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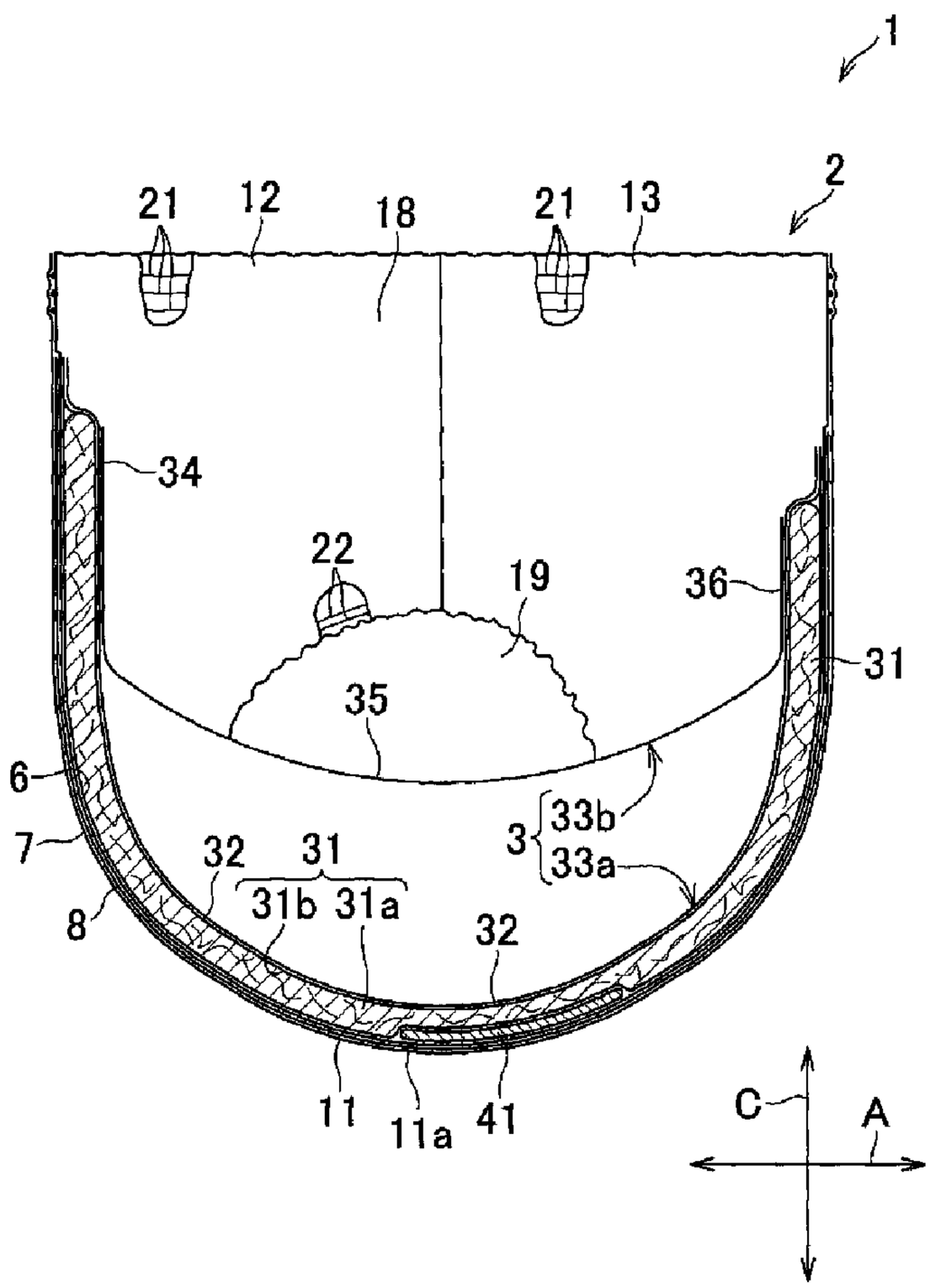

(57) Abrégé/Abstract:
A disposable diaper having a separation sheet for preventing bodily wastes from coming into contact with skin of the wearer. The disposable diaper (1) includes a bodily fluid absorption structure body (3) positioned at least at a crotch region (11). The separation

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(57) Abrégé(suite)/Abstract(continued):
sheet (33b) extends in the front-rear direction A so as to be elastically extendable and retractable, has a front opening and a rear opening, and is provided on a bodily fluid absorption surface of the bodily fluid absorption structure body (3). An elastic panel (41) is provided on that portion of the bodily fluid absorption surface of the bodily fluid absorption structure body (3) which is in the crotch region (11).

A B S T R A C T

A disposable diaper (1) includes a body fluid absorbent core structure (3) in a crotch region (11). An isolating sheet (33b) extends in a back-and-fourth direction (A) so as to be elastically stretchable and contractible in the direction (A). The isolating sheet (33b) has a front opening and a rear opening. In the crotch region, the absorbent structure is provided on a body fluid non-absorbent surface thereof with an elastic panel (41).

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

DISPOSABLE DIAPER

TECHNICAL FIELD

[0001]

The present invention relates to a disposable diaper.

RELATED ART

[0002]

It is well know in disposable diapers, for example, from JP1986-41304A and JP2002-11044A to interpose an isolating sheet between a body fluid absorbent assembly and the wearer's skin in order to protect the wearer's skin from being soiled with body waste.

[0003]

In the case of a disposable diaper disclosed in JP1986-41304A, a hydrophobic topsheet is provided above a cover sheet in an absorbent pad structure. This topsheet has an opening adapted to receive body waste such as feces and elastic bands extending on both sides of the opening in the back-and-forth direction so as to be stretchable in this direction. Upon putting the diaper on the wearer's body, the elastic bands contract and thereby the topsheet is spaced

upward from an absorbent pad into contact with the wearer's skin so as to prevent an absorbent pad from coming in contact with the wearer's skin.

[0004]

The diaper disclosed in JP2002-11044A is of pants-type and includes a skin contact sheet above a liquid-pervious topsheet used to cover an absorbent core. This skin contact sheet has, in a crotch region, an opening adapted to receive feces and elastic members extending between front and rear waist regions are attached in a stretched state to the skin contact sheet so as to surround the opening.

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005]

In the case of the diaper disclosed in JP1986-41304A, a body fluid absorbent core in the crotch region may be formed with a plurality of gathers extending in the back-and-forth direction and/or folded in two in the width direction as the wearer closes his or her legs. Consequentially, it may be made difficult for feces to pass through the opening. If the body fluid absorbent core is formed with gathers or folded in two, the effective area to come in contact with feces may be apparently decreased and absorption of the liquid constituent

of feces may be retarded.

[0006]

In the case of the diaper disclosed in JP2002-11044A, the opening of the skin contact sheet may be rarely closed but a body fluid absorbent core underlying the opening may be formed with gathers and/or folded in two as the wearer closes his or her legs. Consequentially, it may be made substantially difficult for feces to pass through the opening and/or absorption of the liquid constituent of feces by the body fluid absorbent core may be retarded.

[0007]

It is an object of the invention to improve the known diaper as has exemplarily described above so that an adequately large space to receive feces can be easily and reliably formed between the body fluid absorbent core and the isolating sheet.

MEASURE TO SOLVE THE PROBLEM

[0008]

According to the present invention, there is provided a disposable diaper having a back-and-forth direction and a width direction, and a body side and a non-body side opposed to the body side, comprising: a front waist region; a rear waist region; a crotch region extending between said front and rear waist regions; a body fluid absorbent surface on the body

side; a body fluid non-absorbent surface on the non-body side; a body fluid absorbent structure disposed on the body side at least in the crotch region; an isolating sheet disposed on the absorbent surface at least in the crotch region so as to be elastically stretchable and contractible in the back-and-forth direction, and the isolating sheet having front and rear end portions opposed in the back-and-forth directions, lateral portions opposed in the width direction, an intermediate portion between the lateral portions and front and rear openings for receiving body waste partitioned by the intermediate portion wherein said front and rear end portions are fixed to said front and rear waist regions and the intermediate portion is adapted to be spaced from said absorbent surface and thereby to prevent the absorbent surface and the wearer's skin from coming in contact with each other.

[0009]

The present invention is characterized in that the diaper further includes an elastic panel, the elastic panel is integrally fixed to a zone of the absorbent structure located in an middle zone of the crotch region in the width direction.

[0010]

According to one preferred embodiment of the invention, an elastic panel adapted to exert a higher rate of elastic

restoration than that any other sheet material included in the crotch region can exert when the elastic panel bows in the back-and-forth direction as well as in the width direction.

[0011]

According to another preferred embodiment of the invention, the absorbent structure comprises an inner sheet defining a side of the absorbent surface, an outer sheet defining a side of the non-absorbent surface and a body fluid absorbent core.

[0012]

According to another preferred embodiment of the invention, the elastic panel has a width corresponding to 20 to 100 % of the width of the core in a bottom of the crotch region.

[0013]

According to further preferred embodiment of the invention, the core is thin and flexible particularly in its region overlapping the elastic panel.

[0014]

According to further preferred embodiment of the invention, the core is formed in its region overlapping the elastic panel with an opening extending through the core in a thickness direction thereof.

[0015]

According to yet another preferred embodiment of the invention, string-like elastic members attached to the outer surface of the core ahead of the elastic panel so as to extend across the core.

[0016]

According to further another preferred embodiment of the invention, the elastic panel is attached to the outer sheet.

[0017]

According to another alternative preferred embodiment of the invention, the elastic panel is made of a material selected from the group consisting of foamed polyurethane, foamed polyethylene, foamed polystyrene, crimped thermoplastic synthetic fibers and hollow thermoplastic synthetic fibers.

[0018]

According to still another alternative preferred embodiment of the invention, the outer sheet is formed of a laminate composed of a liquid-impervious plastic film and a nonwoven fabric or plastic film respectively covering inner and outer surfaces of the plastic film.

EFFECT OF THE INVENTION

[0019]

With the disposable diaper according to the present invention, upon putting it on the wearer's body, the isolating sheet contracts in the back-and-forth direction and consequently the intermediate portion of the isolating sheet is spaced from the inner sheet so as to come in contact with the wearer's skin. At the same time, the elastic panel provided in the crotch region functions to prevent the body fluid absorbent core located in the crotch region being folded in two and/or formed with a plurality of gathers and thereby to ensure adequately large space between the isolating sheet and the inner sheet when the wearer closes his or her legs. Even if the body fluid absorbent core is temporarily folded in two, the core easily restores its initial state and quickly recovers the large space between the isolating sheet and the inner sheet as soon as the wearer opens his or her legs.

