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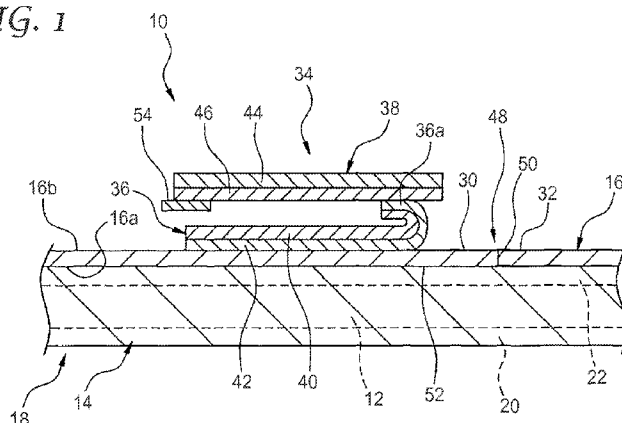
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(54) Title: DISPOSABLE ABSORBENT ARTICLE HAVING ATTACHMENT FOR DISPOSAL

FIG. 1



(57) Abstract: For disposable absorbent articles having an attachment for disposal, to prevent leakage of feces or residues thereof from the disposable absorbent article in the disposal state. The disposable absorbent article (10) includes: a first layer (14) having a liquid absorbent core (12); a liquid impermeable second layer (16) that covers the first layer (14); an attachment (34) provided in a first area (30) of the second layer (16); and a separation mechanism (48) that enables the first area (30) of the second layer 16 to partially separate from a second area (32) as a result of an external force applied to the attachment (34). When the first area (30) is partially separated from the second area (32) due to the separation mechanism (48), the first area (30) can open out from the second area (32) so as to separate from the first layer (14), and together with the attachment (34), the article (10) can be maintained in the disposal state.

DISPOSABLE ABSORBENT ARTICLE HAVING ATTACHMENT FOR DISPOSAL

FIELD OF THE INVENTION

The present invention relates to a disposable absorbent article having an attachment for disposal.

BACKGROUND

It is known that disposable absorbent articles that include a first layer having a liquid absorbent core and a liquid impermeable second layer that covers the first layer have an attachment as a fixing means for maintaining the disposable absorbent article in a state for disposal after use. The attachment rolls up or folds the disposable absorbent article to a small size with the soiled part of the first layer that has received the feces of the wearer on the inside in a state for disposal after use (referred to as the "disposal state" in this application). Disposable absorbent articles having an attachment for disposal include, for example, diapers and sanitary napkins.

Japanese Unexamined Patent Application Publication No. 2008-541925 based on Translation of the PCT Application (herein referred to as "Patent Document 1") discloses an absorbent article such as a diaper or the like having a fixing means for disposal. In Patent Document 1, it is stated that "The present invention relates to an absorbent article (10) that includes an absorbent core (12) disposed between an inside cover sheet (14) and an outside cover sheet (16). This article further includes at least one fixing means (18) for disposal, and this fixing means (18) is either directly or indirectly bonded to the outside cover sheet (16). The fixing means (18) for disposal includes a fixing element (20) capable of fixing the article in a configuration that is convenient for disposal after use of the article. The fixing means (18) for disposal is covered by a material layer (22) having a planar region, and this material layer (22) extends beyond the fixing means (18) for disposal. The material layer (22) is attached to an essential portion of the outside cover sheet (16), or forms this essential portion, and conceals the fixing means (18) for disposal when not being used. The material layer (22) can be removed from the outside cover sheet (16), thereby exposing the fixing means (18) for disposal so that it can be used".

Japanese Unexamined Patent Application Publication No. 2009-507570 based on Translation of the PCT Application (herein referred to as "Patent Document 2") discloses a laminated tape tab used in a disposable absorbent article such as a diaper or the like. In Patent Document 2, it is stated that "The disposable tape tab according to the present invention can be used in disposable articles, in particular, pants type or shorts type diapers for children or incontinence articles for adults, using adhesive applied on the tape tab element. When disposing of the disposable article, the user grips a first end of the disposable tape tab, the tab can be stretched by plastic deformation of an extensible film with low yield point, and as a result, the tab can be stretched sufficiently to wrap around the article, and the article fixed in

the wrapped and/or compacted state is disposed. Therefore, the present invention provides an economical and practical solution for manufacturing the disposable tape tab, and at the same time, enables the soiled disposable article to be conveniently and reliably sealed".

Japanese Unexamined Patent Application Publication No. 2007-215948 (herein referred to as "Patent Document 3") discloses a disposable diaper provided with a fixing tape for disposal on the outside of the body. In Patent Document 3, it is stated that "a disposable diaper is provided in which even if a flexible (low breaking strength) external body is used, when the fixing tape is pulled during use, the external body does not easily tear at the connection with the fixing tape".

