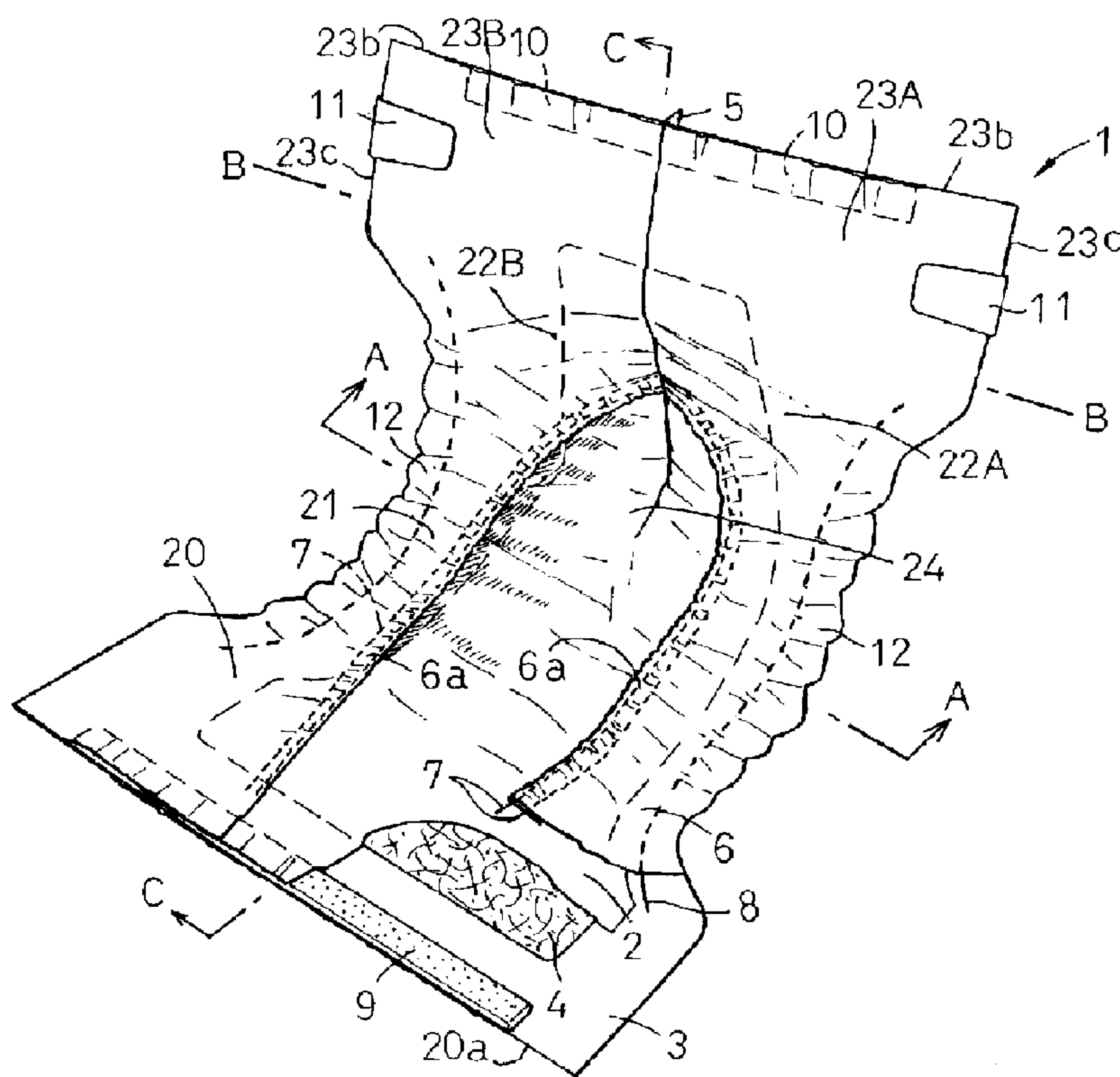




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 (54) Title: DISPOSABLE UNDERGARMENT



(57) Abrégé/Abstract:

A disposable undergarment such as a disposable diaper includes a front waist region 20, a rear waist region 22 and a crotch region 21 extending therebetween, the undergarment has afterward bonded edges 5 extending along a longitudinal end of the rear waist region 22 and a concavity 24 depressed toward a surface destined to be remote from the wearer's skin, the rear waist region 22 is divided into a first rear waist region 22A and a second rear waist region 22B along a longitudinal center line extending in the longitudinal direction to bisect a transverse dimension of the undergarment, and the concavity is formed by drawing the first rear waist region 22A and the second waist region 22B toward each other and bonding the afterward bonded edges 5 to each other on the longitudinal center line.

## A B S T R A C T

## DISPOSABLE UNDERGARMENT

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## DISPOSABLE UNDERGARMENT

This invention relates to disposable undergarment such as diaper covers, disposable diapers or the like.