[0020]

According to the embodiment of the invention wherein the core is thin and flexible particularly in its region overlapping the elastic panel and the core is formed in this region overlapping the elastic panel with an opening extending through the core in a thickness direction thereof, the elastically restorative force of the elastic panel should not be diminished by the core even if the elastic panel is deformed.

Consequentially, the space between the elastic panel and the inner sheet can be easily and reliably maintained.

[0021]

According to the embodiment of the invention wherein string-like elastic members attached to the outer surface of the core ahead of the elastic panel so as to extend across the core, it is substantially prevented that the front portion of the crotch region might be folded in two in the width direction and, even if the front portion of the crotch region is folded in two, the front portion can easily restore the initial state.

[0022]

Effects of the invention to be achieved in the other embodiments will be more fully understood from the detailed description given hereunder.

BRIEF DESCTIPTION OF THE DRAWINGS

[0023]

[FIG. 1] Fig. 1 is a partially cutaway perspective view of a diaper.

[FIG. 2] Fig. 2 is a sectional view taken along the line II-II in Fig. 1.

[FIG. 3] Fig. 3 is a developed view of the diaper of Fig. 1.

[FIG. 4] Fig. 4 is an exploded assembly diagram of the

diaper of Fig. 3.

[FIG. 5] Fig. 5 is an exploded view of a absorbent structure.

[FIG. 6] Fig. 6 is a partially cutaway perspective view of a liquid-absorbent panel according to one preferred embodiment of the invention.

[FIG. 7] Fig. 7 is a sectional view taken along the line VII-VII in Fig. 6.

[FIG. 8] Fig. 8 is an exploded perspective view of the covering chassis according to one preferred embodiment of the invention.

[FIG. 9] Fig. 9 is a view similar to Fig. 8, showing a covering chassis according to another preferred embodiment of the invention.

[FIG. 10] Fig. 10 is a partially cutaway perspective view of an isolating sheet according to one preferred embodiment of the invention.

[FIG. 11] Fig. 11 is a sectional view taken along the line XI-XI in Fig. 10.

[FIG. 12] Fig. 12 is a sectional view taken along the line XII-XII in Fig. 10.

[FIG. 13] Fig. 13 is a view similar to Fig. 7, showing the absorbent panel according to another preferred embodiment

of the invention.

IDENTIFICATION OF REFERENCE NUMERALS USED IN THE DRAWINGS

[0024]

1	disposable diaper
3	liquid-absorbent structure
8	outer side sheet (leak-barrier sheet)
11	crotch region
11a	bottom of crotch region
12	front waist region
13	rear waist region
31	core
32	inner side sheet (inner sheet)
33b	isolating sheet
35	intermediate portion
38	front opening
39	rear opening
41	elastic panel
56	elastic member
A	back-and-forth direction
B	width direction

DESCRIPTION OF THE BEST MODE FOR WORKING OF THE INVENTION

[0025]

A disposable diaper according to the present invention

will be more fully understood from the description given hereunder with reference to the accompanying drawings.

[0026]

Fig. 1 is a partially cutaway perspective view of a diaper 1 and Fig. 2 is a sectional view taken along the line II-II in this perspective view. The diaper 1 is shown in Fig. 1 as put on the wearer's body and has a back-and-forth direction A, a transverse direction B and a height direction C. The diaper 1 has a body side (body fluid absorbent surface side) I and a non-body side (body fluid non-absorbent surface side) O and comprises a covering chassis 2 formed in a pants-type and a body fluid absorbent structure provided inside the covering chassis 2. The covering chassis 2, in turn, comprises an inner sheet 6, an outer sheet 7 and a liquid-impervious leak-barrier sheet 8 sandwiched between these two sheets 6, 7 so as to define a crotch region 11, a front waist region 12 extending forward from the crotch region 11 and a rear waist region 13 extending rearward from the crotch region 11. The front and rear waist regions 12, 13 respectively have opposed lateral margins 15, 16 put flat together and bonded together at a plurality of spots 17 arranged intermittently in the height direction C as viewed in Fig. 1 so as to form a waist-opening 18 and, at the same time, the front and rear waist regions 12,

13 cooperate with the crotch region 11 to form a pair of leg-openings 19. Along respective peripheral edges of the waist-opening 18 and the leg-openings 19, a plurality of waist elastic members 21 and leg elastic members 22 are laid between the inner sheet 6 and the outer sheet 7 and bonded in a stretched state to at least one of these sheets 6, 7. The body absorbent structure 3 is provided at least in the crotch region 11 and comprises an absorbent panel 33a and an isolating sheet 33b. The liquid-absorbent panel 33a comprises, in turn, a body fluid absorbent core 31 formed from a water-absorbent material 31a wrapped with tissue paper 31b and a liquid-pervious inner sheet 32 covering at least the body side I i.e., the body fluid absorbent surface side of the core 31. The isolating sheet 33b is provided on the absorbent surface side of the inner sheet 32. Referring to Fig. 2, the isolating sheet 33b has a front end portion 34 and a rear end portion 36 bonded to the inner sheet 32 in the front and rear waist regions 12, 13, respectively and an intermediate portion 35 spaced upward from the inner sheet 32 in the crotch region 11. Referring again to Fig. 2, the core 31 is sandwiched between the inner sheet 32 and the leak-barrier sheet 8 so as to be covered with the leak-barrier sheet 8 from the outer side of the diaper 1. Body fluid once absorbed by the core 31 should not leak from the

diaper 1. Between the core 31 and the inner sheet 6, there is provided an elastic panel 41.

[0027]

Fig. 3 is a plan view showing the diaper 1' corresponding to the diaper 1 of Fig. 1 with the front and rear waist regions 12, 13 having been forcibly peeled off from each other at the spots 17 and developed in the back-and-forth direction A. In Fig. 3, waist elastic members 21, leg elastic members 22, and elastic members 37 for the crotch region 11 attached in a stretched states to the isolating sheet 33b are indicated by chained lines. The diaper 1' has a longitudinal center line P-P bisecting a width of the diaper 1' and a transverse center line Q-Q bisecting a length of the diaper 1' in the back-and-forth direction A wherein the diaper 1' is configured to be symmetric about the center line P-P. The covering chassis 2 is generally hourglass-shaped and the absorbent structure 3 is rectangular. The isolating sheet 33b provided in association with the absorbent structure 3 comprises opposite lateral portions 40 extending along opposite lateral margins 3a of the absorbent panel 33a and an intermediate portion 35 connecting the lateral portions 40. The lateral portions 40 cooperate with the intermediate portion 35 to define a U-shaped front opening 38 put aside toward the front

waist region 12 and a U-shaped rear opening 39 put aside toward the rear waist region 13. The diaper 1 is adjustably put on the wearer's body so that the wearer's external genital lies in the front opening 38, the wearer's anus lies in the rear opening 39 and, between the external genital and the anus, the intermediate portion 35 comes in contact with the wearer's skin. In this state, it is preferable that a bottom 38a of the U-shape defined by the front opening 38 is located in front of the transverse center line Q-Q while a bottom 39a of the U-shape defined by the rear opening 39 is located in the vicinity of the transverse center line Q-Q. The elastic members 37 for the crotch region 11 in stretched states contract in the back-and-forth direction A as the crotch region 11 bows in the back-and-forth direction A as seen Figs. 1 and 2. Consequentially, the elastic members 37 function to reduce the dimension of the isolating sheet 33b as viewed in Fig. 3 and simultaneously to spaced the intermediate portion 35 from the inner sheet 32 (See Fig. 2).

[0028]

Fig. 4 is an exploded view illustrating assembly of the diaper 1'. The outer sheet 7 is formed of a nonwoven fabric or plastic film and provided on the inner surface thereof with the waist elastic members 21 and the leg members 22 attached

in stretched states thereto by hot melt adhesive (not shown). The outer sheet 7 is further provided on the inner surface thereof with the leak-barrier sheet 8 attached thereto by use of adhesive or any suitable sealing technique. The outer sheet 7 and the leak-barrier sheet 8 are provided, in turn, on the respective inner surfaces with the inner sheet 6 of a nonwoven fabric or plastic film which is the same as the outer sheet 7 in shape as well as in size attached thereto by use of adhesive or any suitable sealing technique. The inner sheet 6 is provided on the inner surface thereof with the elastic panel 41 attached thereto by hot melt adhesive (not shown) so as to be located symmetrically about the longitudinal center line P-P. In the case of the diaper 1 when it is designed as the baby diaper, the elastic panel 41 is preferably dimensioned to have a width corresponding to 20 to 100% of the width of the core 31 as measured at a bottom 11a of the crotch region 11 (See Figs. 1 and 2) lying on the transverse center line Q-Q and a length of 20 to 80 mm. The elastic panel 41 may be attached to the leak-barrier sheet 8 at the rear of the transverse center line Q-Q. The elastic panel 41 may also be attached to the leak-barrier sheet 8 so as to extend forward beyond the transverse center line Q-Q unless a dimension by which the panel 41 extends beyond the transverse center line Q-Q exceeds 30

mm. The inner sheet 6 is further provided on the inner surface thereof with the absorbent structure 3 bonded thereto by hot melt adhesive (not shown). Of the absorbent panel 33a and the isolating sheet 33b constituting together the absorbent structure 3, the absorbent panel 33a has a substantially entire outer surface (i.e., lower surface as viewed in Fig. 4) bonded to the inner sheet 6 so that the absorbent panel 33a cooperates with the inner sheet 6 to sandwich the elastic panel 41. It is also possible to bond the absorbent panel 33a to the elastic panel 41. The isolating sheet 33b is bonded to the inner surface of the absorbent panel 33a along the lateral margins 3a thereof.

[0029]

Fig. 5 is an exploded perspective view of the absorbent structure 3. The absorbent panel 33a constituting the absorbent structure 3 comprises the core 31 formed by the assembly 31a of water-absorbent materials such as fluff pulp, or a mixture of fluff pulp and super-absorbent polymer particles wrapped with tissue paper, and a liquid-pervious inner sheet 32 at least partially covering the inner surface, the side surfaces and the outer surface of the core 31. Fig. 5 indicates a relationship of the absorbent panel 33a with the longitudinal center line P-P and the transverse center line

Q-Q of the diaper 1'. The isolating sheet 33b comprises a pair of nonwoven fabric layers 46, 47 put flat together and a pair of elastic members 37 for the crotch region 11 interposed between these nonwoven fabric layers 46, 47 so as to extend symmetrically about the longitudinal center line P-P and bonded in stretched states to at least one of these two nonwoven fabric layers 46, 47. More specifically, the elastic members 37 extend so as to come closest to each other in a width direction B of the isolating sheet 33b, then to extend along the peripheries of the front opening 38 and the rear opening 39, and to be gradually spaced from each other as these elastic members 37 get nearer to the front end portion 34 and the rear end portion 36, respectively. The opposite lateral portions 34, 36 of the isolating sheet 33b include margins 48 folded back toward the longitudinal center line P-P wherein front and rear end portions 34, 36 of the respective margins 48 are bonded to the inner surface of the absorbent panel 33a along sealing zones 49 provided thereon as indicated by a plurality of dots. Along the front portions 34 and the rear portions 36, the margins 48 folded back and put flat together also are bonded to themselves by adhesion or a suitable sealing technique. While the nonwoven fabric layers constituting the isolating sheet 33 may be liquid-pervious or liquid-impervious, it is

rather preferable to use a nonwoven fabric material having a liquid-permeability lower than that of the inner sheet 32 in order to ensure that a flow of body fluids from the absorbent panel 33a toward the wearer's skin can be reliably blocked by the isolating sheet 33b even if a central portion 35 of the isolating sheet 33b comes in contact with the absorbent panel 33a in a wet condition due to absorption of body fluids during use of the diaper 1.

