

SANITARY ARTICLE HAVING MULTI-LAYERED ABSORBENT MEMBER

BACKGROUND OF THE INVENTION

This invention relates to a sanitary article such as
5 a disposable diaper, a sanitary napkin or a body fluid
absorbent pad for incontinence which include a multi-layered
absorbent member.

Japanese Patent Application Publication No.
1997-253259A describes a disposable diaper comprising a
10 liquid-pervious topsheet, a liquid-impervious backsheet and
upper and lower liquid-absorbent panels both disposed
between the topsheet and the backsheet. The upper
liquid-absorbent panel is formed with a plurality of openings
extending through this panel in a direction of its thickness.
15 This diaper is described herein to be capable of preventing
any amount of excretion discharged thereon from staying on
the topsheet by receiving the entire amount of excretion in
the respective openings formed on the liquid-pervious
topsheet and then transferring this into the upper and lower
20 liquid-absorbent panels.

With the diaper disclosed in the publication, however,
excretion discharged thereon merely spreads within the
respective panels as widely as possible in the course being

absorbed by these panels. In other words, the extent over which excretion is absorbed by the panels is disadvantageously limited to the position at which excretion has been discharged on the diaper. Depending on a capacity
5 of the diaper, excretion discharge focused or localized may cause a certain amount of excretion to stay on the topsheet or in a limited zone, particularly in some of the openings of the panels. In this case, the amount of excretion once received in the openings may flow back toward the topsheet
10 as the panels are compressed under a wearer's body weight.

SUMMARY OF THE INVENTION

An object of this invention is to provide a sanitary article having a multi-layered absorbent member, so that
15 excretion discharged thereon may rapidly spread as widely as possible to prevent any amount of excretion from staying on a topsheet or in the limited zone of the article and thereby to prevent excretion once absorbed in the article from flowing back toward the topsheet.

20 According to this invention, there is provided a sanitary article having a multi-layered absorbent member which includes a panel made of a fibrous web having a compressive recovery elasticity, a plurality of openings

extending through the panel in a thickness direction thereof and spaced one from another in a direction orthogonal to the thickness direction and a plurality of fibrous assembly regions extending between each pair of adjacent openings; the
5 panel includes two or more individual panels stacked one on another in the thickness direction each having a plurality of openings out of alignment with the corresponding openings in the individual panel immediately underlying the precedent individual panel; the article being characterized in that:

10 each of the openings in the precedent individual panel being divided in two or more sections by the fibrous assembly regions in the individual panel immediately underlying the precedent individual panel.

The multi-layered absorbent member according to this
15 invention makes it possible to deflect the flowing direction of excretion by the fibrous assembly ribs (fibrous assembly regions) while the flow of excretion is successively absorbed by the respective panels so that excretion may spread as widely as possible from the top panel toward the bottom panel.
20 In this way, the entire volume of the absorbent member can be efficiently utilized. Even if excretion is discharged onto a limited spot of the absorbent member, it is not apprehended that a certain amount of excretion might stay in

or on this spot of the absorbent member since the discharged amount of excretion can rapidly spread within the absorbent member and is uniformly absorbed therein.

The absorbent member in which the total opening area
5 of the openings progressively increases from the top panel toward the bottom panel can effectively avoid undesirable back flow of excretion even when the absorbent member is compressed in the direction of its thickness. This is because the total opening area of the openings progressively
10 decreases from the bottom panel toward the top panel and the density of the fibrous assembly ribs in the respective panels correspondingly increases in this direction.

The absorbent member in which the fiber density progressively decreases from the top panel toward the bottom
15 panel is effective particularly for high viscosity excretion such as loose passage or menstrual discharge since the absorption capacity for such high viscosity excretion progressively increases from the top panel toward the bottom panel so that the flow of excretion may be rapidly moved
20 downward in the absorbent member.