Japanese Utility Model Application Gazette No. 1995-7620 discloses a disposable diaper comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between these two sheets. The topsheet is provided in the middle zone of the crotch region with a liquid-absorbent annular member which is, in turn, covered with a liquid-pervious cover sheet so that the annular member cooperates with a section of the topsheet encircled by the annular member to form an excrement receiving concavity.

Japanese Utility Model Application Disclosure No. 1994-21624 discloses a disposable diaper comprising a liquid-pervious topsheet, a liquid-impervious backsheet and an absorbent core disposed between these two sheets. The absorbent core is provided in its hip region with a concavity serving to receive excrement disposed onto the diaper.

Both of the proposals intend to form the absorbent core with the concavity serving to receive solid excretion such as faeces therein with or without the annular protuberance

encircling it.

However, various problems may be encountered by such known diapers depending on situations. It is assumed that the excrement receiving concavity formed in the crotch region or the excrement receiving concavity formed in the hip region misses the proper position to receive the excrement. In this case, the solid excretion can not be received by the concavities.

With the diaper described in Japanese Utility Model Application Disclosure No. 1995-7620, the annular member overlies the absorbent core and increases a thickness of the diaper. The increased thickness of the diaper creates the wearer a discomfortable feeling.

In the case of the diaper described in Japanese Utility Model Application Disclosure No. 1994-21624, if the liquid-permeability of the topsheet defining the upper surface of the diaper is not sufficient, the fluid excretion such as loose passage due to diarrhea once having been received by the concavity may flow back again up to the surface of the topsheet and spread sideways. If the absorbent core is relatively thin as achieved by a recent technical progress, it will be difficult to form the concavity adapted to receive a desired amount of excrement.

- 3 -

It is an object of this invention to provide an improved garment enabling the excretion discharged thereon to be reliably received and retain therein without not only the demand for use of the annular member to form the excrement receiving concavity but also the demand for forming the liquid-absorbent core itself in its hip region with the excrement receiving concavity.

According to this invention, there is provided an undergarment contoured by transversely opposite side edges extending in a longitudinal direction thereof and longitudinally opposite ends extending in the transverse direction thereof, the undergarment comprising: a front waist regions, a rear waist region and a crotch region extending therebetween, a laminate panel comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between the topsheet and said backsheet; and the undergarment having afterward bonded edges extending along a longitudinal end of the rear waist region and a concavity depressed toward a surface destined to be remote from the wearer's skin, as the undergarment is put on the wearer's body, the rear waist region being divided into a first rear waist region and a second rear waist region along a longitudinal center line extending in the longitudinal direction to bisect a transverse dimension of the undergarment, and the concavity being formed by drawing the first rear waist region and the

second waist region toward each other and bonding the afterward bonded edges to each other on the longitudinal center line.

According to one embodiment of this invention, the first and second rear waist regions are respectively formed with a first wing transversely extending outward beyond the first rear waist region and a second wing transversely extending outward beyond the second rear waist region and wherein the first and second wings are drawn toward each other so that edges of the first and second wings which are continuous with the first and second rear waist regions, respectively, are bonded to each other.

According to another embodiment of this invention, the undergarment is formed by a laminate panel comprising a liquid-pervious topsheet, a liquid-impervious backsheet both extending over the front and rear waist regions as well as the crotch region and the wings, and a liquid-absorbent core disposed between the topsheet and the backsheet.

According to still another embodiment of this invention, the laminate panel further comprises a pair of barrier cuffs extending inside transversely opposite side edges of the crotch region between the front and rear waist regions and normally tending to rise on an upper surface of

the topsheet, each of the barrier cuffs having a free side edge, a proximal side edge bonded to the upper surface of the topsheet and longitudinally opposite ends respectively lying in the front and rear waist regions, one of the longitudinally opposite ends of the barrier cuff lying the rear waist region being bonded to the corresponding end of the other barrier cuff along the afterward bonded edges so that the pair of barrier cuffs come in contact with each other in the rear waist region.

According to further another embodiment of this invention, the longitudinally opposite ends of the cuffs are bonded to the upper surface of the topsheet so that the longitudinally opposite ends are maintained to be collapsed inwardly of the laminate panel.

Fig. 1 is a perspective view showing a partially cutaway laminate panel according to this invention;

Fig. 2 is a plan view showing the partially cutaway panel as before a concavity is formed;

Fig. 3 is a plan view showing the panel partially in a sectional view taken along a line A-A in Fig. 1;

Fig. 4 is a sectional view taken along a line B-B in Fig. 1; and

Fig. 5 is a sectional view taken along a line C-C in Fig. 1.

Details of an undergarment according to this invention will be more fully understood from the following description of a so-called open-type disposable diaper comprising a laminate panel as one embodiment of this invention given hereunder with reference to the accompanying drawings.

