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US 4617022
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SANITARY NAPKIN AND METHOD FOR MAKING IT

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(57) Claim

1. A sanitary napkin generally including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets, wherein:

there are provided a pair of liquid-resistant sheets extending side by side longitudinally of said napkin, respective outer peripheral edges of said liquid-resistant sheets being bonded to the upper side of said napkin along longitudinally opposite ends and along side edges of said napkin, respective inner edges of said pair of liquid-resistant sheets lying adjacent a center line dividing said napkin transversely in two so as to cover at least a peripheral zone of said topsheet, respectively, cooperating with said topsheet to form pockets each opening toward said center line and to expose a transversely middle zone of said

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topsheet, and said pair of liquid-resistant sheets are placed on the upper side of said napkin so that their inner edges leave a space therebetween larger at a longitudinally middle zone than at the longitudinally opposite ends of said napkin.

3. A method for making a sanitary napkin generally including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets, said method including steps of:

a. feeding a continuous laminate including a topsheet, a backsheet and a core disposed between these two sheets;

b. feeding an original continuous liquid-resistant sheet in a longitudinal direction;

c. dividing said original continuous liquid-resistant sheet transversely in two sheet sections along a center zone thereof so as to describe a predetermined waveform repeatedly;

d. delaying any one of said two sheet sections to be fed substantially by 1/2 pitch of said waveform;

e. spacing said two sheet sections from each other by a predetermined distance;

f. placing and bonding said two sheet sections upon and to said topsheet after said steps "d" and "e"; and

g. cutting said laminate having said two sections into individual napkins.

A B S T R A C T

A topsheet of a sanitary napkin is covered with a pair of liquid-resistant sheets extending side by side longitudinally of the napkin except a transversely middle zone thereof destined to be in contact with the user's vaginal opening and an area extending in the proximity thereof.

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Invention Title:

SANITARY NAPKIN AND METHOD FOR MAKING IT

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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

SANITARY NAPKIN AND METHOD FOR MAKING IT

The present invention relates to a sanitary napkin and a method for making it and, more particularly, to a sanitary napkin or pad for absorbing menstrual discharge and a method for making it.

Various techniques have conventionally been proposed to maintain a skin-contacting surface of a sanitary napkin in a comfortably dry condition and thereby to improve a feeling to wear the sanitary napkin. For example, Japanese Laid-Open Utility Model Application No. Hei 1-122727 discloses a sanitary napkin including a topsheet comprising a section of a hydrophobic plastic film having numerous perforations so as to define a central area of the topsheet destined to be opposed to the user's vaginal opening when the user wears the sanitary napkin and a section of a hydrophobic nonwoven fabric having numerous perforations so as to define an area extending outside the central area.

According to the above-mentioned sanitary napkin menstrual discharge can be immediately transferred to the absorbent core without staying on the topsheet because the topsheet includes the foresaid sections. However, under a body pressure of the user exerted upon the napkin, the

menstrual discharge flows back onto the upper surface of the topsheet and causes a feeling of wetness which is uncomfortable for the user.

Accordingly, it is a principal object of the invention to solve the problem as mentioned above by covering the topsheet of the napkin except a central area thereof with liquid-resistant sheets.

The object set forth above is achieved, according to one aspect of the invention, by a sanitary napkin generally including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets, wherein: there are provided a pair of liquid-resistant sheets extending side by side longitudinally of the napkin, respective outer peripheral edges of said liquid-resistant sheets being bonded to the upper side of the napkin along longitudinally opposite ends and along corresponding side edges of the napkin, respective inner edges of the pair of sheets lying adjacent a center line dividing the napkin transversely in two so as to cover at least a peripheral zone of the topsheet, respectively, cooperating with the topsheet to form pockets each opening toward the center line and to expose a transversely middle zone of the topsheet, and the pair of sheets are placed on the upper side of the napkin so

that their inner edges leave a space therebetween larger at a longitudinally middle zone than at the longitudinally opposite ends of the napkin.

