(12) STANDARD PATENT (11) Application No. **AU 2014285564 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
PULL-ON WEARING ARTICLE

(51) International Patent Classification(s)
A61F 13/496 (2006.01)

(21) Application No: **2014285564** (22) Date of Filing: **2014.04.08**

(87) WIPO No: **WO15/001826**

(30) Priority Data

(31) Number	(32) Date	(33) Country
2014-073508	**2014.03.31**	**JP**

(43) Publication Date: **2015.01.08**
(44) Accepted Journal Date: **2019.11.28**

(71) Applicant(s)
Unicharm Corporation

(72) Inventor(s)
Shimazu, Takeshi;Ichikawa, Makoto;Kawakami, Yusuke;Kondo, Yui

(74) Agent / Attorney
Phillips Ormonde Fitzpatrick, PO Box 323, COLLINS STREET WEST, VIC, 8007, AU

(56) Related Art
WO 2004/054482 A1
JP H09271488 A
JP 2014-050749 A

(12) 特許協力条約に基づいて公開された国際出願

(19) 世界知的所有権機関
国際事務局

(43) 国際公開日
2015 年 1 月 8 日(08.01.2015)

WIPO | PCT

(10) 国際公開番号
WO 2015/001826 A4

(51) 国際特許分類:
A61F 13/496 (2006.01)

(21) 国際出願番号: PCT/JP2014/060137

(22) 国際出願日: 2014 年 4 月 8 日(08.04.2014)

(25) 国際出願の言語: 日本語

(26) 国際公開の言語: 日本語

(30) 優先権データ:
特願 2014-073508 2014 年 3 月 31 日(31.03.2014) JP

(71) 出願人: ユニ・チャーム株式会社(UNICHARM CORPORATION) [JP/JP]; 〒7990111 愛媛県四国中央市金生町下分１８２番地 Ehime (JP).

(72) 発明者: 島津　健(SHIMAZU, Takeshi); 〒7691602 香川県観音寺市豊浜町和田浜１５３１－７　ユニ・チャーム株式会社テクニカルセンター内 Kagawa (JP). 市川　誠(ICHIKAWA, Makoto); 〒7691602 香川県観音寺市豊浜町和田浜１５３１－７　ユニ・チャーム株式会社テクニカルセンター内 Kagawa (JP). 川上　祐介(KAWAKAMI, Yusuke); 〒7691602 香川県観音寺市豊浜町和田浜１５３１－７　ユニ・チャーム株式会社テクニカルセンター内 Kagawa (JP). 近藤　唯(KONDO, Yui); 〒7691602 香川県観音寺市豊浜町和田浜１５３１－７　ユニ・チャーム株式会社テクニカルセンター内 Kagawa (JP).

(74) 代理人: 白浜　吉治, 外(SHIRAHAMA, Yoshiharu et al.); 〒1050001 東京都港区虎ノ門１丁目４番５号　文芸ビル Tokyo (JP).

(81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

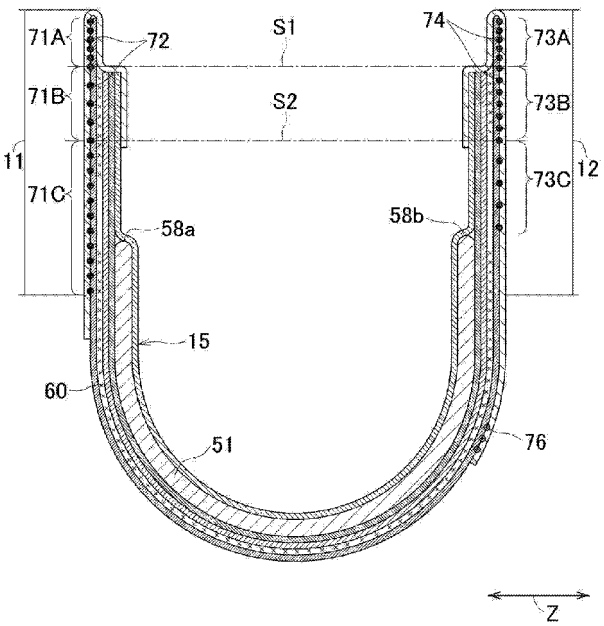
(84) 指定国 (表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, RU, TJ, TM), ヨーロッパ

[続葉有]

(54) **Title**: UNDERPANTS-TYPE WEARABLE ARTICLE

(54) 発明の名称 : パンツ型の着用物品

[図4]



(57) **Abstract**: Provided is an underpants-type wearable article which can be easily worn, and the rear-waist region of which can be smoothly pulled up. This underpants-type wearable article (10) has: a first region (71B) in which front-waist elastic bodies (72) are arranged, and which is disposed between the edge of a waist opening (23) and a front end edge (58a) of a liquid-absorbent core; and a second region (73B) in which rear-waist elastic bodies (74) are arranged and which is disposed between the edge of the waist opening and a rear end edge (58b) of the liquid-absorbent core. The first and second regions are positioned so at to face each other in the front-rear direction (Z). The number of rear-waist elastic bodies present in the second region is higher than the number of front-waist elastic bodies present in the first region. The vertical distance between adjacent rear-waist elastic bodies in the second region is shorter than the vertical distance between adjacent front-waist elastic bodies in the first region.

(57) 要約: 着用操作が容易であるとともに、後ウエスト域の引き上げをスムーズに行うことができるパンツ型の着用物品の提供。 パンツ型の着用物品（１０）は、前ウエスト弾性体（７２）が配置され、ウエスト開口（２３）の縁部と吸液性コアの前端縁（５８ａ）との間に位置する第１領域（７１Ｂ）と、後ウエスト弾性体（７４）が配置され、前記ウエスト開口の縁部と吸液性コアの後端縁（５８ｂ）との間に位置する第２領域（７３Ｂ）とを有し、前記第１及び第２領域は、前後方向（Ｚ）において互いに対向して位置し、前記第２領域における前記後ウエスト弾性体の数は、前記第１領域における前記前ウエスト弾性体の数よりも多く、前記２領域において互いに隣接する前記後ウエスト弾性体の縦方向の離間寸法は、前記第１領域において互いに隣接する前記前ウエスト弾性体のそれよりも小さい。

WO 2015/001826 A4

(AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告（条約第 21 条(3)）

— 補正された請求の範囲（条約第 19 条(1)）

— 出願人の請求に基づく第２１条(2)(a)による期間経過前の公開。

補正された請求の範囲の公開日: 2015 年 8 月 6 日

2014285564 28 Jun 2016

{Description}

{Title of Invention}

PULL-ON WEARING ARTICLE

{Technical Field}

{0001}

The present invention relates to pull-on wearing articles.

{Background}

{0002}

The following discussion of the background to the invention is intended to facilitate an understanding of the invention. However, it should be appreciated that the discussion is not an acknowledgement or admission that any aspect of the discussion was part of the common general knowledge as at the priority date of the application.

{0002a}

Conventionally, pull-on wearing articles are known having a front waist region, a rear waist region and a crotch region extending between the front and rear waist regions, a chassis including the liquid-absorbent core extending from the crotch region to the front and rear waist regions, a waist-opening and a pair of leg-openings. For example, Patent Literature 1 discloses the wearing article provided with the chassis including the front and rear waist regions, the crotch region and the liquid-absorbent core wherein a plurality of string- or strand-like waist elastics extending in the transverse

2014285564 28 Jun 2016

direction are contractibly arranged in the front and rear waist regions under tension.

{0003}

The wearing article disclosed therein has an elastic region (designated hereinafter as a first region) defined on the outer side in the longitudinal direction (lengthwise direction) of the liquid-absorbent core so as to extend in the longitudinal direction between a waist-opening periphery of the front waist region and the liquid-absorbent core and an elastic region (designated hereinafter as a second region) facing a first region in the front-back direction and extending in the longitudinal direction between the waist-opening periphery in the rear waist region and the liquid-absorbent core. The spacing dimension (i.e., pitch) between each pair of the adjacent waist elastics in the first region and the spacing dimension between each pair of the adjacent waist elastics are set to be the same. Consequently, flexural stiffness in the longitudinal direction of the first region and the second region are approximately equal to each other.

{Citation List}

{Patent Literature}

{0004}

{PTL 1}: WO 2004/054482 A

{Summary}

2014285564 28 Jun 2016

{0005}

For the wearing article disclosed in Patent Literature 1, the flexural stiffness in the longitudinal direction in the first region is set to a relatively low level and, in consequence, the chassis is folded in the first region when the waist-opening periphery is spread. The first region folded in this manner facilitates the fingers of the wearer or the care person to be caught by the chassis, thereby making easy the handling to put a diaper on the body of a wearer.

{0006}

Meanwhile in the rear waist region, the second region has a relatively low flexural stiffness approximately equal to that in the first region and consequently this region might be easily folded and touch against the unevenness defined between the thighs and the buttocks of the wearer, making it difficult to pull up the article. If the second region is forcedly pulled up from such a state, a "state of being partially folded and getting relatively large gathers" occurs in part of the chassis in the second region.

{0007}

In view of this, it is desirable to improve the prior art and to provide the pull-on wearing articles so that handling to put the article on the wearer's body may be facilitated and the rear waist region may be smoothly pulled up without occurring the state being turned up in part of the rear waist

2014285564 06 Nov 2019

region.

{0008}

According to a pull-on wearing article having a longitudinal direction, a transverse direction, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region, a rear waist region and a crotch region extending between the front and rear waist regions and provided with a chassis including a liquid-absorbent core extending from the crotch region to the front and rear waist regions, a waist-opening and a pair of leg-openings defined by both lateral edge portions of the front and rear waist regions joined to each other, wherein: the liquid-absorbent core has a front end edge and a rear end edge spaced from and facing each other in the longitudinal direction and extending in the transverse direction; the front waist region has an outermost front waist elastic region extending in the transverse direction along the periphery of the waist-opening, an innermost front waist elastic region extending in the transverse direction on the side of the crotch region, and a first region defined between the outermost front waist elastic region and the innermost front waist elastic region and located outside of the liquid-absorbent core in the longitudinal direction; in the outermost front waist elastic region, the innermost front waist elastic region and the first region, a

2014285564 06 Nov 2019

plurality of front waist elastics is contractibly secured under tension between both lateral edge portions of the front waist region; the rear waist region has an outermost rear waist elastic region extending in the transverse direction along the periphery of the waist-opening, an innermost rear waist elastic region extending in the transverse direction on the side of the crotch region, and a second region defined between the outermost rear waist elastic region and the innermost rear waist elastic region and located outside of the liquid-absorbent core in the longitudinal direction; in the outermost rear waist elastic region, the innermost rear waist elastic region and the second region, a plurality of rear waist elastics is contractibly secured under tension between both lateral edge portions of the rear waist region; the first region and the second region facing each other in a front-back direction in the article when put on a wearer's body; the number of the rear waist elastics is more than the number of the front waist elastics in the first region; a spacing dimension in the longitudinal direction between each pair of the adjacent rear waist elastics in the second region is smaller than a spacing dimension in the longitudinal direction between each pair of the adjacent front waist elastics in the first region; and a sheet- or ribbon-like stiffness imparting element is arranged in a part of the second region.

2014285564 06 Nov 2019

{0009}

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{0010}

According to a second aspect of the present invention there is provided a pull-on wearing article having a longitudinal direction, a transverse direction, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region, a rear waist region and a crotch region extending between the front and rear waist regions and provided with a chassis including a liquid-absorbent core extending from the crotch region to the front and rear waist regions, a waist-opening and a pair of leg-openings defined by both lateral edge portions of the front and rear waist regions joined to each other, wherein: the liquid-absorbent core has a front end edge and a rear end edge spaced from and facing each other in the longitudinal direction and extending in the transverse direction; the front waist region has a first region defined between a periphery of the waist-opening and the front end edge of the liquid-absorbent core so as to extend over an entire area between both lateral edges of the front waist region; the rear waist region has a second region defined between a periphery of the waist-opening and the rear end edge of the liquid-absorbent core so as to extend over an entire area between both lateral edges of the rear waist region; the first

2014285564 06 Nov 2019

region and the second region facing each other in a front-back direction in the article when put on a wearer's body; and a flexural stiffness in the longitudinal direction of the second region is higher than a flexural stiffness in the longitudinal direction of the first region; and a sheet- or ribbon-like stiffness imparting element is arranged in a part of the second region.

{Advantageous Effects of Invention}

{0011}

In one or more embodiments of the pull-on wearing articles according to the first aspect of the present invention, the front waist region has the first region defined between the periphery of the waist-opening and the front end edge of the liquid-absorbent core and including the front waist elastics arranged therein. The rear waist region has the second region defined between the periphery of the waist-opening and the rear end edge of the liquid-absorbent core and, with the article put on the wearer's body, faces the first region in the front-back direction. The number of the rear waist elastics in the second region is more than the number of the front waist elastics in the first region. The spacing dimension in the longitudinal

direction between each pair of the rear waist elastics is smaller than the spacing dimension in the longitudinal direction between each pair of the front waist elastics. For this reason, in the first region, the flexural stiffness in the longitudinal direction is lower than that in the second region and the fingers of the wearer or the care person are smoothly caught by the chassis when the periphery of the waist-opening is spread, facilitating the handling of putting the diaper on the wearer's body. Meanwhile in the second region, the flexural stiffness in the longitudinal direction is higher than in the first region and, for this reason, the chassis is not easily bent. Consequently, it is possible to prevent the chassis from "being partially displaced and getting relatively large gathers", thereby pulling up the rear waist region smoothly.

{0012}

In one or more embodiments of the pull-on wearing articles according to the second aspect of the present invention, the flexural stiffness in the longitudinal direction of the second region defined in the rear waist region is higher than the flexural stiffness in the longitudinal direction of the first region defined in the front waist region. For this reason, the fingers of the wearer or the care person are easily caught by the chassis in the first region and whereby the handling of

putting the diaper on the wearer's body is facilitated. In the second region, the chassis is not easily folded and, in consequence, it is possible to prevent the chassis from "being partially displaced and getting relatively large gathers", thereby pulling up the rear waist region smoothly.

{Brief Description of Drawings}

{0013}

The drawings illustrate specific embodiments of the present invention including optional and preferred embodiments as well as essential features of the invention.

{Fig. 1} Fig. 1 is a perspective view illustrating a disposable diaper according to a first embodiment as an example of pull-on wearing articles according to the present disclosure.

{Fig. 2} Fig. 2 is a partially cutaway, flat-out plan view of the diaper having been elongated close to the maximum elongation states of elastics to such a degree that gathers contraction of the elastics disappear in a longitudinal direction and in a transverse direction.

