclosed herein, having an inner surface and an outer surface. The inner surface has two longitudinal

35 edge zones 5 and two transversal folding axes. The wrapper 5 is folded along the two transversal folding axes, thereby dividing the wrapper 4 into a first region, a second

region and third region folded in an overlapping configuration. At the longitudinal edge zones 5, the sheet of wrapping material is provided with as adhesive to seal the wrapper 4 along the longitudinal edges. The longitudinal edge zones 5 may also be sealed with other sealing means such as heat-sealing or embossing.

5

Determination of length-weighted average fibre length (fiber length distribution, FS5)

Test method designed for advanced fiber analysis; allows for measurement of L(l) [mm] Length-weighted mean fiber length. The fibers are dissolved in water and circulated through a measuring cell where a high-definition camera takes 30 images per second. The camera collects approximately 2000 images during a measurement and a software performs an image analysis to calculate the different fiber parameters. Measurements are fully compliant with ISO 16065-2.

10

Determination of release force

15

The release force (N/m) of a release coating or release liner is evaluated against a standard tape with designation 50110, manufactured by the Tesa company (Hamburg, Germany). The tape is 25 mm wide, 0.3 mm thick, and consists of a 145 mesh acrylate coated fabric with natural rubber as adhesive material. When used for testing, the tape should be maximum one year old. The tape is stored in the dark in a climate of approximately 23 °C and 50 % relative humidity.

20

In case of a release liner, the release liner is removed from the sanitary article. The release liner, or the sheet of wrapping material having a release coating, is then conditioned for at least 2 hours in a laboratory environment set to 23 °C $\pm$ 1 °C and 50 % rh $\pm$ 5%. Subsequent testing takes place in similar environment.

25

For preparing a test sample, the side of the release liner, or of the sheet of wrapping material, that faces the adhesive region on the sanitary article is aligned against the sticky side of the 25 mm wide tape, gently and without undue pressure. The length direction of the tape should coincide with the longitudinal direction of the release liner or sheet of wrapping material (identical to the longitudinal direction of the sanitary article). About one centimeter of the tape protrudes outside of the longitudinal edge of the release liner, and a strip of conventional office printing paper (25 mm wide and about 10 cm long) is attached onto the protruding tape (as a grip area for the subsequent insertion into the tensile tester clamps).

30

35

A sample, prepared as above, is then placed with the tape side upwards on a flat, smooth, and hard surface. A uniform pressure of 8.3 kPa (85 g/cm²), suitably from a metal weight with a flat bottom, is then applied over the 25 mm wide tape for

20 hours. The pressure is then removed, and the sample rests unloaded for 4 more hours before testing.

A conventional tensile tester (such as available from the Zwick/Roell, Instron or Lloyd companies), equipped with a sensitive load cell (suitably 10 N) and two vertically aligned clamps (wider than 25 mm) is used for the test. At the longitudinal edge of the release liner, about 10 mm of the release liner is opened up (detached) from the tape for insertion into the lower clamp of the tensile tester. A fixation plate is placed behind (and together with) the sample in the lower clamp (this can be a metal plate about 1 mm thick and at least as high and wide as tested sample). The fixation plate keeps the non-delaminated part of the sample in a vertical position during testing, providing a 180° angle for the delamination interface. The office paper strip (extending into the tape) is inserted into the upper grip. When inserting the sample into the grips, excessive slack or tension over the sample should be avoided. The weight of the sample is tared (zeroed), and the upper grip is then set to move at a speed of 300 mm/min.

The release liner or sheet of wrapping material should delaminate (separate) completely from the tape. The encountered force, in Newtons, is continuously registered throughout the delamination. A mean force (arithmetic average) is then calculated for the close sequence of measurement points along the delaminated distance. In this, the first and the last 10 mm of delamination should be disregarded to minimize effects from sample distortions in the two extreme positions. Finally, the output from the test (Newtons for the 25 mm tested width) is reported on a Newton per 1 meter width (N/m) basis, according to the formula below.

$$N/m = \frac{N/25mm}{25} \times 1000$$

A release force in the context of this invention is the arithmetic mean from a measurement of 10 individual release liners or sheets of wrapping material (i.e. a mean from the means obtained from the individual samples). The release liners or sheets of wrapping material are taken from representative sanitary articles. The release force can also be measured on release liner or wrapping material taken directly from the supply roll.