The absorbent member being able to utilize the entire volume thereof is suitable particularly as the important component of the sanitary article such as the

liquid-absorbent pad for incontinence control.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view depicting one embodiment
5 of a partially cutaway multi-layered absorbent member for a
sanitary article according to this invention;

Fig. 2 is a diagram schematically illustrating a manner
of penetration, spreading and absorption in the
multi-layered absorbent member;

10 Fig. 3 is a perspective view depicting a partially
cutaway disposable diaper adopting the multi-layered
absorbent member depicted by Fig. 1;

Fig. 4 is a sectional view taken along line A-A in Fig.
3;

15 Fig. 5 is a perspective view depicting a sanitary
napkin adopting the multi-layered absorbent member depicted
by Fig. 1; and

Fig. 6 is a sectional view taken along line B-B in Fig.
5.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Details of a sanitary article having a multi-layered
absorbent member will be more fully understood from the

description given hereunder with reference to the accompanying drawings.

Fig. 1 is a perspective view depicting one embodiment of partially cutaway a multi-layered absorbent member 1 for a sanitary article according to this invention and Fig. 2 is a diagram schematically illustrating a manner of penetration, spreading and absorption in the multi-layered absorbent member 1. An arrow Y in Fig. 2 indicates a direction in which excretion flows.

10 The multi-layered absorbent member 1 comprises a plurality of panels P made of a fibrous web having a compressive recovery elasticity and contoured by longitudinally opposite ends 1a extending parallel to each other transversely of the panels P and transversely opposite side edges 1b extending parallel to each other longitudinally of the panel P.

More specifically, the absorbent member 1 comprises four panels P stacked in a direction of their thickness so that a first panel p1 defines a layer, a fourth panel p4 defines a bottom layer and second panel p2 and third panel p3 define intermediate layers disposed between the first and fourth panels p1, p4.

Each of the panels p1 ~ p4 has a plurality of square

openings H extending through the panel in the direction of its thickness and spaced one from another obliquely with respect to the longitudinally opposite ends 1a as well as to the transversely opposite side edges 1b of the absorbent member 1 and a fibrous assembly rib R (fibrous assembly region) surrounding the respective openings H.

The rib R in each of the panels p1 ~ p4 comprises a plurality of first fibrous assembly ribs r1 and a plurality of second fibrous assembly ribs r2, the first fibrous assembly ribs r1 obliquely extending parallel to and spaced from one to another between respective pairs of the adjacent openings H and the second fibrous assembly ribs r2 being oriented orthogonally to the first fibrous assembly ribs r1. The second fibrous assembly ribs r2 also obliquely extend parallel to and spaced from one another between the respective pairs of the adjacent openings H.

The opening H in each of these panels p1 ~ p4 is defined by a pair of the adjacent first ribs r1 and a pair of the adjacent second ribs r2 intersecting the pair of the adjacent first ribs r1. These panels p1 ~ p4 are bonded together in their overlapping regions using suitable adhesive or a heat-sealing technique.

The openings H of the overlying panel P are out of

alignment with the openings H of the other panel P immediately underlying the overlying panel P and the openings h of the former are respectively divided in two or more sections by the rib R of the latter. Specifically, the openings h₁ of the first panel p₁ are respectively divided in two or more sections by the first and second ribs r₁, r₂ of the second panel p₂, the openings h₂ of the second panel p₂ are respectively divided in two or more sections by the first rib r₁ and the second rib r₂ of the third panel p₃, and the openings h₃ of the third panel p₃ are respectively divided in two or more sections by the first rib r₁ and the second rib r₂ of the fourth panel p₄. In this manner, the openings H of the overlying panel P should be divided in at least two sections by the rib R of the other panel P immediately underlying the overlying panel P.

A total opening area of the openings H in the overlying panel P and a total opening area of the openings h in the other panel P immediately underlying panel P are in the relationship of the former < the latter. In other word, the total opening areas of the respective panels p₁ ~ p₄ progressively enlarge from the first panel p₁ toward the fourth panel p₄. However, it is possible without departing from the spirit and the scope of this invention to dimension

the total opening areas of the respective panels $p_1 \sim p_4$ to be uniform.