SUMMARY

For disposable absorbent articles having an attachment for disposal, it is desirable that it be possible to prevent leakage of feces or residues thereof from the disposable absorbent article in the disposal state, that it be possible to reduce the material cost of the attachment, that it be possible for the user to be able to conveniently operate the attachment, and the like.

One aspect of the present invention is a disposable absorbent article that includes a first layer having a liquid absorbent core; a liquid impermeable second layer that covers the first layer and that includes a first area and a second area that are adjacent to each other; an attachment provided in the first area of the second layer; and a separation mechanism that enables the first area of the second layer to partially separate from the second area as a result of an external force applied to the attachment.

In the disposable absorbent article according to one aspect of the present invention, when the first area is partially separated from the second area due to the separation mechanism, the first area can open out with respect to the second area so as to separate from the first layer, and in conjunction with the attachment, it is possible to maintain the disposable absorbent article in the disposal state. In other words, the first area that has partially separated from the second area of the second layer due to the separation mechanism can open out with respect to the second area so that the first area separates from the first layer, and in this state, the first area is capable of acting as a fastening belt together with the attachment which includes a fastening function. Therefore, as a result of the joint action of the first area and the attachment, it is possible to maintain the disposable absorbent article in the disposal state in which the soiled portion of the first layer that has received the feces of the wearer is wrapped on the inside, and it is possible to prevent leakage of the feces or their residues from the disposable absorbent article in the disposal state. In addition, even when a comparatively short attachment is used, by opening out the first area of the second layer with respect to the second area, it is possible to supplement the length of the attachment, so the combination of the attachment and the first area can act as a fastening belt. Therefore, it is possible to reduce the material cost of the attachment, and reduce the manufacturing cost of the disposable absorbent article. The attachment can be provided exposed on the outside of the second layer

of the disposable absorbent article, so it is convenient for the user to operate the attachment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an enlarged cross-sectional view of the main part of a disposable absorbent article according to an embodiment.

FIG. 2 is a perspective view partially sectioned of an example of the disposable absorbent article in FIG. 1.

FIG. 3 is an enlarged cross-sectional view for describing a method of disposing of the disposable absorbent article in FIG. 1.

FIG. 4 is an enlarged cross-sectional view for describing a method of disposing of the disposable absorbent article in FIG. 1.

FIG. 5 is an enlarged cross-sectional view for describing a method of disposing of the disposable absorbent article in FIG. 1.

FIG. 6 is a perspective view for describing a method of disposing of the disposable absorbent article in FIG. 1.

FIG. 7 schematically illustrates various configurations of separation mechanism of the disposable absorbent article in FIG. 1.

FIG. 8 schematically illustrates various configurations of separation mechanism of the disposable absorbent article in FIG. 1.

FIG. 9 schematically illustrates various arrangements of an attachment of the disposable absorbent article in FIG. 1.

FIG. 10 illustrates a modified example of the attachment of the disposable absorbent article in FIG. 1.

FIG. 11 illustrates another modified example of the attachment of the disposable absorbent article in FIG. 1.

FIG. 12 is an explanatory view of a process of manufacturing the attachment of the disposable absorbent article in FIG. 1, FIG. 12A schematically illustrates an example of an attachment manufacturing apparatus, FIG. 12B is an end surface view of a laminated tape from which the attachment is configured, and FIG. 12C is a perspective view of the laminated tape in roll form.

FIG. 13 is an explanatory view of a process of manufacturing the disposable absorbent article in FIG. 1, schematically illustrating an example of an apparatus for manufacturing the disposable absorbent article.

DETAILED DESCRIPTION

Embodiments according to the present invention will be described in detail below, referencing the appended figures. Throughout all of the figures, corresponding structural elements will be assigned common reference codes. In the present application, the term "disposable absorbent article" means an article constituted so that it absorbs and holds various

feces released from the body of the wearer of the article, and thereafter it is disposed of without reuse.

FIG. 1 is an enlarged cross-sectional view of the main parts of a disposable absorbent article 10 (hereinafter, abbreviated to article 10) according to a first embodiment. In addition, FIG. 2 is a perspective view partially sectioned of a pants-type diaper as an example of the article 10. The article 10 is not limited to the pants-type diaper illustrated in FIG. 2, but can include, for example, other pants-type diapers such as tape-fixing-type diapers and pad-type diapers, and sanitary articles such as napkins, and a napkin integrated with shorts.

The article 10 includes a first layer 14 that has a liquid absorbent core 12, and a liquid impermeable second layer 16 that covers the first layer 14. The first layer 14 and the second layer 16 constitute the laminated structure of an article main body 18. When the article 10 is worn, the first layer 14 is disposed so that it is in contact with the skin of the wearer on the inside of the article main body 18, and the second layer 16 is disposed so that it is in contact with the clothing or the like of the wearer on the outside of the article main body 18.