Determination of tensile properties

Determination of stretch, or elongation at break, is measured by the standard test method ISO 1924-2. Constant rate of elongation 20mm/min and sample dimensions: 15(w)x300(l) mm.

5 Determination of Air Permeability

The NWSP 70.1 Air Permeability test method covers the measurement of the air permeability of materials. The rate of flow of air passing perpendicularly through a given area of fabric is measured at a given pressure difference across the fabric test area over a given time period. Chosen method settings: 20cm², test pressure: 200Pa.

10 Used equipment: TEXTTEST instruments: FX 3300 LabAir (mark 4).

Determination of friction at material

The test method is designed for determination of the friction coefficient of different materials (e.g. plastic films, nonwovens) under well-defined conditions.

15 Processability; the materials friction against steel is measured, to simulate the behaviour in process. A sample of the material is attached to a sledge. By means of a tensile tester the sample is allowed to slide over a friction table with a well-defined surface, and the force is registered. Equipment: Instron, with a crosshead speed of 100mm/min. Method reference: DIN 53375:A.

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Determination of tear resistance

Tear resistance is the maximum force [mN] which is measured when the tearing of the test material occurs when a pendulum tears the material at a 90 degree angle and speed in an Elmendorf tester with a 200g pendulum. Method is according to

25 standard method ASTM D1922-78.

CLAIMS

1. A sanitary article (1), such as a sanitary napkin or a pantiliner, the sanitary article (1) comprising a topsheet (2) and a backsheet (7), the sanitary article (1) extending in a longitudinal direction (L) and in a transverse direction (T), the sanitary article (1) having a first and a second longitudinal side edge, a front edge and a rear edge, the backsheet (7) being provided with a coated adhesive region, the coated adhesive region being releasably attached to a release liner (6), the release liner (6) comprising a sheet of material, wherein the sheet of material (2) comprises natural fibres in mixture with reinforcing fibres, the reinforcing fibres having a greater length-weighted average fibre length than the natural fibres.
2. A sanitary article (1) according to claim 1, wherein the sheet of material comprises 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt%, of the natural fibres and 1 to 50 wt%, preferably 1 to 30 wt%, more preferably 1 to 20 wt%, of the reinforcing fibres.
3. A sanitary article (1) according to claim 1 or 2, wherein the natural fibres are natural cellulosic fibres, preferably wood fibres, or fibers from non-wood plant material.
4. A sanitary article (1) according to any one of the preceding claims, wherein the natural fibres have a length-weighted average fibre length of 0.5 to 5.0 mm, preferably 0.8 to 3.5 mm.
5. A sanitary article (1) according to any one of the preceding claims, wherein the reinforcing fibres are of non-fossil origin.
6. A sanitary article (1) according any one of the preceding claims, wherein the reinforcing fibres are selected from polylactide fibres, glycolic acid polymer fibres, polyvinyl alcohol fibres, bicomponent fibres comprising thermoplastic polymers, non-wood natural fibres, manmade cellulosic fibres, and combinations thereof.

- 5 7. A sanitary article (1) according to claim 6, wherein the reinforcing fibres are manmade cellulosic fibres, preferably manmade fibres formed of cellulose of natural origin, more preferably manmade fibres formed of cellulose that has not been chemically modified, such as viscose, rayon or lyocell, most preferably viscose.
- 10 8. A sanitary article (1) according to any one of the preceding claims, wherein the reinforcing fibres have a length-weighted average fibre length of 3 to 100 mm, preferably 5 to 30 mm, more preferably 6 to 15 mm.
- 15 9. A sanitary article (1) according to any one of the preceding claims, wherein the natural fibres and reinforcing fibres are randomly oriented.
- 20 10. A sanitary article (1) according to any one of the preceding claims, wherein the sheet of material further comprises a binder selected from the group consisting of polyvinyl alcohols, polyvinyl acetate dispersions, ethyl vinyl alcohol dispersions, polyurethane dispersions, acrylic latexes, styrene butadiene dispersions, binders based on finely divided cellulose, binders based on cellulose derivatives, biopolymers and combinations thereof, preferably acrylic latexes.
- 25 11. A sanitary article (1) according to any one of the preceding claims, wherein the sheet of material has a basis weight of 20 to 40 g/m², preferably 25 to 35 g/m².
- 30 12. A sanitary article (1) according to any one of the preceding claims, wherein the sheet of material (2) has a stretch of 0,5 to 7 % and/or an air permeability of 0 to 1000 l/m²/s.
- 35 13. A sanitary article (1) according to any one of the preceding claims, wherein the sheet of material has a release coating, and the coated adhesive region of the sanitary article (1) is releasably attached to the release coating.
14. A sanitary article (1) according to claim 13, wherein the release coating comprises silicone.