Fig. 1 is a perspective view showing a partially cutaway panel 1. The panel 1 comprises a liquid-pervious topsheet 2, a liquid-impervious backsheet 3 and a liquid-absorbent core 4 disposed between these two sheets 2, 3 and bonded to the inner surface of at least one of the two sheets 2, 3. The panel 1 is contoured by transversely opposite side edges extending in the longitudinal direction and longitudinally opposite ends extending in the transverse direction intersecting the longitudinal direction.

The panel 1 is provided with a pair of barrier cuffs 6 extending longitudinally of the panel 1. Each of the cuffs 6 is formed with a liquid-impervious nonwoven fabric sheet and provided along its free side edge 6a with an elastic member 7 secured under tension thereto. The panel 1 is formed in its zone covering the wearer's hip with a concavity

24 depressed toward the surface of the panel 1 being remote from the wearer's skin so that the pair of barrier cuffs 6 may come in contact with each other above the concavity 24 and thereby enclose the concavity 24.

The panel 1 is further formed with a pair of side flaps 12 laterally extending outward from transversely opposite side edges of the absorbent core 4. In addition, the panel 1 is provided along its transversely opposite side edges, which are intended to form a pair of leg-openings, with elastic members 8 extending in the longitudinal direction and secured under tension thereto. Similarly, the longitudinally opposite ends of the panel 1, which are intended to define a waist-opening, are provided with film-like elastic members 9, 10 extending in the transverse direction and under tension thereto so as to be associated with the waist-opening.

Upon relaxation of the elastic members 8, 9, 10, gathers are produced along the longitudinally opposite ends as well as along the transversely opposite side edges of the panel 1. When the panel 1 is longitudinally curved with its inner surface inside, contraction of the elastic members 7 causes the barrier cuffs 6 to rise on the panel 1 and creates gathers along the free side edges 6a of the respective barrier cuffs 6.

Fig. 2 is a partially broken plan view showing the panel 1 as before the concavity 24 is formed. As shown, the panel 1 comprises a front waist region 20, a rear waist region 22 and a crotch region 21 extending between the front and rear waist regions 20, 22 as viewed longitudinally of the panel 1. The panel 1 further comprises a pair of wings 23 extending outward from transversely opposite side edges of the rear waist region 22.

Along longitudinal ends 22a, 23a of the front and wings 22, 23, the panel 1 has a pair of afterward bonded edges 5. Along the afterward bonded edges 5, the backsheet 3 longitudinally extends beyond the topsheet 2 which, in turn, longitudinally extends beyond the barrier cuffs 6.

The panel 1 has a longitudinal center line Y bisecting a transverse dimension of the panel 1. About the longitudinal center line Y, the rear waist region 22 is divided into first and second rear waist regions 22A, 22B and the wings 23 are divided into first and second wings 23A, 23B. The first and second rear waist regions 22A, 22B and first and second wings 23A, 23B are respectively drawn near together in directions as indicated by arrows X, X and the afterward bonded edges 5, 5 are bonded to each other. In consequence, the panel 1 is formed with the concavity 24.

Now edges 23c of the respective wings 23 lying symmetrically about the longitudinal center line partially form the transversely opposite side edges of the panel 1 and outer side edges 23b of the respective wings 23 form one of the longitudinally opposite ends of the panel 1 (See Fig. 1).

The wings are formed with portions of the topsheet 2, the backsheet 3 and the barrier cuffs 6. The absorbent core 4 is disposed between portions of the topsheet 2 and the backsheet 3. In the respective wings 23, the topsheet 2 extends outward slightly beyond the transversely opposite side edges of the absorbent core 4 and the portions of backsheet 3 transversely extending beyond the topsheet 2 are bonded to the corresponding portions of the respective barrier cuffs 6.

The transversely opposite, i.e., longitudinally extending side edges 23b of the wings 23 are provided with the elastic members 10 longitudinally extending along these side edges 23b. The elastic members 10 are disposed between the backsheet 3 and the barrier cuffs 6 and secured to at least one of the backsheet 3 and barrier cuffs 6. The lower ends 23c of the respective wings 23, which transversely extend in parallel to the afterward bonded edges 5, are provided with a pair of tape fasteners 11. The tape

fasteners 11 have their free ends coated with adhesive agent and their proximal ends joined to the lower ends 23c.

Figs. 3 is a plan view showing the panel 1 partially in a sectional view taken along line A-A in Fig. 1 and Fig. 4 is a sectional view taken along a line B-B in Fig. 1. Fig. 3 shows the barrier cuffs 6 as they rise on the inner surface of the panel 1. The transversely opposite side edges of the topsheet 2 extend outward slightly beyond the transversely opposite side edges of the absorbent core 4. The portions of the backsheet 3 transversely extending outward beyond the transversely opposite side edges of the topsheet 2 are bonded to the respective barrier cuffs 6 with the elastic members 8 disposed therebetween.