The liquid absorbent core 12 is a flexible core material included in the first layer 14 that immediately absorbs and retains the liquid component of the feces of the wearer, and has sufficient liquid absorption capability and liquid retention capability. In addition, the liquid absorbent core 12 can have appropriate extensibility and shape following capability so that it can be placed along the body of the wearer. The liquid absorbent core 12 can be manufactured from various commonly known materials that have liquid absorption capability and liquid retention capability with respect to the feces of the wearer. In addition, the liquid absorbent core 12 can be manufactured from a single material, or it can be manufactured from a plurality of materials.

The first layer 14 can further include an inside sheet 20 laminated onto a first surface of the liquid absorbent core 12, and an outside sheet 22 laminated onto a second surface of the liquid absorbent core 12 on the side opposite the inside sheet 20. The inside sheet 20 is a flexible sheet that constitutes the surface that contacts the skin of the wearer, and allows the liquid component of the feces of the wearer to pass without hindrance and provides sufficient liquid permeability to the liquid absorbent core 12. In addition, the inside sheet 20 can be appropriately hydrophobic to separate the liquid retained in the liquid absorbent core 12 from the skin of the wearer. The inside sheet 20 can be manufactured from various materials such as porous foam, meshed foam, porous film, natural fibers (for example, wood fibers or cotton fibers), synthetic fibers (for example, polyester fiber or polypropylene fiber), and the like. In addition, the inside sheet 20 can have a single material single layer structure, or a multiple material laminated structure. The material of the inside sheet 20 can be, for example, polypropylene nonwoven fabric.

The outside sheet 22 is a flexible sheet on the side that does not contact the skin of the wearer, and has sufficient liquid impermeability to prevent the liquid retained in the liquid

absorbent core 12 from passing through it. In addition, the outside sheet 22 can have an appropriate amount of air permeability to permit vapor released from the liquid absorbent core 12 to pass through it. The outside sheet 22 can be manufactured from various materials such as porous plastic film, nonwoven fabric, and the like. In addition, the outside sheet 22 can have a single material single layer structure, or a multiple material laminated structure. The material of the outside sheet 22 can be, for example, polypropylene nonwoven fabric. The outside sheet 22 in conjunction with the inside sheet 20 can enclose the entire liquid absorbent core 12. The first layer 14 may have a configuration without the inside sheet 20 or the outside sheet 22.

The second layer 16 is a flexible sheet having the same properties as the outside sheet 22, and can be manufactured from the same material as the outside sheet 22. Colors, patterns, pictures, characters, and the like that affect the appearance of the article main body 18 can be applied by printing or the like to a surface 16b of the second layer 16 on the side opposite a surface 16a that contacts the outside sheet 22. When the article 10 is a pants-type diaper as illustrated in FIG. 2, polypropylene nonwoven fabric manufactured by the spun bonding method and having a basis weight of 25g/m^2 can be used as the outside sheet 22 and the second layer 16.

The liquid absorbent core 12 and the inside sheet 20, the liquid absorbent core 12 and the outside sheet 22, and the outside sheet 22 and the second layer 16 can be bonded together over their whole surface or at least partially using commonly known bonding means such as adhesive such as pressure sensitive adhesive or hot melt adhesive, ultrasonic bonding, thermal bonding, and the like. In addition, the outer edge portions of the inside sheet 20 and the outside sheet 22 that enclose the liquid absorbent core 12 can be bonded together using similar bonding means.

In the case that the article 10 is a pants-type diaper as illustrated in FIG. 2, the article main body 18 is manufactured into a pants form from the developed state in which the outline is formed in a predetermined hourglass shape, by folding in two at the center of the longitudinal direction with the first layer 14 on the inside, and partially bonding together the side edges that overlap. In FIG. 2, a portion of the second layer 16 and the outside sheet 22 are cut away, clearly illustrating the liquid absorbent core 12. The pants-type article main body 18 includes a single trunk aperture 24 through which the trunk of the wearer passes, and a pair of leg apertures 26 (only one illustrated on the drawing) through which the legs of the wearer pass. A joint 28 is formed in the article main body 18 between the trunk aperture 24 and each of the leg apertures 26. Gathers that include elastic are provided in the trunk aperture and each of the leg apertures 26.

The second layer 16 includes a first area 30 and a second area 32 that are adjacent to each other. The first area 30 is a portion of the second layer 16, and the second area 32 is the portion of the second layer 16 other than the first area 30. The first area 30 and the second

area 32 can have the same properties, and can be manufactured from the same materials. Alternatively, the first area 30 and the second area 32 can have different properties from each other, and can be manufactured from materials that are different from each other. In the configuration illustrated in FIG. 1, the first area 30 includes a portion of both surfaces 16a, 16b of the second layer 16, and the second area 32 includes the remaining portion of both surfaces 16a, 16b of the second layer 16. Therefore, the first area 30 and the second area 32 each have a thickness corresponding to the thickness of the second layer 16, and are adjacent to each other along the surfaces 16a, 16b. The boundary between the first area 30 and the second area 32 is not necessarily clearly prescribed, but the linear portion where the first area 30 and the second area 32 partially separate from each other in the method of disposing of the article 10 described later is the boundary between both areas 30, 32.