15. A sanitary article (1) according to claims 13 or 14, wherein the release force of the release coating is 4.5 to 5.0 N/m as determined with the method described herein.

5 16. A sanitary article (1) according to any one of the preceding claims, wherein the release liner (6) covers part of the backsheet (7) of the sanitary article (1).

10 17. A sanitary article (1) according to any one of the preceding claims, wherein the release liner (6) covers the entire surface of the backsheet (7) or the sanitary article (1).

15 18. A sanitary article (1) according to any one of the preceding claims, wherein the sanitary article (1) is folded along at least one transversal folding axes, and the folded sanitary article (1) is arranged in a wrapper (4), the wrapper (4) comprising a sheet of wrapping material (21) being folded such as to enclose the sanitary article (1), and wherein the sheet of wrapping material (21) comprises natural fibres in mixture with reinforcing fibres, the reinforcing fibres having a greater length-weighted average fibre length than the natural fibres.

20 19. The sanitary article (1) according to claim 18, wherein the wrapper (4) is sealed to enclose the sanitary article (1) by means of mechanical sealing, such as embossing or ultrasonic welding, by heat sealing, by an adhesive, or by a combination thereof.

25 20. A sanitary article (1) according to claims 18 or 19, wherein the sheet of material (21) comprises 50 to 99 wt%, preferably 70 to 99 wt%, more preferably 85 to 99 wt%, of the natural fibres and 1 to 50 wt%, preferably 1 to 30 wt%, more preferably 1 to 20 wt%, of the reinforcing fibres.

30 21. A sanitary article (1) according to claims 18 to 20, wherein the natural fibres are natural cellulosic fibres, preferably wood fibres, or fibers from non-wood plant material.

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22. A sanitary article (1) according to claims 18 to 21, wherein the natural fibres have a length-weighted average fibre length of 0.5 to 5.0 mm, preferably 0.8 to 3.5 mm.

5 23. A sanitary article (1) according claims 18 to 22, wherein the reinforcing fibres are selected from polylactide fibres, glycolic acid polymer fibres, polyvinyl alcohol fibres, bicomponent fibres comprising thermoplastic polymers, non-wood natural fibres, manmade cellulosic fibres, and combinations thereof.

10 24. A sanitary article (1) according to claim 23, wherein the reinforcing fibres are manmade cellulosic fibres, preferably manmade fibres formed of cellulose of natural origin, more preferably manmade fibres formed of cellulose that has not been chemically modified, such as viscose, rayon or lyocell, most preferably viscose.

15 25. A sanitary article (1) according to claims 18 to 24, wherein the reinforcing fibres have a length-weighted average fibre length of 3 to 100 mm, preferably 5 to 30 mm, more preferably 6 to 15 mm.

20 26. A sanitary article (1) according to claims 18 to 25, wherein the natural fibres and reinforcing fibres are randomly oriented.