[0030]

The diaper 1' of Fig. 3 using such isolating sheet 33b may be folded back on itself along the transverse center line Q-Q and then the front and rear waist regions 12, 13 may be bonded to each other along the opposite lateral margins 15, 16 thereof to obtain the diaper 1 of Fig. 1. Thereupon, contraction of the elastic members 37 for the crotch region 11 causes the intermediate portion 35 of the isolating sheet 33b to be spaced upward from the inner sheet 32 of the absorbent panel 33a and to come in contact with the wearer's crotch. It is thus ensured that urine flows toward the absorbent panel 33a through the front opening 38 while feces move toward the absorbent panel 33a through the rear opening 39. In this way, the wearer's skin between the external genital and the anus should not be soiled with bodily waste.

[0027]

The elastic panel 41 interposed between the covering chassis 2 and the core 31 in the absorbent panel 33a ensures that the absorbent panel 33a can smoothly bow down toward the bottom of the diaper 1 substantially without forming gathers extending in the back-and-forth direction A even when the absorbent panel 33a is compressed in the width direction B as the wearer closes his or her legs. In addition, even if the absorbent panel 33a is compressed together with the elastic panel 41 so as to be folded in two, the absorbent panel 33a can be unfolded under a restorative force of the elastic panel 41 as soon as the wearer opens the legs again. Consequentially, the absorbent panel 33a is substantially free from a potential folding line left thereon. More specifically, the intermediate portion 35 of the isolating sheet 33b is adapted to be kept spaced from the absorbent panel 33a by an adequate distance and at the same time the inner surface of the absorbent panel 33a is adapted to extend smoothly, allowing voluminous bodily waste to be received in a space defined between the isolating sheet 33b and the absorbent panel 33a and allowing also a liquid moiety contained in bodily waste to be rapidly absorbed the absorbent panel 33a.

[0032]

Stock material for the elastic panel 41 functioning as has been described above may be selected from the group consisting of a foamed elastic sheet having a thickness in a range of 3 to 10 mm and made of a foamed resin such as a flexible and elastic foam urethane resin, foam polyethylene resin or foam polystyrene resin; a nonwoven fabric or laminate consisting of plural nonwoven fabric layers having a basis weight in a range of 100 to 250 g/m^2 and made of crimped fibers such as mechanically crimped thermoplastic synthetic fibers or thermally crimped thermoplastic synthetic fibers; a nonwoven fabric or laminate consisting of plural nonwoven fabric layers having a basis weight in a range of 100 to 250 g/m^2 and containing elastic yarns such as urethane elastic yarns; and laminate consisting of such foamed elastic sheet and such nonwoven fabric. The foamed elastic sheet preferably has open cells for high air-permeability and, as the crimped fibers, it is preferred to employ composite fibers of sheath-and-core type or side-by-side type and thereby to enhance a restorative force of the elastic panel 41. The elastic panel 41 should have a rate of restoration in the back-and-forth direction A as well as in the width direction B higher than a rate of restoration of any other sheet material and the core provided in the crotch region 11 inside or outside

the elastic panel 41 so that restoration of such sheet materials and core 31 can be promoted by the elastic panel 4 after the diaper 1 has been folded in the back-and-forth direction A and the width direction B.

[0033]

Fig. 6 is a partially cutaway perspective view of the absorbent panel 33a according to one preferred embodiment of the invention and Fig. 7 is a sectional view taken along the line VII-VII in Fig. 6. Referring to Fig. 6, the core 31 of the absorbent panel 33a has no liquid-absorbent material in the vicinity of a point at which the longitudinal center line P-P intersects with the transverse center line Q-Q. In the vicinity of this intersection, instead of the absorbent material, a through-hole 51 extends through the assembly 31a in its thickness direction. This absorbent panel 33a also is provided on the outer surface of the core 31 with the elastic panel 41 as indicated by imaginary lines. The absorbent structure 3 including such absorbent panel 33a is substantially free from a possibility that the elastically restorative force of the elastic panel 41 might be diminished by the presence of the core 31. Therefore, even if folded on itself in the width direction B, the absorbent structure 3 according to this embodiment can be quickly unfolded under the

effect of the elastic panel 41 more easily than in the case of the absorbent structure 3 of Fig. 5. Formation of the adequately large space between the absorbent assembly 33a and the isolating sheet 33b is also ensured more easily than the assembly 33a of Fig. 5. The preferred through-hole 51 has its lower side covered with the tissue paper 31b defining the surface of the absorbent panel 33a. It is also possible to depress the through-hole 51 together with the tissue paper 31b so that the through-hole 51 can be used as a feces receiver. When the diaper 1 is for baby and the through-hole 51 is used for such purpose, the through-hole 51 is preferably put aside forward at a distance of 30 mm or less from the transverse center line Q-Q and a dimension of the through-hole 51 as measured rearward from the transverse center line Q-Q is preferably at least 10 mm longer than a dimension of the through-hole 51 as measured forward from the transverse center line Q-Q and preferably in a range of 30 to 70 mm. While a planar shape of the through-hole 51 is not specified and may be selected from various shapes such as rectangular, square, circular and oval shapes, a shape having a width tapered from its rear end toward its front end such as trapezoidal or triangular shape is principally preferable. This for the reason that such tapered shape is effective to assure that the absorbent

structure 3 is folded along the longitudinal center line P-P alone as a transverse force is exerted on the absorbent structure 3 so as to reduce the width thereof. Such through-hole 51 as shown may be replaced by a thin and flexible depression containing a smaller amount of the core material 31a than the surrounding portion. The elastic panel 41 underlying the through-hole 51 preferably covers 90% or more and particularly preferable covers 100% of the area of the through-hole 51.

[0034]

Fig. 8 is an exploded perspective view of the covering chassis 2 which is alternative to the covering chassis 2 of Fig. 4. The covering chassis 2 illustrated herein is provided on the inner surface of the outer sheet 7 in the crotch region 11 with a transverse elastic member 56 extending in the width direction B in the form of elastic string. The transverse elastic member 56 is prepared separately of the leg elastic members 22 and attached in a stretched or non-stretched state to the outer sheet 7 ahead of the elastic panel 41, preferably 5 to 50 mm ahead of the elastic panel 41 so as to extend across the core 31. The transverse elastic member 56 causes the core 31 to be smoothly bowed without formation of plural gathers extending in the back-and-forth direction A on the core 31 as

the wearer closes his or her legs. Consequently, it is possible for the transverse elastic member 56 to prevent an effective area over which the core 31 comes in contact with feces through the intermediary of the inner sheet 32 from being apparently decreased. When such transverse elastic member 56 is attached in stretched state to the outer sheet 7, a stretching ratio of the elastic member 56 is preferably restrained for fear of possibility that the desired function and effect of the elastic member 56 might be deteriorated.

[0035]

Fig. 9 is a view similar to Fig. 8, showing the covering chassis 2 which is alternative to the covering chassis 2 in Fig. 8. In the case of the covering chassis 2 illustrated by Fig. 9, the string-like leg elastic members 22 comprise front elastic members 22a put aside toward the front waist region 12 and rear elastic members 22b put aside toward the rear waist region 13. The front elastic members 22a extend from the front waist region 12 to the vicinity of the transverse center line Q-Q. The rear elastic members 22b extend from the rear waist region 13 beyond a front edge 41a of the elastic panel 41 and then extend across the absorbent structure 3 to define transverse segments 22c. The transverse segments 22c also are attached in stretched or non-stretched states to the outer

sheet 7 and function to prevent the core 31 from being formed with a plurality of gathers.

[0036]

Fig. 10 is a view similar to Fig. 6 showing of the absorbent structure 3 according to one preferred embodiment of the invention. In the case of the absorbent structure 3 illustrated in Fig. 10, the lateral portions 40 of the isolating sheet 33b are formed on the inner surface with leak-barriers 58. The leak-barriers 58 are formed preferably of a nonwoven fabric, more preferably of a liquid-impervious nonwoven fabric folded back along the lateral portions thereof on themselves in a Z-shape and inverted Z-shape, respectively.

[0037]

Figs. 11 and 12 are sectional views taken along lines XI-XI and XII-XII in Fig. 10, respectively. The leak-barriers 58 are bonded, with respective bottom sides of the Z- and inverted Z-shapes, to the outer surface of the absorbent panel 33a by hot melt adhesive 61. Respective intermediate sides 59b and top sides 59c of the Z- and inverted Z-shapes are bonded to the inner surface of the absorbent panel 33a or the isolating sheet 33b along longitudinally opposite ends thereof by hot melt adhesive 62. The respective intermediate sides 59b and top sides 59c remain folded back one on another without being

bonded together in the vicinity of the transverse center line Q-Q (See Fig. 12). Elastic members 63 are attached in stretched states to the respective intermediate sides 59b and the top sides 59c of the Z- and inverted Z-shapes (See Fig. 10). When the diaper 1 using the body absorbent structure including such leak-barrier barriers 58 is configured on the wearer's body as seen in Fig. 1, the intermediate sides 59b as well as the top sides 59c raise themselves up as indicated by imaginary lines in Fig. 12 under contraction of the elastic members 63 in the back-and-forth direction A. In this way, body fluids should not leak sideways from the absorbent structure 3. Such absorbent structure 3 may be used combination with the covering chassis 2 to achieve a higher protective effect against leak of body fluids through a discontinuous zone defined between the front and rear elastic members 22a, 22b in the crotch region 11 of the covering chassis 2.

[0038]

Fig. 13 is a view similar to Fig. 7, showing the absorbent panel 33a according to another preferred embodiment of the invention. In the case of the absorbent panel 33a exemplarily shown in Fig. 13, the elastic panel 41 is interposed between the outer surface of the water-absorbent materials' assembly

31a and the tissue paper 31b. The elastic panel 41 according to this embodiment also is provided on the outer surface of the core 31. The elastic panel 41 provided on the outer surface of the core 31 as described herein should be understood to include an elastic panel 41 provided between the inner sheet 6 and the leak-barrier sheet 8, an elastic panel 41 provided between the leak-barrier sheet 8 and the outer sheet 7, and an elastic panel 41 provided on the outer surface of the outer sheet 7, each in the covering chassis 2.