The object set forth above is achieved, according to another aspect of the invention, by a method for making sanitary napkin generally including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets, said method including steps of:

a. feeding a laminate including a topsheet, a backsheet and a core disposed between these two sheets;

b. feeding an original continuous liquid-resistant sheet in a longitudinal direction;

c. dividing said original continuous liquid-resistant sheet transversely in two sheet sections along a center line thereof so as to describe a predetermined waveform repeatedly;

d. delaying any one of said two sheet sections to be fed substantially by 1/2 pitch of the waveform;

e. spacing the two sheet sections from each other by a predetermined distance;

f. placing and bonding the two sheet sections upon and to the topsheet after the two steps "d" and "e"; and

that their inner edges leave a space therebetween larger at a longitudinally middle zone than at the longitudinally opposite ends of the napkin.

In the sanitary napkin constructed as described above, the term "liquid-resistant sheet" means a liquid-impermeable or liquid permeation retardant sheet which may be air-permeable or air-impermeable. The topsheet is partially covered with a pair of such sheets so that, over the area thus covered with the pair of sheets, the user's skin may be effectively protected from being smeared with the quantity of menstrual discharge flowing back from the core.

The liquid-resistant sheet divided in two sheet sections defines together with the topsheet the pocket and the quantity of menstrual discharge flowing into the pocket is absorbed through the topsheet within the pocket by the core.

two. The liquid-resistant sheets 5 respectively have inner free edges 13 describing cut lines in waveforms along the center line X - X. The inner free edges 13 opposed to each other are spaced from each other by the maximum distance at the longitudinally middle zone and this distance gradually decreases toward the longitudinally opposite ends 9, 10 at which the liquid-resistant sheets 5 overlap each other. The inner free edges 13 thus spaced from each other function to expose the topsheet 2 so as to be in contact with only the user's vaginal opening and a limited zone in the proximity thereof. The liquid-resistant sheets 5 respectively cooperate with the topsheet 2 to form pockets 15 each opening toward the center line X - X, as shown by Fig. 2.

In the napkin 1 according to the foresaid embodiment, the topsheet 2 may be of a liquid-permeable nonwoven fabric or perforated plastic sheet and the backsheet 3 may be of a liquid-impermeable plastic film. The core 4 may be formed by fluff pulp or a mixture of fluff pulp and superabsorbent polymer powders. The liquid-resistant sheets 5 may be of a liquid-impermeable or liquid permeation retardant plastic film or nonwoven fabric and may be air-permeable or air-impermeable. Using suitably stretchable sheets as such liquid-resistant sheets 5 with a tension maintained

longitudinally of the napkin 1, the liquid-resistant sheets 5 contract as the napkin 1 is longitudinally curved toward the side of the backsheet 3. As a result, the pockets 15 shown by Fig. 2 are significantly opened.

With the napkin 1 put on the user's body, menstrual discharge or the other body fluids is partly absorbed through the exposed zone of the topsheet 2 by the core 4 and partly introduced into the pockets 15 from which it is absorbed by the core 4. Within the core 4, the quantity of menstrual discharged spreads longitudinally as well as transversely of the core 4. A body pressure exerted on the napkin 1 thus put on the user's body may cause the quantity of menstrual discharge once absorbed by the core 4 to flow back onto the upper side of the topsheet 2. However, the napkin 1 effectively eliminates an apprehension that the quantity of menstrual discharge possibly flowing back under the body pressure might smear the user's skin or cause an uncomfortable feeling of wetness, since the peripheral zone of the napkin 1 is covered with the liquid-resistant sheets 5. Unique arrangement such that the liquid-resistant sheets 5 overlap each other at the longitudinally opposite ends of the napkin 1 is particularly effective to prevent the quantity of menstrual discharge flowing back from further

exuding over the upper surface of the topsheet 2.