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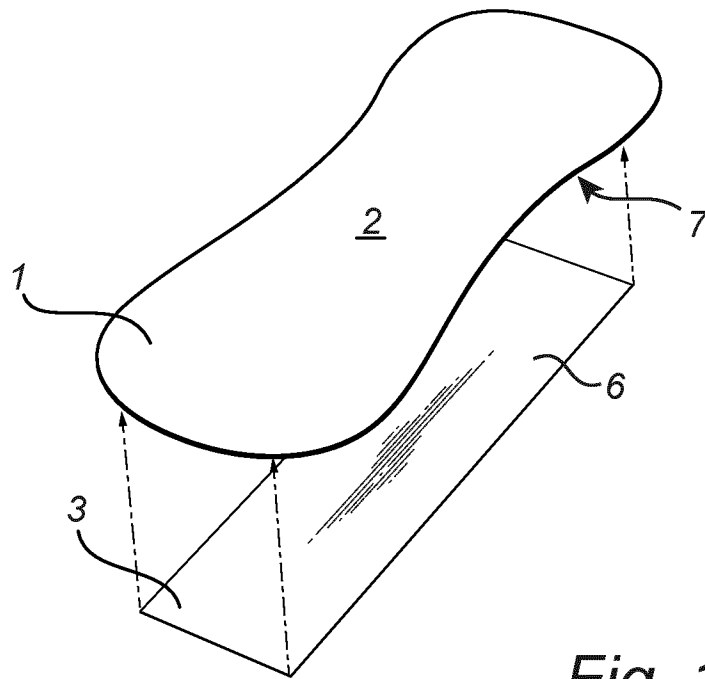


Fig. 1

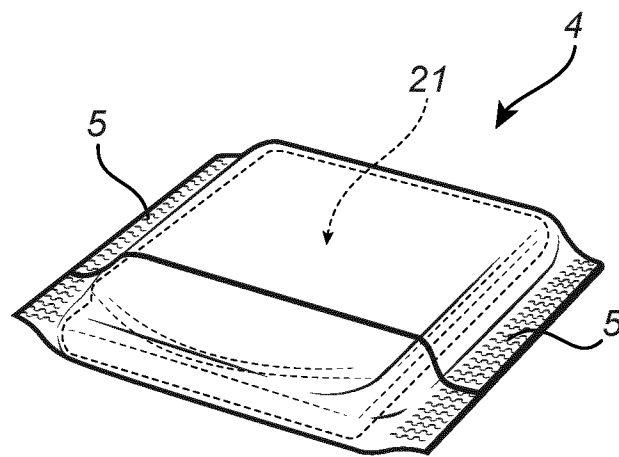


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2023/068029

A. CLASSIFICATION OF SUBJECT MATTER		
INV.	A61F13/47	A61F13/51
	D04H1/4382	D04H1/732
ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
A61F D04H		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 118 316 A2 (UNI CHARM CORP [JP]) 25 July 2001 (2001-07-25) figures paragraphs [0008] - [0011], [0022] - [0028], [0033], [0037], [0045], [0047], [0048] tables -----	1-26
A	US 2012/016328 A1 (SHI BO [US] ET AL) 19 January 2012 (2012-01-19) paragraphs [0004], [0005], [0022], [0068] - [0081] -----	1-26
X	JP H11 47187 A (DAIO SEISHI KK) 23 February 1999 (1999-02-23) figures paragraphs [0008] - [0019] -----	1-26
	----- -/--	
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
20 December 2023		09/01/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Schmitt-Humbert, C

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2023/068029

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H07 303671 A (SHISEIDO CO LTD) 21 November 1995 (1995-11-21) figure 1 paragraphs [0006] - [0022], [0026] -----	1, 3-17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2023/068029

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1118316	A2	25-07-2001	AU 772859 B2 06-05-2004
			BR 0100120 A 28-08-2001
			CA 2331662 A1 21-07-2001
			CN 1306810 A 08-08-2001
			DE 60106790 T2 03-11-2005
			EP 1118316 A2 25-07-2001
			ID 29006 A 26-07-2001
			JP 2001198160 A 24-07-2001
			KR 20010076409 A 11-08-2001
			MY 123625 A 31-05-2006
			SG 91327 A1 17-09-2002
			TW 501924 B 11-09-2002
			US 2001018578 A1 30-08-2001
			US 2003055390 A1 20-03-2003
US 2012016328	A1	19-01-2012	AR 082116 A1 14-11-2012
			AU 2011281265 A1 31-01-2013
			BR 112013001250 A2 17-05-2016
			CN 103003338 A 27-03-2013
			CO 6670535 A2 15-05-2013
			EP 2596054 A2 29-05-2013
			KR 20130106346 A 27-09-2013
			RU 2013104502 A 27-08-2014
			US 2012016328 A1 19-01-2012
			WO 2012010991 A2 26-01-2012
JP H1147187	A	23-02-1999	NONE
JP H07303671	A	21-11-1995	NONE