Instead of the configuration of FIG. 1, the first area 30 can be configured having the surface 16b on the outside of the second layer 16 only. In this case, the first area 30 has a thickness less than the thickness of the second layer 16, and is adjacent to the second area 32 along both the surface 16b and the thickness directions. In addition to the linear portion as described above, the boundary between the first area 30 and the second area 32 is a planar portion that extends substantially parallel to the surface 16b on the inside of the second layer 16.

The article 10 further includes an attachment 34 disposed in the first area 30 of the second layer 16. The attachment 34 includes an attachment portion 36 installed fixed to the first area 30, and a fixing portion 38 that extends from the attachment portion 36 and that can be fixed to the second area 32 (or the first area 30 or the first layer 14) as necessary. The attachment 34 is provided in the first area 30 with the fixing portion 38 overlapping onto the attachment portion 36 so that a folded state is formed. The attachment 34 is maintained in the state of being folded in two when not being used.

The attachment portion 36 has the configuration of adhesive tape that includes a base member 40 in strip form, and a pressure sensitive adhesive layer 42 provided on a first surface of the base member 40. Likewise, the fixing portion 38 has the configuration of adhesive tape that includes a base member 44 in strip form, and a pressure sensitive adhesive layer 46 provided on a first surface of the base member 44. The attachment 34 is manufactured by joining together in the longitudinal direction one strip of adhesive tape that constitutes the attachment portion 36 and another strip of adhesive tape that constitutes the fixing portion 38.

The attachment portion 36 is fixed to the surface 16b of the first area 30 with the pressure sensitive adhesive layer 42. A portion 36a of predetermined length at a first end in the longitudinal direction of the attachment portion 36 is bent toward the base member 40 without being fixed to the surface 16b of the first area 30. The fixing portion 38 is disposed with the pressure sensitive adhesive layer 46 in opposition to the base member 40 of the attachment portion 36. The fixing portion 38 is joined to the portion 36a, of the attachment

portion 36, bent toward the base member 40 side (hereinafter, referred to as the bent portion 36a) near a first end thereof in the longitudinal direction, by both pressure sensitive adhesive layers 46, 42. In FIG. 1, a gap is formed between the base member 40 of the attachment portion 36 and the pressure sensitive adhesive layer 46 of the fixing portion 38, but this gap is for ease of understanding of the configuration of the attachment 34, and when the attachment 34 is not being used, the pressure sensitive adhesive layer 46 of the fixing portion 38 may be superimposed on the base member 40 of the attachment portion 36.

The base member 40 of the attachment portion 36 and the base member 44 of the fixing portion 38 can each be manufactured from various types of materials such as plastic film, nonwoven fabric, laminates thereof, and the like. It is desirable that the base members 40, 44 have sufficient strength (for example, tensile strength) so that they do not rupture when an external force is applied to the attachment 34 in the method of disposal of the article 10 described later. The materials of the base members 40, 44 can be, for example, a blend of polypropylene and polyethylene. The outside surfaces of the base members 40, 44 on the side opposite the pressure sensitive adhesive layers 42, 46 can be subjected to a peeling process such as silicone coating or the like. By subjecting the outside surfaces of the base members 40, 44 to a peeling process, the fixing portion 38 of the attachment 34 not being used can be superimposed on the base member 40 of the attachment portion 36 using the pressure sensitive adhesive layer 46, and as described later, during the manufacturing process of the article 10, it is possible to supply the attachment 34 folded in two and wound around a roll continuously in a direction normal to the plane of the paper in FIG. 1.

The pressure sensitive adhesive layer 42 of the attachment portion 36 can be manufactured from various types of pressure sensitive adhesive, but preferably it is capable of obtaining an adhesive force that can permanently fix the attachment 34 to the first area 30 of the second layer 16. The pressure sensitive adhesive layer 46 of the fixing portion 38 is preferably capable of obtaining an adhesion force that is capable of maintaining fixity of the fixing portion 38 to the second area 32 of the second layer 16 (or to the first area 30 or the first layer 14) while resisting external forces, in the method of disposal of the article 10 as described later. The pressure sensitive adhesive layers 42, 46 can each be manufactured from the same pressure sensitive adhesive, or they can be manufactured from mutually different pressure sensitive adhesives. The material of the pressure sensitive adhesive layers 42, 46 can be, for example, synthetic rubber type adhesive.

