Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2469638 C 2007/09/04

(11)(21) 2 469 638

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 2002/12/17
(87) Date publication PCT/PCT Publication Date: 2003/06/26
(45) Date de délivrance/Issue Date: 2007/09/04
(85) Entrée phase nationale/National Entry: 2004/06/08
(86) N° demande PCT/PCT Application No.: JP 2002/013195
(87) N° publication PCT/PCT Publication No.: 2003/051263
(30) Priorités/Priorities: 2001/12/17 (JP2001-383685);
2002/02/01 (JP2002-26017)

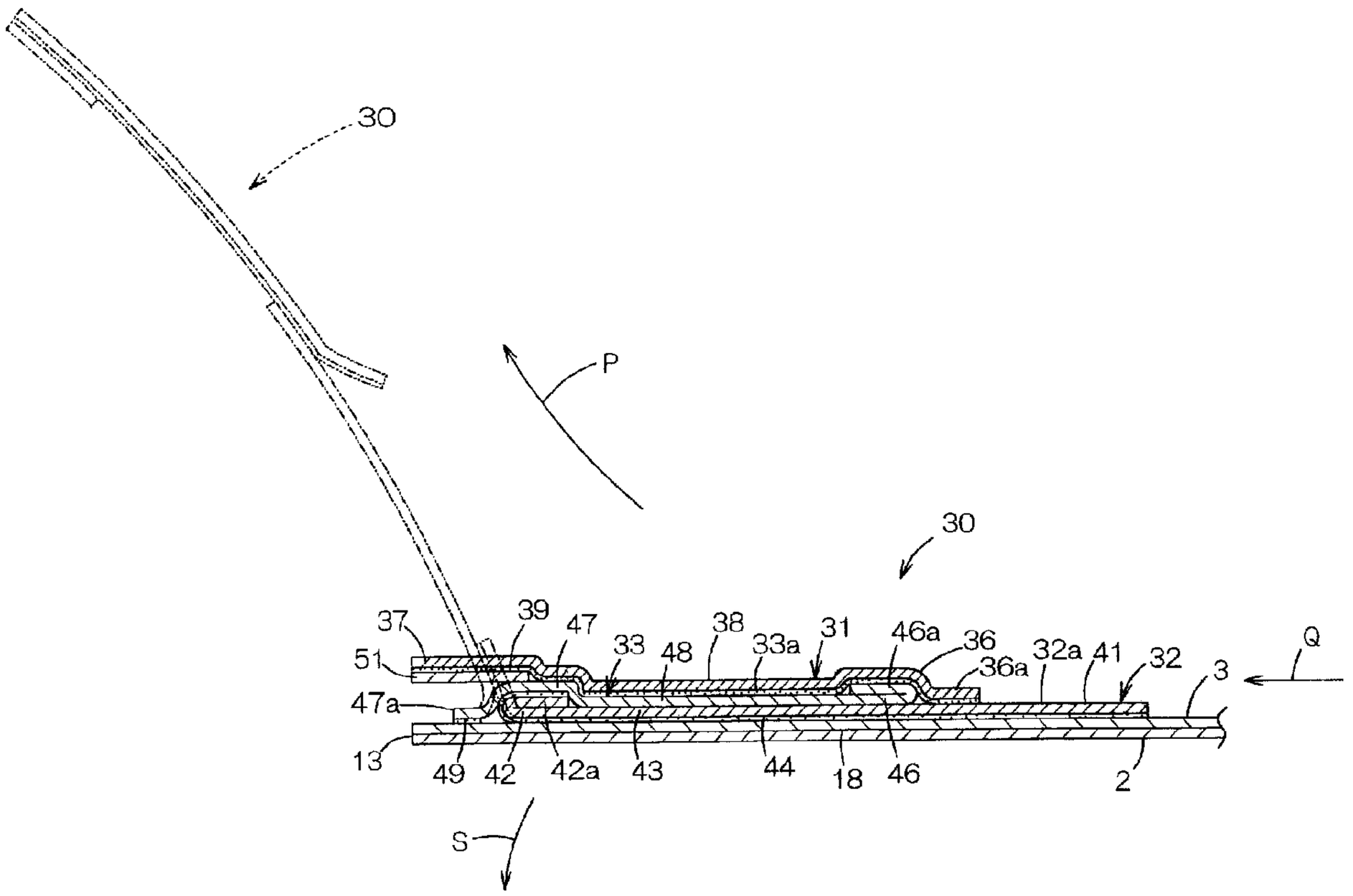
(51) Cl.Int./Int.Cl. *A61F 13/58* (2006.01),
A61F 13/60 (2006.01)

(72) Inventeurs/Inventors:
ITO, KYOKO, JP;
SAITO, KYOTA, JP

(73) Propriétaire/Owner:
UNI-CHARM CO., LTD., JP

(74) Agent: OGILVY RENAULT LLP/S.E.N.C.R.L.,S.R.L.

(54) Titre : ARTICLE JETABLE POUVANT ETRE PORTE ET COMPORTANT UNE FERMETURE RUBAN
(54) Title: DISPOSABLE WEARING ARTICLE PROVIDED WITH TAPE FASTENERS



(57) Abrégé/Abstract:
A disposable wearing article has a first surface 2 and a second surface 3. The second surface 3 is provided with tape fasteners 30 attached thereto. The tape fasteners 30 may be folded so as to be unfolded in a longitudinal direction and comprises a first tape strip 31 and a second tape strip 32 underlying the first tape strip 31. The first tape strip 31 has a free end zone 37 and a first end zone 36 and is adhesively attached to the second tape section 32. The second tape strip 32 has a fixed end zone 47 secured to the second surface 3 and a second end zone 46 and being contiguous to the first end zone 36 of the first tape strip 31. The first end zone 36 of the first tape strip 31 has an extension 36a extending beyond the second end zone 46 of the second tape strip 32 and adhesively attached to the surface of the second tape strip 32.

A B S T R A C T

A disposable wearing article has a first surface 2 and a second surface 3. The second surface 3 is provided with tape fasteners 30 attached thereto. The tape fasteners 30 may be folded so as to be unfolded in a longitudinal direction and comprises a first tape strip 31 and a second tape strip 32 underlying the first tape strip 31. The first tape strip 31 has a free end zone 37 and a first end zone 36 and is adhesively attached to the second tape section 32. The second tape strip 32 has a fixed end zone 47 secured to the second surface 3 and a second end zone 46 and being contiguous to the first end zone 36 of the first tape strip 31. The first end zone 36 of the first tape strip 31 has an extension 36a extending beyond the second end zone 46 of the second tape strip 32 and adhesively attached to the surface of the second tape strip 32.

S P E C I F I C A T I O N

DISPOSABLE WEARING ARTICLE PROVIDED WITH TAPE FASTENERS

TECHNICAL FIELD OF THE INVENTION

This invention relates to a disposable wearing article provided with tape fasteners.

BACKGROUND OF THE INVENTION

Fig. 9 of the accompanying drawings is a side view showing an adhesive tape fastener 102 disclosed in U.S. Patent No. 4,177,812. This tape fastener 102 is used, for example, to connect front and rear waist regions to each other to wear an open-type disposable diaper. The tape fastener 102 illustrated therein comprises a tape strip 111, an adhesive 112 applied on a lower surface 111d of the tape strip 111 and a release paper sheet 113. The tape strip 111 is folded in a Z-shape and attached to the associated one of transversely opposite side edge zones 115a of the diaper. The tape strip 111 folded in this manner defines a top layer 111a, a bottom layer 111b and an intermediate layer 111c and the release paper sheet 113 is secured by the adhesive 112 to the intermediate layer 111c without a possibility that the release paper sheet

113 might be easily peeled off. To prevent the respective layers 111a, 111b and 111c of the tape fastener 102 from being unfolded prior to actual use of the tape fastener 102, the top layer 111a is releasably attached to the release paper sheet 113 with the adhesive 112 so that these top layer 111a may be easily peeled off from the release paper sheet 113. Similarly, the intermediate layer 111c is releasably attached to an adhesive 116 applied on a bottom layer 111b so that the intermediate layer 111c may be easily peeled off from the adhesive 116. For actual use, the tape fastener 102 is pulled leftward with its end zone 120 held by the fingers. The intermediate layer 111c of the tape strip 111 is peeled off from the adhesive 116, then the top layer 111a is peeled off together with the adhesive 112 from the release paper sheet 113 and thus the tape fastener 102 is rectilinearly folded out. Thereafter, the top layer 111a is used to connect the front and rear waist regions to each other.