Referring to Fig. 3, during a step I, a continuous laminate including a continuous liquid-permeable topsheet 102, a continuous liquid-impermeable backsheet 103 and individual liquid-absorbent cores 104 disposed between these two continuous sheets 103, 104 so as to be longitudinally spaced one from another by a desired distance is fed by an endless belt 126.

During a step II, an original continuous liquid-resistant sheet 135 having a stretchability in length is longitudinally fed and divided by a cutter 136 oscillating transversely with respect to a center line of the original sheet 135 so as to describe a cut line defined by repeated substantially identical waveforms transversely in two sheet sections on both sides of the center line and thereby to obtain a pair of continuous liquid-resistant sheet sections 137.

During a step III, one of these two sheet sections 137 is fed with a delay corresponding to at least 1/2 pitch of the cut line relative to the other sheet section 137 and at least one of these two sheet sections 137 is spaced from the other sheet section 137 by a desired distance in a derection as indicated by an arrow Y while these two sheet sections 137

are longitudinally stretched by a desired percentage.

During a step IV, the sheet sections 137 thus stretched are fed onto the topsheet 102 of the laminate 125 and then a sealing machine 142 is used to bond the sheet sections 137 to the laminate 125 by the foresaid seal lines 6 extending along the peripheral edges of the individual cores 104.

During a step V, the laminate 125 and the sheet sections 137 having been bonded to the former are cut by a cutter 143 into the individual napkins 1.

Referring to Fig. 4, during the step II, the cutter 136 is oscillated transversely with respect to a center line C - C of the original sheet 135 so as to describe the cut line 140 substantially defined by a waveform and thereby to obtain right-hand and left-hand sheet sections 137A, 137B. During the step III, one of these two sheet sections 137A, 137B, for example, the sheet section 137B is fed with a delay corresponding to 1/2 pitch of the wafeform with respect to the other sheet section 137A while the sheet section 137B is parallelly moved leftward by a desired distance "d" to a position as indicated by 137B'. In this manner, the right-hand sheet section 137 and the left-hand sheet section 137B' are positioned symmetrically to each other with their corresponding troughs being opposed to each other and their

corresponding crests overlapping each other.

Referring to Fig. 5, the sheet sections 137A, 137B' are positioned so that their troughs defined by the cut line 140 may lie in a desired zone, typically in a zone of each core 104 which is substantially middle longitudinally as well as transversely of the core 104. Then these sheet sections are bonded to the topsheet 102 by the seal lines 6 along the peripheral edges of the respective cores 104.

Referring to Fig. 6, it is also possible to define the cut line 140 only by straight lines.

In the process for making the napkin 1, bonding of the various components may be achieved by using the technique of heat seal or by using adhesive such as hot melt adhesive. It is also possible to employ a non-stretchable sheet as material for the liquid-resistant sheet 5 and, in this case, the step of stretching the sheet can be eliminated.

In the sanitary napkin according to the invention, there is no apprehension that a quantity of menstrual discharge possible flowing back from the liquid-absorbent core might smear the user's skin and cause an uncomfortable feeling of wetness, because the topsheet is covered with the liquid-resistant sheet except the zone destined to be in contact with the user's vaginal opening and a zone extending

in the proximity thereof.

The method for making the napkin according to the invention can effectively avoid a wasteful use of material since the original sheet of liquid-resistant sheet is cut along the cut line oscillating transversely with the center line of the original sheet into the right-hand sheet section and the left-hand sheet section which cooperate together to used as the liquid-resistant sheet and therefore practically no portion of the original sheet must be wasted.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A sanitary napkin including

a liquid-permeable topsheet;

a liquid-impermeable backsheet;

a liquid-absorbent core disposed between said topsheet and said backsheet;

a pair of liquid-resistant sheets extending side by side longitudinally of said napkin, respective outer peripheral edges of said liquid-resistant sheets being bonded to an upper side of said napkin along longitudinally opposite ends and side edges of said napkin, respective inner edges of said pair of liquid-resistant sheets lying adjacent a center line dividing said napkin transversely in two to cover at least a peripheral zone of said topsheet, respectively, cooperating with said topsheet to form pockets each opening toward said center line and to expose a transversely middle zone of said topsheet, and said pair of liquid-resistant sheets being placed on the upper side of said napkin so that their inner edges leave a space therebetween larger at a longitudinally middle zone than at the longitudinally opposite ends of said napkin;

wherein said liquid-resistant sheets are formed with a single stretchable material and bonded to said topsheet in a condition stretched longitudinally thereof.

