

DISPOSABLE DIAPER ✓

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This invention relates to disposable diapers for absorbing and containing of urine and other body exudates and, more particularly, to such disposable diapers of so-called open type or so-called pull-on type.

In disposable diapers generally comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent member disposed between these two sheets, both diapers of so-called open type and diapers of so-called pull-on type are well known in the art. The former is hourglass-shaped as viewed in its plan view and has front and rear waist regions adapted to be separably connected together along their transversely opposite side edges. The latter, on the other hand, has front and rear waist regions adapted to be separably or inseparably connected together along their transversely opposite side edges. In these known diapers, at least one of the front and rear waist regions is provided along its longitudinal end with elastically stretchable members extending circumferentially of the waist regions. The purpose of this elastic stretchable members is to avoid slip-down of the diaper during its use and to improve a fitting of the absorbent member to the wearer's body.

Additionally, the waist regions are provided in their vertically middle level with auxiliary elastically stretchable members circumferentially extending and bonded thereto under appropriate tension. The leg-openings are also provided along their peripheral edges with elastically stretchable members.

With the above known diaper including the elastically stretchable members around the waist-opening and the leg-openings as well as at the vertically middle level of the waist region(s), a good fitting of the diaper to the wearer's body is be effective to avoid leakage of excretion but the interior of the diaper readily become stuffy.

In view of the problem as described above, it is a primary object of the invention to provide a disposable diaper so improved to minimize excretion leakage and to prevent the interior of the diaper from becoming stuffy.

In a disposable diaper comprising a cover member having a front waist region, a rear waist region and a crotch region extending between the front and rear waist region, transversely opposite side edges of the crotch region being curved inwardly so that the sheet-like cover member presents an hourglass-shape as said front waist region, rear waist

region and crotch region are developed in a flat state, and a liquid-absorbent member composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, the liquid-absorbent member extending on the inner surface of the cover member from the crotch region toward the front and rear waist regions; the improvement comprising: the cover member having an elastic stretchability circumferentially of the waist regions along the longitudinal end of at least one of the front and rear waist regions, transversely opposite side edges of the front and rear waist regions being connected or connectable to each other; and the liquid-absorbent member including elastically stretchable members circumferentially extending under appropriate tension across portions of the front and rear waist regions lying immediately above the curved crotch region and longitudinally opposite ends of the respective elastically stretchable members being bonded to transversely opposite side edges of the respective waist regions, the elastically stretchable members being substantially connected to each other so as to form a continuous loop.

Preferably, the cover member is made of a nonwoven fabric having an elastic stretchability circumferentially of

the waist regions.

According to another embodiment, the cover member presents a configuration of a so-called shorts type in which the respective transversely opposite side edges of the front and rear waist regions are separably or inseparably connected to each other.

According to still another embodiment, the cover member is provided at the transversely opposite side edges or the front and rear waist regions with means adapted to be releasably fastened one to another.

Fig. 1 is a perspective view of a partly cutaway disposable diaper according to the invention;

Fig. 2 is a plan view of the partly cutaway disposable diaper in its unfolded state;

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

Fig. 4 is a plan view of the partly cutaway disposable diaper as a variant of the invention.

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

A disposable diaper shown by Fig. 1 in a perspective view as partially broken away basically comprises a cover member 2 shaped in shorts and an absorbent member 3 laid inside the cover member 2. The cover member 2 is made of a nonwoven fabric and composed of a front waist region 6, a rear waist region 7 and a crotch region 8 extending between these front and rear waist regions 6, 7. The front and rear waist regions 6, 7 are put flat together along their transversely opposite side edges 11, 12 which are bonded together at bonded spots 13 intermittently arranged in the vertical direction of each side edge 11, 12. The cover member 2 has a waist-opening 16 and a pair of leg-openings 17. An elastically stretchable member 18 is bonded under appropriate tension around the waist-opening 16 adjacent a peripheral edge of the waist-opening 16.

The liquid-absorbent member 3 has a laminate pad 25 comprising a liquid-permeable topsheet 22, a liquid-impermeable backsheet 23 and a liquid-absorbent core 24 disposed between these two sheets 22, 23. The laminate pad 25 extends from the crotch region 8 of the cover member 2 toward the front and rear waist regions 6, 7, respectively. In the zones of the front and rear waist regions lying immediately above the leg-openings 17 making a part of the

crotch region 8, the liquid-absorbent member 3 includes first and second belt-like elastically stretchable members 26, 27 extending circumferentially of the waist regions from transversely opposite side edges of the laminate panel 25.