C L A I M S

[1] A disposable diaper (1) having a back-and-forth direction (A) and a width direction (B), and a body side (I) and a non-body side opposed to said body side, comprising:

a front waist region (12);

a rear waist region (13);

a crotch region (11) extending between said front and rear waist regions;

a body fluid absorbent surface on said body side;

a body fluid non-absorbent surface on said non-body side;

a body fluid absorbent structure (3) disposed on said body side at least in said crotch region;

an isolating sheet (33b) disposed on said absorbent surface at least in said crotch region so as to be elastically stretchable and contractible in said back-and-forth direction, and said isolating sheet having front and rear end portions (34, 36) opposed in said back-and-forth directions, lateral portion (40) opposed in said width direction, an intermediate portion (35) between said lateral portions and front and rear openings (38, 39) for receiving body waste partitioned by said intermediate portion wherein said front and rear end portions are fixed to said front and rear waist regions and said

intermediate portion is adapted to be spaced from said absorbent surface and thereby to prevent said absorbent surface and said wearer' s skin from coming in contact with each other, said diaper being characterized in that:

said diaper further includes an elastic panel, said elastic panel is integrally fixed to a zone of said absorbent structure located in a middle zone of said crotch region in said width direction.

[2] The diaper according to Claim 1, wherein said elastic panel is adapted to exert a higher rate of elastic restoration than that any other sheet material included in said crotch region can exert when said elastic panel bows in said back-and-forth direction as well as in said width direction.

[3] The diaper according to Claim 1 or 2, wherein said absorbent structure comprises an inner sheet (32) defining a side of said absorbent surface, an outer sheet (7) defining a side of said non-absorbent surface and a body fluid absorbent core (31).

[4] The diaper according to Claim 1, wherein said elastic panel has a width corresponding to 20 to 100 % of the width

of said core in a bottom of said crotch region.

[5] The diaper according to Claim 3, wherein said core is thin and flexible particularly in its region overlapping said elastic panel.

[6] The diaper according to any one of Claims 2 through 5, wherein said core is formed in said region overlapping said elastic panel with an opening extending through said core in a thickness direction thereof.

[7] The diaper according to any one of Claims 3 through 6, wherein string-like elastic members attached to the outer surface of said core ahead of said elastic panel so as to extend across said core.

[8] The diaper according to any one of Claims 3 through 7, wherein said elastic panel is attached to said outer sheet.

[9] The diaper according to any one of Claims 3 through 8, wherein said elastic panel is made of a material selected from the group consisting of foamed polyurethane, foamed polyethylene, foamed polystyrene, crimped thermoplastic

synthetic fibers and hollow thermoplastic synthetic fibers.

[10] The diaper according to any one of Claims 3 through 9, wherein said outer sheet is formed of a laminate composed of a liquid-impervious plastic film and a nonwoven fabric or a plastic film respectively covering inner and outer surfaces of said plastic film.

FIG.1

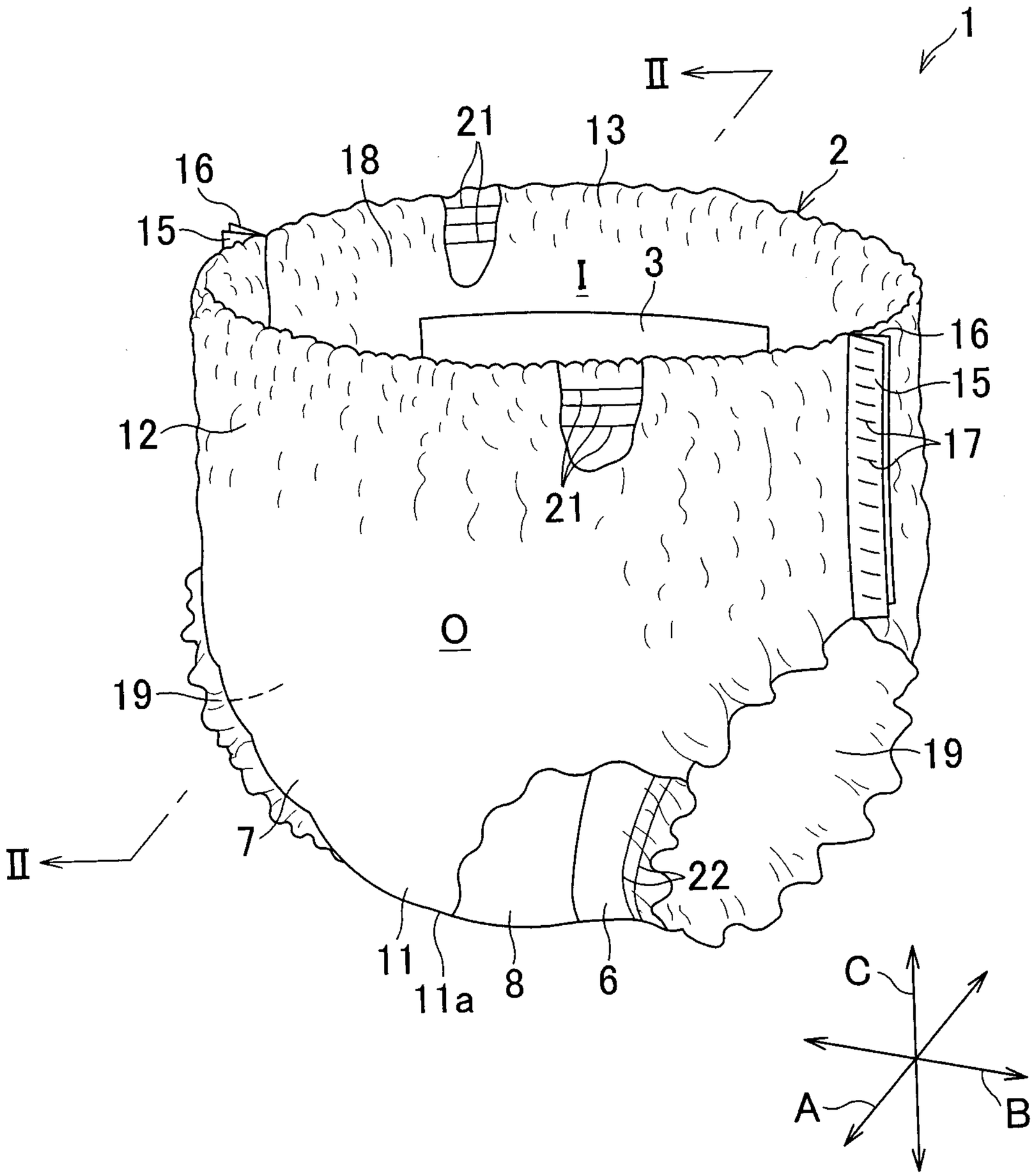
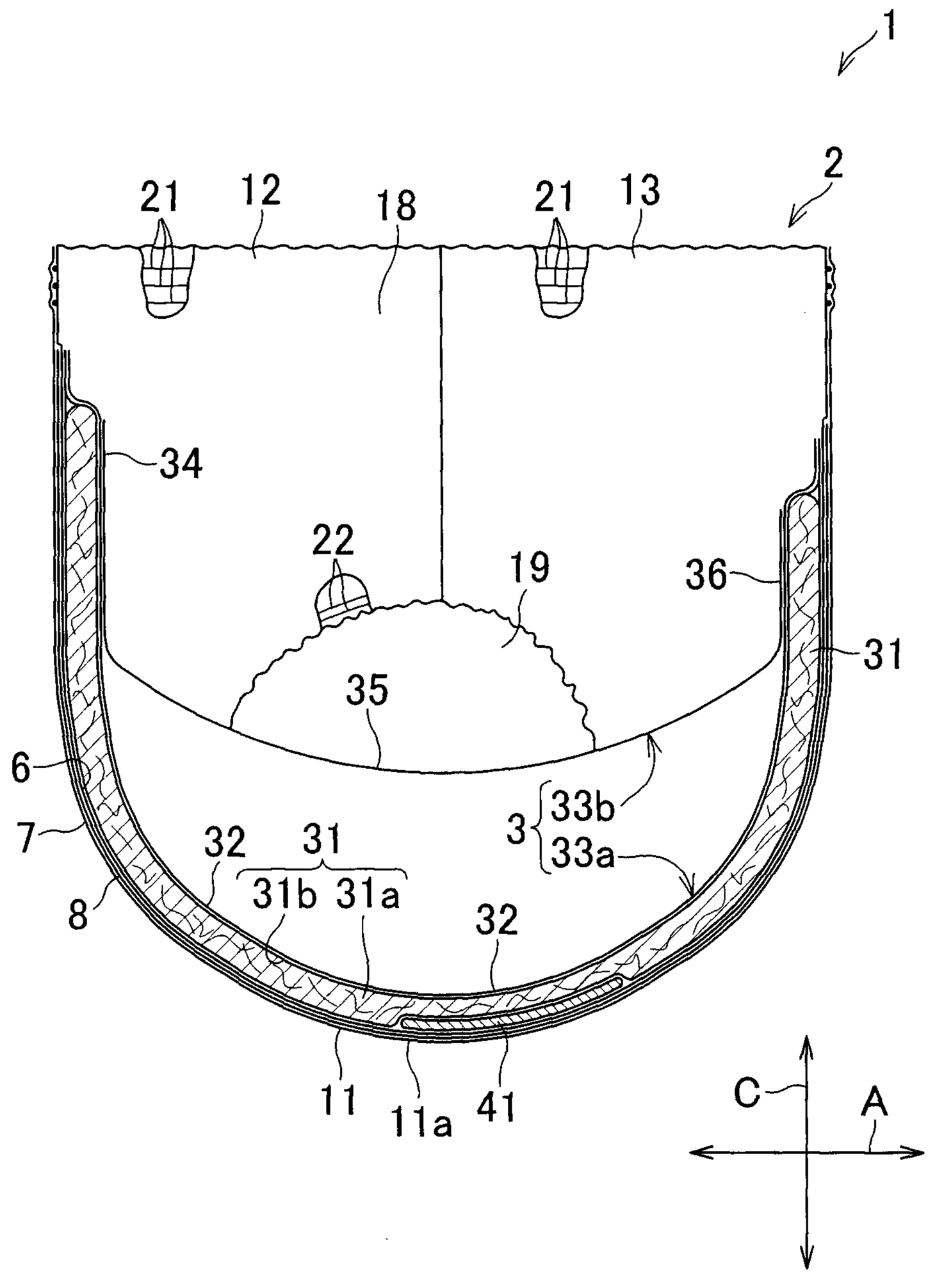


