

- 1 -



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DISPOSABLE DIAPER

The present invention relates to disposable diapers for absorption and containment of excretions.

Japanese Patent Application Disclosure Gazette No. Hei8-322878 disclose a disposable diaper partitioned in a crotch region of the diaper into front and rear halves. According to this disclosure, loose fecal material discharged on a zone of the crotch region extending in the vicinity of a front waist region of the diaper is prevented from flowing forward and thereby the wearer's urinal organs is prevented from being soiled with the loose fecal material.

However, it is impossible for the diaper to intercept an amount of loose fecal material tending to flow toward a rear waist region of the diaper. The amount of loose fecal

-2-

material prevented from flowing forward correspondingly accelerates the loose fecal material to arrive at an end of the rear waist region and may often leak beyond the end of the rear waist region. This situation may occur particularly when the wearer is lying on his or her side.

In view of the problem as has been described above, it is an object of the present invention to provide a disposable diaper adapted to intercept the foregoing flow of loose fecal material, i.e., the flow of loose fecal material toward a rear waist region of the diaper.

According to the present invention, there is provided a disposable diaper having a front waist region, a rear waist region and a crotch region extending therebetween, the diaper comprising a liquid-pervious topsheet, a liquid-impervious

- 3 -

backsheet and a liquid-absorbent core disposed therebetween, wherein: the diaper is formed on an inner surface thereof approximately in a longitudinally rear half area thereof with a plurality of protuberances extending transversely across the rear half area and intermittently arranged longitudinally of the diaper.

According to an embodiment of the present invention, each of the protuberances has a height locally decreased so as to form a groove extending longitudinally of the diaper.

According to another embodiment of the present invention, the protuberances comprise an absorbent material and a liquid-pervious sheet covering the absorbent material.

According to still another embodiment of the present invention, the liquid-pervious sheet is the topsheet.

According to further another preferred embodiment of

-4-

the present invention, the protuberances comprise a sheet material configured so as to be risable up on the inner surface of the diaper.

Fig. 1 is a perspective view of a disposable diaper constructed according to one embodiment of the present invention having a partly cut away portion;

Fig. 2 is a perspective view of a section taken along a line C-C in Fig. 1;

Fig. 3 is a view similar to Fig. 1 of another embodiment of the present invention; and

Fig. 4 is a view similar to Fig. 2 of still another embodiment of the present invention.

Details of a disposable diaper according to the present

- 5 -

invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

Disposable diaper 1 shown by Fig. 1 in a perspective view having a partly cut away portion comprises a liquid-pervious topsheet 2, a liquid-impervious backsheet 3 and a liquid-absorbent core 4 disposed between these two sheets 2, 3, forming together a diaper basic structure 5. The basic structure 5 is longitudinally composed of a front waist region 6, a rear waist region 7 and a crotch region 8 extending between these two waist regions 6, 7. The topsheet 2 and the backsheet 3 extend outward beyond a peripheral edge of the core 4 and are placed upon and bonded to each other along their extensions so as to form longitudinally opposite ends 11, 12 and transversely opposite side edges 13, 13. Along the ends 11, 12, there are provided with elastic members 16, 17

-6-

extending circumferentially of the front and rear waist regions 6, 7, respectively, and along the side edges 13, 13, there are provided with elastic members 18, 18 extending around respective legs of a wearer. These elastic members 16, 17, 18, 18 are disposed between the topsheet 2 and the backsheet 3 and secured under appropriate tension to an inner surface of at least one of these two sheets 2, 3.

The basic structure 5 is formed on its inner surface approximately in its longitudinally rear half area with a plurality of protuberances 21 which extend transversely across the rear half area and are intermittently arranged longitudinally of the basic structure 5. The inner surface of the basic structure 5 is additionally formed along its transversely opposite side edges with a pair of barrier cuffs 22, respectively, extending longitudinally of the basic

-7-

structure 5. Each of the barrier cuffs 22 has its front and rear ends 23, 24 joined to the longitudinally opposite ends 11, 12 of the diaper 1 and a proximal edge zone 26 joined to the corresponding side edge 13 of the diaper 1. The barrier cuff 22 has a distal edge zone 27 lying to a center line C-C transversely dividing the diaper 1 in two and partially covers the inner surface as well as the protuberances 21 of the basic structure 5. It should be understood here that a portion 27A of the distal edge zone 27 lying adjacent the front end 23 is folded back away from the center line C-C onto the corresponding portion of the proximal edge zone 26 and joined thereto. The distal edge zone 27 is provided with an elastic member 28 longitudinally extending and secured thereto under appropriate tension. When the diaper 1 is longitudinally curved with its inner surface inside, the elastic member 28

- 8 -

contracts and consequently the distal edge zone 27 rises up on its inner surface. As a result, a channel 29 formed between the distal edge zone 27 and the inner surface of the basic structure 5 is opened inwardly of the diaper 1.

Fig. 2 is a perspective view of the diaper 1 taken along the line C-C in Fig. 1. The protuberances 21 comprise a first protuberance 41 formed by a liquid-pervious or liquid-impervious sheet and a plurality of second protuberances 42 formed by absorbent cores 43 covered with the topsheet 2 so that the topsheet 2 undulate above the core 4. The first protuberance 41 is risable up on the inner surface of the basic structure 5 and extends across the basic structure substantially in its middle. The first and second protuberances 41, 42 are successively spaced one from another longitudinally of the diaper 1.