{Fig. 3} Fig. 3 is a partially cutaway exploded perspective view of the diaper.

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

{Fig. 5} Fig. 5 is a plan view of a front waist region.

{Fig. 6} Fig. 6 is a plan view of a rear waist region.

{Fig. 7} Fig. 7(a) is a perspective back view illustrating a situation when a known diaper is put on a wearer's body and Fig. 7(b) is a schematic sectional view taken along line VII(b)-VII(b).

{Fig. 8} Fig. 8(a) is a perspective back view illustrating a situation when the diaper illustrated in Fig. 1 and Fig. 8(b) is a schematic sectional view taken along line VIII(b)-VIII(b).

{Fig. 9} Fig. 9 is a back plan view of a rear waist region indicating a region in which a test piece is cut out.

{Fig. 10} Fig. 10 is a back plan view of the rear waist region, indicating a variant of the diaper.

{Fig. 11} Fig. 11 is a schematic sectional view taken along line XI-XI in Fig. 10.

{Fig. 12} Fig. 12 is a plan view similar to Fig. 2, illustrating a diaper according to a second embodiment.

{Fig. 13} Fig. 13 is an exploded perspective view similar to Fig. 3, illustrating the diaper according to the second embodiment.

{Description of Embodiments}

{0014}

<First Embodiment>

The embodiments described below relate to a pull-on wearing

article as illustrated in Figs. 1 through 4 as an example of the pull-on wearing articles according to the present invention, including both optional and preferred features as well as those features which are essential features of the present invention. In Fig. 2, respective elastics described later are kept in a state that the elastics have been sufficiently elongated against contractile force thereof to assure that whole gathering formed on elements of the article to which the elastics are secured under contractile force in a transverse direction X and a longitudinal direction Y approximately disappear so far as ordinary visual perception is concerned.

{0015}

Referring to Figs. 1 through 3, a disposable pull-on diaper 10 as an example of the pull-on wearing article according to the present invention has a longitudinal direction Y and a transverse direction X being orthogonal to each other, a skin facing surface, a non-skin facing surface opposite to the skin facing surface, a longitudinal axis P bisecting a length direction in the transverse direction X and a transverse axis Q bisecting a length direction in the longitudinal direction Y wherein the diaper 10 is approximately symmetric about the longitudinal axis P. The diaper 10 includes a front waist region 11, a rear waist region 12 and a crotch region 13 extending

between the front waist region 11 and the rear waist region 12.

{0016}

The diaper 10 includes a chassis 14 having a basic configuration of the diaper 10. The chassis 14 has both lateral edges partially forming concave curves so as to define the crotch region 13 and the narrowest portion of the crotch region 13 is situated nearer the front waist region 11 in relation to the transverse axis Q. Lateral edge portions 11a, 11b of the front waist region 11 and lateral edge portions 12a, 12b of the rear waist region 12 are respectively opposed to each other in a front-back direction Z and joined along side seams 22 continually extending in the longitudinal direction Y to define a waist-opening 23 and a pair of leg-openings 24. At the side seams 22, sheets overlapping with each other may be fusion-bonded to each other by well known techniques, for example, heat or ultrasonic emboss/deboss processing.

{0017}

The chassis 14 includes a base sheet 25 formed of a fibrous nonwoven fabric lying on the skin facing surface and continuously defining the front and rear waist regions 11, 12 and the crotch region 13, a front waist sheet 26 and a rear waist sheet 27 both formed of fibrous nonwoven fabrics lying on the side of the non-skin facing surface and spaced from and opposed to each other

in the longitudinal direction Y and a liquid-absorbent structure 15 lying on the side of the skin facing surface and extending across the crotch region 13 into the front and rear waist regions 11, 12.

{0018}

<base sheet>

The base sheet 25 has first and second end edges 25a, 25b spaced from and opposed to each other in the longitudinal direction Y and both lateral edges 25c, 25d spaced from and opposite to each other in the transverse direction X. The lateral edges 25c, 25d are respectively defined by linear portions in the front and rear waist regions 11, 12 and curved portions in the crotch region 13 convexly extending toward the longitudinal axis P in such a manner that these curved portions gradually become deeper from the side of the rear waist region 12 to the side of the front waist region 11.

{0019}

<front waist sheet>

The front waist sheet 26 has a generally trapezoidal shape defining the front waist region 11 and part of the crotch region 13 and this generally trapezoidal shape is contoured by an intermediate interior end edge 26a and an exterior end edge 26b both extending in the transverse direction X, both exterior

lateral edges 26c, 26d extending in the longitudinal direction Y and ambilateral interior end edges 26e, 26f connecting the ambilateral exterior edges 26c, 26d to the intermediate interior end edge 26a. The interior end edges 26e, 26f respectively have linear portions linearly extending in the transverse direction X from the exterior lateral edges 26c, 26f and curved portions respectively extending from the respective linear portions to the intermediate interior end edge 26a. The front waist sheet 26 has a folded portion 33 folded inward at a small angle along a periphery of the waist-opening. In a state that the liquid-absorbent structure 15 has been set on the interior surface of the base sheet 25, the folded portion 33 is completely folded back inward along the first end edge 25a of the base sheet 25 and fixed to the respective skin facing surfaces of the base sheet 25 and the liquid-absorbent structure 15.

{0020}

<rear waist sheet>

The rear waist sheet 27 has a generally trapezoidal shape defining the rear waist region 12 and part of the crotch region 13 and this generally trapezoidal shape is contoured by an intermediate interior end edge 27a and an exterior end edge 27b both extending in the transverse direction X, exterior edges 27c, 27d extending in the longitudinal direction Y from the

exterior end edge 27b and curved interior end edges 27e, 27f connecting the exterior end edges 27c, 27d to the intermediate interior end edge 27a. The rear waist sheet 27 has a folded portion 38 folded inward at a small angle along the periphery of the waist-opening. In the state that the liquid-absorbent structure 15 has been set on the interior surface of the base sheet 25, the folded portion 38 is completely folded back inward along the second end edge 25b of the base sheet 25 and fixed to the respective skin facing surfaces of the base sheet 25 and the liquid-absorbent structure 15.

{0021}

Referring to Figs. 2 through 4, front waist elastics 72 extending in the transverse direction X in the front waist region 11 are contractibly secured under tension and between the front waist sheet 26 and the base sheet 25.

Rear waist elastics 74 extending in the transverse direction X in the rear waist region 12 and buttocks-elastics 76 extending from the rear waist region 12 toward the crotch region 13 so as to follow a predetermined curve are contractibly secured under tension between the rear waist sheet 27 and the base sheet 25. The respective elastics arranged in this manner make it possible for the front and rear waist regions 11, 12 to have front and rear elasticized areas 71, 73 adapted to be elastically

contractible as will be described later in detail.

{0022}

As materials for the base sheet 25 and the front and rear waist sheets 26, 27, various types of materials may be used, for example, spunbonded fibrous nonwoven fabrics, SMS (spunbonded/meltblown/spunbonded) fibrous nonwoven fabrics, airthrough fibrous nonwoven fabrics, and plastic sheets of laminate sheets obtained therefrom, each having a mass per unit area in a range of about 10 to about 40 g/m2. In the present embodiment, SMS fibrous nonwoven fabrics having a mass per unit area in a range of about 10 to 18 g/m2, preferably about 13 g/m2 may be used as material for the base sheet 25 and spunbonded fibrous nonwoven fabrics having a mass per unit area in a range of about 15 to 25 g/m2, preferably a mass per unit area of about 20g/m2 may be used as materials for the front and rear waist sheets 26, 27.

In the present embodiment, the respective exterior surfaces of the front and rear waist sheets 26, 27 are optionally subjected to embossing/debossing processing in a reticular pattern so that a concave-convex pattern 28 may be arranged on the respective exterior surfaces. While a central area 13C of the crotch region 13 is formed of the base sheet 25 alone in the present embodiment, it is also possible to form the central area 13C from two or

more sheets.

{0023}

Regarding respective dimensions of the diaper 10 (same as the corresponding dimensions of the chassis 14), a dimension L1 in the longitudinal direction Y of the diaper 10 is in a range of about 600 to about 1000 mm, a dimension W1 in the transverse direction X thereof is in a range of about 400 to about 800 mm and a dimension L2 in the longitudinal direction Y of the respective front lateral edge portions 11a, 11b of the front waist region 11 (same as the corresponding dimension in the longitudinal direction Y of the respective rear lateral edge portions 12a, 12b of the rear waist region 12) is in a range of about 80 to about 150 mm.

{0024}

<liquid-absorbent structure>

Referring to Figs. 2 and 3, the liquid-absorbent structure 15 is contoured by a front end edge 15a and a rear end edge 15b spaced from and opposed to each other in the longitudinal direction Y and extending in the transverse direction X and both edges 15c spaced from and opposed to each other in the transverse direction X and extending in the longitudinal direction Y, and includes a front end portion 16A, a rear end portion 16B and a central portion 16C defined between the front and rear end

portions 16A, 16B. The liquid-absorbent structure 15 lies on the side of the skin facing surface and includes a body side liner 50 formed of liquid-permeable fibrous nonwoven fabrics, a liquid-permeable absorbent body 51 having curved both edges, a pair of barrier-cuff sheets 52 and a barrier back sheet 53. The absorbent body 51 includes a liquid-absorbent core formed of, for example, a mixture of wood fluff pulp and superabsorbent polymer particles or the like and a liquid-absorbent and -diffusive core cover sheet such as tissue paper adapted to wrap the entirety of the liquid-absorbent core. The liquid-absorbent core has a front end edge 58a extending in the transverse direction X in the front waist region 11 and a rear end edge 58b spaced from and opposed to the front end edge 58a in the longitudinal direction Y and extending in the transverse direction X. The body side liner 50, the barrier cuff sheets 52 and the barrier back sheet 53 cooperate together to form end flaps 56a, 56b extending in the longitudinal direction Y from the front end edge 58a and the rear end edge 58b of the liquid-absorbent core, respectively. The liquid-absorbent structure 15 and the base sheet 25 are joined to each other through a joint area 60 formed of well known joint means such as hot melt adhesive distributed onto at least one of facing surfaces of the liquid-absorbent structure 15 and the base sheet

25. While the joint area 60 includes a plurality of joint sub-areas spaced from each other in the longitudinal direction Y, it is possible to provide the joint area in the form of a contiguous joint area in which the entire underside surface of the liquid-absorbent structure 15 may be joined to the base sheet 25.

{0025}

Referring to Fig. 2, a pair of the barrier cuff sheets 52 are respectively doubled up and, in each of the barrier cuff sheets 52, halves of an interior surface are fixed to each other. Each of the barrier cuff sheets 52 has a front fixed portion and a rear fixed portion spaced from and opposite to each other in the longitudinal direction Y, a fixed lateral edge portion 52b extending in the longitudinal direction and a free lateral edge portion 52a lying inside in the transverse direction X of the fixed lateral edge portion 52b. Within the free lateral edge portion 52a, cuff elastics 57 formed of string- or strand-like elastic material extending in the longitudinal direction Y are contractibly secured under tension. Contraction of the cuff elastics 57 causes the free lateral edge portions 52a to space away from the body side liner 50 toward the wearer's body, thereby forming a pair of barriers adapted to prevent body exudates from leaking sideways. The barrier back sheet 53 is formed of

liquid-impermeable fibrous nonwoven fabrics, liquid-impermeable and breathable plastic films or a laminates thereof and allocated so as to cover at least an approximately entire lower surface of the absorbent body 51, thereby preventing body exudates from leaking out from the side of the non-skin facing surface (i.e., bottom surface) of the liquid-absorbent structure 15.

{0026}

<front and rear waist elastic regions>

Fig. 4 is the sectional view taken along line IV - IV in Fig. 1 and Figs. 5 and 6 are plan views respectively illustrate states of the front and rear waist regions 11, 12 in Fig. 2 after the liquid-absorbent structure 15 has been removed. The front waist elastic region 71 has the outermost front waist elastic region 71A extending in the transverse direction X along the periphery of the waist-opening 23, the innermost front waist elastic region 71C extending in the transverse direction X so as to overlap with part of the crotch region 13 and an intermediate front waist elastic region (first region) 71B defined between the outermost front waist elastic region 71A and the innermost front waist elastic region 71C on the outer side in the longitudinal direction Y of the liquid-absorbent core. The rear waist elastic region 73 has the outermost rear waist elastic region

73A extending in the transverse direction X along the periphery of the waist-opening 23, the innermost rear waist elastic region 73C extending in the transverse direction X so as to overlap with part of the crotch region 13 on the outer side in the longitudinal direction Y of the liquid-absorbent core and an intermediate rear waist elastic region (second region) 73B defined between the outermost rear waist elastic region 73A and the innermost rear waist elastic region 73C. As imaginary lines S1, S2 extending in parallel to each other in the front-back direction X suggest in Fig. 4, with the diaper put on the wearer's body, the outermost front waist elastic region 71A faces the outermost rear waist elastic region 73A in the front-back direction Z and the intermediate front waist elastic region 71B faces the intermediary rear waist elastic region 73B in the front-back direction Z. In this regard, as long as the advantageous effect of the present invention described later in detail is ensured, at least the intermediate front waist elastic region 71B and the intermediate rear waist elastic region 73B should face each other in the front-back direction Z.

{0027}

According to the present invention, the intermediate front and rear waist elastic regions 71B, 73B are at least about 50 mm distanced in the longitudinal direction Y from the waist-opening

23 and have a width dimension (i.e., dimension in the longitudinal direction Y), respectively, when the front and rear waist regions 11, 12 respectively have a dimension in the longitudinal direction Y of about 140 mm. When the diaper 10 is put on the wearer's body, the intermediate front and rear waist elastic regions 71B, 73B distanced from the waist-opening 23 at least by about 50 mm facilitate the wearer or the care person to dig up the outermost front waist elastic region 71A with the hands and to get his or her fingers caught in the folded intermediate front waist elastic region 71B. Meanwhile, stiffness of the intermediate rear waist elastic region 73B may be increased so that the intermediate rear waist elastic region 73B would not be easily folded along an unevenness between the buttocks and the thighs of the wearer in the course of pulling up the diaper 10 in the rear waist region 12 to prevent the diaper 10 from being folded up. In addition, to ensure the advantageous effect of the present invention described later in detail, the intermediate front and rear waist elastic regions 71B, 73B are preferably located adjacent to the front and rear end edges 15a, 15b of the liquid-absorbent structure 15, respectively, in the vicinity of which a flexural stiffness varies in the longitudinal direction Y in the front and rear waist regions 11, 12. The as used herein, the term "being folded up" set forth above means

more specifically that the article put on the wearer's body partially displaces and forms relatively large wrinkles/gathers, for example, like "tack" (See Fig. 7).

