

9704076-0
1P055

-1-

THIS SHEET HAS BEEN
REPLACED

TOP LAYER FOR DISPOSABLE BODY FLUIDS ABSORPTIVE ARTICLE

This invention relates to a liquid-permeable top layer for a disposable body fluids absorptive article such as a disposable diaper, sanitary napkin or urine absorptive pad.

It is well known to employ nonwoven fabrics made of staple fibers in order to assure that a top layer of the above-mentioned article may present a cloth-like touch. The nonwoven fabric has usually been provided with a plurality of heat-sealed or bonded spots or lines spaced one from another at a relatively short pitch to prevent the staple fibers from falling out from the nonwoven fabric. Alternatively, the staple fibers have been mechanically intertwined under the known high pressure water jet treatment to maintain the staple fibers bonded one to another.

However, such known nonwoven fabric cannot achieve an intention to realize a soft and cushiony touch as expected although the individual staple fibers are soft and of a small fineness. It is for the reason that the individual staple fibers are bonded one to another at a relatively short pitch and consequently they are prevented from independently moving.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED

In view of the problem as has been described above, it is a principal object of the invention to make top layers of disposable body fluids absorptive articles more soft and cushiony than top layers obtained by employing the known staple fibers.

The object set forth above is achieved, according to the invention, by a liquid-permeable top layer for a disposable body fluids absorptive article, with which at least a skin-contactable side of a liquid-absorbent core as a component of said article is covered, said top layer being characterized by that:

said top layer has a basic density of $10 \sim 200 \text{ g/m}^2$ and a fineness of $1 \sim 10 \text{ d}$; said top layer is made from continuous filaments of thermoplastic synthetic resin parallel extending in one direction; and said top layer is provided intermittently along said one direction with bonded portions in which a plurality of adjacent filaments are bonded together.

Fig. 1 is a perspective view of a sanitary napkin as partially broken away;

Fig. 2 is a fragmentary plan view of a top sheet of the sanitary napkin, showing a specific embodiment of bonded

This Sheet Has Been Replaced



portions;

Fig. 3 is a view similar to Fig. 2 showing another embodiment of the bonded portions;

Fig. 4 is a view similar to Fig. 2, showing still another embodiment of the bonded portions; and

Fig. 5 is a view similar to Fig. 2, showing further another embodiment of the bonded portions.

Details of a topsheet according to the invention will be more fully understood from the description given hereunder in reference with the accompanying drawings.

Sanitary napkin 1 shown by Fig. 1 in a perspective view as partially broken away comprises a liquid-permeable topsheet (top layer) 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed between these two sheets 2, 3. The napkin 1 is substantially rectangular which is longer in a direction of back and front .

The topsheet 2 is obtained by evenly opening tows each comprising continuous filaments 6 of thermoplastic synthetic resin having a fineness of 1 ~ 10 d (denier) into the form of web which is, in turn, cut into sheets each being defined by a predetermined width and length so as to have a basic density of 10 ~ 200 g/m². The respective filaments 6

continuously extend in parallel one to another longitudinally of the napkin 1 until they extend outward beyond longitudinally opposite ends of the absorbent core 4 to define longitudinally opposite ends 7 of the napkin 1. Then the respective filaments 6 are pressure-heat-sealed with one another as well as with a top surface of the backsheet 3 along the longitudinally opposite ends 7. Thus, the respective filaments 6 are pressure-heat-sealed directly or indirectly with the backsheet 3. The respective filaments 6 extending outside lateral side edges 8 and defining transversely opposite side edges 9 of the napkin 1 are also pressure-heat-sealed with one another as well as with the top surface of the backsheet 3. Pressure-heat-sealing treatment of the filaments 6 in this manner forms a pressure-heat-sealed zone 11 extending along a periphery of the napkin 1 and this heat-sealed zone 11 is in compressed state so as to be lower than a surface of a main absorptive zone 10.

The filaments 6 extending across the main absorptive zone 10 of the topsheet 2 surrounded by the bonded zone 11 includes a plurality of pressure-heat-sealed portions 12 linearly extending transversely of the main absorptive zone 10 and a plurality of the adjacent filaments 6 are pressure-heat-sealed with one another in these pressure-heat-sealed

portions 12. As a result, the pressure-heat-sealed portions 12 become depressed with respect to a surface of the main absorptive zone 10 to form grooves and therefore do not irritate the wearer's skin. Between each pair of the pressure-heat-sealed portions 12 which are adjacent to each other longitudinally of the napkin 1, the filaments 6 are protuberant and in soft contact with the wearer's skin. Each of such pressure-heat-sealed portions 12 is 0.3 - 3.0 mm wide longitudinally of the napkin 1 and at least 3.0 mm long transversely of the napkin 1. Each of these pressure-heat-sealed portions 10 may have a length completely connecting the transversely opposite side edges 9, if desired. Longitudinally of the napkin 1, the pressure-heat-sealed portions 10 are intermittently arranged and each pair of adjacent pressure-heat-sealed portions 10 are spaced apart from each other by 5 - 50 mm. Such pressure-heat-sealed portions 12 will be in the form of dot if its width and length are substantially equal to each other.

The topsheet 2 and the absorbent core 4 may be locally unitized with each other by intermittent heat-sealing or bonding in portions where they are in contact with each other.