As schematically illustrated by Fig. 2, excretion flows into the absorbent member 1 through the openings h_1 of the first panel p_1 while partially absorbed by the first panel p_1 . A flow of excretion having reached the first rib r_1 and the second rib r_2 of the second panel p_2 dividing the openings h_1 of the first panel p_1 is now divided by these first rib r_1 and the second rib r_2 into the respective openings h_2 of the second panel p_2 while partially absorbed by the second panel p_2 . A flow of excretion having reached the first rib r_1 and the second rib r_2 of the third panel 3 dividing the openings h_2 of the second panel p_2 is then divided by these first and second ribs r_1, r_2 of the third panel 3 into the respective openings h_4 of the fourth panel p_4 while partially absorbed by the third panel 3. An amount of excretion which has not been absorbed by the first~third panels $p_1 \sim p_3$ is absorbed by the fourth panel p_4 .

The flow of excretion has its direction successively deflected by the first rib r_1 and the second rib r_2 of the respective panels $p_1 \sim p_4$ while gradually absorbed by these panels $p_1 \sim p_4$ so that the flow of excretion may rapidly spread from the first panel p_1 toward the fourth panel p_4 .

Even when the absorbent member 1 is compressed by the wearer's body weight in the direction of its thickness, no movement of excretion from the bottom to the top of the absorbent member 1 since the total opening area of the panel H progressively decreases and the density of the rib R of the panel P from the fourth panel p4 toward the panel p1.

The total opening area of the openings H formed in the panel P is in a range of $15 \sim 1300 \text{ mm}^2$ and a ratio of the total opening area of the opening H to the total surface area of the panel H is in a range of $20 \sim 90 \%$.

The total opening area of the openings H less than 15 mm^2 is too small to guide a flow of excretion smoothly into the absorbent member and, if the flow is guided into the absorbent member, the correspondingly dense rib R would obstruct the flow of excretion from rapidly spreading within the absorbent member 1. On the other hand, the total opening area of the openings H larger than 1300 mm^2 would cause excretion once absorbed by the absorbent member 1 to flow back toward the top surface of the absorbent member 1 through the openings H as the absorbent member 1 is compressed under the wearer's body weight. The area ratio of the openings H lower than 20% will be insufficient to spread excretion within the absorbent member as widely as possible and would cause a

certain amount of excretion to stay on the top surface of the absorbent member 1. On the other hand, the area ratio of the openings li exceeding 80 % would inevitably make the density of the rib R too low and unacceptably reduce the absorptive capacity of the panels p1 ~ p4.

A fiber density of the rib R in the overlying panel P and a fiber density of the rib R in the panel P immediately underlying the overlying panel P are in the relationship of the former > the latter. In other words, the fiber density of the rib R progressively decreases from the first panel p1 toward the fourth panel p4. However, it is possible without departing from the spirit and the scope of this invention to provide the respective panels p1 ~ p4 with a uniform fiber density.

The absorbent member 1 of this invention appropriately functions also for excretion having a relatively high viscosity, for example, loose passage or menstrual discharge. In the absorbent member 1, excretion of the type is not easily absorbed by the first panel p1 and rapidly moves from the first panel p1 toward the fourth panel p4 since the absorption capacity of the rib R for excretion of this type progressively increases from the second panel p2 toward the fourth panel p4.

An example of the process for making the panel P comprises steps of air laying short fibers once dispersed in the air on a conveyor provided thereon with a plurality of pins shaped in conformity of the desired openings H of the panel P to form fibrous web and subjecting the fibrous web
5 on the conveyor to hot air blast to heat-seal the short fibers together.

Another example of the process for making the panel P comprises steps of discharging molten thermoplastic
10 synthetic resin from a spinning nozzle array and simultaneously jetting air streams from gas injectors arranged on both sides of the spinning nozzle array so that the air streams may spin the synthetic resin being discharged from the nozzle array into superfine fibers; collecting these
15 superfine fibers on a meshy conveyor provided below the nozzle array so that the superfine fibers intertwined and collected on the meshy conveyor are bonded together under heat of these superfine fibers themselves to form fibrous web; and finally compression-molding the fibrous web by a
20 pair of pressure rollers to a substantially uniform thickness before the fibrous web is cooled to a desired thickness or after the fibrous web has been cooled.