Figs. 2 and 3 are respectively a plan view showing the diaper longitudinally unfolded by separating the front and rear waist regions 6, 7 of the cover member 2 illustrated in Fig. 1 to be connected along the bonded spots 13 as partially broken away and a sectional view of this diaper taken along a line III - III in Fig. 2. The laminate panel 25 of the liquid-absorbent member 3 has a shape of longitudinally larger rectangle defined by longitudinally opposite ends 31, 32 and transversely opposite side edges 33, 34. The topsheet 22 and the backsheet 23 of the laminate panel 25 are placed one upon another and bonded together by means of hot melt adhesive (not shown) along their portions extending outward beyond the peripheral edges of the rectangular liquid-absorbent core 24. The backsheet 23 extends laterally beyond the side edges of the topsheet 22 and these extensions are folded along transversely opposite side edges 33, 34 of the laminate panel 25 inwardly of the laminate panel 25 so as to form barrier flaps 36, 37. Longitudinally opposite ends 36A, 36B; 37A, 37B of the respective flaps 36, 37 are bonded to

the topsheet 22 by means of hot melt adhesive (not shown). Elastically stretchable members 38, 39 are inserted under appropriate tension into sleeve-like portions 36D, 37D formed by respective inner side edges 36C, 37C of the barrier flaps 36, 37 and extending longitudinally of the barrier flaps 36, 37. These elastically stretchable members 38, 39 have their opposite ends (not shown) bonded to the longitudinally opposite ends 36A, 36B; 37A, 37B of the respective barrier flaps 36, 37. In the state of the diaper as shown by Fig. 1, the elastically stretchable members 38, 39 contract and consequently pockets 41, 42 are formed between the respective flaps 36, 37 and the topsheet 22 are forced to open inwardly of the laminate panel 25.

The first and second elastically stretchable members 26, 27 of the liquid-absorbent member 3 are normally under tension circumferentially of the waist regions and have their opposite ends 43, 44, 46, 47 bonded by means of hot melt adhesive (not shown) to the inner surface of the cover member 2 at transversely opposite side edges of the cover member 2. Longitudinally middle portions of the first and second elastically stretchable members 26, 27 are bonded the outer surface of the backsheet 23 by means of hot melt adhesive 51. The first and second elastically stretchable members 26, 27

are at the same distance from a center line dividing the diaper in right and left halves so that, when the diaper is risen as shown in Fig. 1, the ends 43, 46 and the ends 44, 47 are substantially connected together, respectively, to form a substantially continuous loop.

With such diaper put on the wearer's body, the elastically stretchable member 18 associated with the waist-opening is tightly placed against the upper region of the wearer's belly while the first and second elastically stretchable members 26, 27 are tightly placed against the lower region of the wearer's belly. In consequence, even if the elastically stretchable member 18 associated with the waist-opening slips down beyond the bulge of the belly, the first and second elastically stretchable members 26, 27 can prevent the liquid-absorbent member 3 from slipping down.

The laminate panel 25 of the liquid-absorbent member 3 may be formed as compact as possible without decrease in its body fluids absorbing capacity to assure that the area over which it contacts with the wearer's body is sufficiently reduced to avoid a stiffness experienced by the wearer. Such compact laminate panel 25 is covered with the cover member 2 so that the wearer's hand might not contact and move the laminate pad 25 from its proper placement. The cover

member 2 may have a size and appearance adapted to ensure a breathable gap between the wearer's body and the cover member 2, on one hand, and to ensure a good appearance like the ordinary clothes. However, the cover member 2 is not limited to the embodiment as has been described and illustrated. For example, a sheet having an elasticity circumferentially of the waist regions may be employed for the cover member 2 so as to place the cover member 2 tightly against the wearer's body. It is also possible to modify the embodiment described hereinabove so that the first and second elastically stretchable members 26, 27 extend between the side edges 33, 34 of the laminate panel 25 and the respective side edges of the cover member 2 and thereby the intermediate sections 48, 34 can be eliminated. In this way, the first and second elastically stretchable members 26, 27 can be shortened. Also in this case, the first and second elastically stretchable members 26, 27 cooperates with the laminate panel 25 to form a loop.

