

DISPOSABLE DIAPER PROVIDED WITH TAPE FASTENERS

The present invention relates to disposable diapers provided with tape fasteners used when the diaper is put on a wearer's body.

Conventional disposable diapers are provided with tape fasteners laterally extending from transversely opposite side edges of a rear waist region of the diaper so that the tape fasteners may be separably anchored on a front waist region of the diaper when the diaper is put on a wearer's body. A specific example of such a tape fastener comprises a basic tape member which is elastically stretchable and contractile circumferentially of the diaper. An end of the basic tape member on a side of the diaper is joined to a corresponding side edge of the diaper and an end of the basic tape member remote from the diaper carries thereon a hook member as one component of mechanical fasteners. To put the diaper on the wearer's body, the basic tape member is longitudinally stretched until said hook member can be engaged with a loop member attached to the front waist region as the other component of the mechanical fastener. In general, the hook member is of a rectangular shape.

With such elastic tape fastener, its basic tape member

9901683-4

20 APR 1999

This Sheet Has Been Replaced



-2-

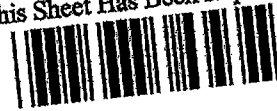
and possibly the hook member carried thereon tend to be transversely curved away from the diaper as said tape fastener is stretched in a direction of waist-line in order to anchor the tape fastener to the front waist region. If the hook member also is curved together with the basic tape member, the hook member will be curved away from the surface of the loop member to be engage the hook member and make reliable engagement with the loop member difficult. In other words, an effective surface area of the hook member will become substantially smaller than its actual surface area. As a result, a desired high fastening effect can not be obtained even if the hook member of a relatively large size is employed.

In view of the problem as has been pointed out, it is an object of the present invention to utilize an available surface area of the hook member attached to the elastic tape fastener as efficiently as possible.

According to the invention, there is provided a disposable diaper comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between the topsheet and the backsheet, longitudinally opposite ends extending in parallel to each

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



-3-

other in a direction of waist-line and transversely opposite side edges extending in parallel to each other, a pair of tape fasteners extending outwards from the side edges, respectively, in the direction of waist-line, wherein: each of the tape fasteners has a basic tape member which is elastically stretchable/contractile in the direction of waist-line and a hook member; the basic tape member has a longitudinal direction extending in parallel to the direction of waist-line and a transverse direction being orthogonal to the direction of waist-line, the basic tape member including, in the longitudinal direction, a proximal end portion joined to one of the side edges of the diaper and a distal end portion opposed to the proximal end portion, and the hook member is attached to the basic tape member on an inner surface of the distal end portion so as to be spaced from the proximal end portion and has inner and outer side edges extending transversely of the basic tape member, and the inner side edge extends towards the proximal end portion in a transversely middle zone of the basic tape member.

Fig. 1 is a perspective view showing a disposable diaper arranged according to one embodiment of the present invention as partially broken away;

THIS SHEET HAS BEEN
REPLACED

Fig. 2 is a diagram showing a part of Fig. 1 in an enlarged scale;

Fig. 3 is a sectional view taken along line C-C in Fig. 2; and

Fig. 4 is a sectional view taken along a line IV-IV in Fig. 1.

Details of a disposable diaper provided with a tape fasteners according to the present invention will be more fully understood from the description given hereunder with reference to the accompanying drawings.

Disposable diaper 1 provided with tape fasteners shown by Fig. 1 in a perspective view as partially broken away comprises a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core 4 disposed between the topsheet 2 and the backsheet 3. Configurationally, the diaper 1 has a front waist region 6, a rear waist region 7 and a crotch region 8 extending between the front and rear waist regions 6, 7.

The topsheet 2 and the backsheet 3 are placed upon each other and bonded together over their portions extending outwards beyond a peripheral edge of the core 4 so as to define longitudinally opposite ends 11, 12 extending in a

direction of waist-line and transversely opposite side edges 13, 13 extending transversely of said ends 11, 12. The rear end 12 and the side edges 13, 13 are respectively provided with an elastic member 14 associated with a waist-opening and elastic members 16, 16 associated with a pair of leg-openings. The elastic members 14, 16, 16 are disposed between the topsheet 2 and the backsheet 3 and bonded under appropriate tension to an inner surface of at least one of the topsheet 2 and the backsheet 3. A pair of tape fasteners 21, 21 extending laterally from the side edges 13, 13, respectively. The fasteners 21 may be separably anchored to an outer surface of the front waist region 6 when the diaper 1 is put on the wearer's body.

Fig. 2 is a fragmentary plan view showing details of the tape fastener 21 and Fig. 3 is a sectional view taken along center line C-C dividing the fastener 21 in upper and lower halves as viewed in Fig. 2. The fastener 21 comprises a basic tape member 22 being elastically stretchable/contractile in the direction of waist-line, a hook member 23 forming a part of the known mechanical fasteners which further includes a loop member as a counterpart, and an inelastic sheet member 24.

The basic tape member 22 has a longitudinal direction

which is parallel to the direction of waist-line and a transverse direction which is orthogonal to the direction of waist-line. The basic tape member 22 extends from its proximal end portion 26 joined to at least one of the topsheet 2 and the backsheet 3 to its distal end portion 27 opposed to the proximal end portion 26. The basic tape member 22 has an elastically stretchable/contractile zone 28 adjacent the side edge 13 and upper and lower edges 31, 32 extending in parallel to each other in the direction of waist-line.