{0028}

<respective elastics>

The front waist elastics 72 may be formed of string- or strand-like elastic material. The front waist elastics 72 in the outermost front elastic region 71A are formed of a plurality of string- or strand-like elastic materials preferably having a fineness in a range of 300 to 1000 dtex and secured at stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 3 to about 15 mm in the longitudinal direction Y. Meanwhile in the present embodiment, the front waist elastics 72 are formed of five string- or strand elastic materials having a fineness of about 620 dtex and secured at stretch ratio in a range of about 2.3 at regular intervals of about 6 mm in the longitudinal direction Y. The front waist elastics 72 in the intermediate front waist elastic region 71B are arranged so as to overlap with the end flap 56a in a planar view and formed of a plurality of string- or strand-like elastic materials each having a fineness in a range of 300 to 1000 dtex and secured at a stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 3 to

about 15 mm in the longitudinal direction Y. Meanwhile in the present embodiment, four string- or strand-like materials having a fineness of about 470 dtex are secured at a stretch ratio of about 2.3 at regular intervals of about 10 mm in the longitudinal direction Y. The front waist elastics 72 in the innermost front waist elastic region 71C are formed of a plurality of elastic materials having a fineness in a range of 300 to 1000 dtex and secured preferably at a stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 5 to about 20 mm in the longitudinal direction Y. Meanwhile in the present embodiment, the front elastics 72 in the innermost front waist elastic region 71C are formed of ten string- or strand-like elastic materials secured a stretch ratio of about 2.5 at regular intervals of about 10 mm in the longitudinal direction Y.

{0029}

The rear waist elastics 74 may be formed of string- or strand-like elastic materials. The rear waist elastics 74 in the outermost rear waist elastic region 73A are formed of a plurality of elastic materials having a fineness in the range of 300 to 1000 dtex and secured at a stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 3 to about 15 mm in the longitudinal direction

Y. Meanwhile in the present embodiment, the elastics 74 are formed of five elastic materials having a fineness of about 620 dtex and secured at a stretch ratio of about 2.3 at regular intervals in a range of about 3 to about 15 mm in the longitudinal direction Y. The rear waist elastics 74 in the intermediate rear waist elastic region 73B are formed of a plurality of elastic materials having a fineness in a range of 300 to 1000 dtex and secured at a stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 3 to about 15 mm in the longitudinal direction Y. Meanwhile in the present embodiment, the elastics 74 are formed of six elastic materials having a fineness of about 780 dtex and secured at a stretch ratio of about 2.1 at regular intervals of about 7 mm in the longitudinal direction Y. The rear waist elastics 74 in the innermost rear waist elastic region 73C are formed of a plurality of elastic materials having a fineness in a range of 300 to 1000 dtex and secured at a stretch ratio in a range of about 1.8 to about 3.5 preferably at regular intervals in a range of about 5 to about 20 mm in the longitudinal direction Y. Meanwhile in the present embodiment, this rear waist elastics 74 are formed of four elastic materials having a fineness of about 780 dtex and secured at a stretch ratio of about 2.5 at regular intervals of about 15 mm in the longitudinal direction Y.

{0030}

Referring to Fig. 6, the chassis 14 has a buttocks-elastic region 75 extending from the rear waist region 12 to the crotch region 13. The buttocks-elastic region 75 is provided with a plurality of buttocks-elastic 76 extending toward the transverse axis Q so as to describe a curve contractibly secured thereto under tension. The buttocks-elastics 76 may be formed from a plurality of string- or strand-like elastic materials having a fineness in a range of about 500 to about 800 dtex and secured at a stretch ratio in a range of about 1.0 to about 2.5.

{0031}

A spacing dimension (pitch) in the longitudinal direction Y between each pair of the adjacent rear waist elastics 74 arranged in the intermediate rear waist elastic region 73B is smaller than a spacing in the longitudinal direction Y between each pair of the adjacent front waist elastics 72 arranged in the intermediate front waist elastic region 71B.

As used herein, the term "spacing dimension in the longitudinal direction Y between each pair of the adjacent elastics" means a dimension in the longitudinal direction Y of the elastic nonexistent area defined between each pair of the adjacent elastics. To ensure that the spacing dimension (pitch) between each pair of the adjacent rear waist elastics 74 is smaller than

that between each pair of the adjacent front waist elastics 72, for example, the number of the rear waist elastics 74 more than the number of the front waist elastics 72 or the rear waist elastics 74 having a fineness (thickness) larger than that of the front waist elastics may be used.

{0032}

Such an arrangement that the number of the rear waist elastics 74 in the intermediate rear waist elastic region 73B is more than the number of the front waist elastics 72 in the intermediate front waist elastic region 71B and the spacing dimension in the longitudinal direction Y between each pair of the adjacent rear waist elastics 72 in the intermediate rear waist elastic region 73B is smaller than that between each pair of the adjacent front waist elastics 72 in the intermediate front waist elastic region 71B ensures that a flexural stiffness in the longitudinal direction Y of the intermediate rear waist elastic region 73B (i.e., the stiffness against the formation of a folded line which would otherwise be formed in the transverse direction X) is higher than a flexural stiffness in the longitudinal direction Y. In addition, the string- or strand-like front and rear waist elastics 72, 74 arranged in the front and rear waist regions 11, 12 ensure that, after the rear waist region 12 has been pulled upward beyond the buttocks of the wearer to the level of the

waist thereof, the front and rear waist regions 11, 12 are put in appropriate contact with the wearer's skin without "being folded up". Thus, it is possible to improve the fit.

{0033}

As one of the solutions to ensure that the flexural stiffness in the intermediate rear waist elastic region 73B is higher than the flexural stiffness in intermediate front waist elastic region 71B, the rear waist elastics 74 in the intermediate rear waist elastic region 73B having the fineness larger than that of the front waist elastics 72 in the intermediate front waist elastic region 71 may be used. In addition, as described later about the exemplary variant and the other embodiment, elements (stiffness imparting elements such as adhesive tape, nonwoven fabrics or plastic auxiliary sheets)serving to enhance the flexural stiffness in the longitudinal direction Y relative to the intermediate front waist elastic region 71B may be added to the intermediate rear waist elastic region 73B to ensure a correlative relationship of flexural stiffness between these two regions represented by the intermediate front waist elastic region 71B < the intermediate rear waist elastic region 73B.

{0034}

When the flexural stiffness is differentiated from each other between the front and rear waist elastic regions 71B, 73B merely

by respective arrangements of the front and rear waist elastics 72, 74 as in the present embodiment, the number of the rear waist elastics 74 may be set to be more than the number of the front waist elastics 72 necessarily to make the pitch of the former narrower than the pitch of the latter. In consequence, the number of gather lines interfering with folding in the longitudinal direction Y which are formed in the inelastic areas (the elastic nonexistent areas) defined between each pair of the adjacent rear waist elastics 74 and extending in the transverse direction X is necessarily more than the number of the gather lines formed in the inelastic areas (the elastic nonexistent areas) and extending in the transverse direction X. A flexural stiffness of the former is higher than that of the latter. Also in the light of the fact that the relatively small gathers are formed in the inelastic areas defined between each pair of the rear waist elastics 74 and the relatively large gathers are formed in the inelastic areas defined between each pair of the front waist elastics 71, a flexural stiffness of the former is higher than that of the latter.

{0035}

Fig. 7 is a diagram illustrating a situation of putting a diaper 110 as an example of the conventional diapers on the wearer's body and Fig. 8 is a diagram illustrating a situation of putting

the diaper 10 according to the present embodiment on the wearer's body.

{0036}

Referring to Fig. 7, in the conventional diaper 110, the same string- or strand-like elastic material is used for both the front waist elastics and the rear waist elastics and the number of the front waist elastics arranged in the intermediate front waist elastic region 171B of the front waist region is set to be the same as the number of the rear waist elastics arranged in the intermediate rear waist elastic region 173B. In the conventional diaper having such arrangement, the pitch for the front waist elastics is approximately the same as the pitch for the rear waist elastics 174 and a flexural stiffness of the intermediate front waist elastic region 171B is relatively low. Certainly, when the waist-opening is outspread, the intermediate front elastic region 171B is smoothly folded on the side of the front waist region, facilitating the fingers of the wearer to get caught by this intermediate front elastic region 171B and thereby facilitating the front waist region to be pulled up. However, in the intermediate rear waist region, the intermediate rear waist elastic region 173B also is folded similarly to the intermediate front waist elastic region 171B. In consequence, the intermediate rear waist elastic region 173A

touches against the unevenness 79 defined between the thighs 77 and the buttocks 78, making it difficult to pull the intermediate rear waist elastic region 173 and, in consequence, the diaper 110 upward. Furthermore, handling of pulling up the diaper 110 restricted in this manner makes the intermediate rear waist elastic region 173C also to be readily folded. If the rear waist region is forcedly pulled up from such a state, the intermediate rear waist elastic region 173B will remain in "being folded up" and feeling of wearing might be discomforted and leakage of body exudate might occur.

{0037}

Referring to Fig. 8, in the diaper 10 according to the present embodiment, the front and rear waist elastics 72, 74 are formed of the same string- or strand-like elastic materials wherein the number of the rear waist elastics 74 arranged in the intermediate rear waist elastic region 73B is more than that of the rear waist elastics 74 arranged in the intermediate front elastic region 71B, as has previously been described. For this reason, the flexural stiffness in the longitudinal direction of the intermediate rear waist elastic region 73B is higher than the flexural stiffness in the longitudinal direction of the intermediate front waist elastic region 71B so that, when the waist-opening 23 of the diaper 10 is spread to put the diaper

on the wearer's body, the intermediate front waist elastic region 71B is folded so that the fingers may smoothly get caught by this region 71B and consequently facilitate handling of pulling up the diaper. Furthermore, in the rear waist region 12, the intermediate rear waist elastic region 73B counteracts the action of the intermediate front waist elastic region 71B to fold this region 73B and makes it possible to pull up the entirety of the rear waist region 12 with keeping a snug fit to the wearer's body. In this manner, the outermost rear waist elastic region 73A should not be caught by the unevenness 79 between the thighs 77 and the buttocks 78. In addition, it is possible for the innermost rear waist elastic region 73C to be smoothly pulled up without being folded in concert with pulling up of the intermediate rear waist elastic region 73B. Since it is possible to put the diaper on the wearer's body with the rear waist region 12 being smoothly pulled up, the rear waist region 12 should not be "partially displaced and getting relatively large gathers", discomforting a feeling of wearing and causing the leakage of body exudates.

{0038}

When the number of the front waist elastics and the rear waist elastics (174) arranged in the intermediate front and rear elastic regions 171B, 173B are uniform and the flexural stiffness

in the longitudinal direction of the both regions 171B, 173B is approximately uniform as in the conventional diaper 110, the rear waist region should not be displaced and the feeling of wearing might be discomforted. Assuming that various factors such as the number, the pitch and the fineness of the front waist elastics and the rear waist elastics are adjusted so that the flexural stiffness in the longitudinal direction of the intermediate front waist elastic region 171B may become the same level as the level of flexural stiffness at which the intermediate rear waist elastic region 173B is free from a likelihood of "being folded up" or the flexural stiffness is set to be higher than the flexural stiffness of the intermediate rear waist elastic region 173B, with the diaper 110 put on the wearer's body, an entirety of the front waist region might too tightly fit to the abdominal region to grasp the diaper with the hands of the wearer or the care person when the diaper is pulled up. Consequently, a handleability might be deteriorated and the abdominal region might be uncomfortably compressed. Contrariwise in the diaper 10 according to this embodiment, the number of the front waist elastics 72 arranged in the intermediate front waist elastic region 71B is more than the number of the rear waist elastics 74 arranged in the intermediate rear waist elastic region 73B and the correlation ship between

the flexural stiffness in the longitudinal direction Y of the intermediate front waist elastic region 71B and the flexural stiffness in the longitudinal direction Y of the intermediate rear waist elastic region 73B is represented by the intermediate front waist elastic region 71B < the intermediate rear waist elastic region 73B. In this way, a plurality of technical effects, i.e., the handleability to put the diaper 10 on the wearer's body, preventing a feeling of wearing from being discomforted and preventing body exudates from leaking are ensured.

{0039}

<Measuring method for flexural stiffness>

Flexural stiffness was measured with use of Torque Tester (Model No. EX - 0762) (load cell: pull • compression 50N, torque 1N) manufactured by IMADA SEISAKUSHO CO., LTD. From the front and rear waist regions 11, 12, respectively, test pieces each having a dimension of 45 mm in the longitudinal direction Y measured from a position 35 mm distanced in the longitudinal direction Y from the waist-opening 23 toward the crotch region 13 and a dimension 30 mm in the transverse direction X about the longitudinal axis P were prepared. Fig. 9 is an explanatory diagram indicating a cutout area of a test piece 40 in the rear waist region 12. Opposite ends 41, 42 of the test pieces 40 in

longer direction (i.e., in the longitudinal direction Y) were respectively held over a length of 10 mm by a pair of chucks of the tester, one of the chucks was revolved around the other chuck so as to bend the test piece 40 and a flexural stiffness of the test piece 40 which had been bend was measured with use of the torque tester. Measurement was conducted at rotation rate of 30 rpm, rotation angle of 50° and measurement angle of 40°. Five test pieces were prepared for the front and rear waist regions 11, 12, respectively, (Embodiments 1 through 5) and an average value of the measurement values (torque strength) (unit: mN • m) on these test pieces was obtained as an average flexural stiffness in the longitudinal direction Y. Since the front and rear waist elastics 72, 74 are present in the front and rear waist regions 11, 12 as objects to be measured, the dimensions were measured with the front and rear waist regions 11, 12 being stretched in the longitudinal direction Y and in the transverse direction X against the contractile force of the front and rear waist elastics 72, 74 when the test piece was cut out. As indicated in TABLE 1, a flexural stiffness value B1 of the intermediate rear waist elastic region 73B was unexceptionally higher than the intermediate front waist elastic region 71B. In this regard, it is also possible to compare the flexural stiffness in the longitudinal direction Y of the intermediate

front and rear waist elastic regions 71B, 73B with the measurement result obtained by measuring the test pieces prepared of the same gauge as mentioned above in accordance with JIS L1096 19.1A method (45° cantilever method).