The fiber forming the fibrous web may be selected from

a group including polyolefine fiber such as polypropylene fiber and polyethylene fiber, polyester fibers such as polyethylene terephthalate fiber and polybutylene terephthalate fiber, polyamide fiber such as nylon 66 fiber and nylon 6 fiber, acryl fiber, cellulose fiber such as pulp fiber, rayon fiber and acetate fiber, and superabsorption polymer fiber. It is also possible to disperse and hold superabsorption polymer grains in fiber interstices of the fibrous web.

10 As a general rule, the panel P forming with the absorbent member 1 comprises two, three, four or more layers of the individual panels stacked one on another so far as each opening H of each overlying panel P is divided in at least two sections by the rib R of the panel P immediately
15 underlying the overlying panel P. The openings H of the absorbent member 1 are not limited to the square shaped openings but may be of circular, oval, rectangular, triangular or other shape.

Fig. 3 is a perspective view showing the disposable
20 diaper as a specific example of the sanitary napkin adopting the multi-layered absorbent member 1 shown by Fig. 1 as partially broken away and Fig. 4 is a sectional view taken along a line A - A in Fig. 3. The diaper 10 comprises a

liquid-pervious topsheet 11, a liquid-impervious backsheet 12 and the multi-layered absorbent member 1 disposed between the topsheet 11 and the backsheet 12. The diaper 10 is longitudinally configured by a front waist region 13, a rear waist region 15 and a crotch region 14 extending between the front and rear trunk regions 13, 15. The diaper 10 is contoured by longitudinally opposite ends 10a extending in parallel to each other transversely of the diaper 10 and transversely opposite side edges 10b extending in parallel to each other longitudinally of the diaper 10. In the crotch region 14, the side edges 10b curve inwardly of the diaper 10 so as to describe circular arcs, respectively. The diaper 10 further comprises a pair of liquid-resistant leak-barrier cuffs 16 longitudinally extending in parallel to and spaced from each other along the side edges 10b, respectively.

The absorbent member 1 comprises the first ~ fourth panels p1 ~ p4 stacked one on another in the thickness direction of the absorbent member 1 each having the first and second fibrous assembly ribs r1, r2 and a plurality of openings 9 surrounded by the first and second fibrous assembly ribs r1, r2. These panels p1 ~ p4 are bonded together in their regions in which the first and second ribs r1, r2 of the respective panels p1 ~ p4 overlap one another.

A liquid-absorbent core 17 in the form of mat having no opening underlies the fourth panel p4. The absorbent member 1 is fixed to the diaper 10 by bonding the first panel p1 to the inner surface of the topsheet 11. The core 17 is
5 bonded to respective inner surfaces of the fourth panel p4 and the backsheet 12.

Along the longitudinally opposite ends 10a of the diaper 10, transversely extending film-like elastic members 18 associated with a waist-hole are disposed between the
10 topsheet 11 and the backsheet 12 and bonded under tension to the inner surface of at least one of these sheets 11, 12. Along the transversely opposite side edges 10b, longitudinally extending thread-like elastic members 19 associated with leg-holes are bonded under tension to the
15 diaper 10 in the manner similar to the elastic members 18. In the rear waist region 15, respective proximal ends of tape fasteners 2 are attached to the transversely opposite side edges 10b of the diaper 10 so that these tape fasteners 20 extend inward transversely of the diaper 10. In the front
20 waist region 13, a rectangular target tape strip (not shown) is attached to the outer surface of the backsheet 12 so that the respective tape fasteners 20 may be anchored on the target tape strip.