Instead of the configuration in which the attachment 34 is manufactured by joining together two strips of adhesive tape, a configuration in which the attachment portion 36 and the fixing portion 38 are entirely manufactured from a single adhesive tape can be adopted. In addition, instead of the pressure sensitive adhesive layer 42, the attachment portion 36 can be permanently fixed to the first area 30 by another bonding means such as ultrasonic bonding, thermal bonding or the like, or by another fixing means such as stitching or the like. In

addition, instead of the pressure sensitive adhesive layer 46, the fixing portion 38 can be configured so that it is fixed to the second area 32 (or the first area 30 or the first layer 14) when disposing of the article 10 as described later, using another fixing means such as a hook and loop fastener.

The article 10 further includes a separation mechanism 48 that enables the first area 30 of the second layer 16 to be partially separated from the second area 32 due to an external force applied to the attachment 34. The separation mechanism 48 allows the first area 30 to separate from the second area 32 when the external force applied to the attachment exceeds a predetermined value. In order to partially separate the first area 30 from the second area 32, the separation mechanism 48 does not allow the first area 30 to separate from the second area 32 when the external force to partially separate the first area 30 from the second area 32 is less than or equal to the predetermined value, so both areas 30, 32 are maintained in their initial state adjacent to each other.

The separation mechanism 48 includes a material weakening portion 50 formed at the boundary between the first area 30 and the second area 32. The material weakening portion 50 can tear the second layer 16 due to an external force applied to the attachment 34. In the embodiment of FIG. 1 and FIG. 2, the material weakening portion 50 is constituted from a plurality of perforation holes arranged in a row in the form of a broken line (in other words perforations). Alternatively, the material weakening portion 50 can be constituted from a portion of the second layer 16 where the thickness is locally reduced.

In the configuration in which the second layer 16 is bonded to the first layer 14 (outside sheet 22) by commonly known bonding means as described previously, the separation mechanism 48 can have an adhesive force reduction portion 52 (FIG. 1) that reduces the adhesive force at the first area 30 of the adhesive means between the second layer 16 and the first layer 14 to less than that of the second area 32. The adhesive force reduction portion 52 can be provided by changing the type of adhesive means or the adhesion area, and the like with respect to the first layer 14 at the first area 30 and the second area 32. It is possible to not bond the first area 30 to the first layer 14. The material weakening portion 50 and the adhesive force reduction portion 52 can be used in combination as the separation mechanism 48.

The attachment 34 can include a tab 54 at the end edge that is capable of bearing the tensile force as the external force for tearing the second layer 16 at the material weakening portion 50. The tab 54 can have a width (the dimension in the direction normal to the plane of the paper in FIG. 1) that is substantially equal to the width of the fixing portion 38, and a length (the dimension in the left to right direction in FIG. 1) that is sufficiently shorter than the length of the fixing portion 38, disposed so that it projects slightly in the length direction from the end edge of the fixing portion 38, and can be bonded to the fixing portion 38 by the pressure sensitive adhesive layer 46. As illustrated on the drawings, the tab 54 may be

disposed projecting to the outside of the attachment portion 36, or it may be disposed on the base member 40 of the attachment portion 36. The tab 54 can be manufactured from various types of materials such as plastic film, nonwoven fabric, laminates thereof, and the like. It is desirable that the tab 54 has sufficient tensile strength so that it does not rupture when a tensile force is applied to the attachment 34 in the method of disposal of the article 10 described later.

In the form illustrated in FIG. 2, which is an example of the article 10, the material weakening portion 50 of the separation mechanism 48 extends in an approximately U-shape substantially around the attachment 34. The material weakening portion 50 is provided at least surrounding the position of the joint between the attachment portion 36 of the attachment 34 and the fixing portion 38 (therefore, the bent portion 36a of the attachment portion 36) (FIG. 1). In the pants-type diaper of FIG. 2, which is an example of an article 10, the attachment 34 is disposed with the tab 54 facing toward the side near the trunk aperture 24, and the position of the joint between the attachment portion 36 and the fixing portion 38 (the bent portion 36a) is disposed toward the side near the crotch area 56 between the pair of leg apertures 26. The material weakening portion 50 extends as a broken line in the approximately U-shape surrounding the attachment 34, along the joint position of the attachment 34 (the bent portion 36a) and both side edges extend in the longitudinal direction of the attachment 34 folded in two. The material weakening portion 50 is not formed on the trunk aperture 24 side. In the method of disposal of the article 10 as described later, the first area 30 and the second area 32 maintain their state of being permanently connected together at the position where there is no material weakening portion 50.

In the article 10, when the first area 30 of the second layer 16 is partially separated from the second area 32 due to the separation mechanism 48, the first area 30 can open out from the second area 32 so as to separate from the first layer 14, and together with the attachment 34, which has a fastening function, the article 10 can be maintained in the disposal state. The following is an explanation of an example of a disposal method of the article 10, with reference to FIGS. 3 to 6. FIGS. 3 to 5 are cross-sectional views of the main part of the article 10, and FIG. 6 is a perspective view of a pants-type diaper as an example of the article 10 during disposal.