In the case of the above-cited tape fastener 102 of prior art, a force exerted on the top layer 111a and the intermediate layer 111c in a direction indicated by an arrow Q from the right as viewed in Fig. 9 causes the intermediate layer 111c to be peeled off from the adhesive 116 in a direction indicated by an arrow R. The tape fastener 102 having its intermediate layer

111c peeled off from the adhesive 116 in this manner prior to actual use of the tape fastener 102 can no more retain its Z-shape folded state and the end zone 120 can not be easily held by the finger in order to handle the diaper or put the diaper on a wearer's body. Such an inconvenience makes it extremely troublesome to put the diaper particularly on an unexceptionally restless baby's body.

It is an object of this invention to improve a disposable wearing article provided with folded tape fasteners adapted to be unfolded for actual use of the article so that these tape fasteners are not unintentionally peeled off from the wearing article but easily unfolded when these tape fasteners are actually used.

DISCLOSURE OF THE INVENTION

According to this invention, there is provided a disposable wearing article having a first surface facing the wearer's body and a second surface facing a garment, the article comprising an adhesive tape fastener disposed to the second surface, the tape fastener having a free end zone and a fixed end zone opposed to each other in a longitudinal direction, the fixed end zone being secured to the second surface, the tape fastener being disposed to the wearing article in a folded

posture, the tape fastener being unfolded in a direction from the fixed end zone toward the free end zone with the free end zone being held, and the tape fastener having an inner surface facing the second surface in an unfolded state and being partially coated with an adhesive.

The disposable wearing article further comprises the tape fastener lying in a folded posture at an upper site on the disposable wearing article and comprising a first tape strip having the free end zone and a first end zone opposed to the free end zone in the longitudinal direction and a second tape strip underlying the first tape strip so as to face the second surface and having the fixed end zone and a second end zone opposed to the fixed end zone and being connected to the first end zone of the first tape strip at the second end zone, the first tape strip being coated on the inner surface with the adhesive so as to be releasably attached to the second tape strip underlying the first tape strip, the first end zone including an extension extending from the free end zone toward the first end zone beyond the second end zone of the second tape strip and releasably attached to the second surface, and a region of the second tape strip in which an inner surface of the first tape strip is releasably attached to the second tape strip being not adhesively attached to the second surface opposed to the

region so as to be released upwardly from the second surface.

This invention includes the following embodiments.

(1) A third tape strip is interposed between the second tape strip and the second surface and secured over its substantially full length to the second surface and wherein the fixed end zone is adhesively attached to the second surface with the third tape strip therebetween.

(2) The extension of the first tape strip is releasably attached to the second surface with the third tape strip therebetween.

(3) The disposable wearing article is a pants-type disposable diaper having a front waist region, a rear waist region and a crotch region extending between these waist regions, the crotch region is provided with an absorbent core, the front and rear waist regions being connected together along respective transversely opposite side edge portions so as to form a waist-hole and a pair of leg-holes, and the fixed end zone of the second tape strip is adhesively attached to the second surface in each of the side edge portions of at least one of the front or rear waist region so that the longitudinal direction of the second tape strip is parallel to a waist-surrounding direction of the diaper.

(4) The disposable diaper has flaps formed by a sheet material extending outwardly beyond a peripheral edge of the core and

the fixed end zone of each the second tape strip is adhesively attached to the second surface in each of the flaps.

(5) A portion of the second surface under each of the tape fastener in a folded posture or a laminated sheet portion including the portion of the second surface and sheet members separately provided in addition to the portion which are overlaid and joined together has a flexural stiffness of (0.03 - 0.7) X $10^{-4}N \cdot m^2/m$.

In the following description of this invention, a flexural stiffness is a value obtained by using the automatic net flexure tester Model KESFB2-AUTO-A of KATO TECH on 100 X 100mm specimen and given in unit of $10^{-4}N \cdot m^2/m$. With the specimen being curved in the direction orthogonal to the direction in which the folded tape fastener will be unfolded, a curvature variation dK from $0.5cm^{-1}$ to $1.5cm^{-1}$ and a difference dM between bending moments associated with the curvatures of $0.5cm^{-1}$ and $1.5cm^{-1}$, respectively, are obtained. The ratio dM/dK is the flexural stiffness in this invention. The measuring method of the flexural stiffness in this manner is described in "Textile Engineering", Vol. 33, No. 2.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partially cutaway plan view showing the

disposable diaper according to this invention;

Fig. 2 is a diagram illustrating the manner in which the tape fasteners are used;

Fig. 3 is a diagram similar to Fig. 2;

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

Fig. 5 is a cross-sectional view illustrating the process in which the tape fasteners are unfolded;

Fig. 6 is a cross-sectional view similar to Fig. 5;

Fig. 7 is a view similar to Fig. 4 showing a preferred embodiment of this invention;

Fig. 8 is a perspective view showing another preferred embodiment of this invention; and

Fig. 9 is a side view showing the tape fasteners of prior art.

DESCRIPTION OF THE BEST MODE FOR WORKING OF THE INVENTION

Details of a disposable wearing article provided with tape fasteners according to this invention will be more fully understood from the description of the disposable diaper as a specific embodiment given hereunder in reference to the accompanying drawings.

Fig. 1 is a partially cutaway plan view showing a

disposable diaper 1 using tape fasteners 30 according to this invention. The diaper 1 comprises a liquid-pervious topsheet 2 facing a wearer's body, a liquid-impervious backsheet 3 facing a garment and a liquid-absorbent core 4 interposed between these two sheets 2, 3. As viewed in Fig. 1, the backsheet 3 overlies the topsheet 2. The diaper 1 is contoured by a front end 11 and a rear end 12 extending in parallel to each other in a transverse direction and a pair of transversely opposite side edges 13 extending in parallel to each other in a longitudinal direction orthogonal to the transverse direction. The diaper 1 is composed, in the longitudinal direction, of a crotch region 8 defining the middle region, a front waist region 6 being contiguous to the crotch region 8 and extending to the front end 11, and a rear waist region 7 being contiguous to the crotch region 8 and extending to the rear end 12. In the crotch region 8, the side edges 13 curve inwardly. Portions of the top- and backsheets 2, 3 extending outwardly beyond peripheral edge of the core 4 are overlaid and joined together by means of a well-known hot melt adhesive (not shown) to form a front flap 16, a rear flap 17 and a pair of side flaps 18. In the front and rear flaps 16, 17, waist-surrounding elastic members 19 are secured in a stretched state to the inner surface of at least one of the top- and backsheets 2, 3. In the side flaps 18,

thigh-surrounding elastic members 21 are stretched along the curved portions of the respective side edges 13 and secured to the inner surface of at least one of the top- and backsheets 2, 3 in a stretched state. In the rear waist region 7, portions of the backsheet 3 defining the side flaps 18 are respectively provided with tape fasteners 30 secured thereto in the vicinity of the side edges 13 and extending in a waist-surrounding direction. These tape fasteners 30 are in folded state and adapted to be unfolded outwardly beyond the side edges 13 of the diaper 1.

Figs. 2 and 3 are diagrams illustrating the manner in which the tape fasteners 30 are used. Fig. 2 illustrates the diaper 1 as put on the wearer's body with the tape fasteners 30 unfolded so as to extend from the rear waist region 7 and releasably attached to the front waist region 6. Fig. 3 illustrates the used diaper 1 having the front and rear waist regions 6, 7 overlaid each other with the topsheet 2 inside, rolled up together from the crotch region 8 toward the front and rear ends 11, 12 and retained in this rolled up state by the tape fasteners 30. In this manner, the tape fasteners 30 serve as fastening means not only when the diaper 1 is put on the wearer's body but also when the used diaper 1 is rolled up for disposal.

Fig. 4 is a cross-sectional view taken along a line IV - IV in Fig. 1. Each of the tape fasteners 30 shown in Fig. 4 has a top tape strip 31, a bottom tape strip 32 and an intermediate tape strip 33 interposed between the top tape strip 31 and the bottom tape strip 32. The top tape strip 31, in turn, has an inner end zone 36 lying inward of the diaper 1, an outer end zone 37 lying outward of the diaper 1 and an intermediate zone 38. The inner surface of these zones 36 - 38 opposite to the backsheet 3 is coated with a first adhesive 39 which is pressure-sensitive. The bottom tape strip 32 also has an inner end zone 41, an outer end zone 42 and an intermediate zone 43. The inner surface of these zones 41 - 43 opposed to the backsheet 3 is coated with a second adhesive 44 which is pressure-sensitive. It should be noted that a portion 42a of the outer end zone 42 is folded upwardly as seen in Fig. 4. The intermediate tape strip 33 also has an inner end zone 46, an outer end zone 47 and an intermediate zone 48. An end 47a of the outer end zone 47 opposed to the backsheet 3 is coated on its inner surface with a third adhesive 49 which is pressure-sensitive. A portion 46a of the inner end zone 46 is folded upwardly as seen in Fig. 4.