- 9 -

The first protuberance 41 has its lower edge 47 joined to the topsheet 2 by means of hot melt adhesive 47 and its upper edge 48 provided with an elastic member 49 extending transversely of the diaper 1. The elastic member 49 is covered with the sheet forming the first protuberance 41 and secured to the sheet under appropriate tension. Between the first protuberance 41 and the inner surface of the basic structure 5, a channel 51 is formed, which is adapted to be opened rearwardly of the diaper 1. When the diaper 1 is transversely curved with its inner surface inside, the elastic member 49 contracts whereupon the first protuberance 41 rises up on the inner surface of the basic structure 5 and the channel 51 is opened as shown. A crest 52 of the first protuberance 41 may be joined to the inner surface of the barrier cuff 22 which covers the crest 52, if desired. In this case, the first

- 10 -

protuberance 41 necessarily rises up as the barrier cuff 22 rises.

The second protuberances 42 are formed by covering the corresponding number of cores 43 obtained by directly molding the core 4 of the basic structure 5 or by molding a suitable absorbent material separately of the core 4 with the topsheet 2. Figs. 1 and 2 show an embodiment in which the absorbent material is molded separately of the core 4 to obtain the cores 43. It is also possible to form the second protuberances 42 by covering the cores 43 molded separately of the core 4 with a liquid-pervious sheet provided separately of the topsheet 2 and then by joining this assembly to the inner surface of the diaper 1.

The diaper 1 constructed as has been described above may be put on the wearer's body with a pair of tape fasteners

- 11 -

56 attached to the side edges 13, 13 of the rear waist region 7 being anchored onto the front waist region 6. With such diaper 1, even if loose fecal material is discharged thereon, it is effectively prevented from flowing forward and thereby the wearer's urinary organs is protected from being soiled with the loose fecal material because the diaper 1 is partitioned by the first protuberance 41 into front and rear halves. An amount of loose fecal material tending to flow rearward, i.e., toward the back of the wearer is reliably intercepted by a plurality of second protuberances 42 and prevented from leaking beyond the rear end 12 of the diaper 1. With the protuberances 21 containing therein a suitable absorbent material as the second protuberances 42 are so in the case of this embodiment, not only interception of the loose fecal material tending to flow rearwardly of the diaper

- 12 -

1 but also absorption of water contained in the loose fecal material is achieved. In this manner, the effect of preventing the loose fecal material from leaking beyond the rear end 12 is further ensured.

Fig. 3 is a view similar to Fig. 1 showing another embodiment of the present invention. According to this embodiment of the diaper 1, the second protuberances 42 making a part of the protuberances 21 are formed with grooves 56 extending longitudinally of the diaper 1 by dimensioning a height of the respective protuberances 42 to be locally decreased. By permitting certain amount of the loose fecal material to flow rearwardly of the diaper 1 through the grooves 56, an effective area of the core 4 is enlarged over which an amount of water contained in the loose fecal material can be absorbed by the core 4. It is also possible to provide

- 13 -

each of the second protuberances 42 with a plurality of the grooves 56.

Fig. 4 is a view similar to Fig. 2 showing still another embodiment of the present invention. According to this specific embodiment of the diaper 1, the topsheet 2 is utilized to form a plurality of pleats extending transversely of the diaper 1 so that these pleats form the protuberances 21. Specifically, the topsheet 2 is successively folded on itself and bonded together to form the protuberances 21. Each of the protuberances 21 contains within its crest an elastic member 49 extending transversely of the diaper 1 and secured under appropriate tension to an inner surface of the crest.

According to the present invention, suitable adhesive agents such as hot melt adhesive or suitable glue may be used to bond the respective members together. For the

- 14 -

heat-sealable members, the heat-sealing technique may be used.

The most important feature of the disposable diaper according to the present invention lies in that the diaper is formed on its inner surface approximately in its rear half area with a plurality of protuberances which extend transversely across the rear half area and are longitudinally spaced one from another. Such a unique arrangement ensures that the loose fecal material discharged thereon can be prevented not only from flowing forward but also from leaking beyond the rear end of the diaper. The protuberances containing therein a suitable absorbent material can further improve the effect of preventing the loose fecal material from leaking beyond the rear end of the diaper.

WHAT IS CLAIMED IS:

1. A disposable diaper (1) having a front waist region (6), a rear waist region (7) and a crotch region (8) extending therebetween, said diaper (1) comprising a liquid-pervious topsheet (2), a liquid-impervious backsheet (3) and a liquid-absorbent core (4) disposed therebetween, wherein:

said diaper (1) is formed on an inner surface thereof approximately in a longitudinally rear half area thereof with a plurality of protuberances (21) extending transversely across said rear half area and intermittently arranged longitudinally of said diaper (1).

2. The diaper (1) according to Claim 1, wherein each of said protuberances (21) has a height locally decreased to form

a groove (56) extending longitudinally of the diaper (1).

3. The diaper (1) according to Claim 1, wherein said protuberances (21) comprise an absorbent material and a liquid-pervious sheet (2) covering said absorbent material.

4. The diaper (1) according to Claim 3, wherein said liquid-pervious sheet (2) is said topsheet.

5. The diaper (1) according to Claim 1, wherein said protuberances (21) comprise a sheet material configured so as to be risable up on said inner surface of said diaper (1).