The barrier cuffs 6 have their proximal side edges 6b bonded to the upper surface of the topsheet 2 and their longitudinal ends 6c extending in the rear waist regions 22 as well as in the wing 23 are bonded to the upper surface of the topsheet 2 so that these ends 6c may be held to collapse inward of the panel 1 onto the upper surface of the topsheet 2. Along the free side edges 6a, the barrier cuffs 6 are folded back onto the inner surface of the panel 1 to wrap the elastic members 7 which are, in turn, intermittently bonded to the barrier cuffs 6.

Referring to Fig. 4, along the afterward bonded edges 5 extending in the region defined by the wings 23, the respective barrier cuffs 6 associated with the first and second wings 23A, 23B have their upper surfaces put flat and bonded together. Similarly, the sections of the topsheet 2 associated with the first and second wings 23A, 23B and extending upward beyond the barrier cuffs 6 as viewed in Fig. 4 have their upper surfaces put flat and bonded together. The sections of the backsheet 3 extending upward beyond the topsheet 2 as viewed in Fig. 4 also have their upper surfaces put flat and bonded together.

Fig. 5 is a sectional view taken along a line C-C in Fig. 2. As shown, the panel 1 presents a sectional shape substantially of L-shape defined by the rear waist region 22 and the wings 23 rising with respect to the front waist region 20 and the crotch region 21. The concavity 24 has the maximum depth substantially in a middle zone of the bonded edge 5.

In the front waist region 20, the outer surface of the panel 1 is provided with a pair of fastening zones each in the form of a target tape so that the respective tape fasteners may be fastened to the corresponding a target tape by means of the adhesive agent applied on the inner surfaces

-12-

of the tape fasteners. In this manner, a waist-opening and a pair of leg-openings are formed (not shown).

Excretion is first absorbed by a portion of the absorbent core 4 lying in the front waist region 20, the crotch region 21 and the rear waist region 22, and then exudes into a portion of the absorbent core 4 lying in the wings 23 to be absorbed therein. Compared to the case in which no portion of the absorbent core 4 is present in the wings 23, an amount of excretion which can be absorbed by the core 4 is correspondingly increased. Even if the portion of the absorbent core 4 lying in the wings 23 is compressed by the back of the undergarment wearer, it is not concerned that the amount of excretion once absorbed by the portion of the core 4 lying in the wings 23 might exude again on the upper surface of the panel 1 because the upper surfaces of the wings 23 are covered with the respective barrier cuffs 6. The portion of the absorbent core 4 additionally serves as a cushion and thereby contributes to improvement of a feeling to wear the undergarment.

The topsheet 2 may be formed by a liquid-pervious sheet such as nonwoven fabric or porous plastic film, preferably a sheet which is not only liquid-pervious but also hydrophobic. The backsheet 3 may be formed with a liquid-impervious

plastic film or a laminate of such plastic film and a hydrophobic nonwoven fabric, preferably a breathable and liquid-impervious sheet. The barrier cuffs 6 may be formed with a breathable nonwoven fabric or a breathable, liquid-impervious and stretchable nonwoven fabric sheet. When the stretchable nonwoven fabric sheet is used as the stock material for the barrier cuffs 6, the barrier cuffs 6 may be secured under tension to the upper surface of the panel 1 and it may be eliminated to provide the free side edges 6a of the respective barrier cuffs 6 with the elastic members 7. The nonwoven fabric may be selected from a group consisting of a spun bond nonwoven fabric, a spun lace nonwoven fabric and a melt blown nonwoven fabric, each comprising fibers having a basis weight of 5 ~ 150 g/m<sup>2</sup>. The absorbent core 4 comprises a mixture of fluff pulp and superabsorptive polymer particles compressed to a desired thickness and entirely covered with a water-pervious sheet such as tissue paper. Bonding of these members may be performed by means of suitable adhesive agent such as hot melt adhesive, glue or heat-sealing technique.

This invention is applicable not only to a so-called open type disposable diaper but also to the other article such as a diaper cover or a pants type disposable diaper. In

the case of the diaper cover, for example, a liquid-impervious plastic film or a laminate of such plastic film and a hydrophobic nonwoven fabric may be used to form the diaper cover and a liquid-absorbent pad may be placed in the concavity 24 of this cover.

The undergarment proposed by this invention enables the formation of a concavity serving to receive and retain discharged excretion within the undergarment without any demand for use of the annular member to form the excrement receiving concavity or for forming the liquid-absorbent core itself with the excrement receiving concavity. Compared to such known excrement receiving concavity, this invention enables the concavity to have a large range in the rear waist region as well as in the crotch region. With an advantageous consequence, the excrement can be reliably received by the concavity even if a position at which the excrement is discharged shifts back- or forward or laterally relative to the wearer's body.

If excretion is solid, such excretion will directly fall into the concavity and neither flow back nor leak from the undergarment. Even if excretion is fluid, such excretion will be absorbed by the absorbent core through the topsheet and neither flow back to the upper surface nor spread

-15-

thereon. Above the concavity, the pair of barrier cuffs are in contact with each other to enclose the concavity so that these cuffs function as barriers to prevent the excretion from leaking.