In the tape fastener 30 arranged as has been described above, the top tape strip 31 has its inner end zone 36 secured

to connect to the folded portion 46a of the intermediate tape strip 33 so as not to be peeled off and a portion 36a of the inner end zone 36 extending beyond the intermediate tape strip 33. The portion 36a is releasably attached to an outer surface 32a of the bottom tape strip 32 so as to be peeled off easily. In the outer end zone 37 of the top tape strip 31, the first adhesive 39 is covered with a film strip 51. The intermediate zone 38 of the top tape strip 31 is releasably attached to an outer surface 33a of the intermediate tape strip 33 so as to be peeled off easily.

Almost all over the bottom tape strip 32 is secured to the outer surface (i.e., the upper surface as viewed in Fig. 4) of the backsheet 3 by means of the second adhesive 44 except for the folded portion 42a of the outer end zone 42 so as not to be peeled off. Specifically, the folded portion 42a is secured to connect to the inner surface of the outer end zone 47 of the intermediate tape strip 33 so as not to be peeled off.

The intermediate zone 48 of the intermediate tape strip 33 is not adhered to the outer surface 32a of the bottom tape strip 32 except for the portion 46a folded and adhered to the top tape strip 31 and the outer end zone 47 adhered to the portion 42a of the bottom tape strip 32. Therefore the intermediate tape strip 33 can be peeled off easily from the outer surface

32a. The second adhesive 44 and the third adhesive 49 may be replaced by an adhesive which is curable after coating.

This tape assembly comprising the top tape strip 31, the intermediate tape strip 33 and the bottom tape strip 32 retains a posture folded in a Z-shape prior to actual use of the diaper. With the outer end zone 37 of the top tape strip 31 held together with the film strip 51, the tape fastener 30 is pulled upward obliquely with respect to the backsheet 3 in a direction indicated by an arrow P extending from the bottom tape strip 32 secured to the backsheet 3 toward the deformable outer end zone 37. In consequence, the zones and/or the portions releasably attached one to another are released one from another and the tape fastener 30 is rectilinearly unfolded as indicated by imaginary lines. If the first adhesive 39 has affinity to the bottom tape strip 32 and the intermediate tape strip 33, surfaces of these tape strips 32, 33 may be previously coated with a suitable release agent such as a silicone oil to be peeled off from these tape strips 32, 33.

Figs. 5 and 6 are views similar to Fig. 4, illustrating a process in which the tape fasteners 30 are unfolded. Pulling the outer end zone 37 of the top tape strip 31 upwardly in the direction of the arrow P as shown in Fig. 5 causes the top tape strip 31 to be straightened left- and upwardly between its outer

end zone 37 and inner end zone 36 as shown by Fig. 6. Following this movement of the outer end zone 37, a portion of the outer end zone 47 of the intermediate tape strip 33 lying inside the end 47a (i.e., portion on the right side of the end 47a as viewed in Figs. 5 and 6) secured to the backsheet 3 is pulled upwardly so as to be spaced from the bottom tape strip 32 secured to the backsheet 3. Consequently, an angle A included between the top tape strip 31 and the intermediate tape strip 33 is progressively enlarged. A peel force is exerted between these top tape strip 31 and intermediate tape strip 33 and facilitates these two tape strips 31, 33 to be peeled off from each other. When the top tape strip 31 is further pulled, particularly when the top tape strip 31 is pulled obliquely upwardly so as to enlarge the angle A, a peel force is exerted on the portion 36a of the top tape strip 31 attached to the bottom tape strip 32 and thereby facilitates the portion 36a to be peeled off from the bottom tape strip 32. It should be noted, however, that the inner end zone 36 of the top tape strip 31 is secured to the portion 46a of the intermediate tape strip 33, the outer end zone 47 of the intermediate tape strip 33 is secured to the portion 42a of the bottom tape strip 32 and the bottom tape strip 32 is secured to the backsheet 3. In this way, the tape fastener 30 is rectilinearly unfolded as indicated by the imaginary lines

in Fig. 4 as the outer end zone 37 of the top tape strip 31 is pulled.

The tape fastener 30 can be unfolded merely by pulling the outer end zone 37 of the top tape strip 31 upwardly in the direction of the arrow P and this feature facilitates the tape fastener 30 to be handled. Even if a force is exerted on the tape fastener 30 in a direction indicated by an arrow Q (See Fig. 4), it is unlikely that the top tape strip 31 and the intermediate tape strip 33 might be easily peeled off from the bottom tape strip 32 because the portion 36a of the top tape strip 31 is adhered to the bottom tape strip 32 as shown. In other words, the tape fastener 30 is free from an inconvenience that the respective tapes might be unintentionally peeled off before the diaper is put on baby's body and an operation of putting the diaper on the baby's body might take much time and effort as the conventional tape fastener folded in a Z-shape has often been the case. The tape fastener 30 according to the present embodiment of this invention is so arranged that the top tape strip 31 is peeled off from the intermediate tape strip 33 successively from its outer end zone 37 toward its inner end zone 36 and finally the portion 36a of the inner end zone 36 is peeled off from the bottom tape strip 32. With such an arrangement, even if a series of peeling the top tape strip 31

off from the other tape strips is stopped in mid way, it will be easy to set back the tape fastener 30 to its initial Z-posture as shown in Fig. 4 so far as the portion 36a has not been peeled off from the bottom tape strip 32.

In order to ensure that the tape fastener 30 can be more easily unfolded in the direction of the arrow P, a flexural stiffness of a laminated sheet portion underlying the tape fastener 30 and comprising the bottom tape strip 32, to which the inner end zone 36 of the top tape 31 is releasably attached, the backsheet 3 and the topsheet 2, which are overlaid and joined together should be preferably in a range of $(0.03 - 0.7) \times 10^{-4} N \cdot m^2/m$ in a direction S which intersects with the direction in which the tape fastener 30 is unfolded. The tape fastener 30 can be easily deformed as shown in Figs. 5 and 6 so far as the side flap 18 exhibits a flexural stiffness in the range. It should be noted, however, that the flexural stiffness of the side flap 18 exceeding $0.7 \times 10^{-4} N \cdot m^2/m$ would disadvantageously deteriorate feeling to wear the diaper 1.

Fig. 7 is a view similar to Fig. 4, showing one preferred embodiment of this invention. In the case of this alternative embodiment, the tape fastener 30 comprises the top tape strip 31 and the intermediate tape strip 33 shown in Fig. 4 and does not include the bottom tape strip 32 shown in Fig. 4. Of the

intermediate tape strip 33, the end 47a of the outer end zone 47 is secured to the backsheet 3 by means of the third adhesive 49 and the portion lying inside the end 47a is not adhesively attached to the backsheet 3. The folded portion 46a of the inner end zone 46 is adhered to the inner surface of the inner end zone 36 of the top tape strip 31. The inner end zone 36 of the top tape strip 31 also includes the edge portion 36a extending inwardly of the diaper 1 beyond the folded edge portion 46a of the intermediate tape strip 33. The portion 36a is releasably attached to the backsheet 3 by means of the first adhesive 39. In the top tape strip 31, the first adhesive 39 applied on the outer end zone 37 is covered with the film strip 51 but exposed on the portion lying aside from the film strip 51 toward the inner end zone 36. The exposed portion of the first adhesive 39 attaches the top tape 31 releasably to the inner side of the intermediate tape strip 33 in the vicinity of the inner end zone 46 beyond the end 47a. The tape fastener 30 according to this embodiment also can be unfolded as easily as the embodiment shown in Fig. 4 and its arrangement is simpler than that of the embodiment shown in Fig. 4. However, with this embodiment of the tape fastener 30, the force required to pull the top tape strip 31 is directly exerted on the backsheet 3 at the portion 36a of the top tape strip 31 and at the end 47a of the intermediate

tape strip 33. Taking account of this, this tape fastener 30 is preferably used with the backsheet 3 having a high strength.

In the embodiment shown in Fig. 7 also, the flexural stiffness of the laminated sheet portion underlying the tape fastener 30 and comprising the backsheet 3 and the topsheet 2 overlaid and joined each other should be preferably in a range of (0.03 - 0.7) X $10^{-4}N \cdot m^2/m$. The laminated sheet portion includes a region in which the inner end zone 36 of the top tape strip 31 is releasably attached to the backsheet 3. When the topsheet 2 is not adhesively attached to the backsheet 3 immediately under the tape fastener 30, a flexural stiffness of the backsheet 3 alone is preferably in a range of (0.03 - 0.7) X $10^{-4}N \cdot m^2/m$.