When disposing of the article 10 after it has been worn, the disposal state, in which the soiled portion of the first layer 14 that has received the feces released by the wearer is wrapped on the inside, is maintained by the attachment 34 of the article 10. As an example of the method of disposal, first, with the article main body 18 appropriately rolled up or folded so that the soiled portion of the first layer 14 is wrapped, the fixing portion 38 of the attachment 34 is moved in a direction so that it is separated from the attachment portion 36. At this time, as illustrated in FIG. 3, the user grips the tab 54, and applies a force F1 to the fixing portion 38 so that the fixing portion fastened to the attachment portion 36 by the pressure sensitive adhesive layer 46 is gradually peeled from the attachment portion 36. When the fixing

portion 38 has been separated from the attachment portion 36 except for the position of the joint with the bent portion 36a (FIG. 3), the force F1 is removed.

Next, as illustrated in FIG. 4, the user applies a force F2 to the fixing portion 38 via the tab 54 so that the fixing portion is pulled in its longitudinal direction. The force F2 applied to the fixing portion 38 is concentrated at the bent portion 36a of the attachment portion 36, and is transmitted to the second layer 16 of the article main body 18 directly underneath the bent portion 36a, and is concentrated in the portion of the material weakening portion 50 of the separation mechanism 48 that is closest to the bent portion 36a (for example, the portion corresponding to the bottom side of the U). When the force F2 exceeds a specific value, the material weakening portion 50 starts to tear at the portion closest to the bent portion 36a, and by continuously pulling the fixing portion 38 in the longitudinal direction, the material weakening portion 50 progressively tears.

When the fixing portion 38 is further pulled in the longitudinal direction from the state illustrated in FIG. 4, the second layer 16 is torn along the material weakening portion 50 by tearing the whole material weakening portion 50, and the first area 30 is partially separated from the second area 32. At this time, as illustrated in FIG. 5, the first area 30 is folded back and opened out with respect to the second area 32 so as to separate from the first layer 14, and can extend to the outside beyond the outer edge of the article main body 18 (the peripheral edge of the trunk aperture 24 of the pants-type diaper in FIG. 2). In the state illustrated in FIG. 5, the whole attachment 34 fixed to the first area 30 is disposed to the outside of the outer edge of the article main body 18 (peripheral edge of the trunk aperture 24) as a result of opening out the first area 30 with respect to the second area 32. In addition, the fixing portion 38 of the attachment 34 is disposed projecting further to the outside from the end edge of the first area 30 which is separated from the outer edge of the article main body 18 (peripheral edge of the trunk aperture 24), and the pressure sensitive adhesive layer 46 of the fixing portion 38 is facing toward the same side (downwards in the figure) as the surface 16b of the first area that has been folded back with respect to the second area 32.

With the first area 30 disposed in the opened out position as illustrated in FIG. 5, the fixing portion 38 of the attachment 34 is fixed by the pressure sensitive adhesive layer 46 onto an appropriate position of the second area 32 of the second layer 16 of the article main body 18 that has been appropriately rolled up or folded. The attachment 34 with the fixing portion 38 fixed to the second area 32 maintains the article main body 18 fastened in the rolled up or folded state resisting external forces with its own tensile strength and the adhesive force of the pressure sensitive adhesive layers 42, 46. At this time, as illustrated in FIG. 6, the first area 30 in the opened out position together with the attachment 34 act as a fastening belt wound at least partially around the article main body 18. Therefore, the first area 30 together with the attachment 34 can maintain the article 10 in the disposal state in which it is wrapped up small.

When the first area 30 is disposed in the opened out position, the second layer 16 is opened

on the inside of the material weakening portion 50 partially exposing the first layer 14, but when the first layer 14 has the outside sheet 22, leakage of the liquid retained in the liquid absorbent core 12 is prevented by the outside sheet 22 at the exposed portion. In addition, depending on the dimensions of the first area 30 and the attachment 34, when the two are wound around the article main body 18, in some cases, the fixing portion 38 of the attachment 34 will extend beyond the second area 32, and be fixed to the exposed portion of the first layer 14 on the inside of the material weakening portion 50, or will also extend beyond the exposed portion and be fixed to the first area 30 in the opened out position. In this case, the fixing portion 38 may be continuously fixed to two or more mutually adjacent areas from among the second area 32, the exposed portion of the first layer 14, and the first area 30 in the opened out position.

In this way, in the article 10, the first area 30 that has partially separated from the second area 32 of the second layer 16 as a result of the separation mechanism 48 is opened out with respect to the second area 32 so that the first area 30 separates from the first layer 14, and, in this state, the first area 30 can act together with the attachment 34, which has a fastening function, as a fastening belt for the appropriately rolled up or folded article main body 18. Therefore, according to the article 10, as a result of the joint action of the first area 30 and the attachment 34, it is possible to maintain the article 10 in the disposal state in which the soiled portion of the first layer 14 that has received the feces of the wearer is wrapped on the inside, and it is possible to prevent leakage of the feces or their residues from the article 10 in the disposal state.