2. A sanitary napkin according to Claim 1, wherein said liquid-resistant sheets are formed with an air-permeable nonwoven fabric.

3. A sanitary napkin according to Claim 1, wherein said liquid-resistant sheets are formed with an air-permeable plastic film.

4. A sanitary napkin substantially as herein described with reference to the accompanying drawings.

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DATED: 5 November 1998
PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
UNI-CHARM CORPORATION

33177/95

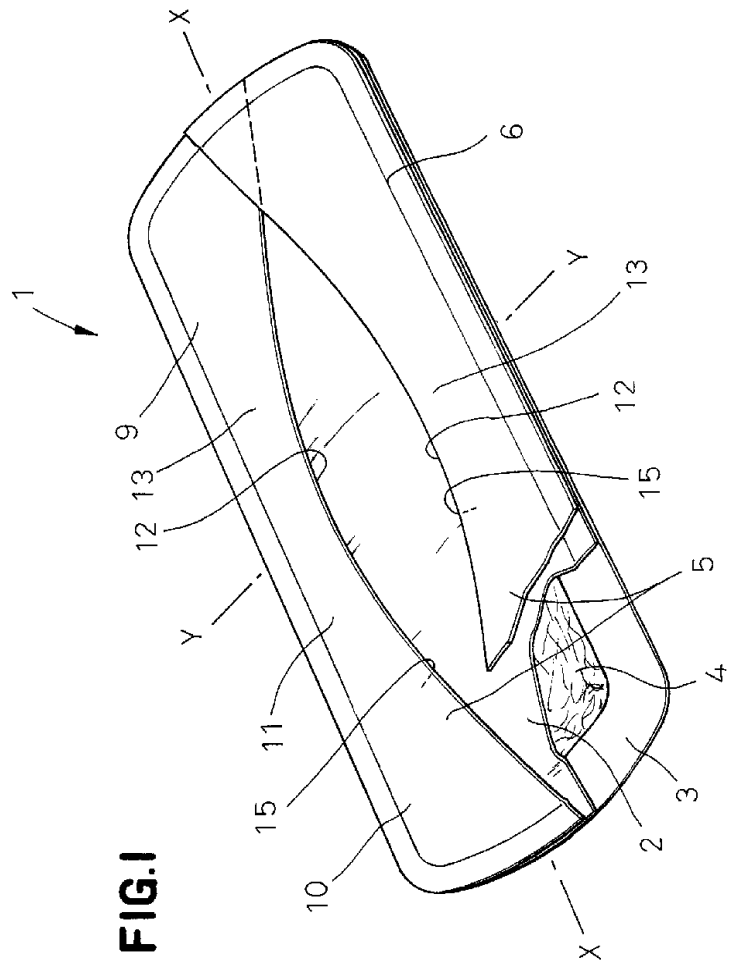

FIG.I

FIG.2

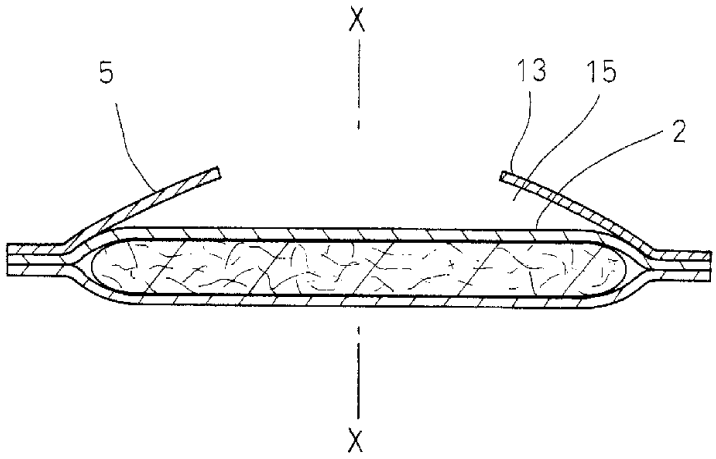

FIG.3

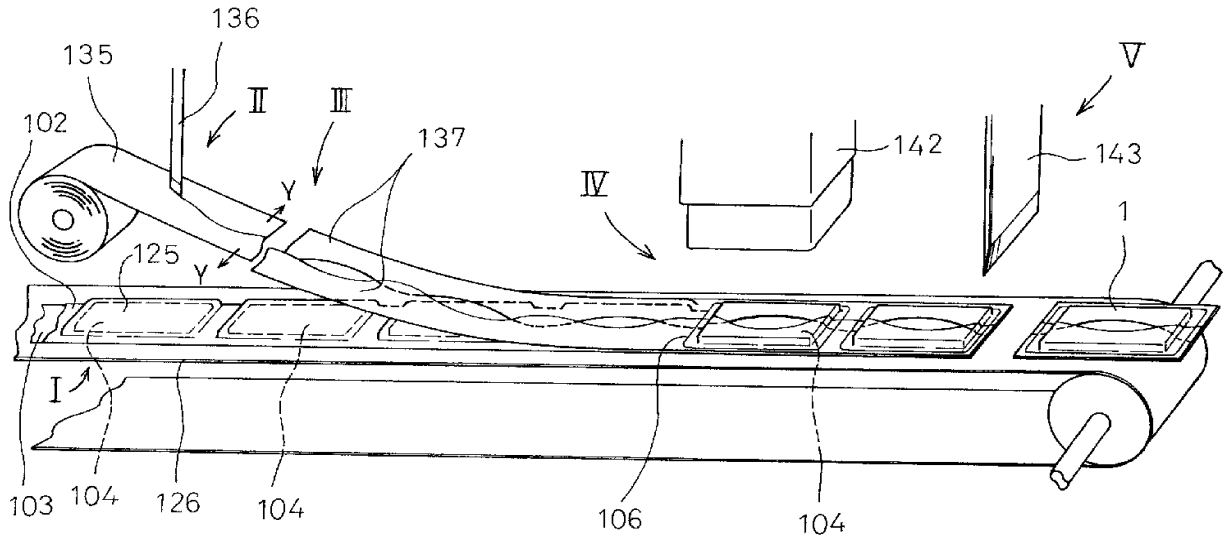

FIG.4

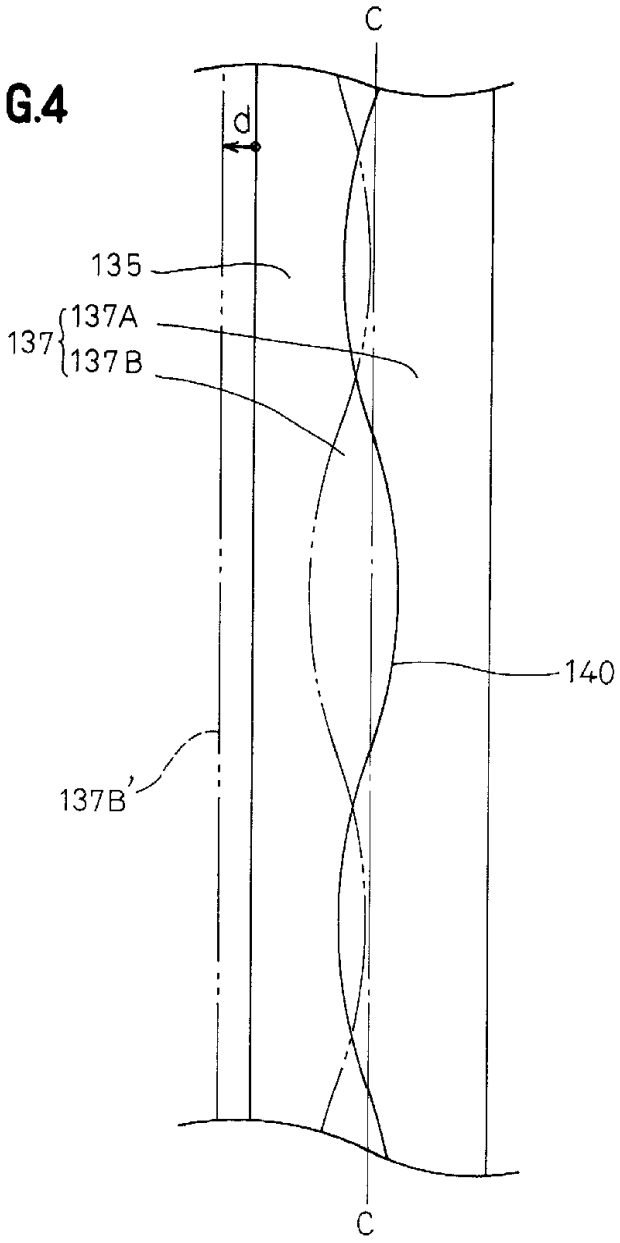

FIG.5

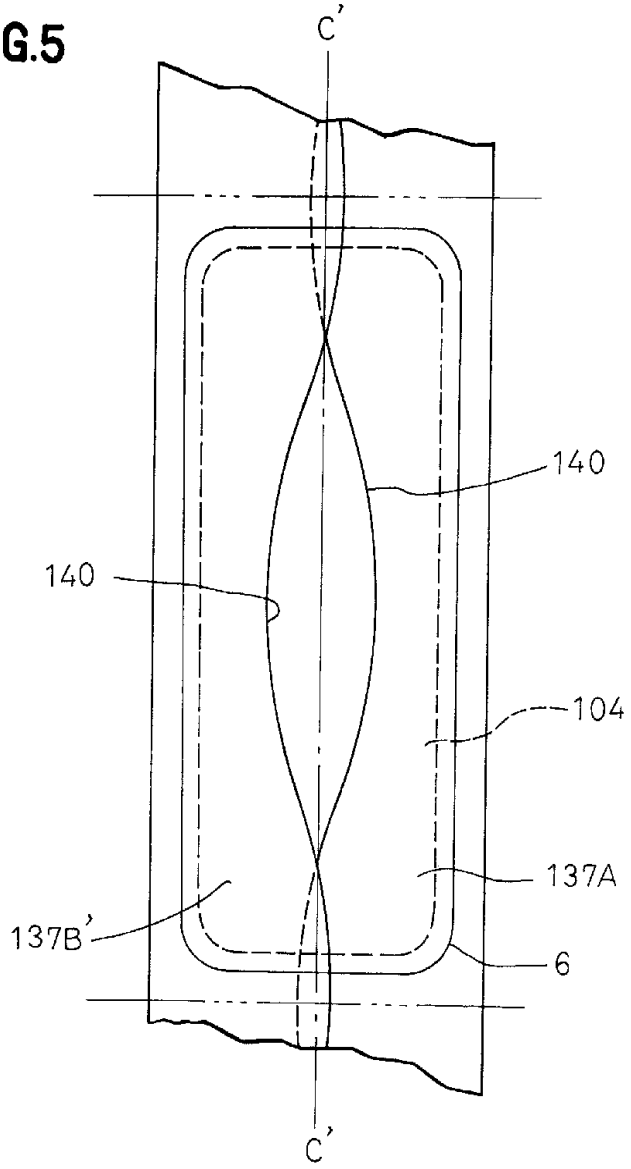

FIG.6