Fig. 8 is a partially cutaway perspective view showing a pants-type disposable diaper 81 as another preferred embodiment of this invention. This diaper 81 comprises a topsheet 52, a backsheet 53 and a core 54 disposed between these two sheets 52, 53. The diaper 81 is composed of a front waist region 56, a rear waist region 57 and a crotch region 58. The top- and backsheets 52, 53 extend outward beyond a peripheral edge of the core 54 to form transversely opposite side edge portions 59, 60 of the front and rear waist regions 56, 57, respectively. These side edge portions 59, 60 are joined

together at a plurality of regions so that the front and rear waist regions 56, 57 cooperate with the crotch region 58 to form a waist-hole 61 and a pair of leg-holes 62. Tape fasteners 30 similar to those shown in Fig. 4 are disposed to the diaper 81 on the side edge portions 60 or 59 of the rear waist region 57 or the front waist region 56, respectively, so as to extend in a waist-surrounding direction. In the case of the illustrated embodiment, these tape fasteners 30 are disposed to the rear waist region 57. The tape fastener 30 is unfolded rectilinearly as indicated by imaginary lines as the outer end zone 37 of the top tape strip 31 is held and pulled. The tape fasteners 30 disposed to the diaper 81 serve as fastening means not only when the diaper 81 is put on the wearer's body but also when the used diaper 81 is rolled up for disposal.

While the invention has been described with respect to the disposable diaper 1, 81, this invention is applicable also to the other disposable wearing article such as disposable training pants or disposable medical gown. Film of plastic such as polyester, polypropylene, polyethylene or urethane may be used as a stock material for the top tape strip 31, bottom tape strip 32 and the intermediate tape strip 33. The first, second and third adhesives 39, 44, 49 preferably have a high affinity to the film to be coated with these adhesives.

With the disposable wearing article provided with the tape fasteners, the fastener tape comprises the top tape strip and the intermediate tape strip folded on each other so that the outer end zone of the top tape strip may be held and pulled upwardly to stretch the top tape strip and simultaneously to enlarge the angle included between the top tape strip and the intermediate tape strip underlying the top tape strip. In this way, the top tape strip can be easily peeled off from the intermediate tape strip. The inner end zone of the top tape strip may be releasably attached to the surface of the wearing article facing the undergarment to prevent the folded tape fasteners from being unintentionally unfolded.

WE CLAIM:

1. A disposable wearing article having a first surface facing said wearer's body and a second surface facing a garment, said article comprising an adhesive tape fastener disposed to said second surface, said tape fastener having a free end zone and a fixed end zone opposed to each other in a longitudinal direction, said fixed end zone being secured to said second surface, said tape fastener being disposed to said wearing article in a folded posture, said tape fastener being unfolded in a direction from said fixed end zone toward said free end zone with said free end zone being held, and said tape fastener having an inner surface facing said second surface in an unfolded state and being partially coated with an adhesive, said tape fastener lying in a folded posture at an upper site on said disposable wearing article and comprising a first tape strip having said free end zone and a first end zone opposed to said free end zone in said longitudinal direction, a second tape strip underlying said first tape strip and secured over its longitudinally full length to said second surface and having a second end zone and a third end zone opposed to said second end zone, and a third tape strip interposed between said first and second tape strips and having a fourth end zone and said fixed end zone opposed to said fourth end zone and being connected to said first end zone of said first tape strip at said fourth end zone and to at least one of said third end zone of said second tape strip and a zone of said second surface adjacent to said third end zone at said fixed end portion, and

said first tape strip being coated on the inner surface thereof with said adhesive so as to be releasably attached to said third tape strip underlying said first tape strip,

said first end zone including an extension extending from said free end zone toward said first end zone beyond said fourth end zone of said third tape strip and releasably attached to said second surface, said article being wherein:

said free end zone of said first tape strip has an outer end portion separated from said fixed end zone of said third tape strip as well as from said second surface while extending outward of said article from said fixed end zone; and a first region of said third tape strip located between said fixed end portion and said fourth end zone in which the inner surface of said first tape strip is releasably attached to said third tape strip being not adhesively attached to an outer surface of said second tape strip so as to be liftable upwardly off said second tape strip when said tape fastener is unfolded.

2. The disposable wearing article according to Claim 1, wherein said disposable wearing article is a pants-type disposable diaper having a front waist region, a rear waist region and a crotch region extending between these waist regions, said crotch region is provided with an absorbent core, said front and rear waist regions being connected together along respective transversely opposite side edge portions so as to form a waist-hole and a pair of leg-holes and wherein said fixed end zone of said second tape strip is adhesively attached to said second surface in each of said side edge portions of at least one of said front or rear waist region so that the longitudinal direction of said second tape strip is parallel to a waist-surrounding direction of said diaper.

3. The disposable wearing article according to Claim 2, wherein said disposable diaper has flaps formed by a sheet

material extending outwardly beyond a peripheral edge of said core and said fixed end zone of each said second tape strip is adhesively attached to said second surface in each of said flaps.

4. The disposable wearing article according to any one of Claims 1-3, wherein a portion of said second surface under each of said tape fastener in a folded posture or a laminated sheet portion including said portion of said second surface and sheet members separately provided in addition to said portion which are overlaid and joined together has a flexural stiffness of (0.03 - 0.7) x 10^{-4}N . m^2/m.