The leak-barrier cuffs 16 lie immediately outside the transversely opposite side edges 1b of the absorbent member 1. Each of these leak-barrier cuffs 16 has a fixed side edge portion 16a firmly bonded to the outer surface of the topsheet 11 and extending longitudinally of the diaper 10, a free side edge portion 16b extending inward from the fixed side edge portion 16a transversely of the diaper 10 in the crotch region 14 and normally biased to rise on the diaper 10 and a longitudinally opposite fixed end portions 16c collapsed inward transversely of the diaper 10 and bonded to the outer surface of the topsheet 11 in the collapsed state in the front and rear waist regions 13, 15. An elastically stretchable member 21 is bonded under tension to the free side edge portion 16b of the leak-barrier cuff 16 so that the member 21 may extend longitudinally of the diaper 10 and covered with a marginal part of the free side edge portion 16b.

Referring to Fig. 3, the elastic members 18, 19, 21 are relieved of their tension, resulting in that the diaper 10 is longitudinally curved with its inner surface inside and gathers are formed along the longitudinally opposite ends 10a as well as the transversely opposite side edges 10b and along the respective free side edge portions 16b of the leak-barrier cuffs 16. Consequently, the topsheet 11

cooperates with the leak-barrier cuffs 16 to form a pair of pockets opening inward transversely of the diaper 10.

The tape fasteners 20 are anchored on the target tape strip by means of pressure-sensitive adhesive applied on
5 respective inner surfaces of the tape fasteners' free end portions to form the pair of leg-holes and the waist-hole (not shown).

In the diaper 10, transversely opposite side edge portions 11a of the topsheet 11 extend outward transversely
10 of the diaper 10 slightly beyond the transversely opposite side edges 1b of the absorbent member 1. Transversely opposite side edge portions 12a of the backsheet 12 as well as respective outer edge portions 16d of the leak-barrier cuffs 16 extend outward transversely of the diaper 10 beyond
15 the side edge portions 11a of the topsheet 11. The outer side edge portion 11a of the topsheet 11 is disposed between the side edge portion 12a of the backsheet 12 and the adjacent outer edge portion 16d of the cuff 16 and firmly bonded to the inner surface of at least one of the backsheet 12 and the
20 leak-barrier cuff 16. The side edge portion 12a of the backsheet 12 and the adjacent outer edge portion 16d of the leak-barrier cuff 16 are put flat and firmly bonded together. The elastic member 19 associated with the leg-hole is

disposed between the side edge portion 12a of the backsheet 12 and the adjacent outer edge portion 16d of the leak-barrier cuff 16 and bonded under tension to the inner surface of at least one of the backsheet 12 and the leak-barrier cuffs 16.

5 In the vicinity of the longitudinally opposite ends 10a of the diaper 10, portions of the topsheet 11 and the backsheet 12 extending outward longitudinally of the diaper 10 beyond the longitudinally opposite ends 1a of the absorbent member 1 are put flat and firmly bonded together.

10 In the diaper 10, the flow of excretion has its direction successively deflected by the first rib r1 and the second rib r2 of the respective panels p1 ~ p4 while gradually absorbed by these panels p1 ~ p4 so that the flow of excretion rapidly spread from the first panel p1 toward the fourth panel
15 p4. The amount of excretion which has not been absorbed by the first~fourth panels p1 ~ p4 is absorbed by the core 17.

Fig. 5 is a perspective view depicting a sanitary napkin 30 as another example of the sanitary article adopting the multi-layered absorbent member 1 shown by Fig. 1 and Fig.

20 6 is a sectional view taken along line B - B in Fig. 5. The napkin 30 comprises a liquid-pervious topsheet 31, a liquid-impervious backsheet 32 and the multi-layered absorbent member 1 disposed between the topsheet 31 and the

backsheet 32. The napkin 30 is contoured by longitudinally opposite ends 30a extending transversely of the napkin 30 and destined to lie back and forth with respect to wearer's shorts and transversely opposite side edges 30b extending
5 longitudinally of the napkin 30 and destined to lie along the leg-holes of the wearer's shorts.