The backsheet 3 is made of thermoplastic synthetic

resin film such as polyethylene film.

The absorbent core 4 comprises a shaped mixture of fluff pulp fibers and super water absorptive polymer particles and may be covered with tissue paper if desired. Use of tissue paper facilitates the topsheet 2 to be unitized with the absorbent core 4.

With the napkin 1 constructed as has been described above, the topsheet 2 comprising the filaments 6 presents a cloth-like touch and at the same time a comfortable softness or cushioning effect like a cotton layer. The filaments 6 are reliably prevented from falling out from the napkin 1 since the filaments 6 are pressure-heat-sealed together along the longitudinally opposite ends 7 of the napkin 1 and directly or indirectly pressure-heat-sealed with the backsheet 3. In addition, the filaments 6 are pressure-heat-sealed in a plurality of pressure-heat-sealed portions 12 formed between the longitudinally opposite ends 7. Such a arrangement effectively eliminates any apprehension that the filaments 6 might be separated one from another to exposure the absorbent core 4 or entangled one with another so as to deteriorate a feeling to wear the napkin 1.

Figs. 2 ~ 5 are fragmentary plan views of the topsheet 2 showing various embodiments of the pressure-heat-sealed

portions 12. In the case of the topsheet 2 shown by Fig. 2, the pressure-heat-sealed portions 12 comprise a plurality of first pressure-heat-sealed portions 12A parallel extending in the longitudinal direction X-X and a plurality of second pressure-heat-sealed portions 12B parallel extending in the transverse direction Y-Y. The first and second pressure-heat-sealed portions 12A, 12B extend between the longitudinally opposite ends 7 and between the transversely opposite side edges 11, respectively. Each of these pressure-heat-sealed portions 12A, 12B has a width of 0.3 ~ 3.0 mm. Both the first and second pressure-heat-sealed portions 12A, 12B are parallel spaced one from another by 5 ~ 50 mm, respectively.

In the case of the topsheet 2 shown by Fig. 3, the pressure-heat-sealed portions 12 comprise a plurality of first pressure-heat-sealed portions 12A parallel extending between the transversely opposite side edges 11 describing rightward rising slopes and a plurality of second pressure-heat-sealed portions 12B parallel extending between the transversely opposite side edges 11 describing leftward rising slopes. Respective widths and parallel spacings of the first and second pressure-heat-sealed portions 12A, 12B are similar to them in the case shown by Fig. 2.

In the case of the topsheet 2 shown by Fig. 4, the pressure-heat-sealed portions 12 comprise a plurality of curved lines parallel extending between the transversely opposite side edges 11 and describing sine curves. Widths and parallel spacings of the pressure-heat-sealed portions 12 are similar to them in the case shown by Fig. 2.

In the case of the topsheet 2 shown by Fig. 5, the pressure-heat-sealed portions 12 comprise relatively short seal lines 12A, 12B extending longitudinally and transversely of the napkin 1, respectively, to describe a plurality of crosses. These cross-shaped pressure-heat-sealed portions 12 may be arranged regularly or irregularly on the topsheet 2. Each of the seal lines 12A, 12B has a width of 0.3 - 3.0 mm and a length of 3 - 20 mm.

If the filaments 6 are hydrophobic, it is possible to treat a bottom side of the topsheet 2 with a suitable agent to make it hydrophilic and thereby to facilitate body fluids to transfer from a top side toward a bottom side of the topsheet 2.

To bond the filaments together or to bond the filaments to the backsheet, not only known technique of heat-sealing as used in the above-mentioned embodiments but also suitable adhesive such as the known hot melt adhesive may be used.

The topsheet according to the invention realizes a cloth-like soft and cushiony touch by using the filaments. The filaments are reliably prevented from falling out from the napkin since they are heat-sealed together along the longitudinally opposite ends of the napkin and bonded directly or indirectly to the backsheet. The filaments parallel extend in one direction and thereby promote spreading of body fluids in this direction.



THIS SHEET HAS BEEN
REPLACED

-10-

WHAT IS CLAIMED IS:

1. Liquid-permeable top layer for a disposable body fluids absorptive article, with which at least a skin-contactable side of a liquid-absorbent core as a component of said article is covered, said top layer being characterized in that:

said top layer has a basic density of $10 \sim 200 \text{ g/m}^2$ and a fineness of $1 \sim 10 \text{ d}$; said top layer is made from continuous filaments of thermoplastic synthetic resin parallel extending in one direction; and said top layer is provided intermittently along said one direction with bonded portions in which a plurality of adjacent filaments are bonded together.

2. Top layer according to Claim 1, wherein said bonded portions in which the filaments are bonded together are intermittently provided also in a direction transversely of said one direction.

3. Top layer according to Claim 1 or 2, wherein opposite ends of said top layer in said one direction are bonded directly or indirectly to a backsheet as a component of said

This Sheet Has Been Replaced





-11-

THIS SHEET HAS BEEN
REPLACED

body fluids absorptive article.

4. Top layer according to Claim 1, wherein said bonded portions in which the filaments are bonded together define grooves in the surface of said top layer.

5. Top layer according to Claim 1, wherein said one direction is a longitudinal direction of said article.

This Sheet Has Been Replaced