FIG.1

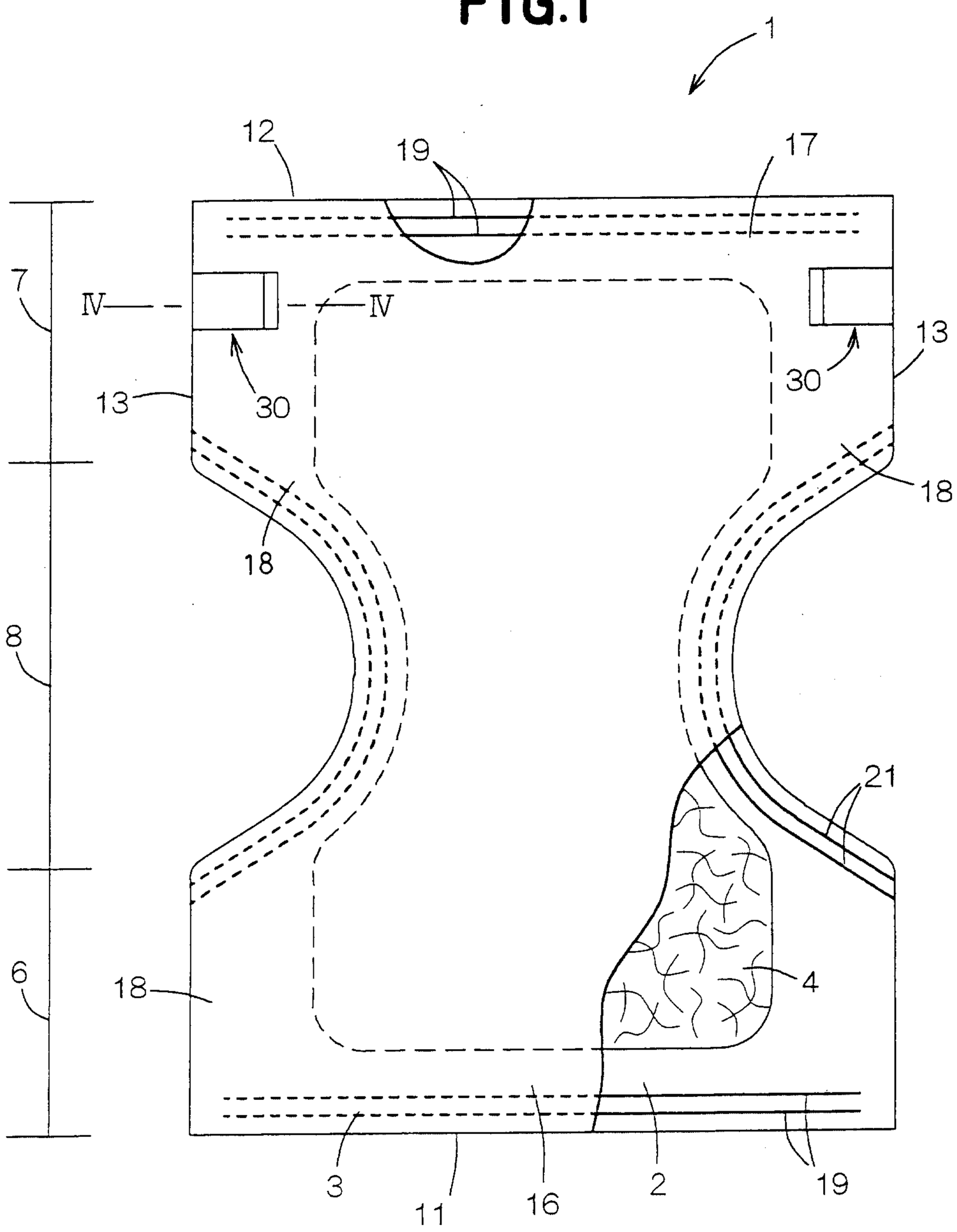
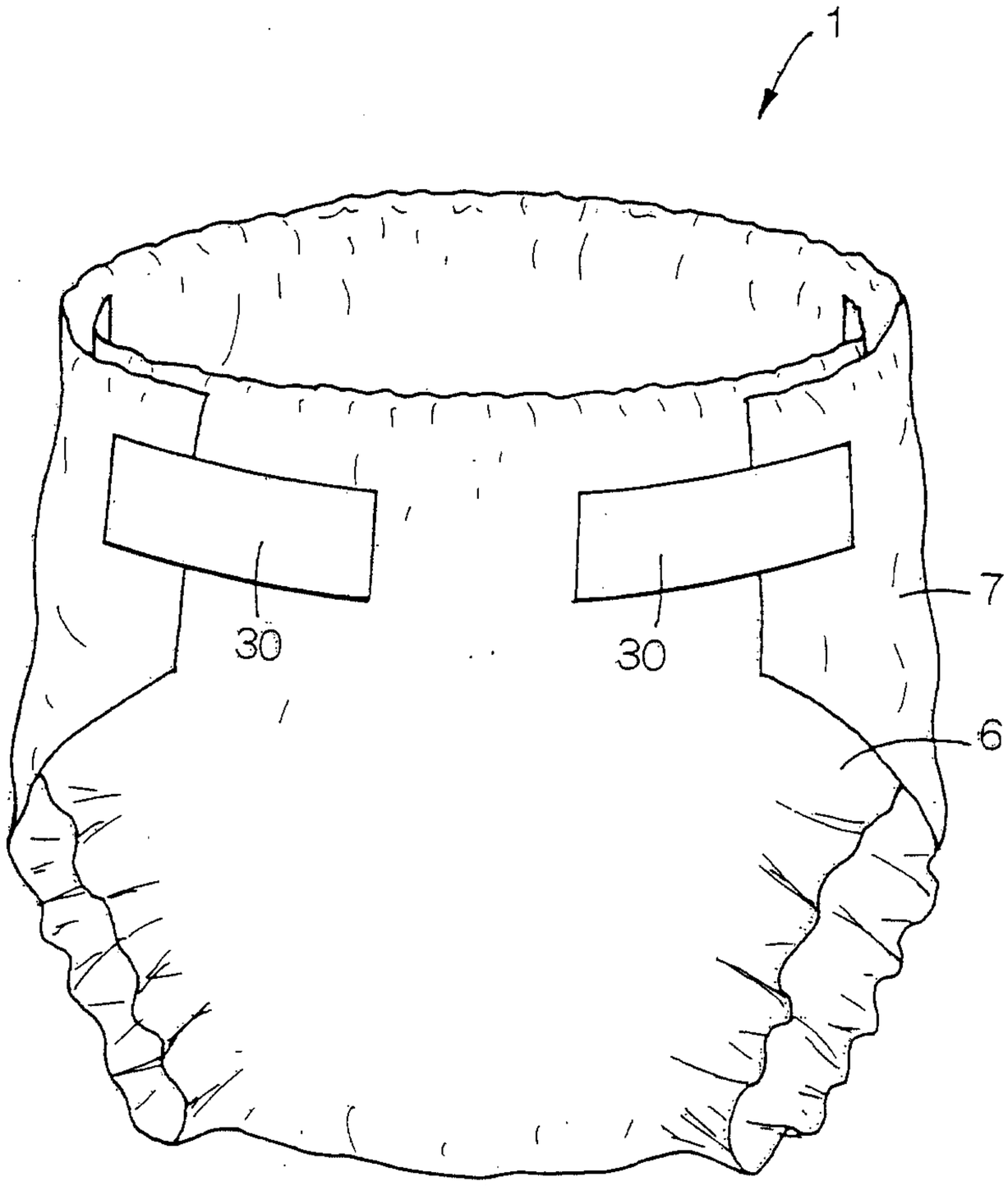