In addition, in the article 10, even though the attachment 34, whose length is comparatively short in the fully exploded state, is used in the folded in two state, by opening out the first area 30 of the second layer 16 with respect to the second area 32, it is possible to supplement the length of the attachment 34, so that the combination of the attachment 34 and the first area 30 can act as a fastening belt. Therefore, according to the article 10, it is possible to reduce the material cost of the attachment 34, and therefore reduce the cost of manufacturing the article 10.

In addition, in the article 10, it is possible to arrange the attachment 34 exposed on the outside of the second layer 16 of the article main body 18, so it is convenient for the user to operate the attachment 34. By adding the tab 54 to the attachment 34, the user can accurately apply the external force F2 to the attachment 34 that is required for the separation mechanism 48 to partially separate the first area 30 from the second area 32.

The article 10 is not limited to the configuration illustrated in FIGS. 1 to 6. For example, as schematically illustrated in FIG. 7, the article 10 can have various configurations of material weakening portion 50 (separation mechanism 48).

FIG. 7A illustrates the material weakening portion 50 that extends as a broken line in the approximately U shape illustrated in FIG. 2. In contrast, the material weakening portion

50 illustrated in FIG. 7B extends as a broken line in the approximately V shape converging near the joint position of the attachment 34 (bent portion 36a) and spreading out on both sides of the attachment 34. In addition, the material weakening portion 50 illustrated in FIG. 7C extends as a broken line in the large approximately U shape along the outline of the article main body 18. In addition, the material weakening portion 50 illustrated in FIG. 7D extends as a broken line in an hourglass shape along the outline of the article main body 18. In each of these material weakening portions 50, the shapes can be formed by mixing appropriate curves, in addition to a combination of straight lines as illustrated on the drawing.

In each of the material weakening portions 50 in FIGS. 7A to 7D, the material weakening portion 50 does not completely surround the first area 30, but a portion remains where the material weakening portion 50 is not formed between the first area 30 and the second area 32. In the method of disposal of the article 10 as described above, the first area 30 and the second area 32 opened out remain permanently connected together at the portion where there is no material weakening portion 50. In addition, in each of the configurations illustrated in FIG. 7A to 7D, the attachment 34 provided in the first area 30 is disposed so that the joint position (bent portion 36a) is closest to a portion of the material weakening portion 50 located on the side opposite the portion where there is no material weakening portion 50. As a result of this arrangement, the force F2 (FIG. 4) applied to the attachment 34 via the tab 54 is transmitted to the second layer 16 of the article main body 18 from the bent portion 36a, and is concentrated in the portion of the material weakening portion 50 closest to the bent portion 36a, so it is possible to promptly and reliably produce a tear in the material weakening portion 50. The portion of the material weakening portion 50 that is closest to the bent portion 36a of the attachment 34 can be appropriately selected.

In the case that the article 10 is the pants-type diaper illustrated in FIG. 2, the article main body 18, which includes the first layer 14 and the second layer 16, includes the crotch area 56, a stomach area 58 that extends from the crotch area 56, and a back area 60 on the side opposite the stomach area 58 and that extends from the crotch area 56 (FIG. 2). In the pants-type diaper of FIG. 2, the first area 30 is provided in the back area 60, and the second area 32 is the crotch area 56 and the stomach area 58 and the back area 60 apart from the first area 30.

The article main body 18 illustrated in FIGS. 7A to 7C is for the case that the article main body 18 is a pants type diaper as illustrated in FIG. 2, and the first area 30 and the attachment 34 can be provided in at least one of the stomach area 58 and the back area 60. On the other hand, the article main body 18 illustrated in FIG. 7D is for a case where the article main body 18 of the pants-type diaper of FIG. 2 is cut and separated at the joint 28 (FIG. 2), and the first area 30 is provided continuous with the stomach area 58, the back area 60, and the crotch area 56, and the portion of the stomach area 58, the back area 60, and the crotch area 56 apart from the first area 30 is the second area 32.

The greater the dimensions of the first area 30, as in the configurations of FIGS. 7C and

7D, the greater the dimensions of the fastening belt constituted by the first area 30 in conjunction with the attachment 34, when using the method of disposing of the article 10 as described above. Therefore, even when the quantity of feces of the wearer received by the first layer 14 is large, it is possible to maintain the article 10 in the disposal state with the soiled portion of the first layer 14 that has received the feces wrapped on the inside, as a result of the first area 30 with large dimensions, and it is possible to more effectively prevent leakage of the feces or their residues from the article 10 in the disposal state.