FIG.2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C
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FIG.3

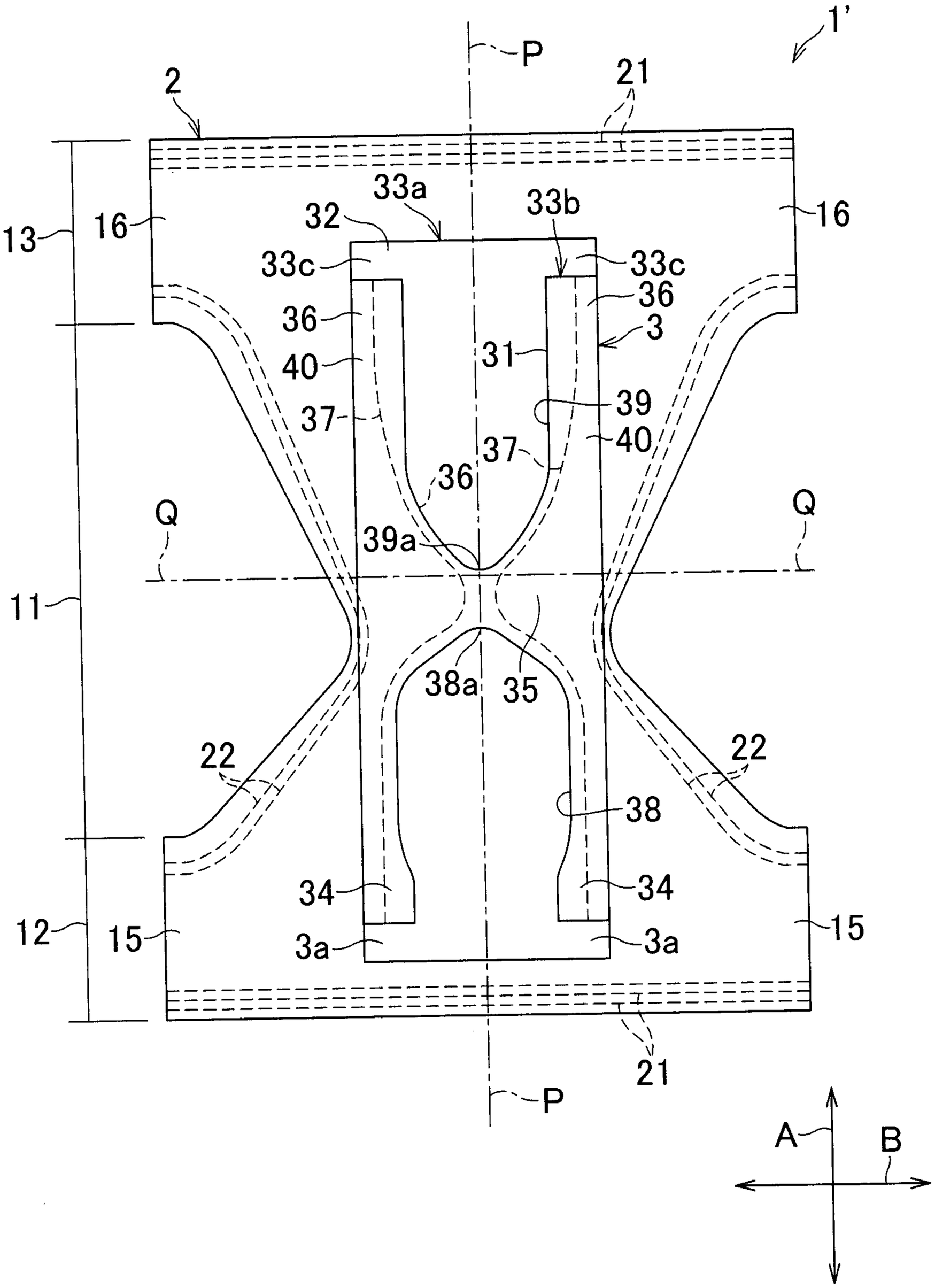
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FIG.4

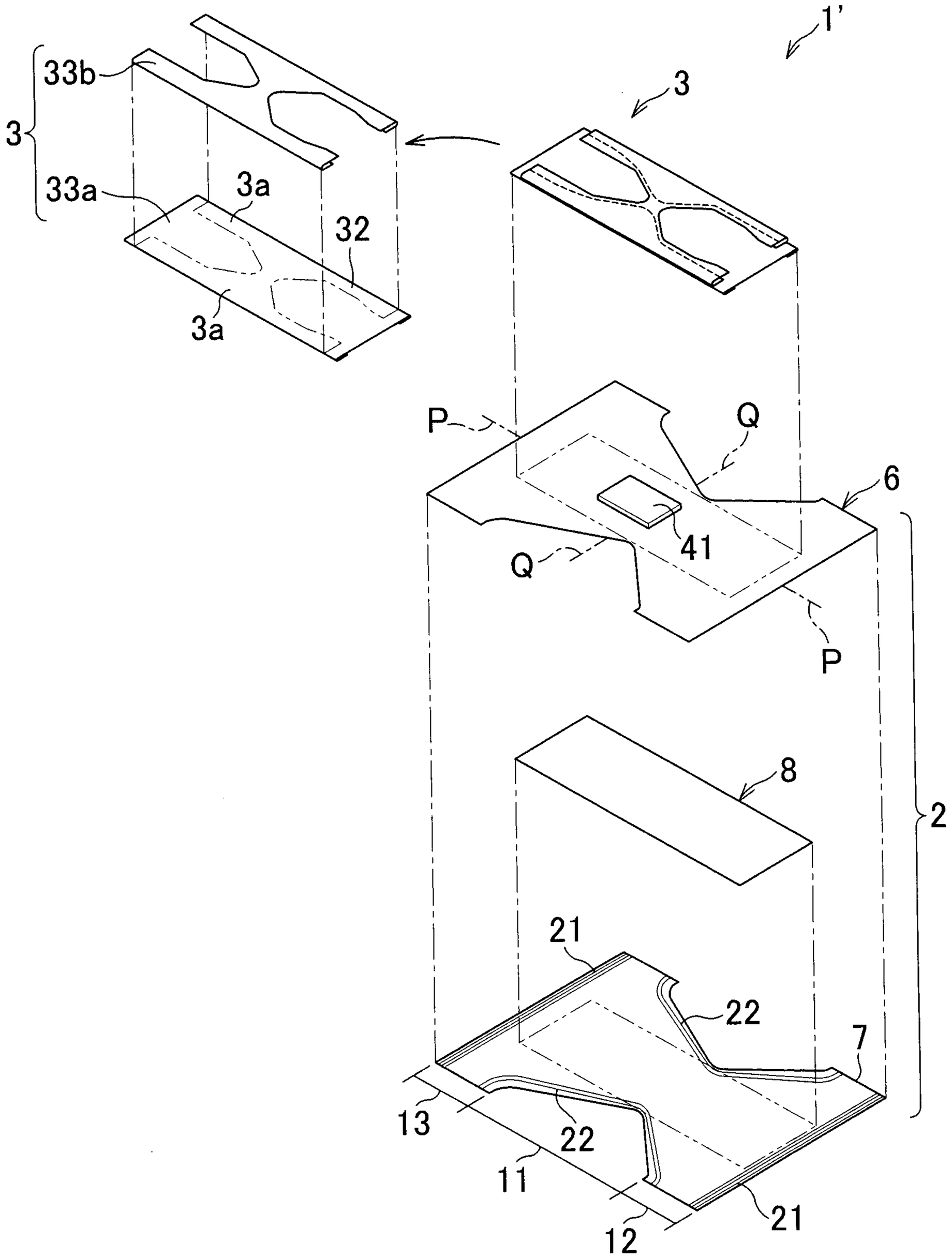

FIG.5

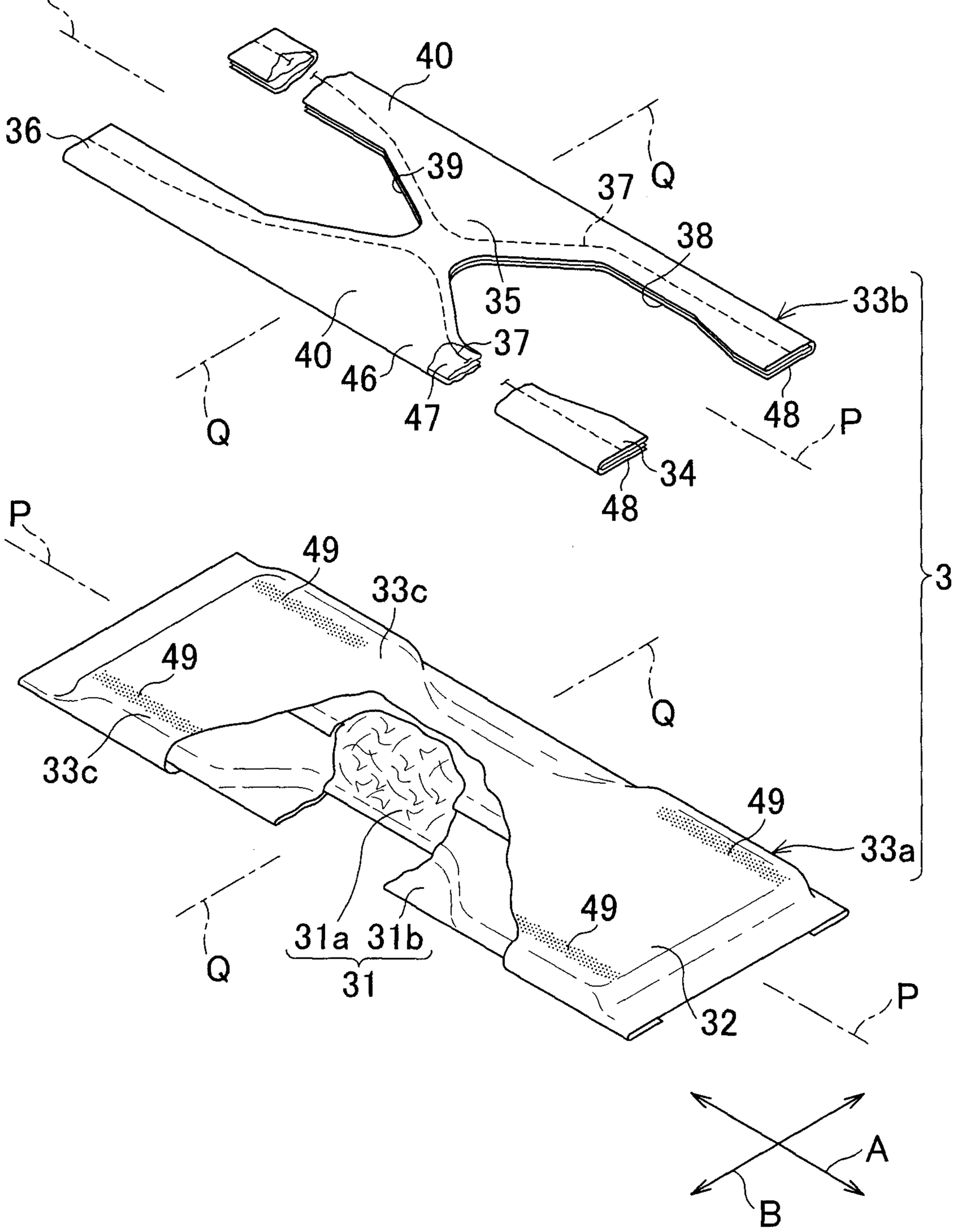
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FIG.6