{0040}

{TABLE 1}

	Embodiment No. 1	Embodiment No. 2	Embodiment No. 3	Embodiment No. 4	Embodiment No. 5	Average value
Bending stiffness value (B1) in front & intermediary regions (unit: mN•m)	0.4	0.5	0.5	0.6	0.7	0.5
Bending stiffness value (B2) in rear & intermediary regions (unit: mN•m)	1.2	1.7	1.1	1.3	1.2	1.3

{0041}

Material, fineness, stretch ratio and spacing dimension of the respective elastics in the respective elastic regions are appropriately set so that the elongation stress of the respective elastic regions, specifically, the elongation stress at a moment of 171% elongation (a dimension of 71% relative to the maximum elongation 100%) measured over a predetermined width (30 mm) of the region defined outside in the transverse direction X of the absorbent body 51 may become about 2.5 N in the outermost front waist elastic region 71A, about 2.5 N in the intermediate front waist elastic region 71B, about 5.0 N in the innermost front waist elastic region 71C, about 2.5 N in the outermost rear waist elastic region 73A, about 3.0 N in the intermediate

rear waist elastic region 73 B and about 5.0 N in the innermost rear waist elastic region 73C. When the numbers and the pitches of the front and rear waist elastics 72, 74 are adjusted so that the flexural stiffness of the intermediate rear waist elastic region 73B may be higher than that of the intermediate front waist elastic region 71B, the elongation stress of the intermediate rear waist elastic region 73B becomes higher than the elongation stress of the intermediate front waist elastic region 71B. A differential elongation stress between the outermost front waist elastic region 71A and the intermediate front waist elastic region 71B is in a range of about 0 to about 3.0 N, a differential elongation stress between the intermediate front waist elastic region 71B and the innermost front waist elastic region 71C is in a range of about 0.5 to about 3.0 N, a differential elongation stress between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B is in a range of about 0 to about 3.0 N and a differential elongation stress between the intermediate rear waist elastic region 73B and the innermost rear waist elastic region 73C is in a range of about 1.0 to about 5.0 N.

{0042}

By adjusting the number and the pitch of the rear waist elastics 74 so that the elongation stress of the intermediate rear waist

elastic region 73B may become higher than that of the outermost rear waist elastic region 73A, it is possible to restrict a possibility that the undesirable situation of "being partially displaced and getting relatively large gathers" might occur, thereby pulling up the rear waist region 12 of the diaper 10 smoothly along the buttocks of the wearer. While the chassis 14 is apt to be bent in the regions in which the elongation stress noticeably varies, it is possible to restrict such folding of the chassis 14 in a boundary division between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B by setting the differential elongation stress between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B to 3.0 N or less. In this regard, more preferably the number and the pitch of the front waist elastics 72 are adjusted so that the elongation stress of the intermediate front waist elastic region 71B may become lower than that of the outermost front waist elastic region 71A and consequently the chassis 14 may be smoothly bent.

{0043}

Referring to Fig. 5, a spacing dimension R1 in the longitudinal direction Y between the innermost front waist elastic 72a in the longitudinal direction Y in the outermost front waist elastic region 71A and the outermost front waist elastic 72b in the

longitudinal direction Y in the intermediate front waist elastics 71B is preferably in a range of about 5 to about 20 mm and, in the present embodiment, this spacing dimension is about 16 mm. A spacing dimension R2 in the longitudinal direction Y between the innermost front waist elastic 72b in the longitudinal direction Y in the intermediate front waist elastic region 71B and the outermost front waist elastic 72d in the longitudinal direction Y in the innermost front waist elastic region 71C is preferably in a range of about 5 to about 15 mm and, in the present embodiment, this spacing dimension is about 10 mm.

Referring now to Fig. 6, a spacing dimension R3 between the innermost rear waist elastic 74a in the longitudinal direction Y in the outermost rear waist elastic region 73A and the outermost rear waist elastic 74b in the longitudinal direction Y in the intermediate rear waist elastic region 73B is preferably in a range of about 5 to about 15 mm and, in the present embodiment, this spacing dimension is about 7 mm. A spacing dimension R4 in the longitudinal direction Y between the innermost rear waist elastic 74c in the longitudinal direction Y in the intermediate rear waist elastic region 73B and the outermost rear waist elastic 74d in the longitudinal direction Y in the innermost rear waist elastic region 73C is preferably in a range of about

10 to about 25 mm and, in the present embodiment, this spacing dimension is about 15 mm. As used herein, the terms "spacing dimensions for the respective elastic members" means a dimension in the longitudinal direction Y of elastic non-existent region defined between each pair of the adjacent elastics. The spacing dimension R3 in the longitudinal direction Y between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B is preferably set to be smaller than the spacing dimension R1 in the longitudinal direction Y between the outermost front waist elastic region 71A and the intermediate front waist elastic region 71B.

{0044}

In the area defined between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B as well as in the area defined between the outermost front waist elastic region 71A and the intermediate front waist elastic region 71B, the stretching stress, therefore the flexural stiffness in the longitudinal direction Y varies in the area defined between the outermost rear waist elastic region 73A and the intermediate rear waist elastic region 73B as well as in the area defined between the outermost front waist elastic region 71A and the intermediate front waist elastic region 71B. Consequently, the chassis 14 might be easily folded. However,

the spacing dimension R3 in the rear waist region 12 may be set to be smaller than the spacing dimension R1 in the front waist region 11 to restrict the possibility that the chassis 14 might be folded in the rear waist region 12.

{0045}

The front end edge 15a of the liquid-absorbent structure 15 is preferably located between the innermost front waist elastic 72a in the outermost front waist elastic region 71A and the outermost front waist elastic 72b in the intermediate front waist elastic region 71B and more preferably located closer to the outermost front waist elastic 72b. The front end edge 15a may be located in the stretching stress variable area between the outermost front waist elastic region 71A and the intermediate front waist elastic region 71B to facilitate the front waist region 11 to be folded around the front end edge 15a and the fingers of the wearer or the care person to be caught when the waist-opening 23 of the diaper 10 is spread. The rear end edge 15b of the liquid-absorbent structure 15 is preferably located so as to face the front end edge 15a in the front-back direction Z or located closer than the front end edge 15a to the waist-opening 23. The rear end edge 15b extending to the vicinity of the waist-opening 23 makes it possible that the presence of the end flap 56b of the liquid-absorbent structure

15 enhances the flexural stiffness of the intermediate rear waist elastic region 73B and further effectively restricts flexural of the rear waist region 12 when the diaper 10 is pulled up.

{0046}

The dimensions in the longitudinal direction Y of the respective elastic regions in the front and rear waist regions 11, 12 may be sized at appropriate proportion as far as the advantageous effects of the present invention are ensured. For example, the dimension in the longitudinal direction Y of the intermediate front and rear waist elastic regions 71B, 73B and the innermost front and rear waist elastic regions 71C, 73C may be set to be 1.0 to 2.5 times of the dimension in the longitudinal direction Y of the outermost front and rear waist elastic regions 71A, 73A or the dimensions in the longitudinal direction Y of the respective elastic regions may be evenly sized. The dimensions in the longitudinal direction Y of the outermost front and rear waist elastic regions 71A, 73A are preferably set to be the same and the dimensions in the longitudinal direction Y of the intermediate front and rear waist elastic regions 71B, 73B are also preferably set to be the same.

{0047}

<Measuring method for stretching stress>

The stretching stress of the front and rear waist elastic

regions 71, 73 are measured at a rate of pulling set to 100 mm/min with use of Tensile Tester (INSTRON Model: 5564) manufactured by Instron Japan Co., Ltd., by a method as follows. Test pieces having a length in the transverse direction X in a range of 30 to 50 mm are cut out from the areas in the respective elastic regions not overlapping with the liquid-absorbent structure and a pair of gauge lines 20 mm spaced in the transverse direction X from each other are plotted on the respective test pieces. Stretching force of the respective test pieces at a moment that the spacing dimension between the pair of gauge lines reaches 1.7 times of the initial spacing dimension are measured and comparatively reviewed. When the dimension in the longitudinal direction Y of the diaper 10 corresponding to the width dimension of the test pieces is not uniform, the measured values of stretching force from the respective test pieces may be converted to the values for the dimension of 30 mm and the respective test pieces are comparatively reviewed on the basis of such converted values.

{0048}

<Exemplary Variant>

Fig. 10 is a plan view exemplarily illustrating a variant of the diaper 10 according to the first embodiment flatly developed in the longitudinal direction Y as well as in the transverse

direction X until the respective elastics are stretched to the maximum elongation (until the gathers due to contraction of the elastics disappear) as viewed from the back side.

{0049}

In the diaper 10 according to this variant, a central region 66 of the intermediate rear waist elastic region 73B is provided with a stiffness imparting element 65 functioning as adhesive tape used when the diaper 10 is disposed of. Referring to Fig. 11, the stiffness imparting element 65 is located on the side of the non-skin-facing surface of the rear waist sheet 27. The stiffness imparting element 65 is made of a plastic sheet extending in the longitudinal direction Y and includes a first region 61, a second region 62 and a third region 63 sectionalized along folding lines and stacked one on another in Z-shape. The first region 61 is fixed with adhesive to the rear waist sheet 27, the second region 62 is releasably bonded to the first region 61 and the third region 63 is releasably joined to the second region 62.

{0050}

In such diaper 10, the stiffness imparting element 65 attached to the intermediate rear waist elastic region 73B enhances the flexural stiffness of the intermediate rear waist elastic region 73b and make it possible to restrict occurrence of "being folded

up" which might occur when the diaper 10 is put on the wearer's body. Material for the stiffness imparting element 65 is not limited to plastic sheet and it is also possible to use mono- or multilayered fibrous nonwoven fabrics.

{0051}

The stiffness imparting element 65 may be located not only in a central area 66 in the transverse direction X of the intermediate rear waist elastic region 73B but also on lateral areas 67 at the outside in the transverse direction X of the central area 66. In the case of the diaper 10 exemplarily illustrated in Fig. 10, the stiffness imparting element 65 is located in the central area 66 so as to overlap with the longitudinal axis P and extends from the innermost rear waist elastic region 73C to the outermost rear waist elastic region 73A. When the diaper 10 is pulled up from the legs to the waist of the wearer, the central region 66 hits against the buttocks 78 of the wearer and there is a possibility that a the state "being folded up" might restrict pulling up of the diaper 10. However, provision of the stiffness imparting element 65 effectively restricts occurrence of such undesirable state "being folded up" and makes it possible to pull up the diaper 10 smoothly along the buttocks 78. It is also possible to locate the stiffness imparting element 65 not only in the central region

66 but also in both lateral regions 67, 67 in the transverse direction X and allocation of a plurality of the stiffness imparting element 65 makes it possible to restrict folding of the rear waist region 12 further reliably. In addition, arrangement of the stiffness imparting element 65 so as to extend from the innermost rear waist elastic region 73C to the outermost rear waist elastic region 73A makes it possible to prevent the chassis 14 from folding along the boundary between the outermost rear waist elastic region 73B and the intermediate rear waist elastic region 73B as well as along the boundary between the intermediate rear waist elastic region 73B and the innermost rear waist elastic region 73C.

{0052}

<Second Embodiment>

Fig. 12 is a plan view similar to Fig. 2, illustrating the diaper 10 according to the second embodiment and Fig. 13 is an exploded perspective view similar to Fig. 3, illustrating the diaper 10 according to the second embodiment. The diaper 10 according to the present embodiment is similar to the diaper according to the first embodiment so far as the basic arrangement is concerned and therefore following description is limited to dissimilarities.

{0053}

In the diaper 10 according to the present embodiment, waist elastic sheets 90 which are elastically contractible in the transverse direction X are substituted for the front and rear waist elastics 72, 74 and located in the front and rear waist regions 11, 12. The waist elastic sheet 90 includes a front waist elastic sheet 91 located in the front waist region 11 and a rear waist elastic sheet 92 located in the rear waist region 12. The front waist elastic sheet 91 lies on the outside in the longitudinal direction Y of the liquid-absorbent core between the base sheet 25 and the front waist sheet 26. The rear waist elastic sheet 92 is made of the same sheet material as that of the front waist elastic sheet 91 and lies on the outside in the longitudinal direction Y of the liquid-absorbent core between the base sheet 25 and the rear waist sheet 27. The front and rear waist elastic sheets 91, 92 are joined to each other through the intermediary of the side seams 22 to form an annular waist elastic region. In a second region 84 defined between a periphery of the waist-opening 23 and the rear end edge 58b of the liquid-absorbent core and extending over an entire area between both lateral edges of the rear waist region 12, an auxiliary sheet 93 is provided.

{0054}

The auxiliary sheet 93 is provided over the entire region

defined between the both lateral edges of the rear waist region 12 so that, in a region defined outside in the longitudinal direction Y of the liquid-absorbent core in the front and rear waist regions 11, 12, the flexural stiffness in the longitudinal direction Y of the second region 84 may be higher than in the other regions. In the first region 83 defined between the periphery 81 of the waist-opening 23 and the front end edge 58a of the liquid-absorbent core in the front waist region 11 of the diaper 10 and facing the second region 84 in the front-back direction Z when the diaper 10 is on the wearer's body, the flexural stiffness in the longitudinal direction Y is set to be relatively low in comparison with that in the second region 84. The auxiliary sheet 93 may be formed of fibrous nonwoven fabrics or the like and is preferably the sheet member which is elastically stretchable/contractible in the transverse direction X.

{0055}

In the diaper 10 according to the second embodiment, the flexural stiffness in the longitudinal direction Y of the second region 84 is higher than the flexural stiffness in the longitudinal direction Y of the first region 83 and therefore the technical effects similar to those of the first embodiment are ensured.

{0056}

The respective constituent elements of the diaper 10 according to the present invention are not limited to those described in the specification but the other various types of material widely used in the relevant technical field may be used without limitation. As used herein, terms "first", "second" and "third" in the specification and claims of this invention are used merely to distinguish the similar elements, similar positions or the other similar items.

