

DISPOSABLE DIAPER

This invention relates to a disposable diaper having front and rear waist regions adapted to be releasably fastened together along their transversely opposite side edges.

There has already been available the disposable diaper of open type having the front and rear waist regions placed one upon another along their transversely opposite sides on which the mutually cooperating fastener means are provided so that said mutually cooperating fastener means may be releasably engaged with each other in actual use of the diaper. For example, Japanese Utility Model Application Disclosure Gazette No. 1991-107917 discloses the disposable diaper in which the transversely opposite side flaps of the front waist region are respectively provided with upper and lower fastener tape strips. With such disposable diaper of well known art, the front and rear waist regions can be fastened together along each of the opposite side edges over a wide range in the vertical direction and thereby the diaper can be fastened more reliably to the wearer's body than in the case of the diaper having a single fastener means on each of the side edges.

However, a person putting the such diaper on a baby or a patient has sometimes experienced a trouble in handling the diaper because the fastener means separated into the upper and lower fastener portions by a relatively large space must be brought in engagement with the corresponding fastener portions on the other waist region.

In view of the problem as has been described above, it is a principal object of the invention to provide a disposable diaper so improved that fastener means formed one of front and rear waist regions and separated into upper and lower fastener portions can be brought by a helping person in engagement with corresponding fastener portions provided on the other waist region at once with his or her finger tips never touching the functional surfaces of the fastener portions.

The object set forth above is achieved, according to the invention, by a disposable diaper comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core and structurally composed of a front waist region, a rear waist region and a crotch region extending longitudinally between said front and rear waist regions, said front and rear waist regions being placed one

upon another along their transversely opposite side edges, and mutually cooperating fastener means formed on side flaps defined adjacent the respective side edges of said front and rear waist regions so as to be releasably engaged with each other, said disposable diaper being characterized by that fastener member forming a part of said mutually cooperating fastener means formed on the inner surface of each said side flap is vertically separated into upper and lower fastener sub-members by a non-fastened tab zone defined by a vertical dimension of at least 10 - 30 mm along its side to the outermost edge of said side flap and a circumferential dimension of at least 5 mm and a region comprising a zone surrounding said fastener sub-members with a width of 2 - 10 mm and said tab zone has a rigidity of 1 - 50 g as determined by a handle-o-meter.

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

Fig. 2 is a sectional view taken along a line II - II in Fig. 1; and

Fig. 3 is a scale-enlarged plan view showing a side flap in another embodiment of the invention.

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

The disposable diaper shown by Fig. 1 in a perspective view as partially broken away comprises a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed between these two sheets 2, 3. Structurally, the diaper is longitudinally composed of a front waist region 6, a rear waist region 7 and a crotch region 8 extending between said two regions 6, 7. The top- and backsheets 2, 3 are placed one upon another and bonded together over their portions extending outward beyond a peripheral edge of the core 4 so as to form longitudinally opposite end flaps 11, 12 and transversely opposite side flaps 13, 14 of said front and rear waist regions 6, 7, respectively, and a pair of leg-surrounding flaps 16, of said crotch region 8. The end flap 12 of the rear waist region 7 and the respective leg-surrounding flaps 16 of the crotch region 8 are provided with a waist line elastic member 17 and leg-surrounding elastic members 18, respectively. These elastic members 17, 18 are disposed between the top- and backsheets 2, 3 and bonded with appropriate tensions to the inner surface of at least one of these two sheets 2, 3. The

side flaps 13 of the front waist region 6 are provided on the outer surface of the backsheet 3 with female members 21 of the mechanical fastener commonly known under the trade name of Magic Tape or Velcro. The side flaps 14 of the rear waist region 7 are provided their inner sides with male members 22 of said mechanical fastener. To put the diaper on wearer's body, the side flaps 14 of the rear waist region 7 may be placed on the corresponding side flaps 13 of the front waist region 6 from outside in a direction as indicated by an arrow Y so that said male members 22 may be engaged with the corresponding female members 21.