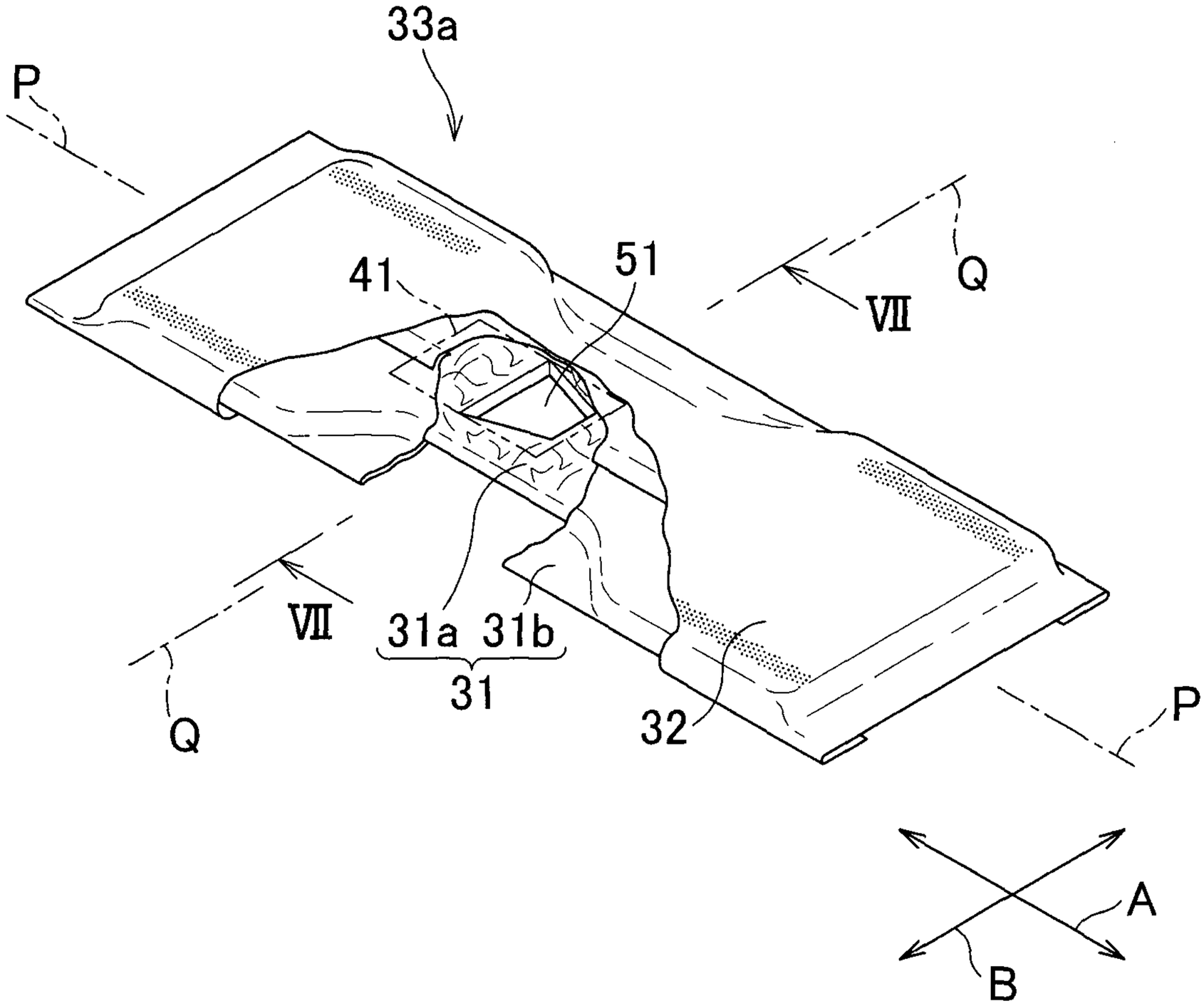


FIG.7

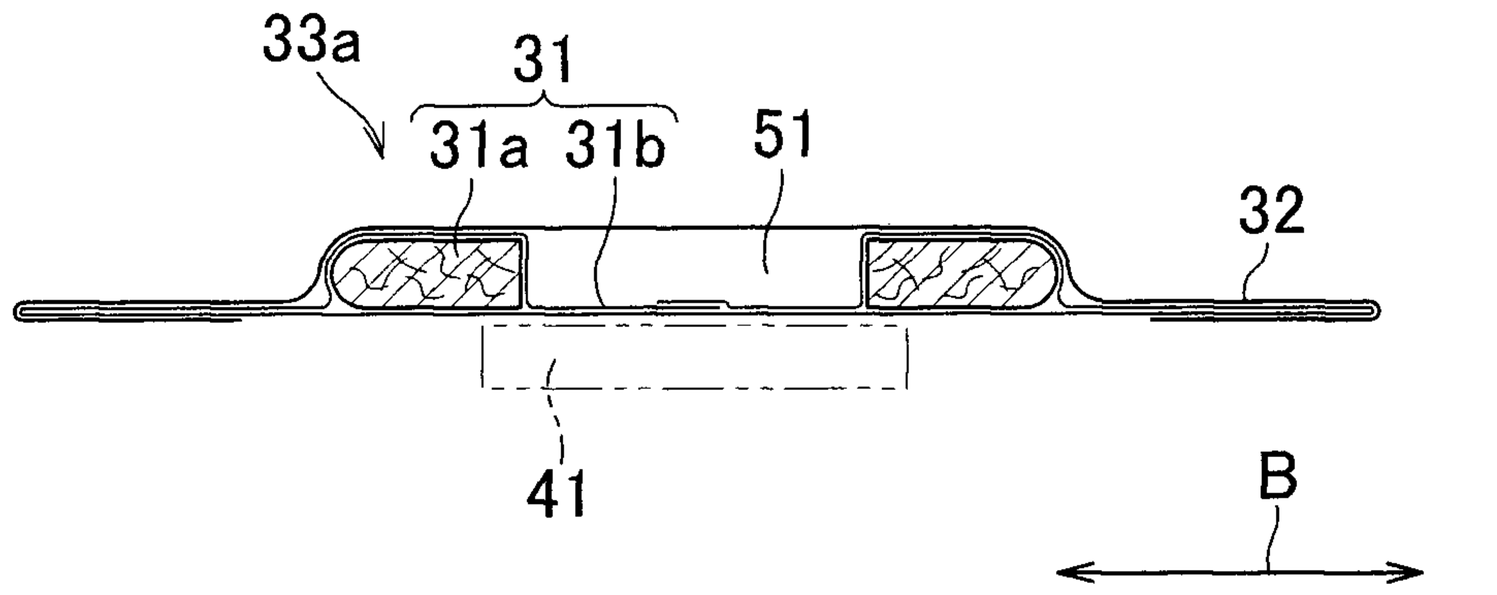
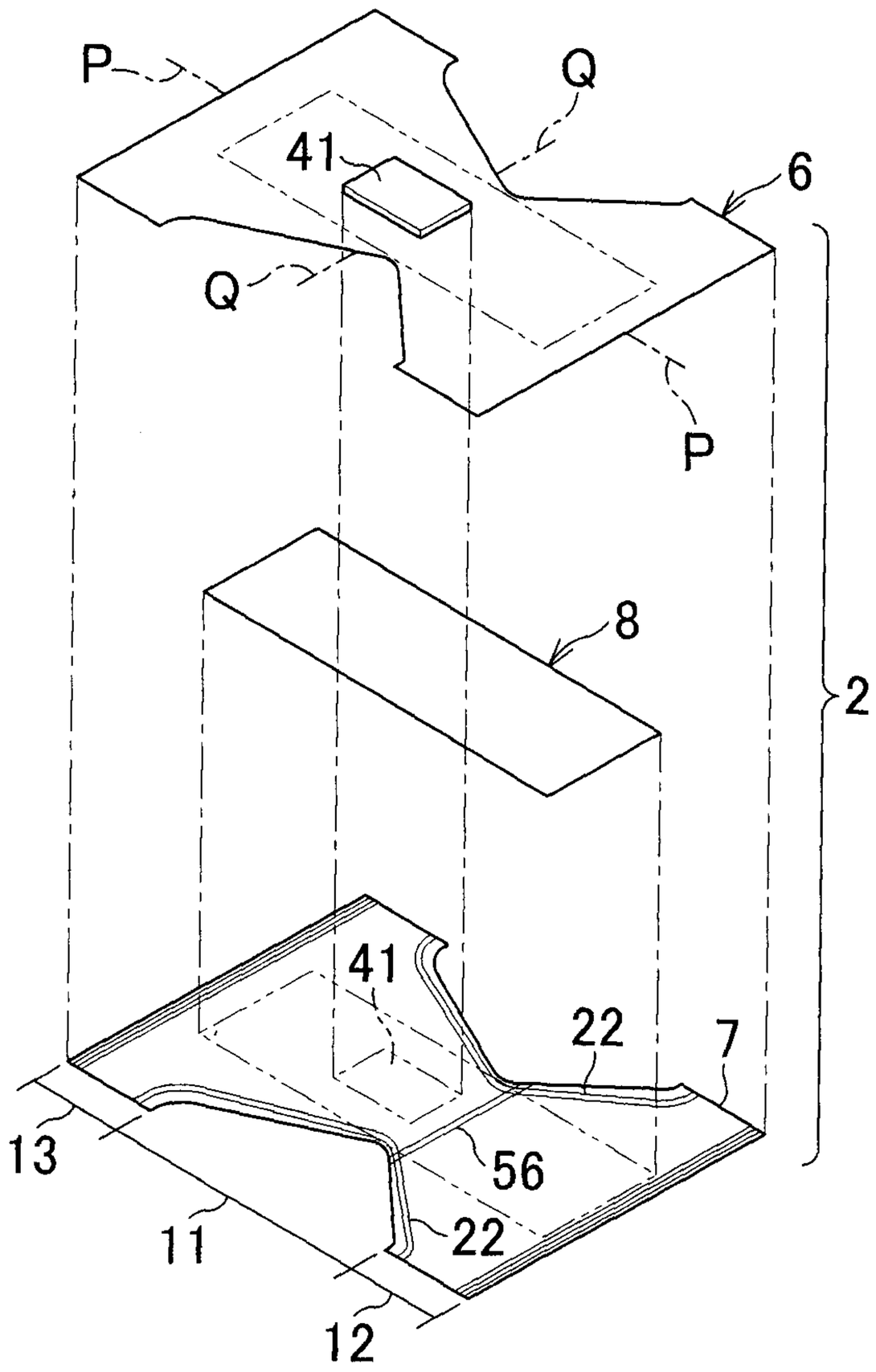