- 16 -

## WHAT IS CLAIMED IS:

1. A disposable undergarment contoured by transversely opposite side edges extending in a longitudinal direction thereof and longitudinally opposite ends extending in a transverse direction thereof, said undergarment comprising:

a front waist region, a rear waist region and a crotch region therebetween:

a laminate panel comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between said topsheet and said backsheet; and

said undergarment having a pair of afterward bonded edges extending along a longitudinal end of said rear waist region and a concavity depressed toward a surface destined to be remote from a wearer's skin as said undergarment is put on a wearer's body, said rear waist region being divided into a first rear waist region and a second rear waist region along a longitudinal center line extending in said longitudinal direction to bisect a transverse dimension of said undergarment, and said concavity being formed by drawing said first rear waist region and said second waist region toward each other and bonding said afterward bonded edges to each other on said longitudinal center line.

2. The disposable undergarment according to Claim 1, wherein said first and second rear waist regions are respectively formed with a first wing transversely extending outward beyond said first rear waist region and a second

- 17 -

wing transversely extending outward beyond said second rear waist region and wherein said first and second wings are drawn toward each other so that edges of said first and second wings which are continuous with said first and second rear waist regions, respectively, are bonded to each other.

3. The disposable undergarment according to Claim 2, wherein said laminate panel further comprises a pair of barrier cuffs extending inside transversely opposite side edges of said crotch region between said front and rear waist regions, each of said barrier cuffs having a free side edge, provided therealong with an elastic member, a proximal side edge bonded to the upper surface of said topsheet and longitudinally opposite ends respectively lying in said front and rear waist regions, wherein said barrier cuffs tend to ride above an upper surface of said topsheet under contraction of said elastic member, one of said longitudinally opposite ends of said barrier cuff lying said rear waist region being bonded to the corresponding end of the other barrier cuff along said afterward bonded edges so that said pair of cuffs come in contact with each other in said rear waist region.

4. The disposable undergarment according to Claim 3, wherein said longitudinally opposite ends of said barrier cuffs are bonded to the upper surface of said topsheet so that said longitudinally opposite ends are maintained to be collapsed inwardly of said laminate panel.