FIG.2



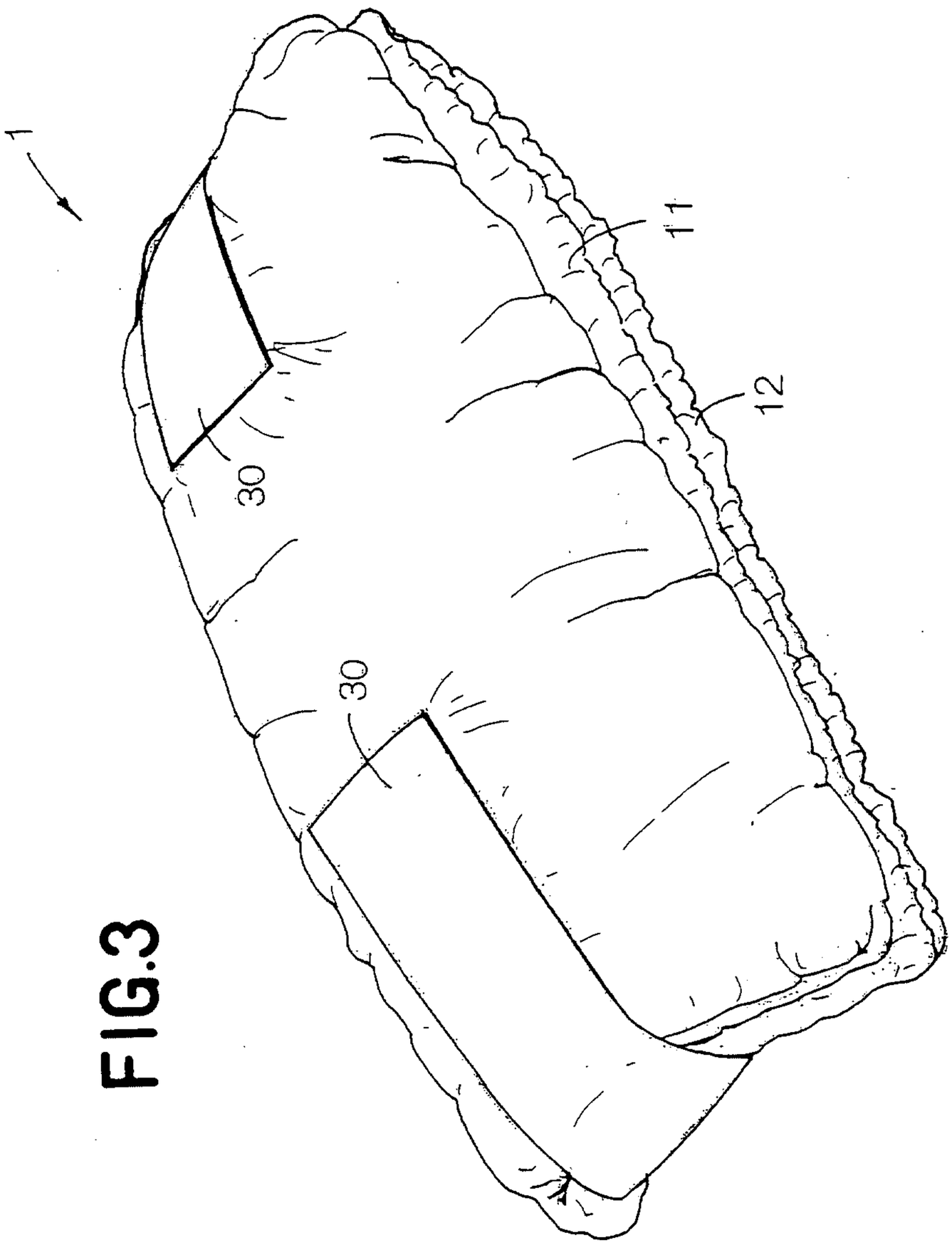


FIG.3

FIG.4

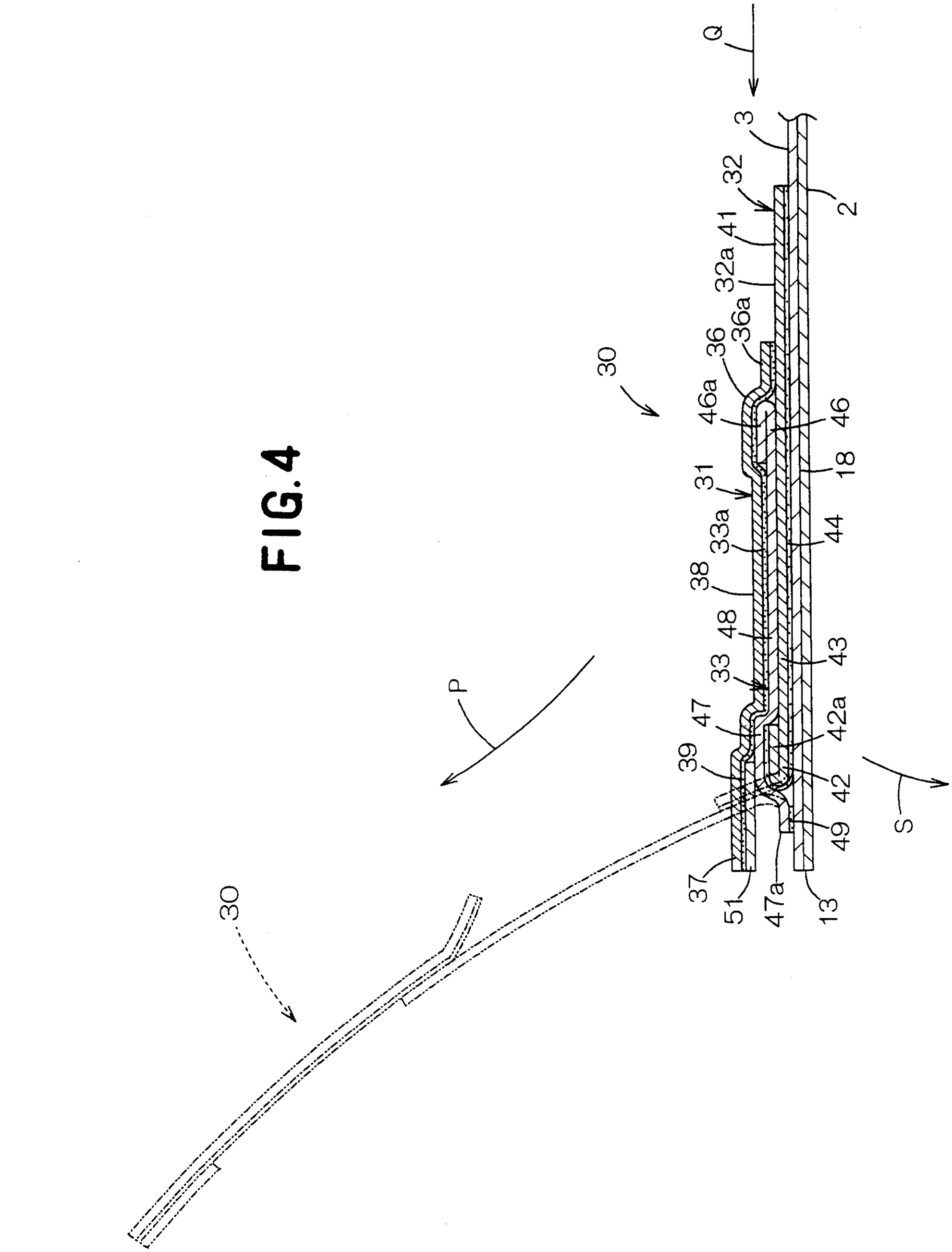

30
P
30
S
2
18
13
31
32
32a
33
33a
36
36a
37
38
39
41
42
42a
43
44
46
46a
47
47a
48
49
51