Fig. 4 is a plan view showing a variant of the disposable diaper according to the invention. Differing from the diaper shown by Figs. 1 and 2, here is shown the diaper of a so-called open type. The cover member 2 presents a hourglass-shape and tape fasteners 51 extend laterally from

transversely opposite side edges of the rear waist region 7. Each of the fasteners 51 is provided at its distal end with a hook member 52 of the mechanical fastener known by the trademark of VELCRO, etc. To wear the diaper, the respective hook members 52 may be anchored on the associated loop members (not shown) of the mechanical fastener provided on the outer surface of transversely opposite side edges of the front waist region 6 so as to connect the front and rear waist regions to each other. Each of the loop members may extend to the middle of the front waist region 6 if desired to enlarge an area in which the hook member can be anchored.

To implement the invention, a nonwoven fabric, a plastic sheet, a rubber sheet or the like may be used, in addition to the nonwoven fabric, as material for the cover member 2. The topsheet 22 of the liquid-absorbent member 3 may be formed by nonwoven fabric, a porous plastic sheet or the like and the backsheet 23 may be formed by a plastic sheet, a rubber sheet or the like. The liquid-absorbent core 24 may be formed by a fluff pulp or a mixture of fluff pulp and polymer of high absorptivity.

The disposable diaper according to the invention allows at least the liquid-absorbent member to be formed as compact as possible so that the cover member as well as the liquid-

absorbent member closely contacting the wearer's body over an excessively large area do not cause uncomfortable stuffiness. The size and shape of the cover member used to cover the liquid-absorbent member can be selected to maintain a breathable gap between the cover member and the wearer's body. In this manner, the invention provides a comfortable disposable diaper by minimizing a possibility that the diaper become stuffy.



WHAT IS CLAIMED IS:

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1. In a disposable diaper comprising a cover member having a front waist region, a rear waist region and a crotch region extending therebetween, transversely opposite side edges of said crotch region being curved inwardly so that said cover member presents an hourglass-shape as said front waist region, rear waist region and crotch region are developed in a flat state, and a liquid-absorbent member composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, said liquid-absorbent member extending on the inner surface of said cover member from said crotch region toward said front and rear waist regions; the improvement comprising:

said cover member having an elastic stretchability circumferentially of the waist regions along a longitudinal end of at least one of said front and rear waist regions, transversely opposite side edges of the front and rear waist regions being connected or connectable to each other; and

said liquid-absorbent member including elastically stretchable members circumferentially extending under appropriate tension across portions of said front and rear waist regions lying immediately above said curved crotch

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region and longitudinally opposite ends of the respective elastically stretchable members being bonded to transversely opposite side edges of the respective waist regions, said elastically stretchable members being substantially connected to each other so as to form a continuous loop.

2. The disposable diaper according to Claim 1, wherein said cover member is made of a nonwoven fabric having an elastic stretchability circumferentially of the waist regions.

3. The disposable diaper according to Claim 1, wherein said cover member presents a configuration of so-called shorts type in which the respective transversely opposite side edges of said front and rear waist regions are separably or inseparably connected to each other.

4. The disposable diaper according to Claim 1, wherein said cover member is provided at the transversely opposite side edges of said front and rear waist regions with means adapted to be releasably fastened one to another.

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DISPOSABLE DIAPER

A disposable diaper includes a cover member presenting an hourglass-shape and a separate liquid-absorbent member composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core. The cover member has an elastic stretchability along the upper end of front or rear waist region and these front and rear waist regions are connected or connectable along transversely opposite side edges thereof. The liquid-absorbent member includes first and second elastically stretchable members circumferentially extending across portions of the front and rear trunk regions lying immediately above the crotch region. Longitudinally opposite ends of these elastically stretchable members are bonded to the transversely opposite side edges of the cover member.

Refer to Fig. 2.