{0057}

The disclosure relating to the present invention as has been described above may be arranged at least as follows:

{0058}

A pull-on wearing article having a longitudinal direction Y, a transverse direction X, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region 11, a rear waist region 12 and a crotch region 13 extending between the front and rear waist regions 11, 12 and provided with a chassis 14 including a liquid-absorbent core extending from the crotch region 13 to the front and rear waist regions 11, 12, a waist-opening 23 and a pair of leg-openings 24 defined by both lateral edge portions of the front and rear waist regions 11, 12 joined to each other, wherein: the

liquid-absorbent core has a front end edge 58a and a rear end edge 58b spaced from and facing each other in the longitudinal direction Y and extending in the transverse direction X; the front waist region 11 has a plurality of front waist elastics 72 extending between both lateral edge portions of the front waist region 11 and contractibly secured under tension in the transverse direction X and an intermediate front waist elastic region 71B defined between a periphery of the waist-opening 23 and the front end edge 58a of the liquid-absorbent core; the rear waist region 12 has a plurality of rear waist elastics 74 extending between both lateral edge portions of the rear waist region 12 and contractibly secured under tension in the transverse direction X and an intermediate rear waist elastic region 73B defined between the periphery of the waist-opening 23 and the rear end edge 58b of the liquid-absorbent core; the intermediate front waist elastic region 71B and the intermediate front waist elastic region 71B face each other in a front-back direction Z in the article put on a wearer's body; the number of the rear waist elastics 74 in the intermediate rear waist elastic region 73B is more than the number of the front waist elastics 72 in the intermediate front elastic region 71B; and a spacing dimension in the longitudinal direction Y between each pair of the adjacent rear waist elastics 74 in the intermediate

rear waist elastic region 73 is smaller than a spacing dimension in the longitudinal direction Y between each pair of the adjacent front waist elastics 72 in the intermediate front waist elastic region 71B.

{0059}

A pull-on wearing article having a longitudinal direction Y, a transverse direction X, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region 11, a rear waist region 12 and a crotch region 13 extending between the front and rear waist regions 11, 12 and including a chassis 14 including a liquid-absorbent core extending from the crotch region 13to the front and rear waist regions 11, 12, a waist-opening 23 and a pair of leg-openings 24 defined by both lateral edge portions of the front and rear waist regions joined to each other, wherein:

the liquid-absorbent core has a front end edge 58a and a rear end edge 58b spaced from and facing each other in the longitudinal direction Y and extending in the transverse direction X;

the front waist region 11 has a first region 83 defined between a periphery of the waist-opening 23 and the front end edge 58a of the liquid-absorbent core so as to extend over an entire area between both lateral edges of the front waist region 11;

the rear waist region 12 has a second region defined between

a periphery of the waist-opening 23 and the rear end edge 58b of the liquid-absorbent core so as to extend over an entire area between both lateral edges of the rear waist region 12;

the first region 83 and the second region 84 facing each other in a front-back direction Z in the article put on a wearer's body; and

a flexural stiffness in the longitudinal direction of the second region is higher than a flexural stiffness in the longitudinal direction Y of the first region 83.

{0060}

The present invention disclosed above in the paragraphs {0058} and {0059} include the following embodiments, which may be taken in isolation from or in combination with each other.

(1) The outermost front waist elastic region 71A in which the front waists 72 are arranged is defined in proximity of the periphery of the waist-opening 23, the outermost rear waist elastic region 73A in which the rear waist elastics 74 are arranged is defined in the vicinity of the periphery of the waist-opening 23, the spacing dimension in the longitudinal direction Y between the innermost rear waist elastic 74a in the outermost rear waist elastic region 73A and the outermost rear waist elastic 74b in the intermediate rear waist elastic region 73B is smaller than the spacing dimension in the longitudinal

direction Y between the innermost front waist elastic 72a in the outermost front waist elastic region 71A and the outermost front waist elastic 72b in the intermediate front waist elastic region 71B.

(2) The elongation stress over the predetermined width of the intermediate rear waist elastic region 73B is higher than the elongation stress over the predetermined width of the outermost rear waist elastic region 73A.

(3) a sheet- or ribbon-like stiffness imparting element is arranged in a part of the second region.

(4) The stiffness imparting element 65 is located in a central area in the transverse direction X of the intermediate rear waist elastic region 73B.

(5) The stiffness imparting element 65 is an adhesive tape extending in the longitudinal direction Y.

{Reference Signs List}

{0061}

10 diaper (pull-on wearing article)

11 front waist region

12 rear waist region

13 crotch region

14 chassis

15 liquid-absorbent structure

58a front end edge of liquid-absorbent core

58b rear end edge of liquid-absorbent core

65 stiffness imparting element

71 front waist elastic regions

71A outermost elastic region in front waist region

71B intermediate front waist elastic region (first region)

72 front waist elastics

73 rear waist elastic regions

73A outermost elastic region in rear waist region

73B intermediate rear waist elastic region (second region)

74 rear waist elastics

X transverse direction

Y longitudinal direction

Z front-back direction

2014285564 06 Nov 2019

The claims defining the invention are as follows:

{Claim 1}

A pull-on wearing article having a longitudinal direction, a transverse direction, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region, a rear waist region and a crotch region extending between the front and rear waist regions and provided with a chassis including a liquid-absorbent core extending from the crotch region to the front and rear waist regions, a waist-opening and a pair of leg-openings defined by both lateral edge portions of the front and rear waist regions joined to each other, wherein:

the liquid-absorbent core has a front end edge and a rear end edge spaced from and facing each other in the longitudinal direction and extending in the transverse direction;

the front waist region has

an outermost front waist elastic region extending in the transverse direction along the periphery of the waist-opening,

an innermost front waist elastic region extending in the transverse direction on the side of the crotch region, and

a first region defined between the outermost front waist elastic region and the innermost front waist elastic region and located outside of the liquid-absorbent core in the

2014285564 06 Nov 2019

longitudinal direction;

in the outermost front waist elastic region, the innermost front waist elastic region and the first region, a plurality of front waist elastics is contractibly secured under tension between both lateral edge portions of the front waist region;

the rear waist region has

an outermost rear waist elastic region extending in the transverse direction along the periphery of the waist-opening,

an innermost rear waist elastic region extending in the transverse direction on the side of the crotch region, and

a second region defined between the outermost rear waist elastic region and the innermost rear waist elastic region and located outside of the liquid-absorbent core in the longitudinal direction;

in the outermost rear waist elastic region, the innermost rear waist elastic region and the second region, a plurality of rear waist elastics is contractibly secured under tension between both lateral edge portions of the rear waist region;

the first region and the second region facing each other in a front-back direction in the article when put on a wearer's body;

the number of the rear waist elastics is more than the number of the front waist elastics in the first region;

2014285564 06 Nov 2019

a spacing dimension in the longitudinal direction between each pair of the adjacent rear waist elastics in the second region is smaller than a spacing dimension in the longitudinal direction between each pair of the adjacent front waist elastics in the first region; and

a sheet- or ribbon-like stiffness imparting element is arranged in a part of the second region.

{Claim 2}

A pull-on wearing article having a longitudinal direction, a transverse direction, a skin facing surface, a non-skin-facing surface opposed to the skin facing surface, a front waist region, a rear waist region and a crotch region extending between the front and rear waist regions and provided with a chassis including a liquid-absorbent core extending from the crotch region to the front and rear waist regions, a waist-opening and a pair of leg-openings defined by both lateral edge portions of the front and rear waist regions joined to each other, wherein:

the liquid-absorbent core has a front end edge and a rear end edge spaced from and facing each other in the longitudinal direction and extending in the transverse direction;

the front waist region has a first region defined between a periphery of the waist-opening and the front end edge of the

2014285564 06 Nov 2019

liquid-absorbent core so as to extend over an entire area between both lateral edges of the front waist region;

the rear waist region has a second region defined between a periphery of the waist-opening and the rear end edge of the liquid-absorbent core so as to extend over an entire area between both lateral edges of the rear waist region;

the first region and the second region facing each other in a front-back direction in the article when put on a wearer's body; and

a flexural stiffness in the longitudinal direction of the second region is higher than a flexural stiffness in the longitudinal direction of the first region; and

a sheet- or ribbon-like stiffness imparting element is arranged in a part of the second region.

{Claim 3}

The wearing article according to claim 1 wherein the spacing dimension in the longitudinal direction between the innermost rear waist elastic in the outermost rear waist elastic region and the outermost rear waist elastic in the second region is smaller than the spacing dimension in the longitudinal direction between the innermost front waist elastic in the outermost front waist elastic region and the outermost front waist elastic member in the first region.

2014285564 06 Nov 2019

{Claim 4}

The pull-on wearing article according to claim 3 wherein the elongation stress over the predetermined width of the second region is higher than the elongation stress over the predetermined width of the outermost rear waist elastic region.

{Claim 5}

The pull-on wearing article according to any one of claims 1 to 4 wherein the stiffness imparting element is located in a central area in the transverse direction of the second region.

{Claim 6}

The pull-on wearing article according to claim 5 wherein the stiffness imparting element is an adhesive tape extending in the longitudinal direction.

FIG.1

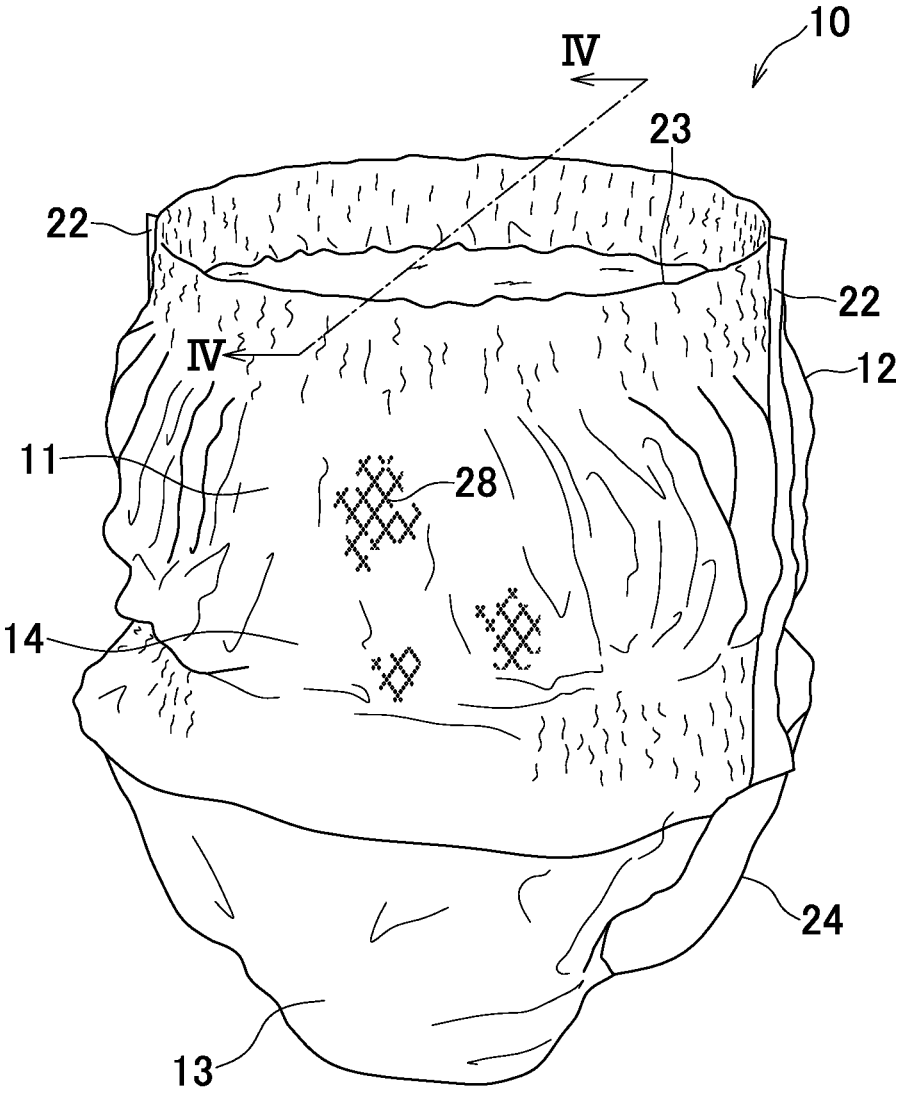
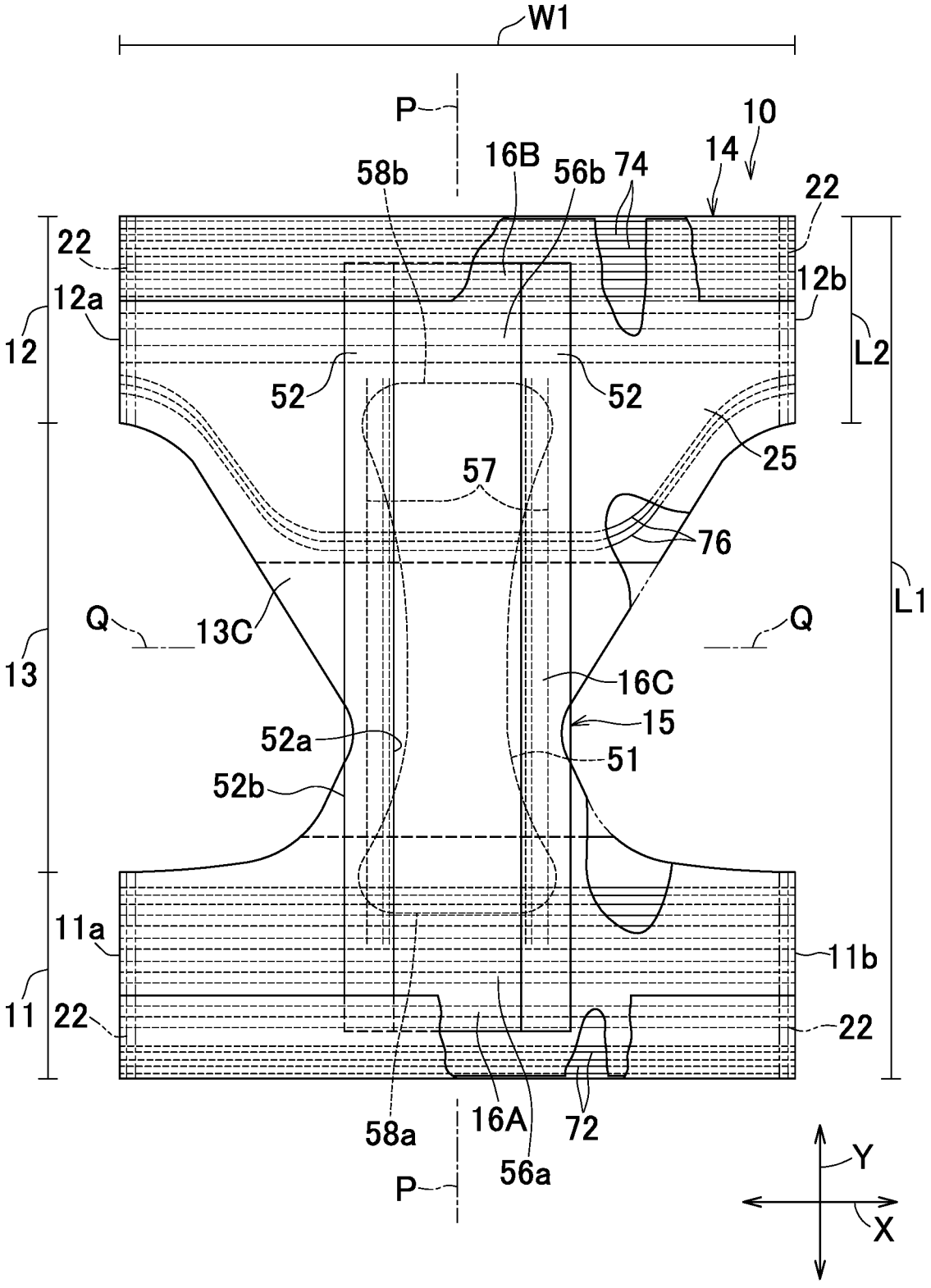