The hook member 23 is attached to an inner surface of the basic tape member 22 slightly spaced inwards from the distal end portion 27 so as to extend between the upper and lower edges 31, 32. The hook member 23 has an inner edge 33 adjacent the proximal end portion 26 of the basic tape member 22 and an outer edge 34 remote from the proximal end portion 26. The inner edge 33 describes, in vicinity of the center line C-C, a curve which extends towards the proximal end portion 26 relative to the remaining zones adjacent the upper and lower edges 31, 32, respectively. The zone 28 in which the basic tape member 22 is elastically stretchable/contractile in the direction of waist-line is defined between the inner edge 33 and the proximal end

portion 26. According to this specific embodiment, the outer edge 34 extends transversely of the basic tape member 22 substantially in a vertical direction as viewed in Fig. 2.

The inelastic sheet member 24 is disposed between the basic tape member 22 and the hook member 23 in the direction of fastener's thickness and partially covers the inner surface of the distal end portion 27. The sheet member 24 has its inner edge lying in coincidence with the inner edge of the hook member 23 and its outer edge extending outwards beyond the outer edge of the hook member 23 to the distal end portion 27 of the basic tape member 22 so as to be placed thereupon with a same shape as the distal end portion 27. The inelastic sheet member 24 partially rigidifies the distal end portion 27 of the basic tape member 22 and thereby facilitates the hook member 23 to be anchored to the loop member (not shown) on the front waist region 6. Additionally, the sheet member 24 makes an outermost region of the distal end portion 27 inelastic and thereby facilitates the tape fastener 21 to be held between the wearer's or helper's fingers of a wearer or an assisting person. It should be understood that the present invention can be exploited also without use of such inelastic sheet member 24 if the above-mentioned functions and/or effects

provided by the inelastic sheet member 24 are not required for the tape fastener 21.

Fig. 4 is a sectional view taken along line IV-IV in Fig. 1. As represented by imaginary lines, the basic tape member 22 is curved outwardly of the diaper 1 as the flat tape fastener 21 is stretched in the direction of waist-line. However, the hook member 23 is substantially free from affection of the basic tape member 22 being curved in such a manner and remains flat, because the inner edge 33 of the hook member 23 is present only in proximity of the center line C-C.

With the tape fastener 21 for the disposable diaper as has been described hereinabove, the hook member 23 is shaped so that most of its surface area is concentrated in vicinity of the center line C-C. Such an arrangement is advantageous in that, even if the elastic basic tape member 22 is stretched in the direction of waist-line and consequently curved transversely away from the diaper 1 as shown in Fig. 4, the hook member 23 can be maintained flat over most of its surface area and easily as well as accurately anchored to the loop member. The hook member 23 is preferably arranged so that 60 ~ 80% of its surface area is present in ranges of 25% of a full width of the tape fastener 21 above and below of

the center line C-C, respectively. Corners 30 (See Fig. 2) of the hook member 23 preferably describe circular arcs with a radius of 0.5 ~ 5 mm in order that these corners 30 should not stimulate the wearer's skin. While the hook member 23 as a whole is preferably laminated with the basic tape member 22 as in the embodiment shown, it is also possible to laminate the inner edge 33 and the zone in vicinity thereof with the basic tape member 22 leaving the outer edge 34 free, if it is unnecessary to laminate the hook member 23 entirely with the basic tape member 22.

To assemble the diaper 1, joining or bonding of the respective members may be achieved using an adhesive agent such as hot melt adhesive or glue. For the members made of heat-sealable materials, it is also possible to utilize the heat-sealing technique for the joining or bonding.

The disposable diaper according to the present invention allows the hook member to be easily and accurately anchored to the loop member even if the elastically stretchable/contractile fastener is transversely curved away from the diaper as the fastener is stretched in the direction of waist-line. This is achieved by the unique arrangement of the hook member such that its inner edge extends towards the proximal end portion of the fastener in vicinity of the

-10-

transversely middle zone of the fastener.



WHAT IS CLAIMED IS:



1. A disposable diaper comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between said topsheet and said backsheet, longitudinally opposite ends extending in parallel to each other in a direction of waist-line and transversely opposite side edges extending in parallel to each other, and a pair of tape fasteners extending outwards from said side edges, respectively, in said direction of waist-line, wherein:

each of said tape fasteners has a basic tape member which is elastically stretchable/contractile in said direction of waist-line and a hook member;

said basic tape member has a longitudinal direction extending in parallel to said direction of waist-line and a transverse direction being orthogonal to said direction of waist-line, said basic tape member having in said longitudinal direction, a proximal end portion joined to one of the side edges of said diaper and a distal end portion opposed to said proximal end portion; and

said hook member is attached to said basic tape member on an inner surface of said distal end portion so as to be



This Sheet Has Been Replaced



-12-

spaced from said proximal end portion and has inner and outer side edges extending transversely of said basic tape member, and said inner side edge extends towards said proximal end portion in a transversely middle zone of said basic tape member.

2. A disposable diaper according to Claim 1, wherein said basic tape member is elastically stretchable/contractile in said direction of waist-line.

3. A disposable diaper according to Claim 1, wherein an inelastic sheet member is disposed between said basic tape member and said hook member and covers the inner surface of said distal end portion.

THIS SHEET HAS BEEN
REPLACED