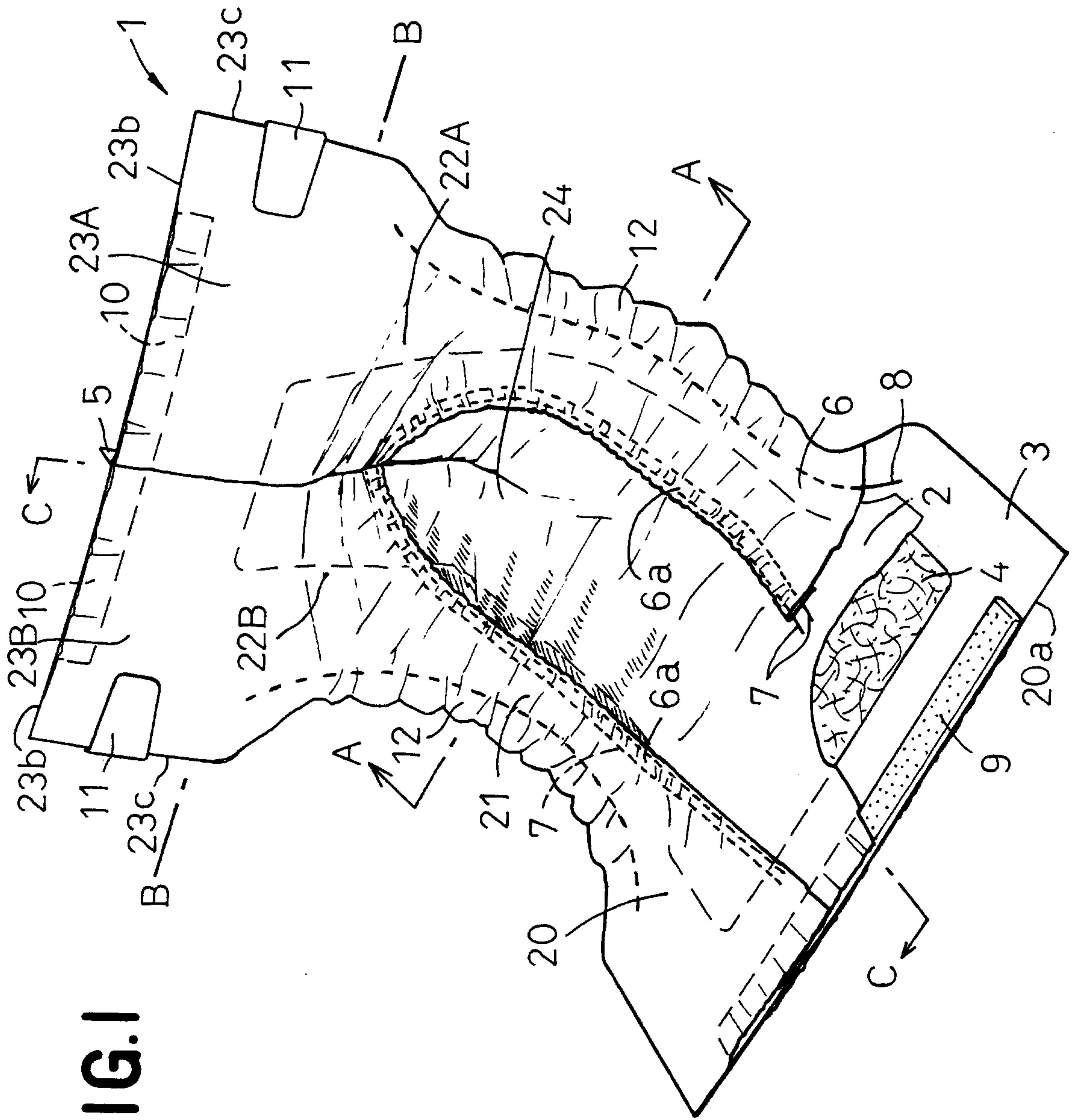


FIG. 1

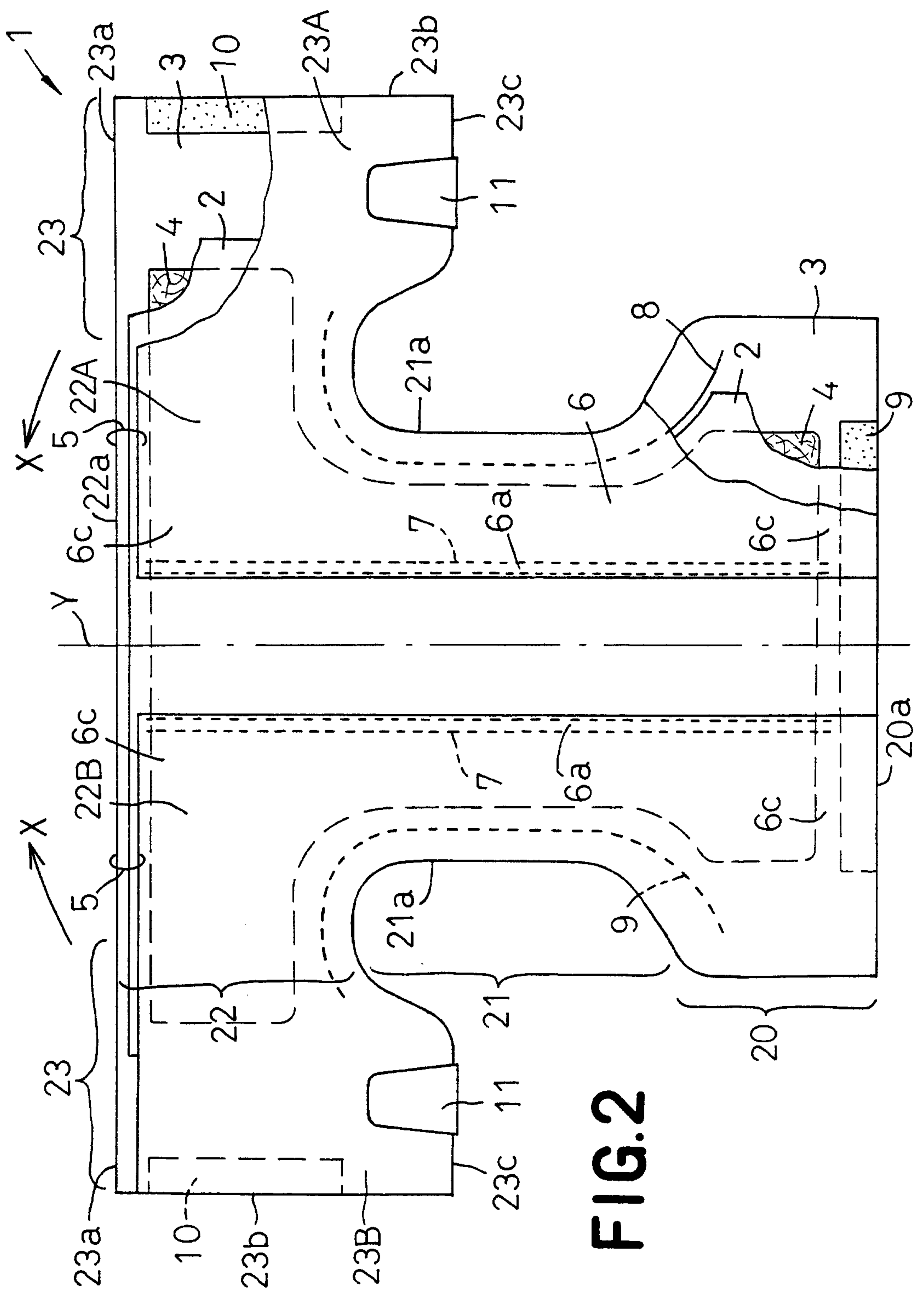