FIG.2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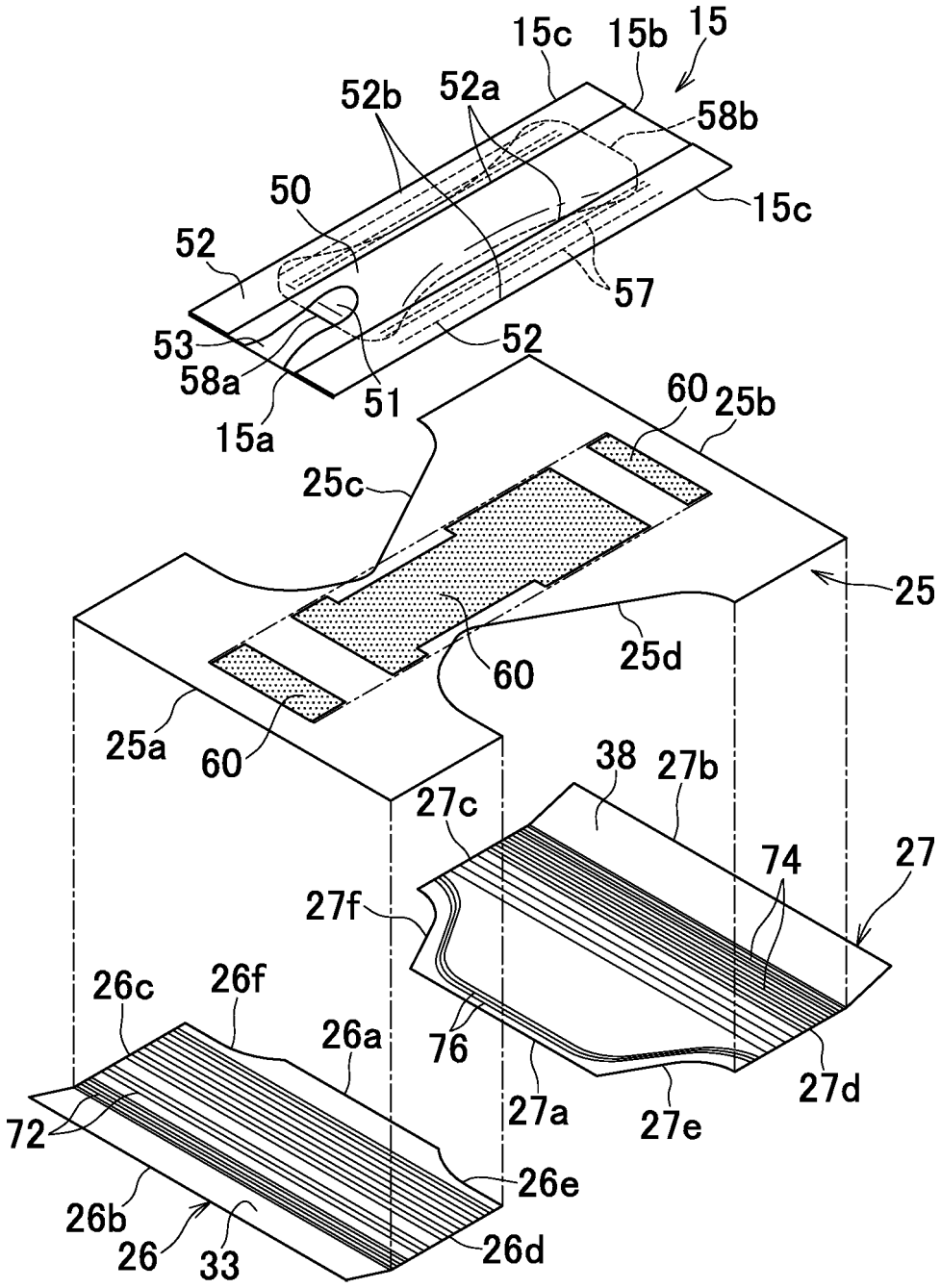
58b
16B
56b
74
22
22
12b
12a
12
L2
52
52
25
57
76
Q
13C
Q
L1
13
16C
15
52a
51
52b
11a
11b
11
22
22
58a
16A
72
56a
P
Y
X

FIG.3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15b
15
52b
52a
58b
50
15c
52
57
53
52
58a
51
15a
60
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25c
25
60
25d
25a
60
38
27b
27c
74
27
27f
26c
26f
26a
76
27a
27e
27d
72
26e
26b
26
33
26d