FIG.8



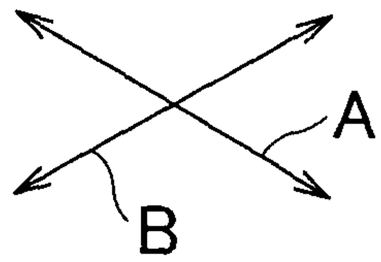


FIG.9

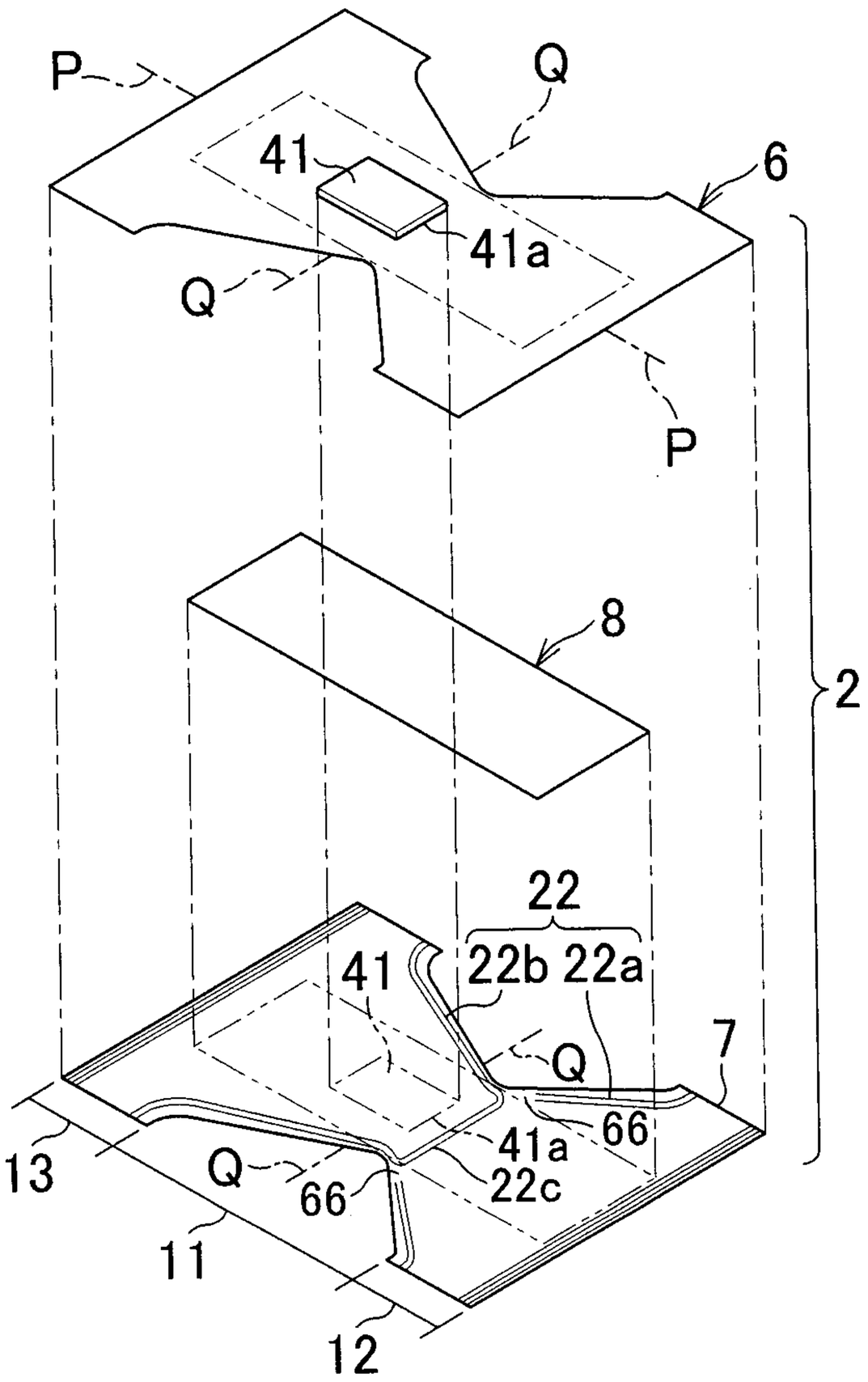


FIG.10

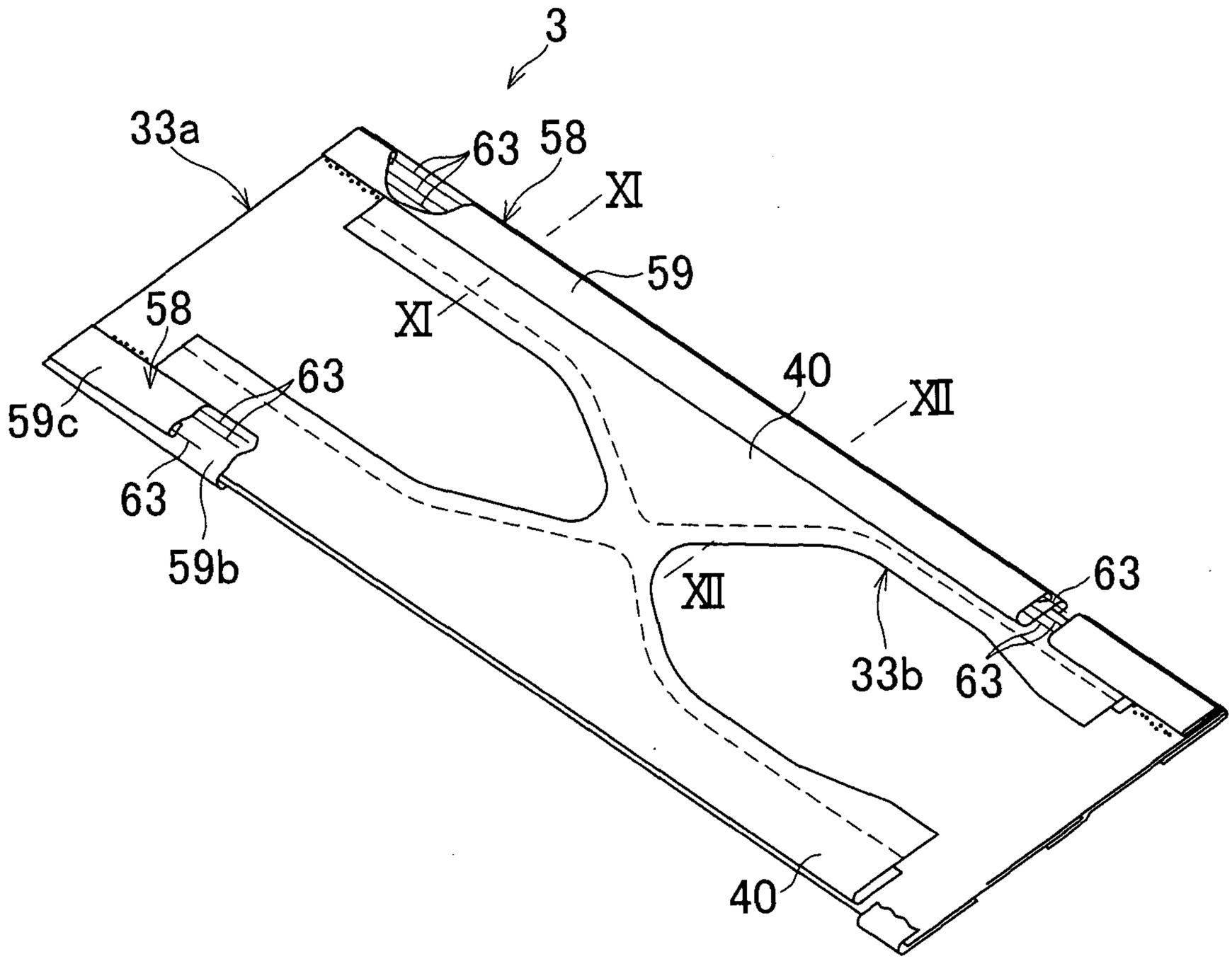


FIG.11

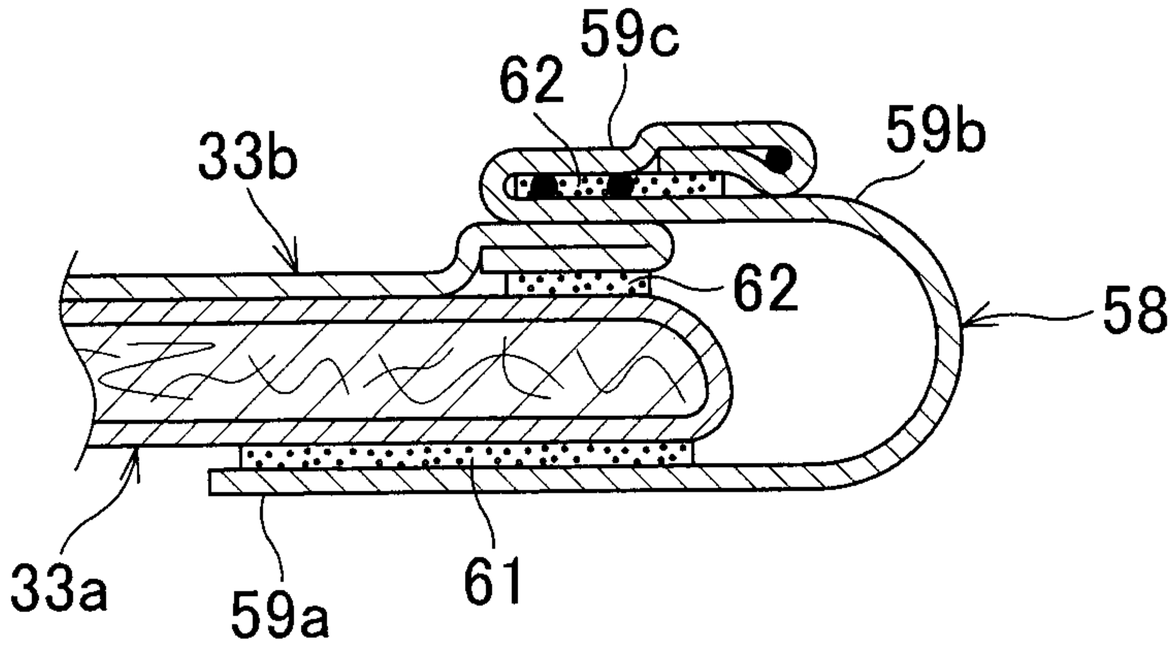

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FIG.12