In the respective side flaps 14 of the rear waist region 7, reinforcing sheets 23 are bonded to the inner surface of the topsheet 2. Each of these reinforcing sheets 23 is provided on its inner surface with an upper male sub-member 22A and a lower male sub-member 22B forming together said male member 22 which are aligned with each other on a line extending vertically of this side flap 14. The upper and lower male sub-members 22A, 22B comprise rectangular strips each defined by a circumferential length W of 5 ~ 50 mm and a vertical length L of 5 ~ 50 mm. The upper and lower male sub-members 22A, 22B are vertically spaced from each other by a distance D of 10 ~ 30 mm and spaced inward from

the peripheral edge of the associated reinforcing sheet 23. A region defined between the upper and lower male sub-members 22A, 22B by said dimensions W and D serves as a part of a tab region to be held by fingers of a person helping diaper wearer with his or her one finger tip put against said part when the side flap 14 is held so as to fasten the male member 22 to the corresponding female member 21. Referring to Fig. 1, imaginary lines indicate three fingers 26, 27, 28 of said helper holding one of said side flaps 14.

Fig. 2 is a sectional view taken along a line II - II in Fig. 1, wherein the side flap 14 is held by the helper's fingers 26, 27, 28 and the female member 21 is indicated by imaginary lines. Assumed that said fingers 26, 27, 28 are the thumb, the forefinger and the middle finger, the bulb of the thumb may be put against the inner surface of the side flap 14 between the upper and lower male sub-members 22A and 22B while the respective bulbs of the forefinger 27 and the middle finger 28 may be put against the outer surface of said flap 14 to press said upper and lower male sub-members 22A, 22B from their rear sides. Then, said upper and lower male sub-members 22A, 22B may be pressed against the female member 21 to bring these two male sub-members 22A, 22B in engagement with the female member 21 at once. Troublesome handling of

the diaper required to bring said two male sub-members 22A, 22B separately in engagement with said female member 21 is thus eliminated and correspondingly a time taken to put the diaper on the wearer's body.

The reinforcing sheet 23 serves to reinforce the side flap 14 so that the side flap 14 can stand repeated engagement and disengagement occurring between the female member 21 and the male member 22. At the same time, the reinforcing sheet 23 makes the male member 22 sufficiently rigid to ensure that the flap 14 can be easily held and pressed against the female member 21 with said flap 14 being maintained to be vertically oriented in flat or slightly convex state, as will be seen in Fig. 2. Generally, soft sheets of agreeable touch are employed as materials for the top- and backsheets 2, 3, so the side flaps 14 comprising such materials are relatively soft and it is sometimes difficult for the helper to hold these flaps 14 in flat state as seen in Fig. 2. The sheet 23 is useful to solve this problem. Preferably, a reinforcing effect of the sheet 23 is adjusted so that, once the sheet 23 has been bonded to the flap 14, a rigidity in a region defined around the upper and lower male sub-members 22A, 22B with a width of 2 ~ 10 mm as well as between these two male sub-members 22A, 22B so as to

receive the finger tip is higher than a rigidity in a region extending around the first-mentioned region but lower than a rigidity in regions occupied by said upper and lower male sub-members 22A, 22B, respectively. In this case, the rigidity value in the first-mentioned region defined around the upper and lower male sub-members 22A, 22B as well as between these two male sub-members 22A, 22B should be preferably 1 ~ 50 g as determined by the handle-o-meter. With such arrangement and dimensioning, there is no apprehension that the region of relatively high rigidity might disagreeably stimulate the wearer's skin since the region of relatively high rigidity is surrounded by the region of relatively low rigidity. The reinforcing sheet 23 may be made of various sheet-like materials such as nonwoven fabric, woven fabric, plastic film and paper. The reinforcing sheet 23 may be bonded to the outer surface of the backsheet 3 or disposed between the top- and backsheets 2, 3 and bonded to the inner surface of at least one of these top- and backsheets 2, 3. Determination of the rigidity value by the handle-o-meter is specified by "J. TAPPI paper & pulp testing method" issued from PAPER & PULP TECHNICAL SOCIETY.