FIG.4

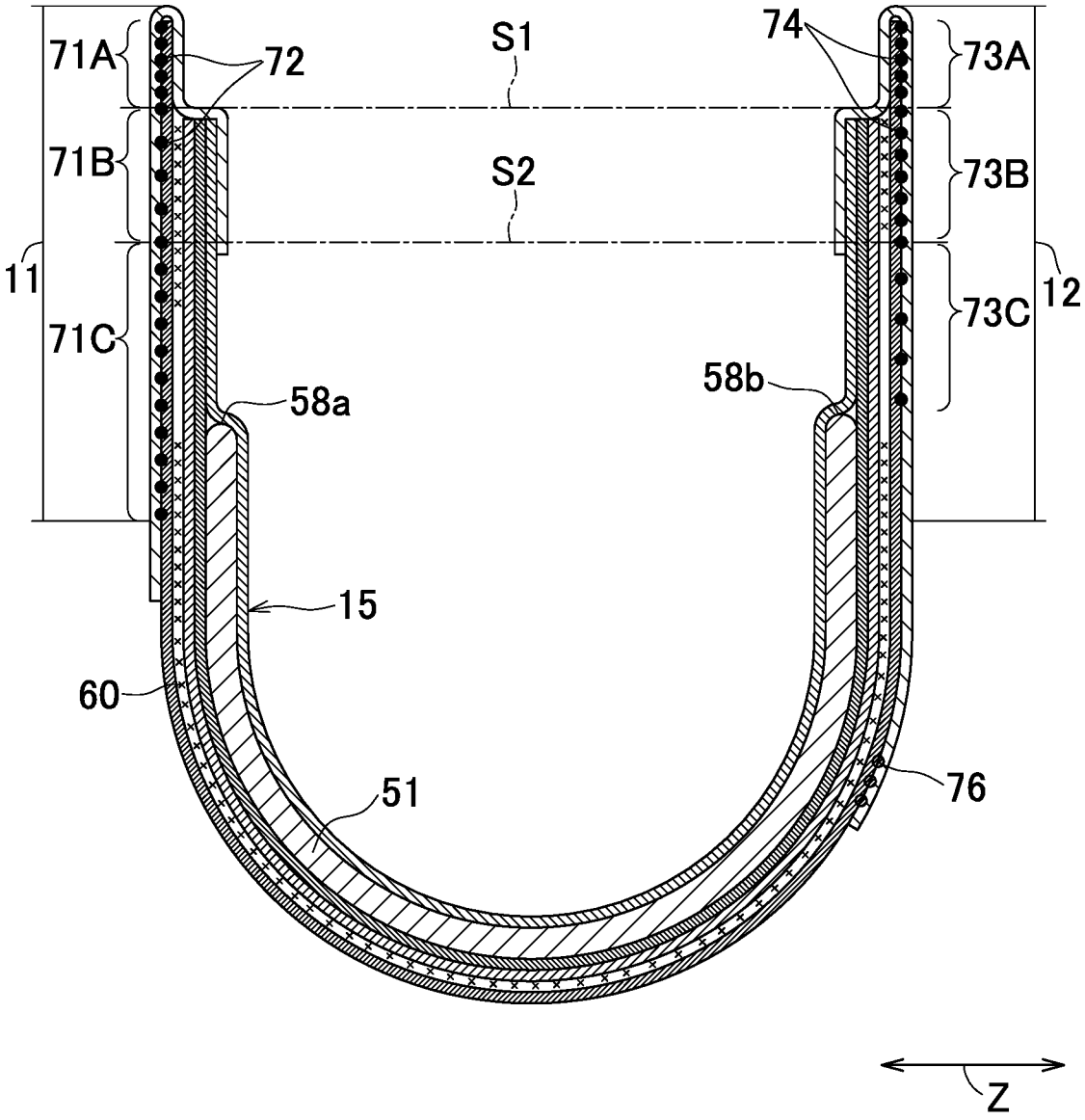


FIG.5

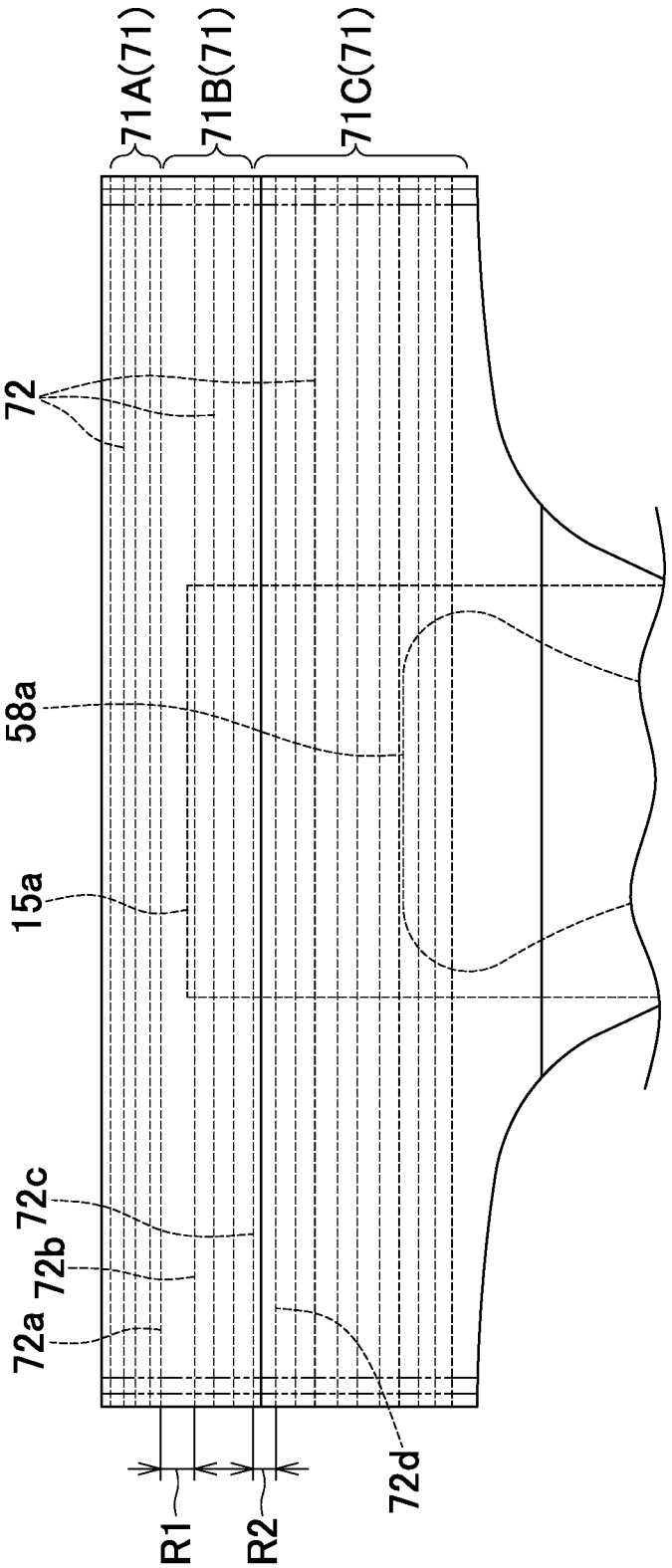


FIG.6

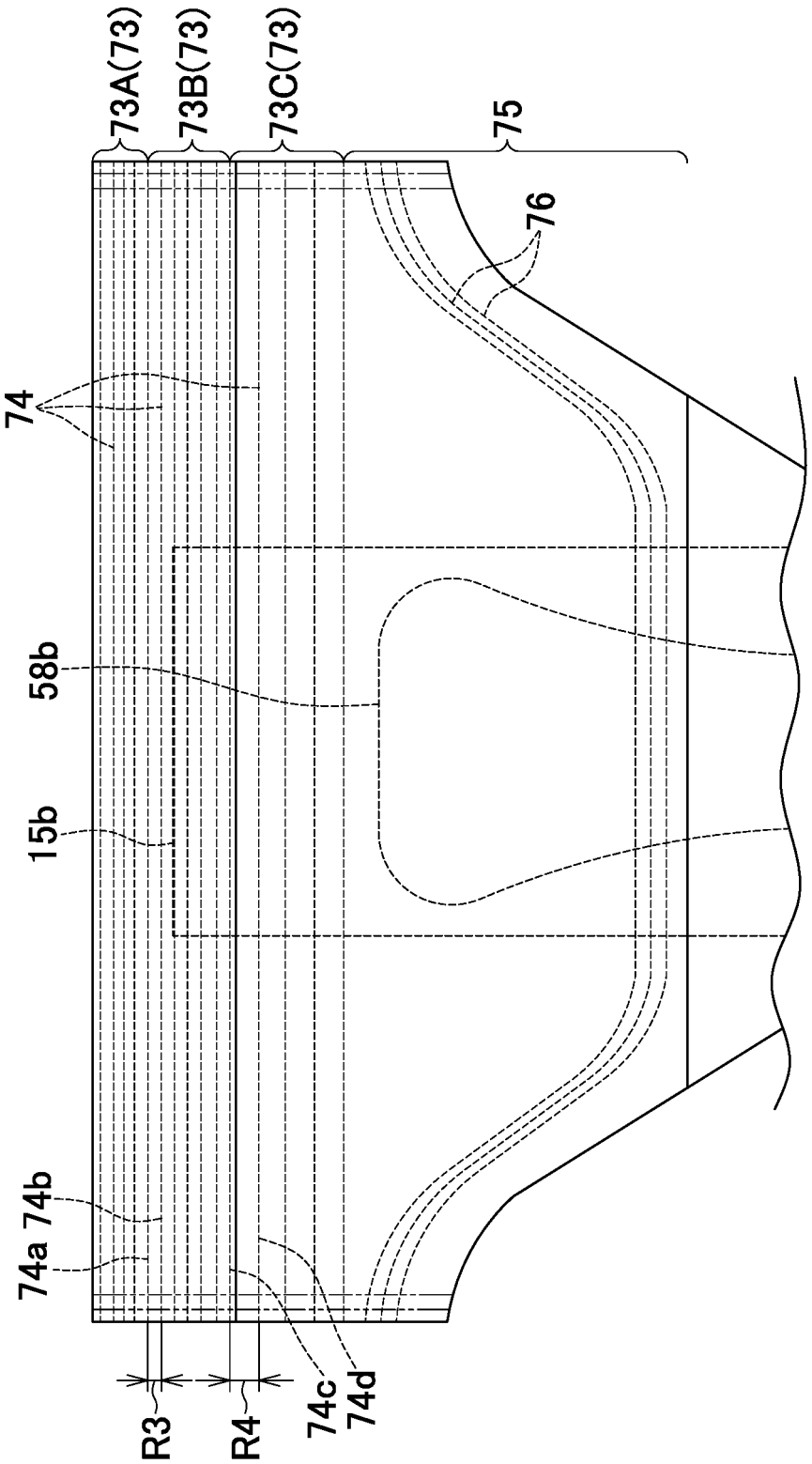


FIG.7

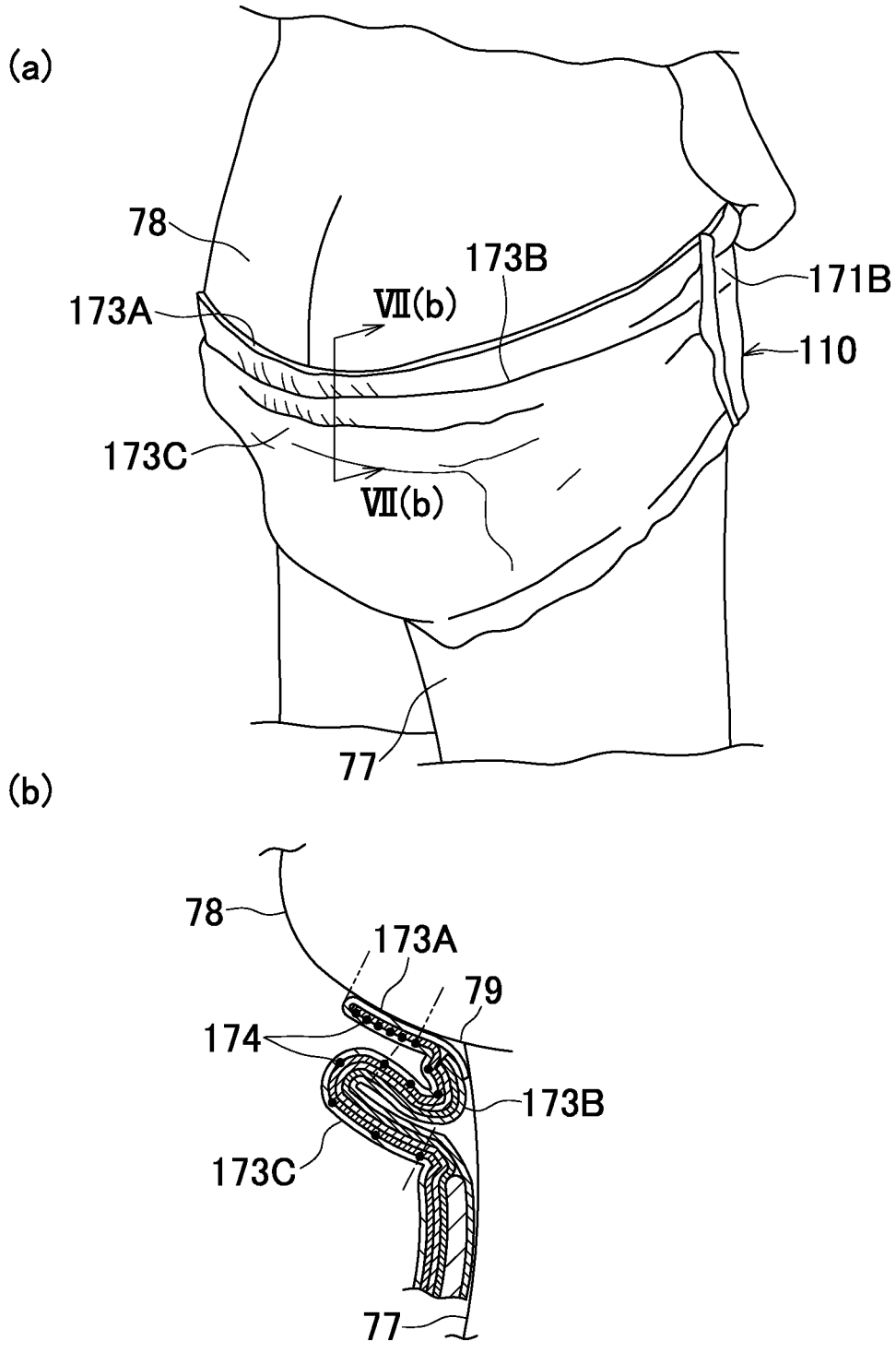

(a)
78
173B
171B
173A
Ⅶ(b)
110
173C
Ⅶ(b)
77
(b)
78
173A
79
174
173B
173C
77

FIG.8

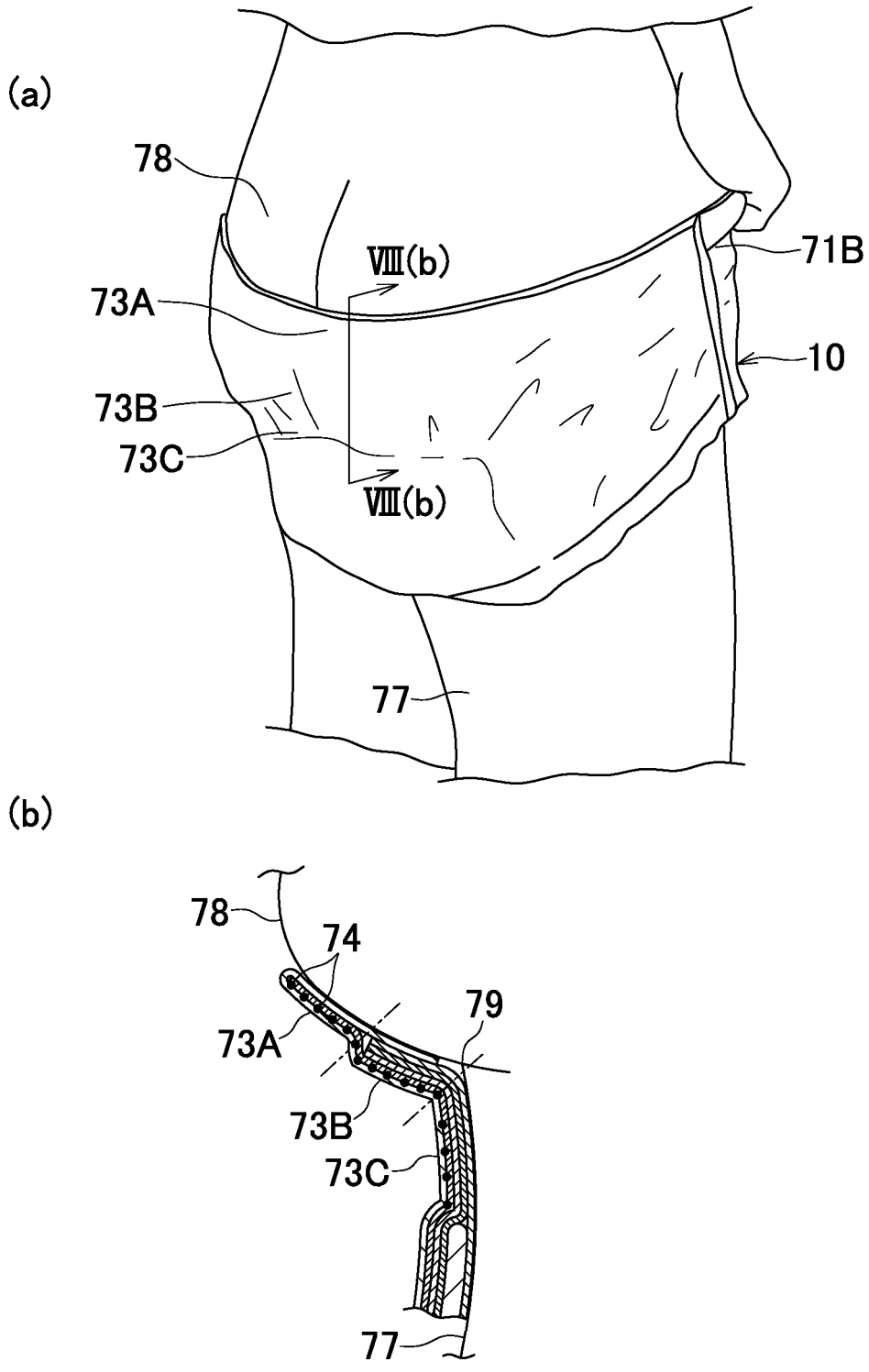


FIG.9

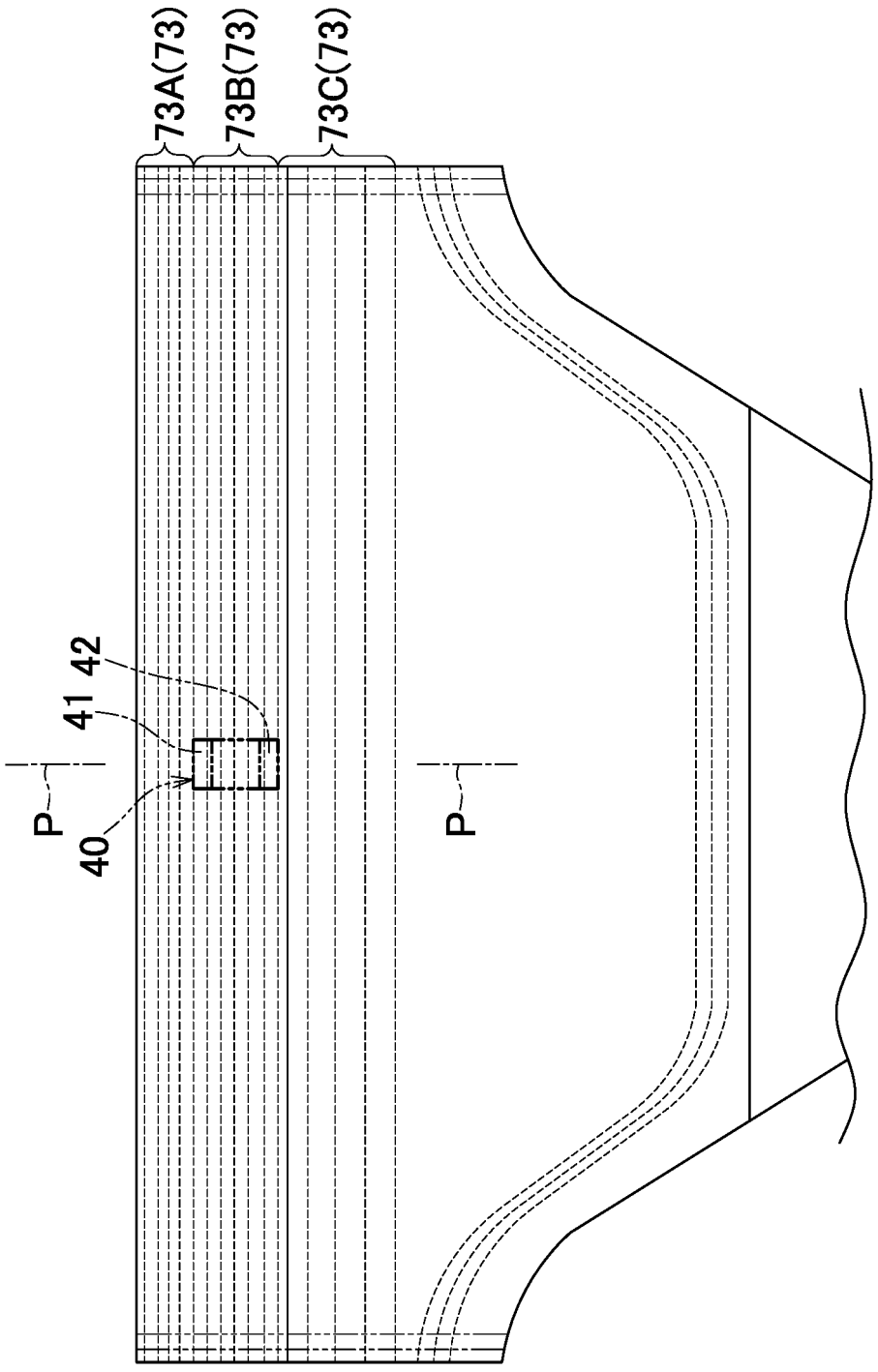


FIG.10

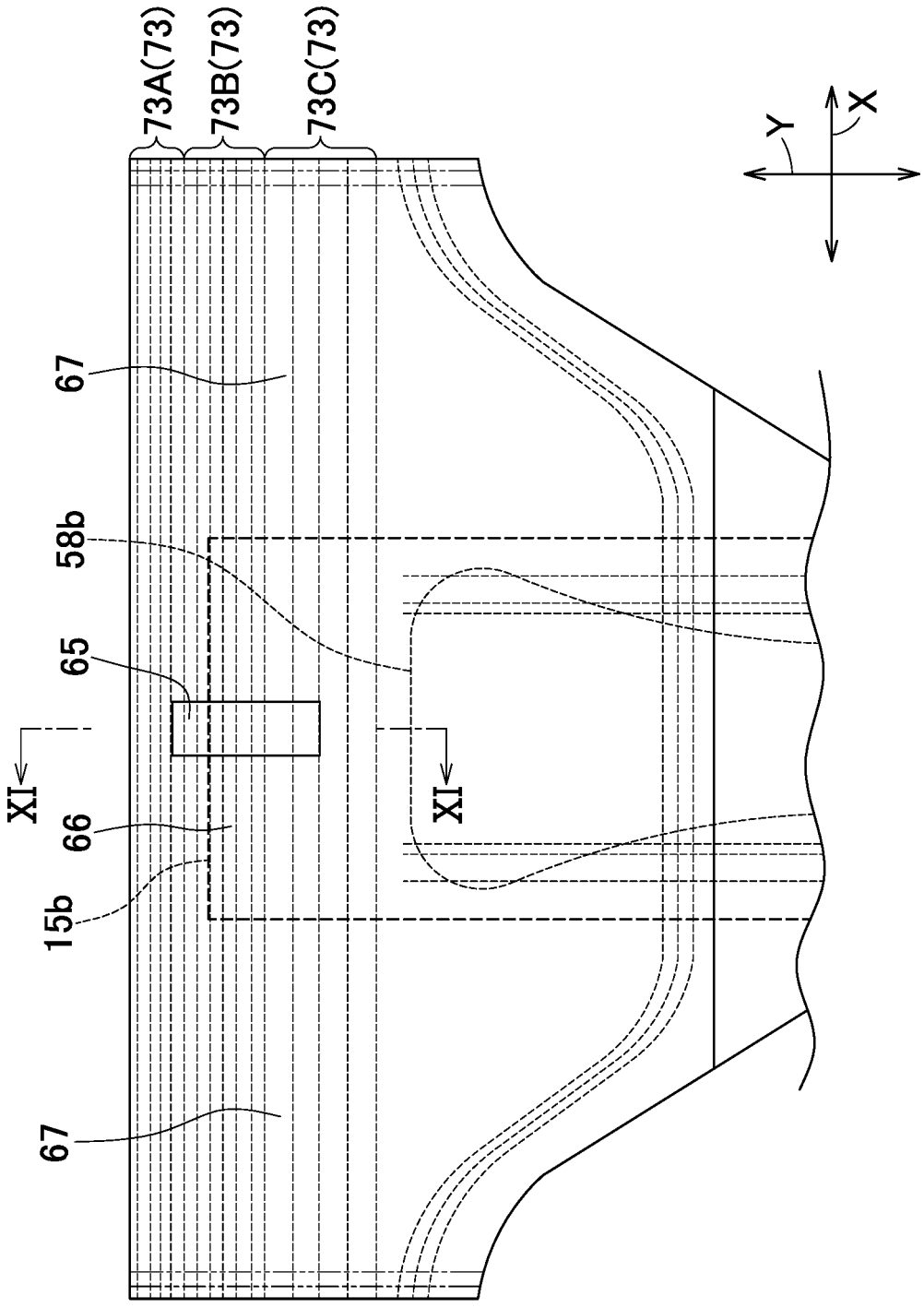


FIG.11