FIG.2

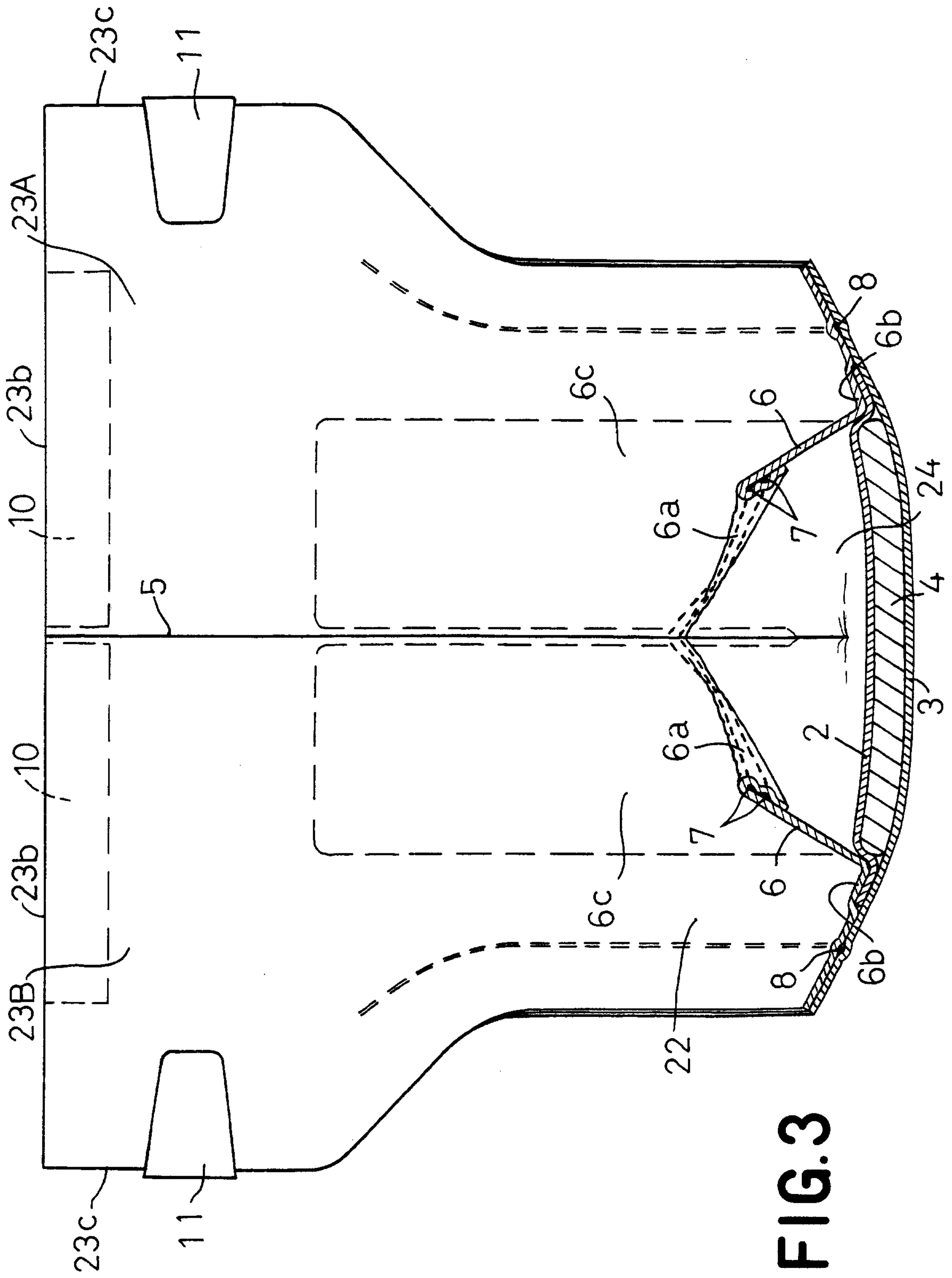
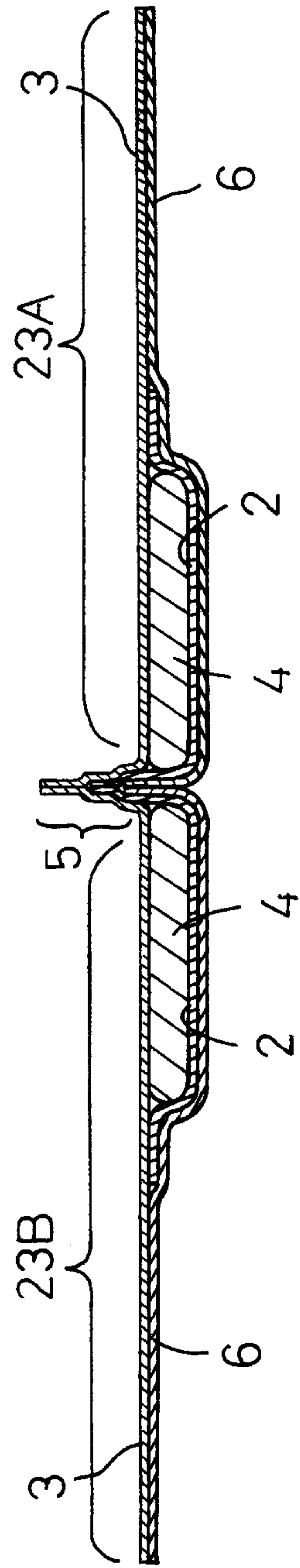