FIG.5

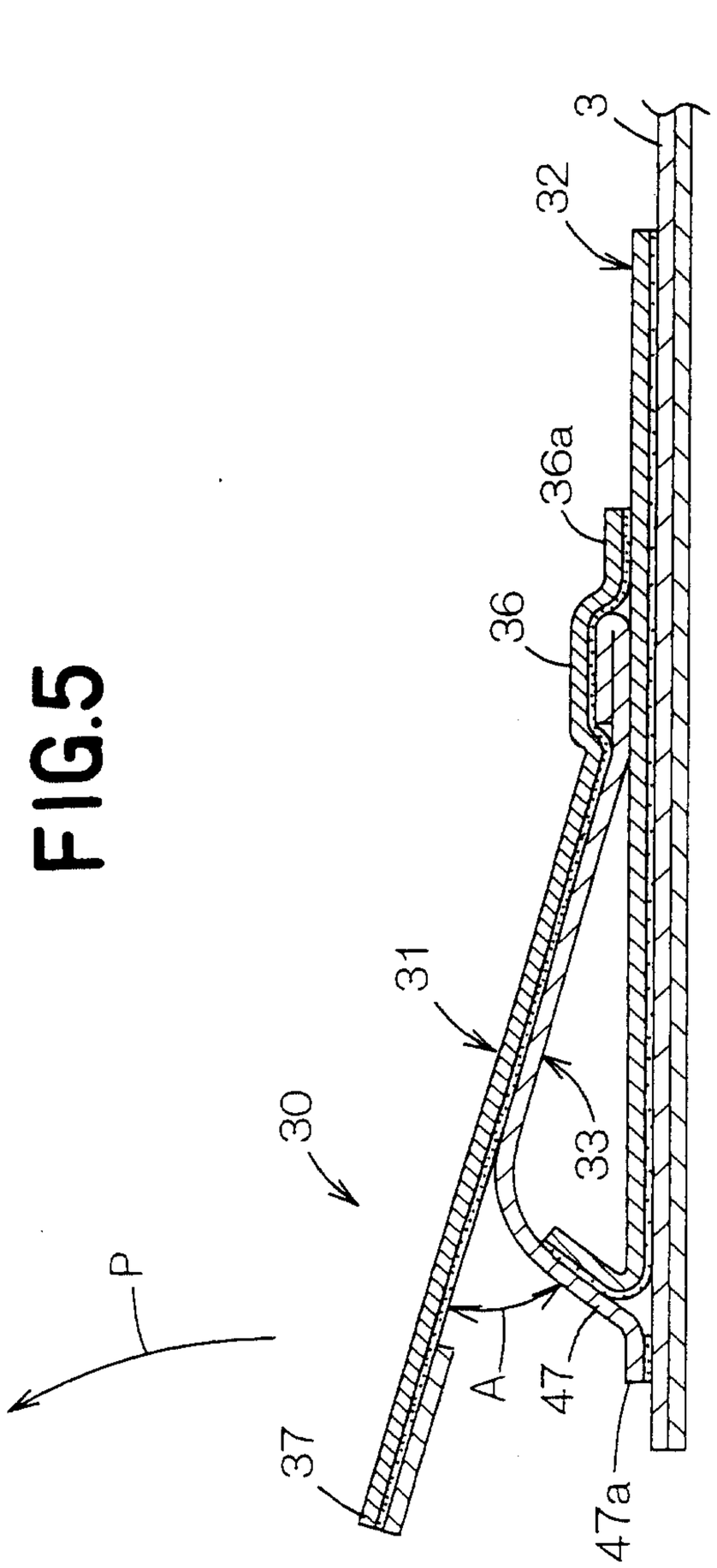


FIG.6

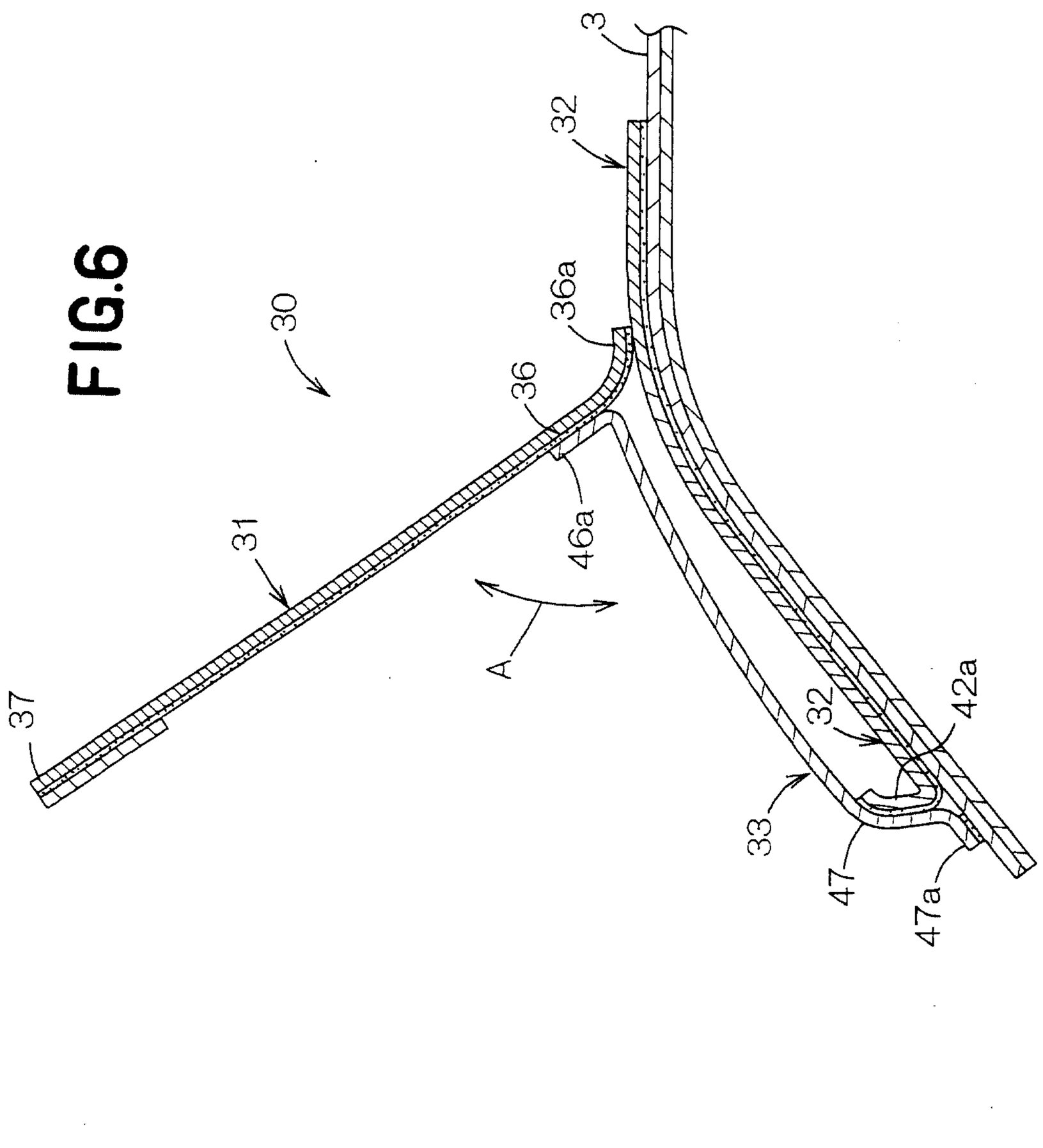


FIG.7

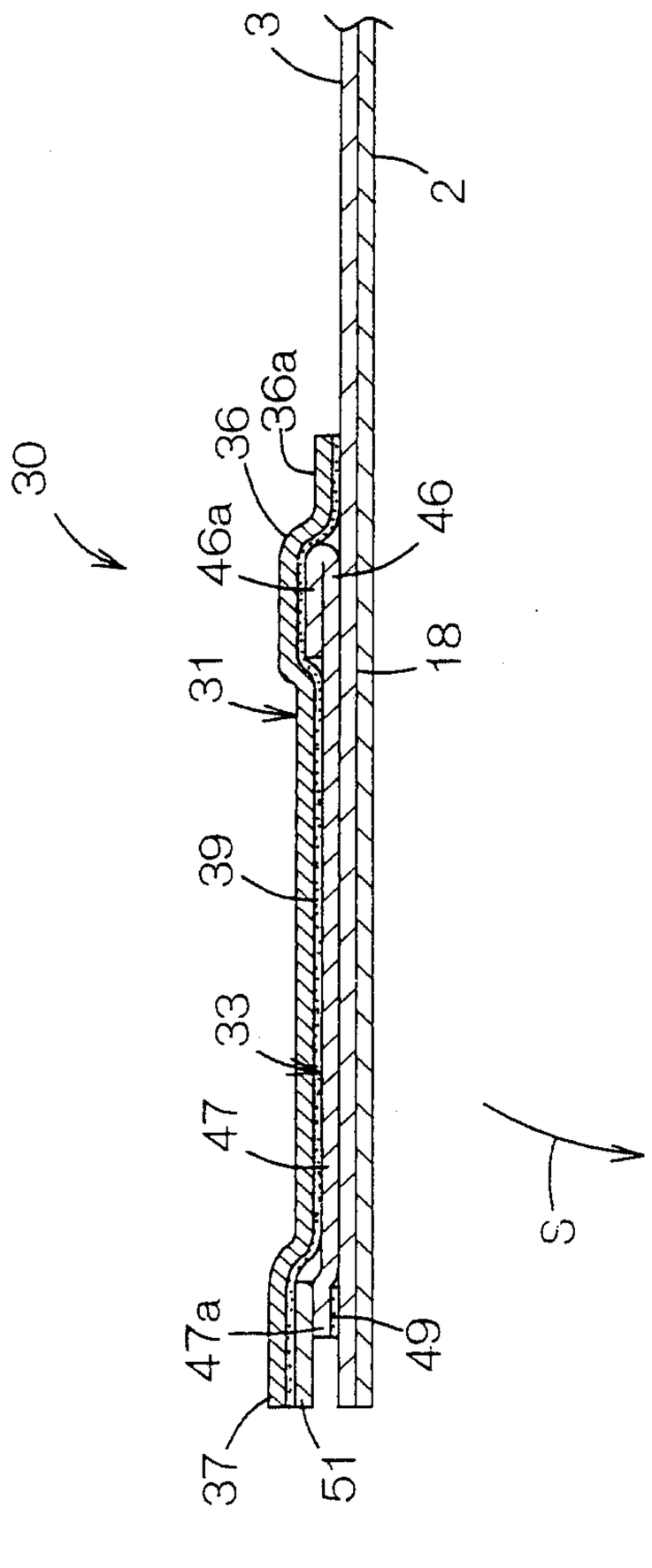


FIG.8

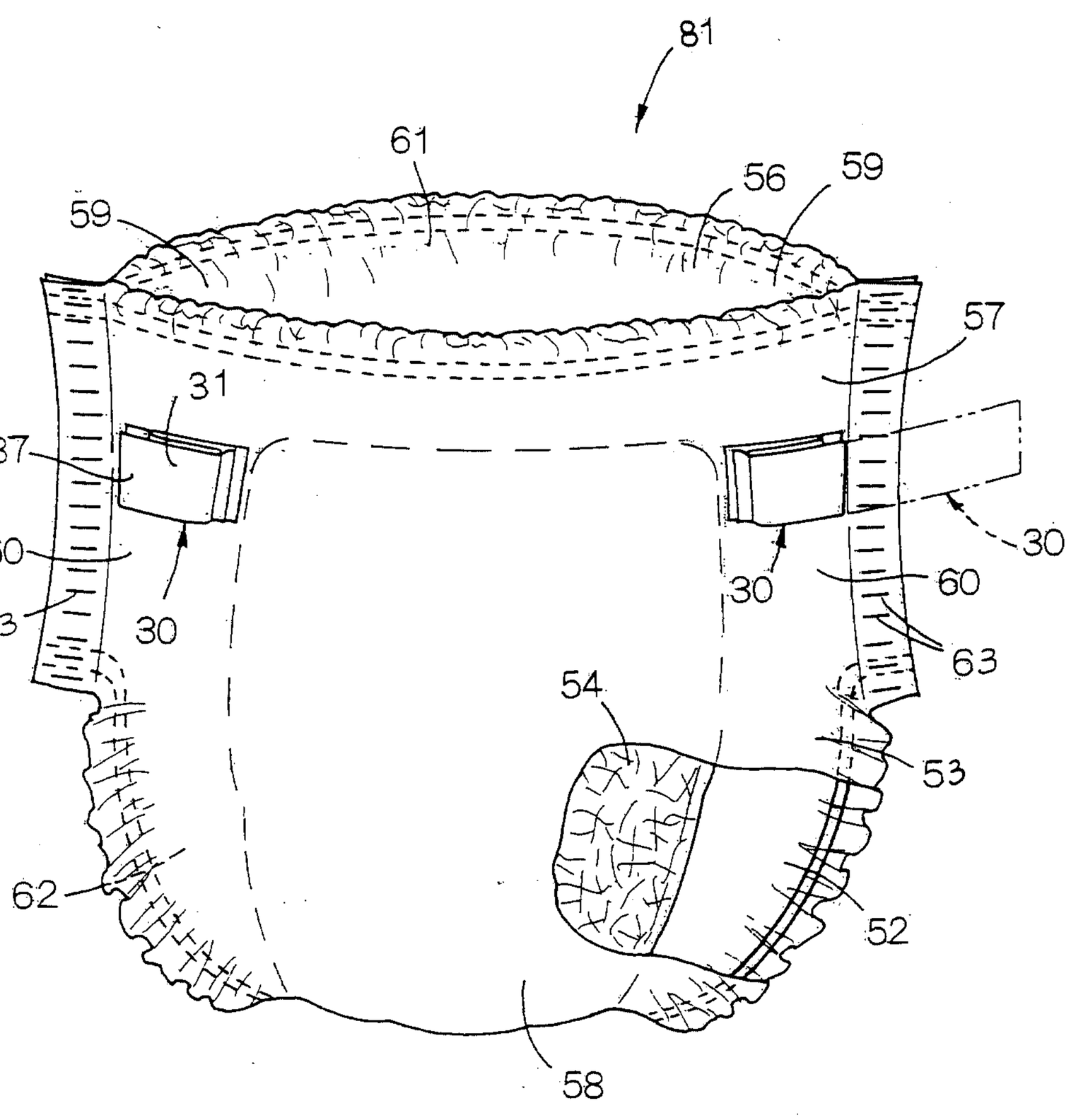