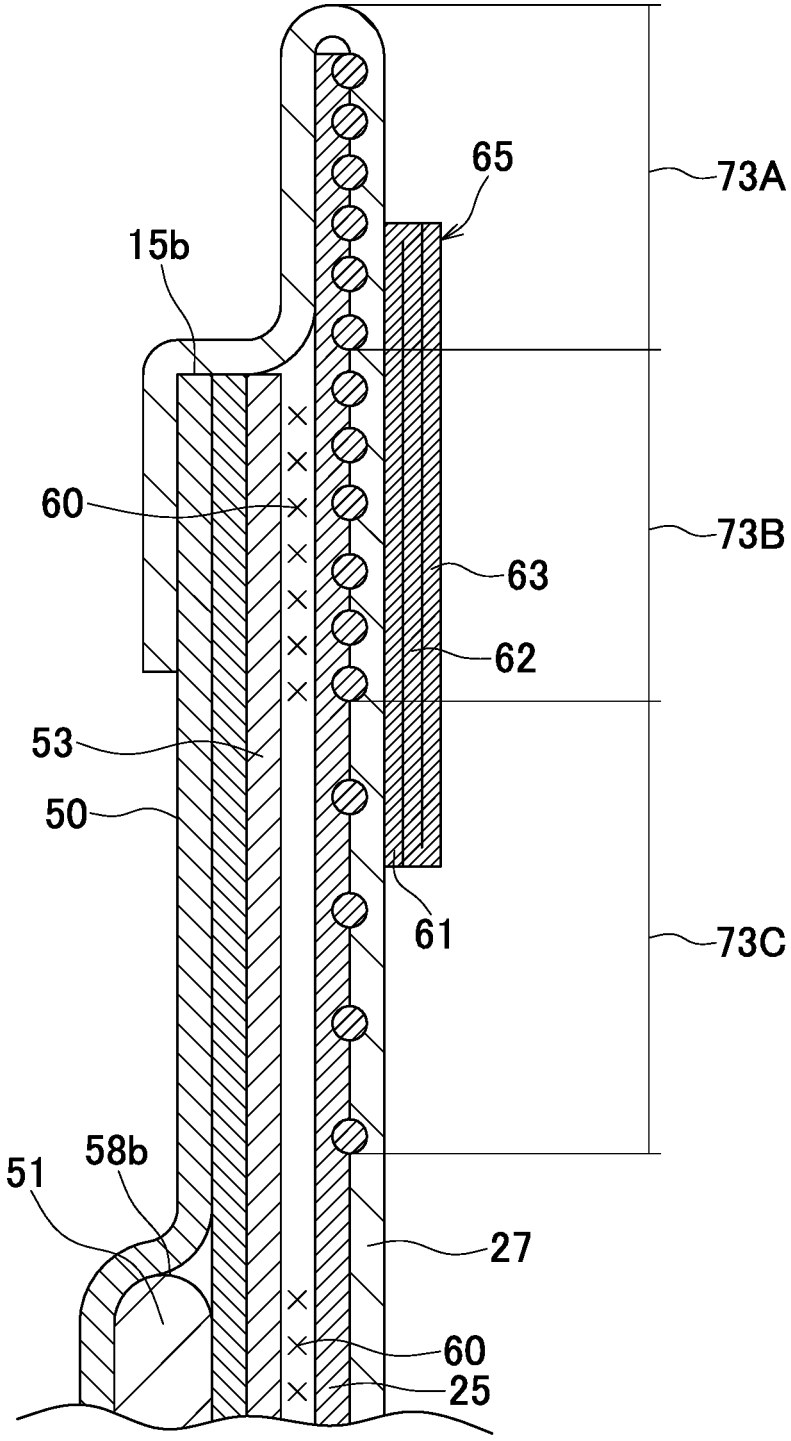
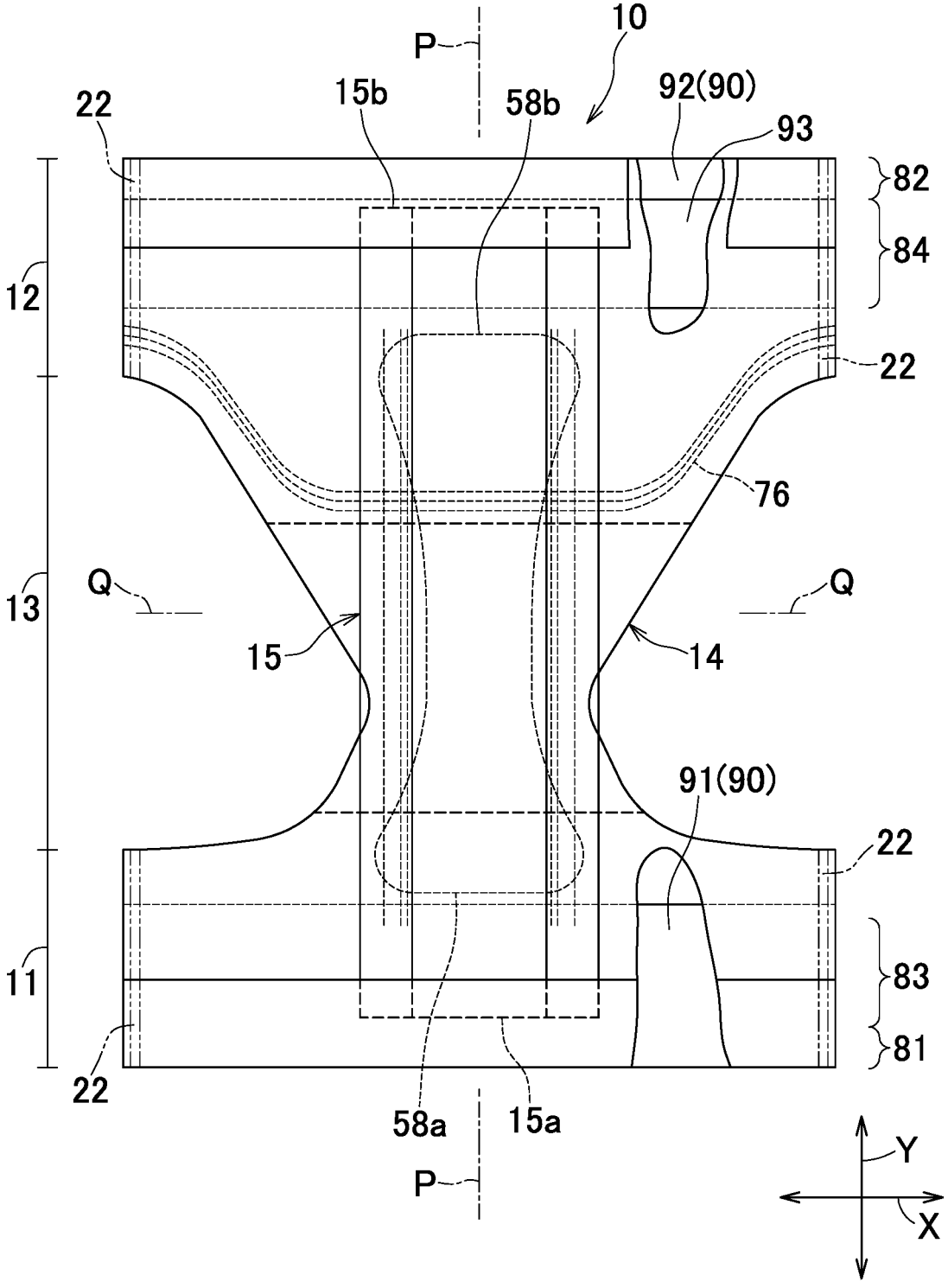


FIG.12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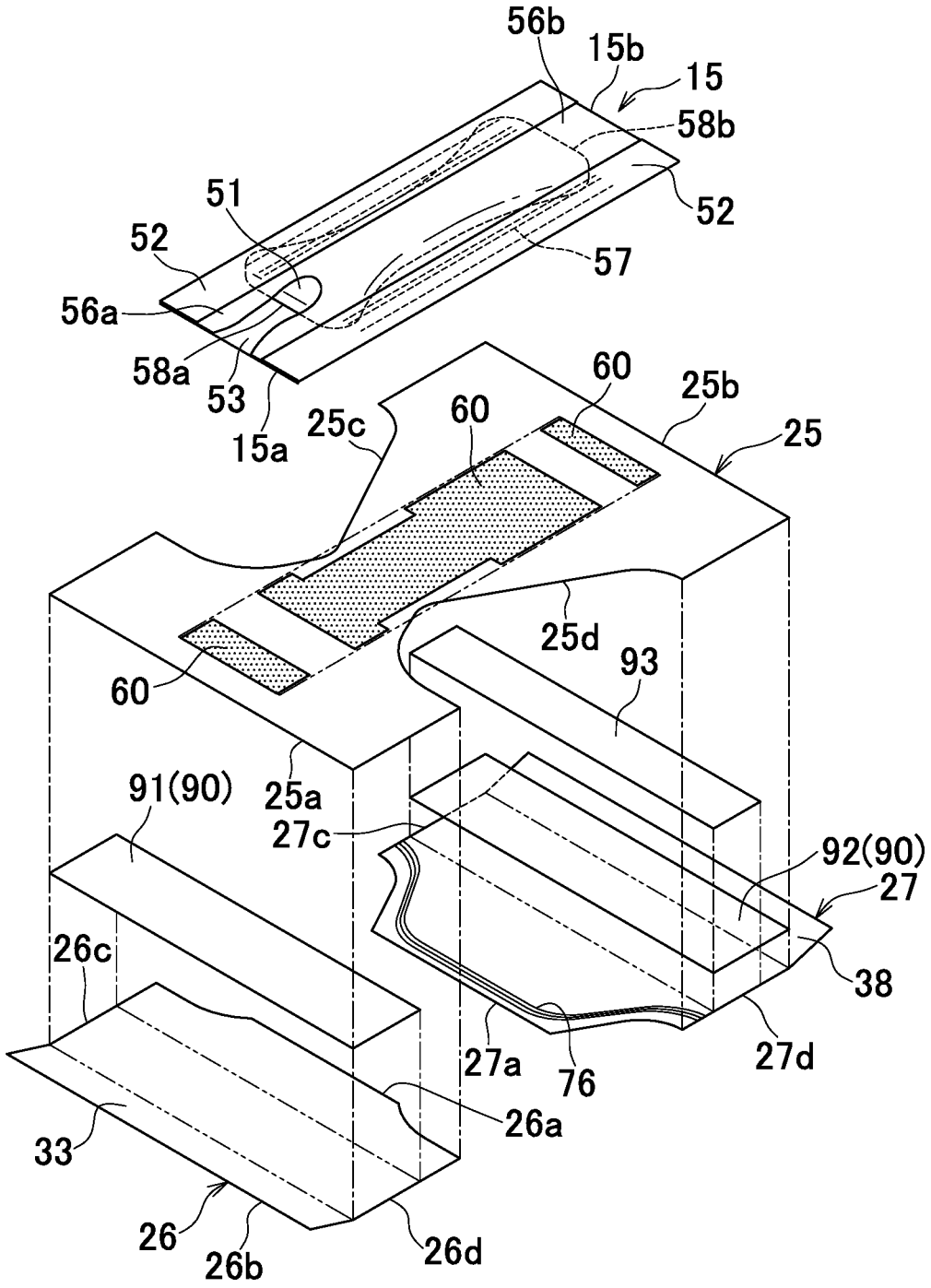
P
15b
58b
92(90)
93
22
82
84
12
22
76
Q
Q
13
15
14
91(90)
22
11
83
81
22
58a
15a
P
Y
X

FIG.13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15b
15
58b
52
51
52
57
56a
58a
53
15a
60
25b
25c
60
25
25d
93
60
91(90)
25a
27c
92(90)
27
26c
38
27a
76
27d
26a
33
26
26b
26d