In the vicinity of the side edges 30b, the napkin 30 has a pair of liquid-resistant barrier flaps 33 extending in parallel to each other longitudinally of the napkin 30 and
10 spaced from each other transversely of the napkin 30. Substantially in the middle region of the napkin 30, the topsheet 31 is formed with a rectangular opening 34 with its longer sides extending in parallel to the side edges 30b of the napkin 30. The absorbent member 1 is exposed through this
15 opening 34 of the topsheet 31.

The absorbent member 1 comprises the first ~ fourth panels p1 ~ p4 stacked in a direction of their thickness. Substantially in the middle regions of the respective panels p1 ~ p4, the absorbent member 1 has the first and second
20 fibrous assembly ribs r1, r2 and a plurality of openings E surrounded by these ribs r1, r2. The panels p1 ~ p4 have neither the first and second ribs r1, r2 nor the openings E in the regions other than the middle regions. These panels

p1 ~ p4 are bonded one to another in their zones in which the first and second ribs r1, r2 of these panels p1, p2 overlap one another.

A liquid-absorbent core 35 in the form of mat having
5 no opening underlies the fourth panel p4. The absorbent member 1 is fixed to the napkin 30 by bonding the first panel p1 to the inner surface of the topsheet 31. The core 35 is bonded to respective inner surfaces of the fourth panel p4 and the backsheet 32.

10 The barrier flaps 33 lie immediately outside the transversely opposite side edges 1b of the absorbent member 1. Each of these barrier flaps 33 has a fixed side edge portion 33a firmly bonded to the outer surface of the topsheet 31 and extending longitudinally of the napkin 30, a free side edge
15 portion 33b extending outward transversely of the napkin 30 in its middle region and normally biased to rise on the napkin 30 and a longitudinally opposite fixed end portions 33c collapsed outward transversely of the napkin 30 and firmed bonded to the outer surface of the topsheet 31 in this
20 collapsed state in the vicinity of the longitudinally opposite ends 30a of the napkin 30. An elastically stretchable member 36 is bonded under tension to the free side edge portion 33b of the barrier flap 33 so that the elastic

member 36 may extend longitudinally of the napkin 30 and covered with a marginal part of the free side edge portion 33b.

In the vicinity of the transversely opposite side edges 30b of the napkin 30, portions of the topsheet 31 and the backsheet 32 extending outward transversely of the absorbent member 1 beyond the transversely opposite side edges 1b of the absorbent member 1 are put flat and firmly bonded together. Also in the vicinity of the longitudinally opposite ends 30a of the napkin 30, portions of the topsheet 31 and the backsheet 32 extending outward longitudinally of the absorbent member 1 beyond the transversely opposite side edges 1a of the absorbent member 1 are put flat and firmly bonded together.

In the napkin 30, the flow of excretion has its direction successively deflected by the first and second ribs r1, r2 of the respective panels p1 ~ p4 while gradually absorbed by these panels p1 ~ p4 so that the flow of excretion rapidly spread from the first panel p1 toward the fourth panel p4. The amount of excretion which has not been absorbed by the first~fourth panels p1 ~ p4 is absorbed by the core 3b.

The topsheet 11, 31 may be formed with a liquid-pervious sheet such as nonwoven fabric or porous

plastic film, preferably by a liquid-pervious hydrophilic sheet. The backsheet 12, 32, the leak-barrier cuffs 16 and the barrier flaps 33 may be formed with hydrophobic nonwoven fabric, liquid-impervious plastic film or a laminated sheet consisting of hydrophobic nonwoven fabric and plastic film, preferably by a breathable but liquid-impervious sheet. It is also possible to use, as the stock material for the backsheet 12, 32, the leak-barrier cuffs 16 and the barrier flaps 33, composite nonwoven fabric (SMS nonwoven fabric) comprising melt blown nonwoven fabric having a high water-resistance of which the opposite sheet surfaces are sandwiched between sheet surfaces of melt blown nonwoven fabric having a high strength and a high flexibility.

The nonwoven fabric may be selected from a group including spun lace nonwoven fabric, needle punch nonwoven fabric, melt blown nonwoven fabric, thermal bond nonwoven fabric, spun bond nonwoven fabric and chemical bond nonwoven fabric. The component fiber of the nonwoven fabric may be selected from a group including polyolefine, polyester and polyamide fibers and conjugated fiber of polyethylene/polypropylene or polyester.