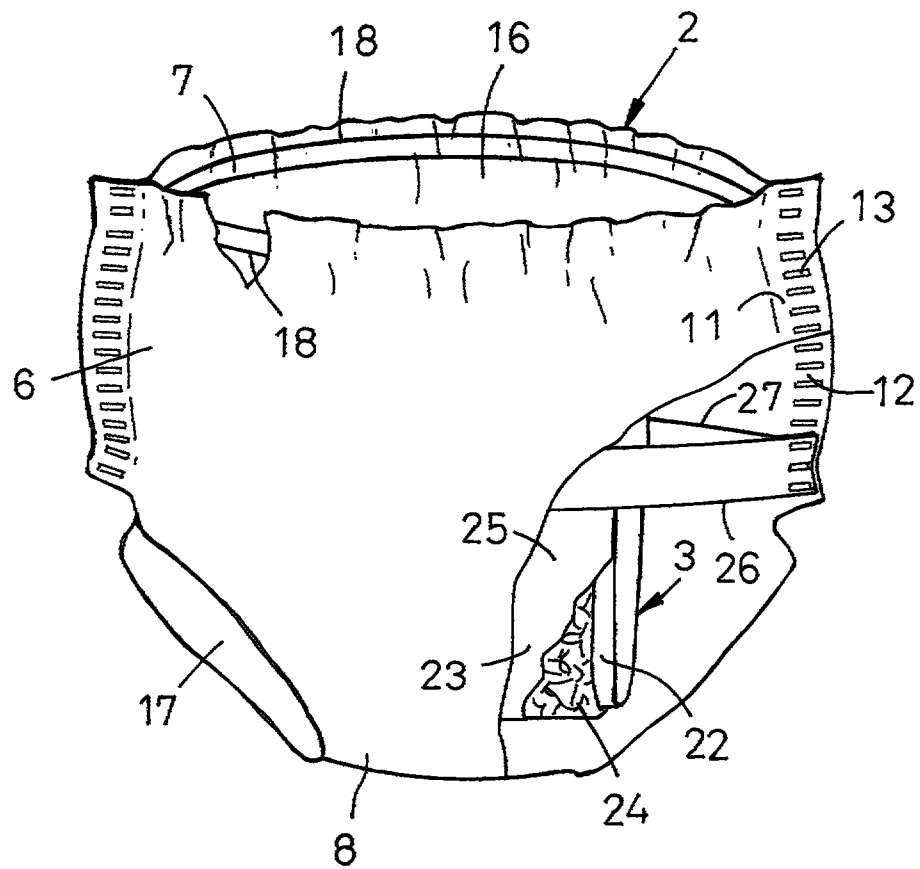
FIG. I

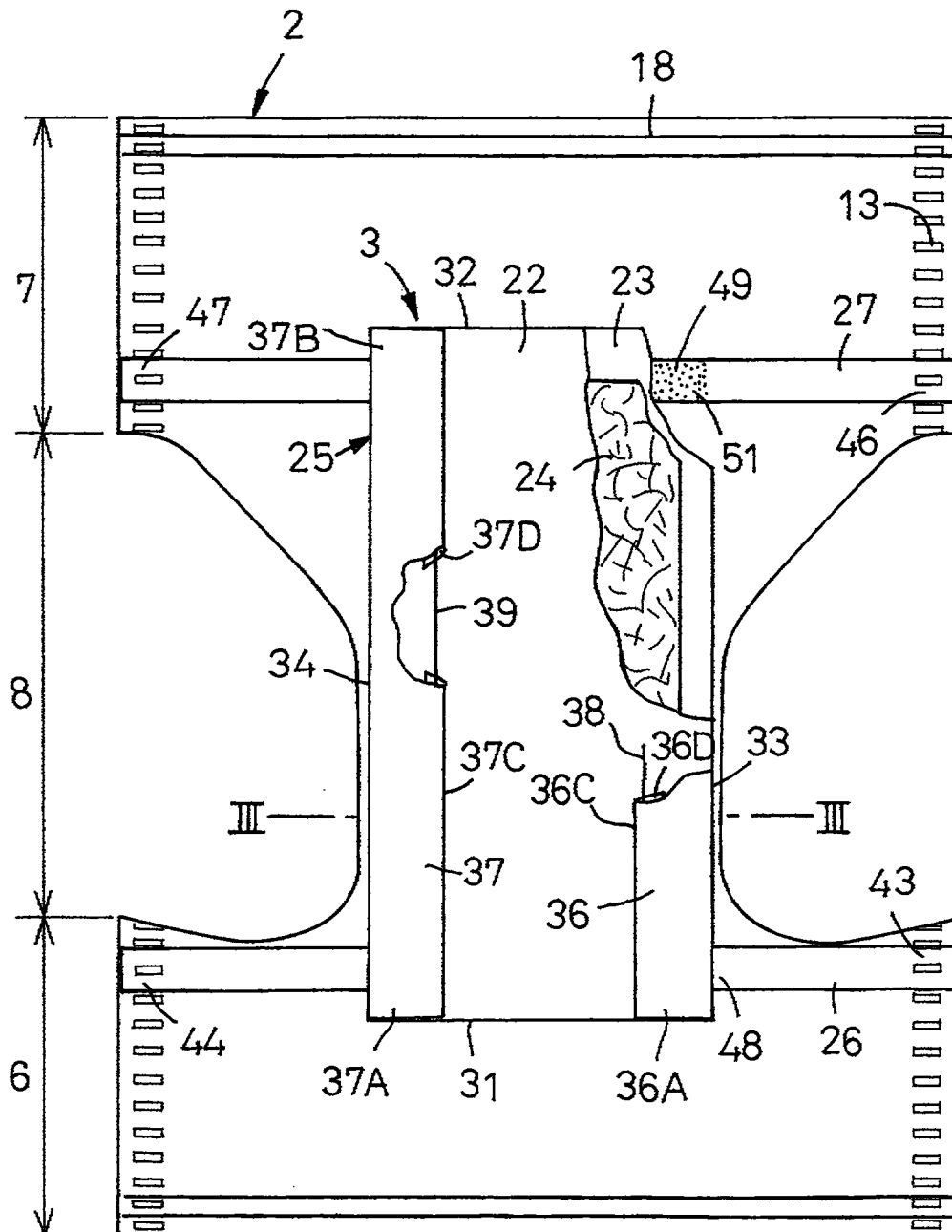