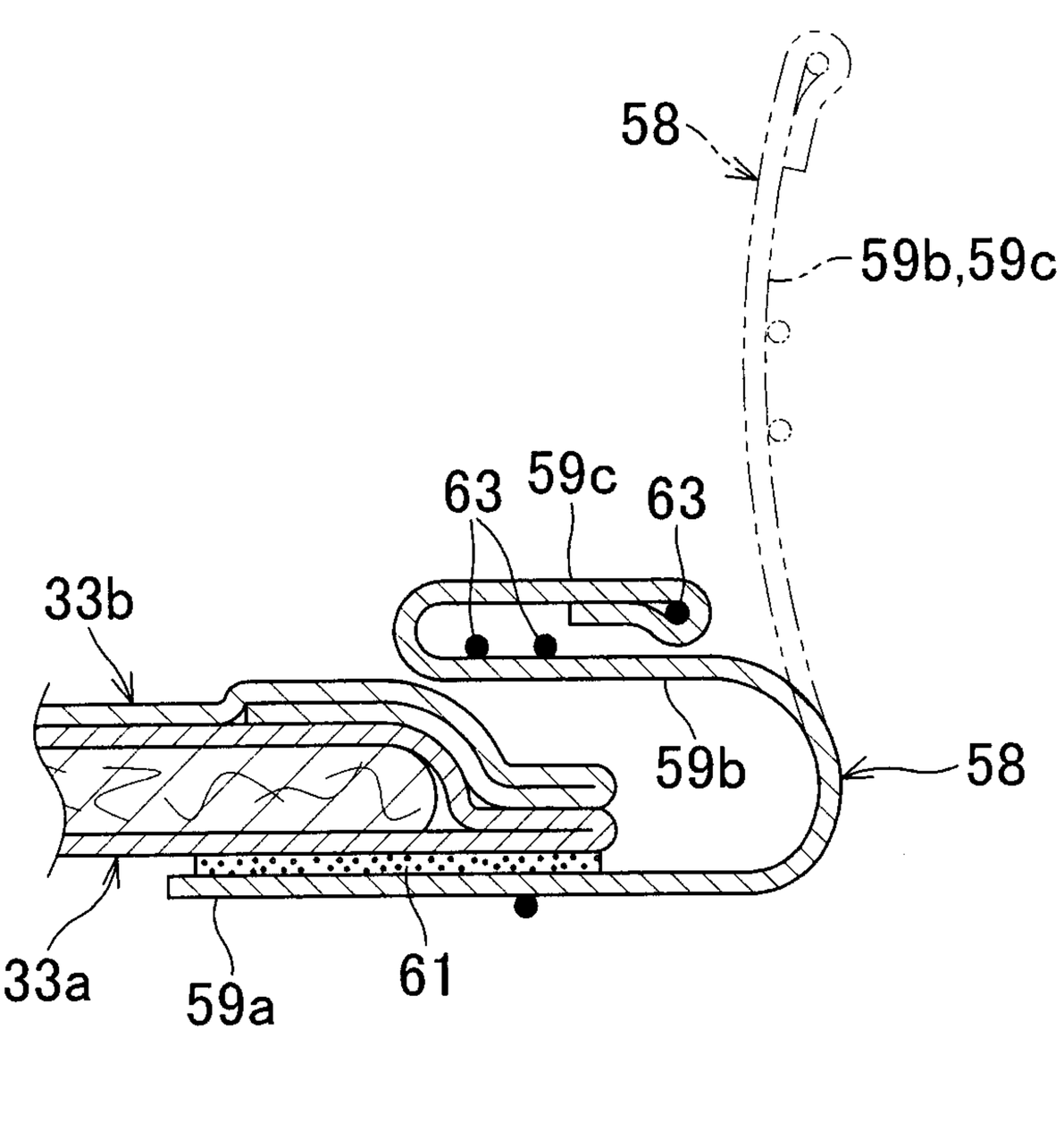
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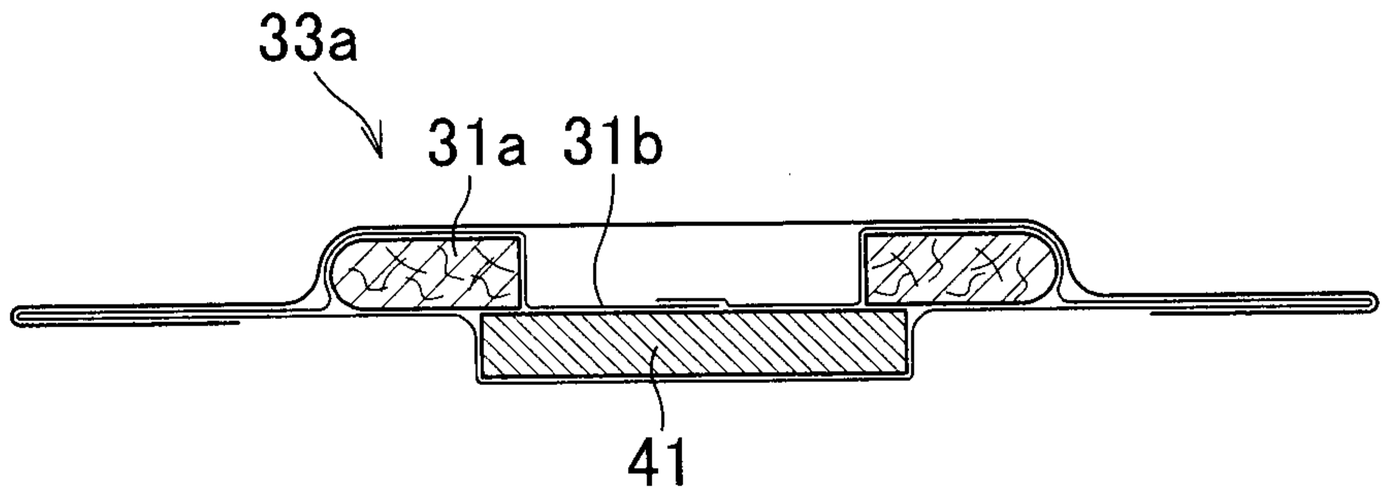
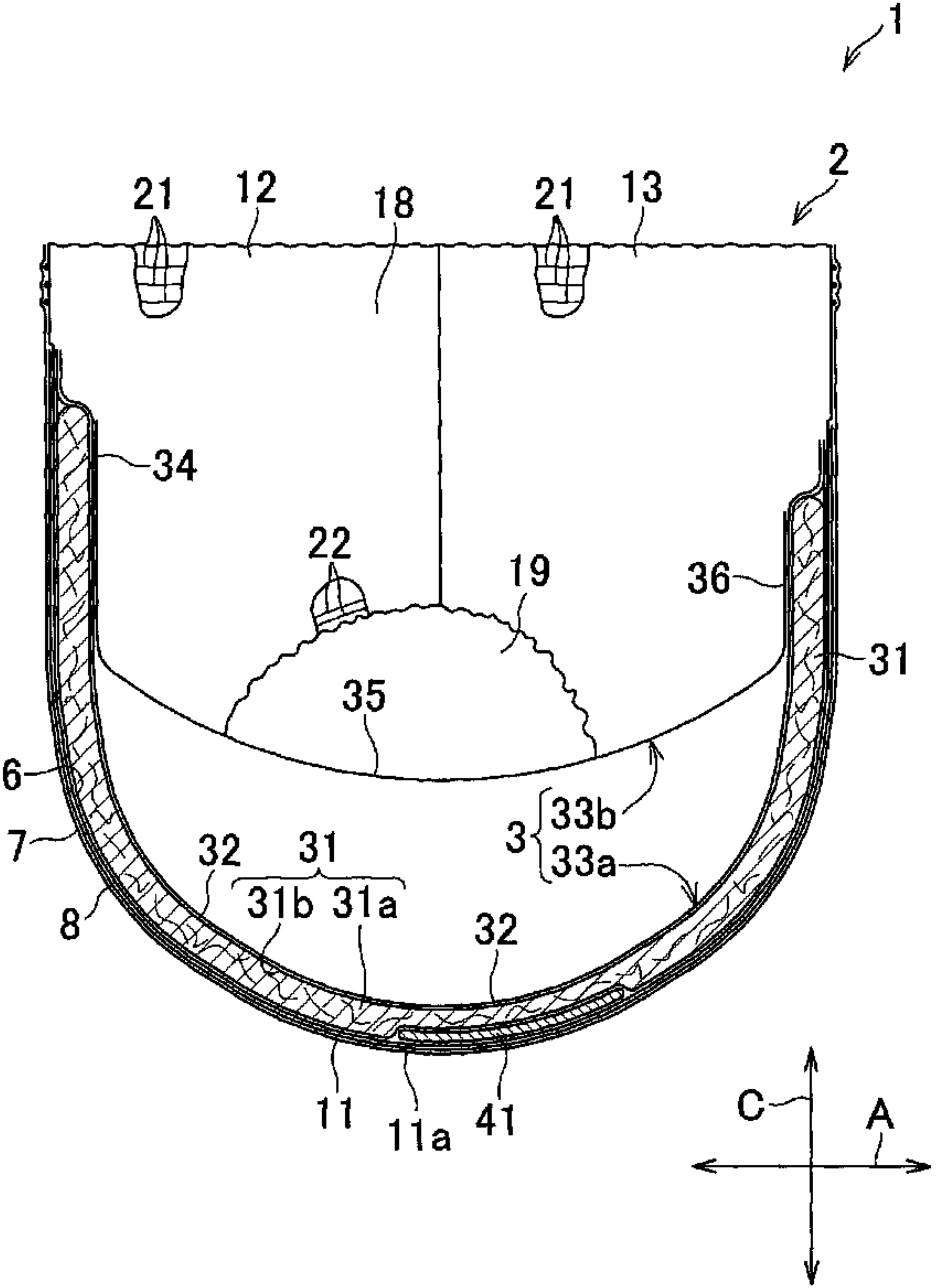
FIG.13

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