The core 17, 35 may be formed with a mixture of fluff pulp and high absorption polymer grains compressed to a

desired thickness and then entirely covered with a water-pervious sheet (not shown) such as tissue paper.

Bonding of the absorbent member 1 and the core 17, 35 to the sheets 11, 12, 31, 32, fixing of the sheets 11, 12, 5 31, 32, the leak-barrier cuffs 16 and the barrier flaps 33, and attaching of the elastic members 18, 19, 21, 36 may be carried out using suitable adhesive such as hot melt adhesive or pressure-sensitive adhesive or a heat-sealing technique.

While the topsheet 11, 31 has been described as the 10 component of the diaper 10 as well as the sanitary napkin 30, it should be understood that the topsheet 11, 31 is not essential for these diaper 10 and napkin 30 and the absorbent member 1 may be directly exposed on the diaper 10 or the napkin 30 in the absence of the topsheet 11, 31.

15 This invention is applicable not only to the disposable diaper 10 and the sanitary napkin 30 but also to a liquid-absorbent pad for continence control.

WHAT IS CLAIMED IS:

1. A sanitary article (10) having a multi-layered absorbent member (1) which includes a panel (P) made of a fibrous web having a compressive recovery elasticity, a plurality of openings (H) extending through said panel in a thickness direction thereof and spaced one from another in a direction orthogonal to said thickness direction and a plurality of fibrous assembly regions (R) extending between each pair of adjacent said openings;

said panel (P) including two or more individual panels (p) stacked one on another in said thickness direction each having a plurality of openings (h) out of alignment with the corresponding openings (h) in the individual panel (p) immediately underlying the precedent individual panel (p); said article being characterized in that:

each of the openings (h) in the precedent individual panel (p) is divided in two or more sections by said fibrous assembly regions (R) in the individual panel (p) immediately underlying the precedent individual panel (p).

2. the sanitary article (10) according to Claim 1, wherein a total opening area of the openings (h) in respective said

individual panels (p) is in a range of 15 ~ 1300 mm² and a ratio of said total opening area of the openings (h) to a total surface area in respective said individual panels (p) is in a range of 20 ~ 80 % and wherein the total opening area of the openings (h) in each of the individual panels (p) and the total opening area of the openings (h) in the panel (p) immediately underlying the precedent individual panel (p) are given in a relationship of the precedent individual panel (p) $\leq$ the individual panel (p) immediately underlying said precedent individual panel (p).

3. The sanitary article (10) according to Claim 1 or 2, wherein a fiber density in each of the individual panels (p) and a fiber density in the panel (p) immediately underlying the precedent individual panel (p) are given in a relationship of the precedent individual panel (p) $\geq$ the individual panel (p) immediately underlying said precedent individual panel (p).

20 4. The sanitary article (10) according to Claim 1, wherein said fibrous assembly regions (R) in respective said individual panels (p) are defined by a plurality of first fibrous assembly ribs (r1) extending parallel to and spaced

from one another in any one of longitudinal, transverse and oblique directions and a plurality of second fibrous assembly ribs (r2) extending parallel to and spaced from one another in a direction intersecting said direction of said first fibrous assembly ribs (r1) so that each of said openings (h) is defined by each pair of adjacent said first fibrous assembly ribs (r1) and each pair of adjacent said second fibrous assembly ribs (r2) intersecting said pair of adjacent said first fibrous assembly ribs (r1).

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5. The sanitary article (10) according to Claim 1, wherein said openings (h) are locally formed in desired regions in respective said individual panels (p).

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6. The sanitary article (10) according to Claim 1, wherein at least one of respective said individual panels (p) contains superabsorption polymer or is formed with an absorbent fibrous web made of superabsorption polymer.

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7. The sanitary article (10) according to Claim 1, wherein a liquid-absorbent core (17) in the form of a mat having no opening underlies a lowermost one of said individual panels (p).