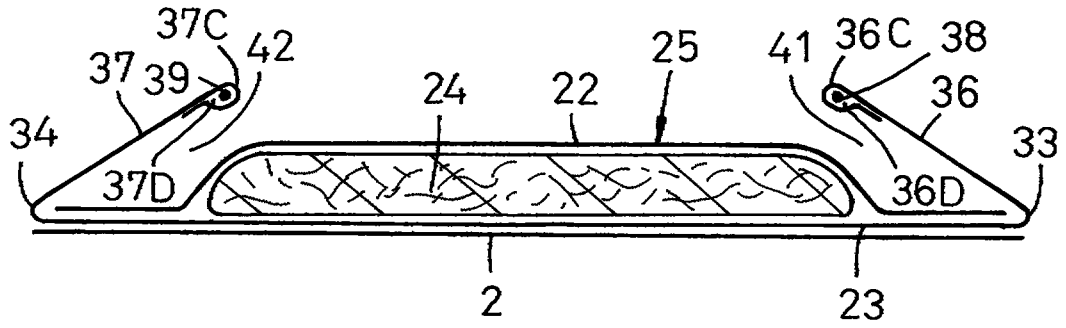
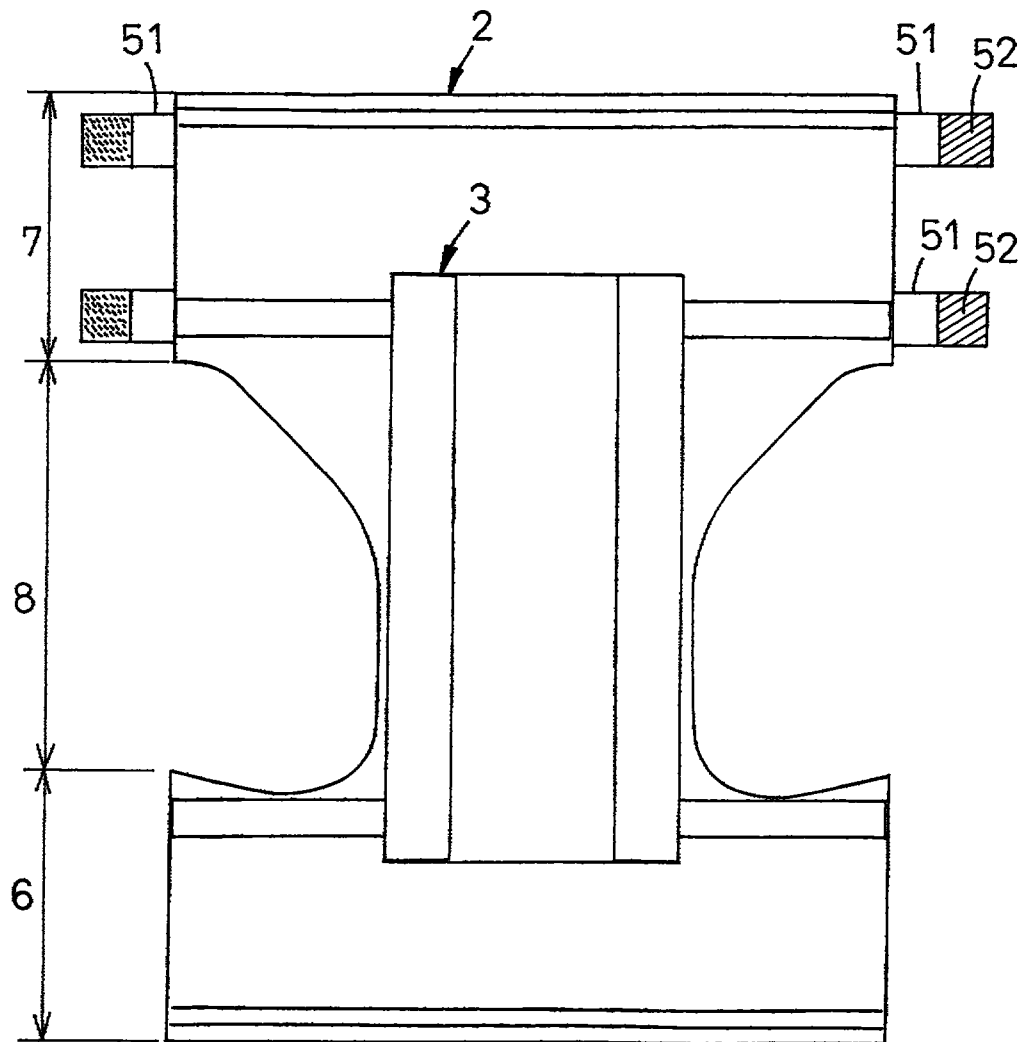
FIG. 2