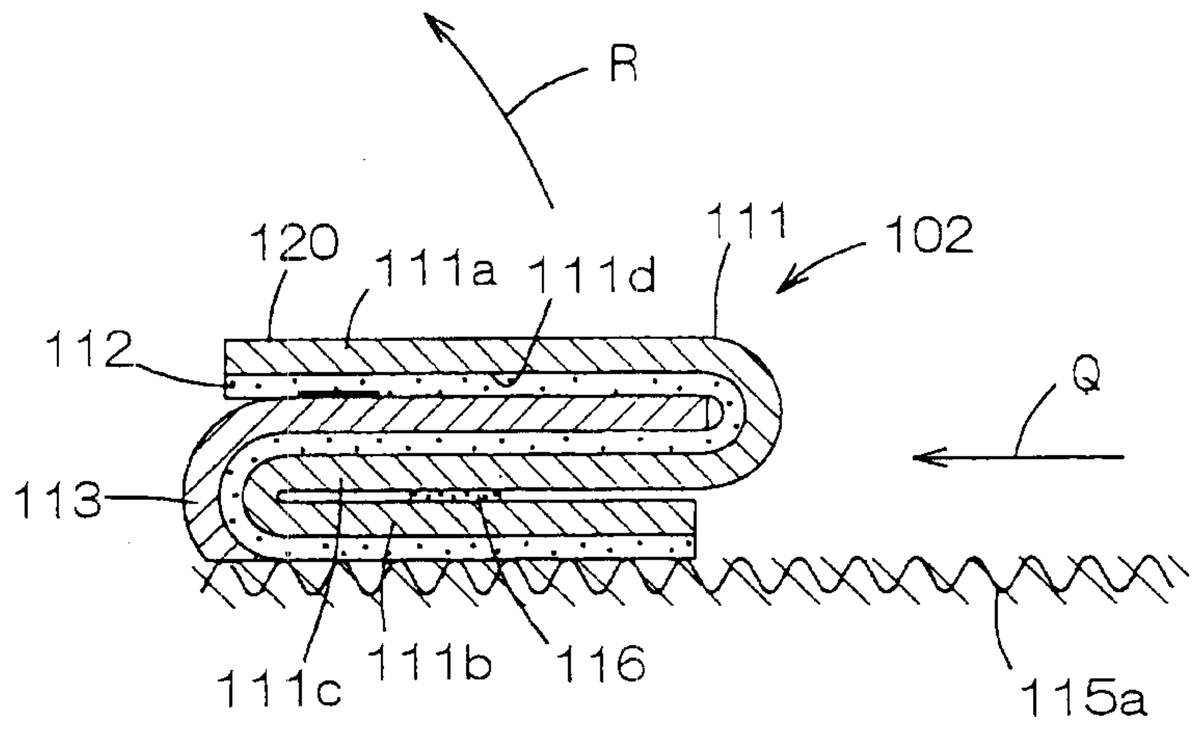
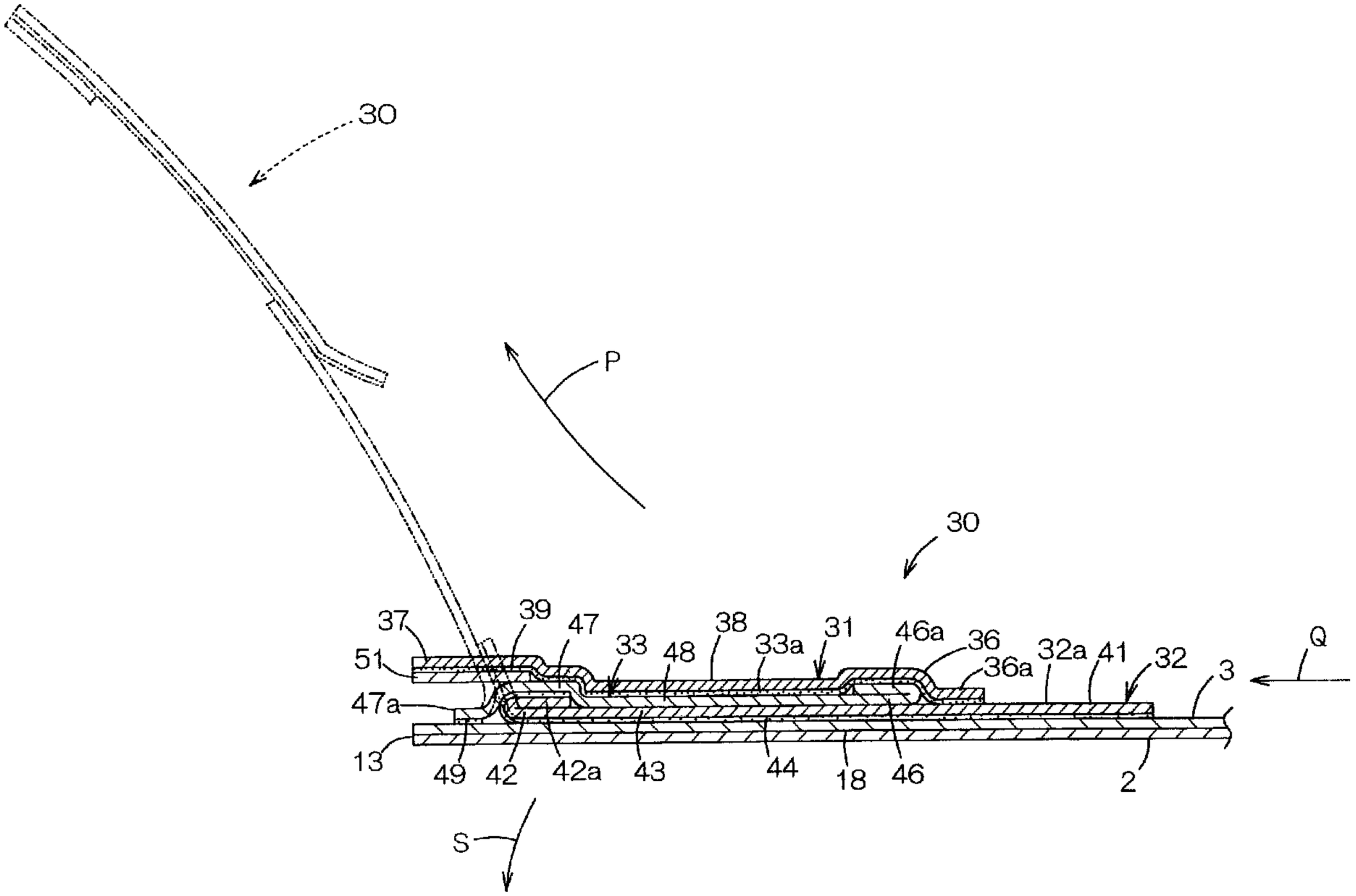


FIG.9



PRIOR ART


30
P
30
37
39
47
33
48
38
33a
31
46a
36
36a
32a
41
32
3
Q
51
47a
13
49
42
42a
43
44
18
46
2
S