FIG.3

FIG. 4



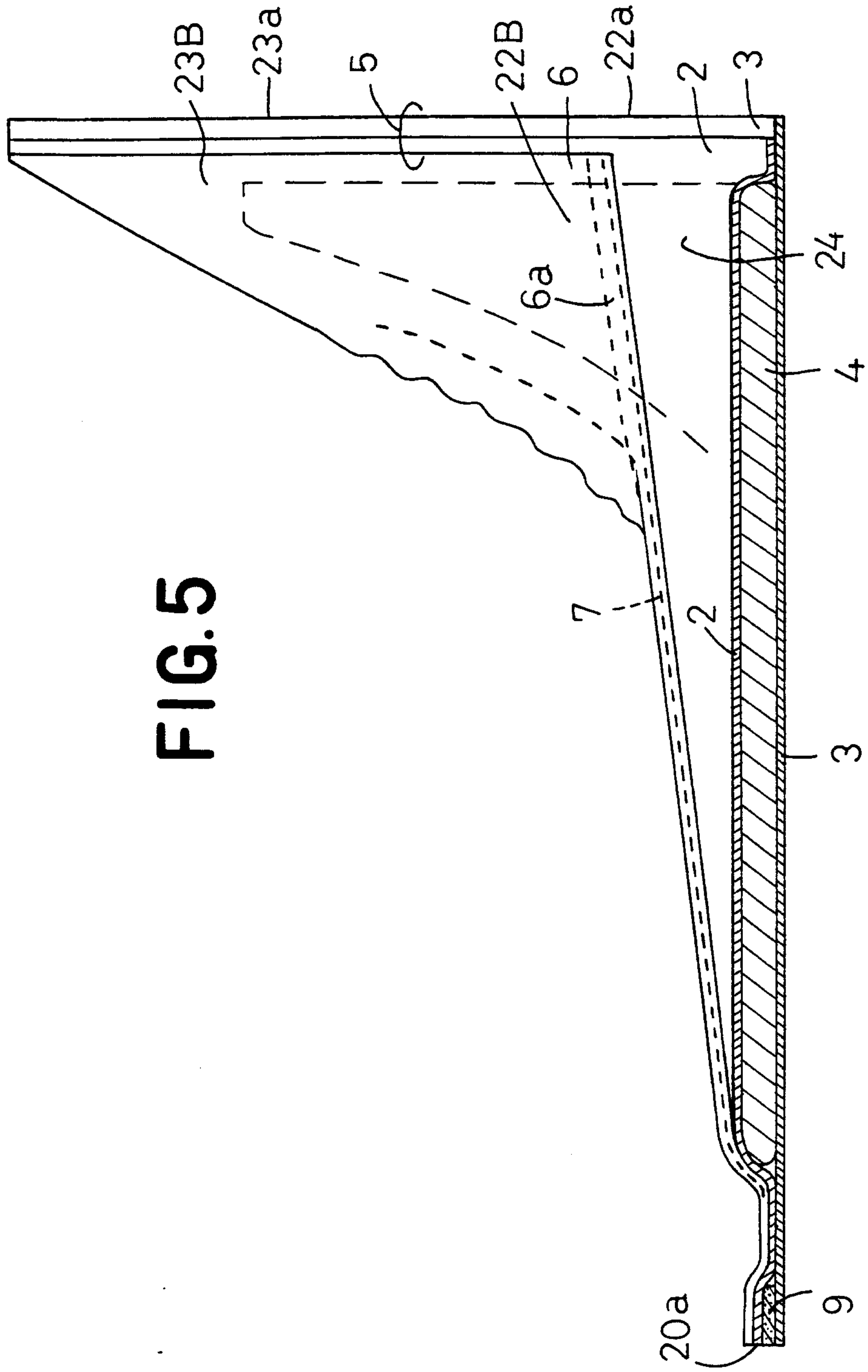


FIG. 5