FIG.3**FIG.4**



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WHAT IS CLAIMED IS:

1. In a disposable diaper comprising a cover member having a front waist region, a rear waist region and a crotch region extending therebetween, transversely opposite side edges of said crotch region being curved inwardly so that said cover member presents an hourglass-shape as said front waist region, rear waist region and crotch region are developed in a flat state, and a liquid-absorbent member composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed therebetween, said liquid-absorbent member extending on the inner surface of said cover member from said crotch region toward said front and rear waist regions; the improvement comprising:

said cover member having an elastic stretchability circumferentially of the waist regions along a longitudinal end of at least one of said front and rear waist regions, transversely opposite side edges of the front and rear waist regions being connected or connectable to each other; and

said liquid-absorbent member including elastically stretchable members circumferentially extending in a transversely stretched state thereof across portions of said front and rear waist regions lying immediately above said curved crotch region and transversely

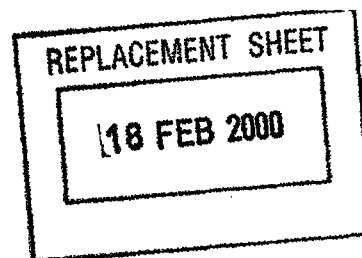
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opposite ends of the respective elastically stretchable members being bonded to transversely opposite side edges of the respective waist regions, said elastically stretchable members being substantially connected to each other so as to form a continuous loop.

2. The disposable diaper according to Claim 1, wherein said cover member is made of a nonwoven fabric having an elastic stretchability circumferentially of the waist regions.
3. The disposable diaper according to Claim 1, wherein said cover member presents a configuration of so-called shorts type in which the respective transversely opposite side edges of said front and rear waist regions are separably or inseparably connected to each other.
4. The disposable diaper according to Claim 1, wherein said cover member is provided at the transversely opposite side edges of said front and rear waist regions with means adapted to be releasably fastened one to another.