The respective opposite edges 13, 14 of the front and

rear waist regions placed one upon another may be fastened together by using suitable adhesive instead of using the mechanical fasteners as used in the illustrated embodiment. For example, the upper and lower male sub-members 22A, 22B may be replaced by sheets of plastic film coated with suitable adhesive to bond them to the reinforcing sheet 23, on one hand, and the female member 21 may be replaced by a sheet of plastic sheet coated with suitable release agent. It should be understood that, when the sheets of film coated with adhesive are employed, their material as well as thickness must be selected so as to improve the rigidity in the region occupied by these sheets of film just as in the case of the male sub-members 22A, 22B.

Fig. 3 is a scaled-enlarged plan view showing the side flap 14 in a variant of the invention. According to this variant, the upper and lower male sub-members 22A, 22B are continuous with each other via an intermediate portion 31 at their sides to the longitudinally center line (not shown) of the diaper along which the diaper is divided into right and left halves. At their sides to the outermost edge 14A of the flap 14, an outer edge 31A of said intermediate portion 31 is curved inward by 5 mm or more with respect to outer edges 32A, 32B of the upper and lower male sub-members 22A, 22B as

indicated by a dimension line B. In a zone defined by said curved portion opening toward the outermost edge 14A of the flap 14, the upper and lower male sub-members 22A, 22B are spaced from each other by 10 ~ 30 mm as indicated by a dimension line A. A zone left by said curved portion is a non-fastened zone in which the reinforcing sheet 23 is exposed. Said non-fastened zone may be used as a part of the tab against which the thumb of the helper is placed to hold the side flap 14. With the male member 22 of relatively high rigidity, such arrangement will further facilitate the male member 22 to be engaged with the female member 21 than in the cases as shown by Figs. 1 and 2.

According to the invention, bonding of the respective members may be achieved, in addition to use of suitable adhesive such as hot melt adhesive, by use of heat-sealing technique.

The disposable diaper according to the invention effectively saves a time taken to put the diaper on the wearer's body since the helper can fasten the upper and lower fastening sub-members provided on each side flap of the diaper to the complementary fastening member at once. Such time saving effect advantageously alleviates the helpers' labor working in hospital, nursery school, home for the aged

or the like in which the helpers are required to help a plurality of babies, patients or the aged people being unable to leave their beds to wear and take off the diapers within a relatively short time. Additionally, the helper is able to handle the diaper without any apprehension that his or her finger tips might be injured since the helper need not touch the functional portions of the fasteners.



WHAT IS CLAIMED IS:

1. Disposable diaper comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between these two sheets and structurally composed of a front waist region, a rear waist region and a crotch region extending longitudinally between said front and rear waist regions, said front and rear waist regions being placed one upon another along their transversely opposite side edges, and mutually cooperating fastener means formed on side flaps defined adjacent the respective side edges of said front and rear waist regions so as to be releasably engaged with each other, said disposable diaper being characterized by that:

fastener member forming a part of said mutually cooperating fastener means formed on the inner surface of each said side flap is vertically separated into upper and lower fastener sub-members by a non-fastened tab zone defined by a vertical dimension of at least 10 - 30 mm along its side to the outermost edge of said side flap and a circumferential dimension of at least 5 mm and a region comprising a zone surrounding said fastener sub-members with a width of 2 - 10 mm and said tab zone has a rigidity of 1 - 50 g as determined



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by a handle-o-meter.

2. Disposable diaper according to Claim 1, wherein said fastener sub-members, a first region comprising said zone surrounding said fastener sub-members with the width of 2 - 10 mm and said tab zone, and a second region surrounding said first region have their rigidities decreasing in the order of said fastener sub-member, said first region and said second region.