If the material weakening portion 50 is constituted from perforations, various perforations can be adopted, as illustrated in FIG. 8. FIG. 8A illustrates a perforation 50A in which perforations in which the dimension of perforated holes that are arranged in a row in the form of a broken line in the direction of each row (in other words, the length L1, as illustrated in FIG. 8B), and the dimension between adjacent perforated holes in the direction of the row (in other words, the length L2, as illustrated in FIG. 8B) are substantially equal. FIG. 8B illustrates a perforation 50B in which the length L1 of each perforated hole of the row in the form of a broken line is approximately from 1 to 10 times the length L2 between adjacent perforation holes. FIG. 8C illustrates a perforation 50C in which the length L1 of each perforated hole of the row in the form of a broken line is approximately from 1 to 10 times the length L2 between adjacent perforation holes, and the lengths L1 of the adjacent perforated holes are different from each other. These perforations 50A to 50C can be selected as appropriate taking into consideration the material of the second layer 16, and the force required to tear the second layer 16 along the material weakening portion 50.

As schematically illustrated in FIG. 9, the first area 30 and the attachment 34 of the article 10 can be arranged in various positions and various orientations on the second layer 16.

FIG. 9A illustrates the first area 30 and the attachment 34 arranged at approximately center in the article main body 18. In contrast, the first areas 30 and the attachments 34 illustrated in FIG. 9B are arranged so that the tabs 54 of the attachments 34 are oriented to the side facing each other, with one each arranged on the left and right sides of the drawing of the article main body 18. In the case that the article 10 is the pants-type diaper illustrated in FIG. 2, each set of the first area 30 and the attachment 34 is arranged on the side near the trunk aperture 24. In addition, the first areas 30 and the attachments 34 illustrated in FIG. 9C are arranged with the tabs 54 of the attachments 34 oriented to the side in opposite directions, with one set each arranged on the left and right sides of the drawing of the article main body 18. In the case that the article 10 is the pants-type diaper illustrated in FIG. 2, each set of the first area 30 and the attachment 34 is arranged on the side near the leg apertures 26.

The first area 30 and the attachment 34 illustrated in FIG. 9D are arranged at approximately center in the article main body 18 with the tab 54 of the attachment 34 oriented sideways. The first area 30 and the attachment 34 illustrated in FIG. 9E are arranged at the bottom end of the article main body 18 with the tab 54 of the attachment 34 oriented

downwards. The first area 30 and the attachment 34 illustrated in FIG. 9F are arranged at the bottom end of the article main body 18 with the tab 54 of the attachment 34 oriented sideways.

The first area 30 and the attachment 34 illustrated in FIG. 9G are arranged at the bottom end of the article main body 18 with the tab 54 of the attachment 34 oriented upwards. The first area 30 and the attachment 34 illustrated in FIG. 9H are arranged at the top side end of the article main body 18 with the tab 54 of the attachment 34 oriented upwards.

In each of the configurations illustrated in FIGS. 9A to 9H, the material weakening portion 50 does not completely surround the first area 30, but a portion where the material weakening portion 50 is not formed is provided between the first area 30 and the second area 32. The attachment 34 is disposed so that the joint position (bent portion 36a) is closest to a portion of the material weakening portion 50 located on the side opposite the portion where there is no material weakening portion 50. As a result of this arrangement, the force F2 (FIG. 4) applied to the attachment 34 via the tab 54 is transmitted to the second layer 16 of the article main body 18 from the bent portion 36a, and is concentrated in the portion of the material weakening portion 50 closest to the bent portion 36a, so it is possible to promptly and reliably produce a tear in the material weakening portion 50. The portion of the material weakening portion 50 that is closest to the bent portion 36a of the attachment 34 can be appropriately selected.

As illustrated in FIG. 9, one or more first areas 30 and one attachment 34 provided in each of these first areas 30 can be provided in the article 10. Although not illustrated on the drawings, one or more first areas 30 and two or more attachments 34 provided in each of these first areas 30 can be provided in the article 10. In addition, the first area 30 and the attachment 34 can be provided in the second layer 16 at a position corresponding to a portion of the first layer 14 where the liquid absorbent core 12 is not provided, or a portion of the first layer 14 where the inside sheet 20 or the outside sheet 22 is not provided. The position and number of the first areas 30 and the attachments 34 can be selected as appropriate taking into consideration the time of the user to carry out the method of disposing of the article 10 as described previously, or the reliability of wrapping the soiled portion of the first layer 14 in accordance with the method of disposal.

As illustrated in FIGS. 10 and 11, the article 10 can be provided with an attachment whose configuration is different from the attachment 34.

An attachment 62 illustrated in FIG. 10 includes the attachment portion 36 installed fixed to the first area 30 of the second layer 16, a fixing portion 64 that extends from the attachment portion 36 and if necessary can be fixed to the second area 32 of the second layer 16, and the tab 54 fixed to the tip of the fixing portion 64. The attachment 62 is disposed on the first area 30 while the fixing portion 64 overlaps onto the attachment portion 36 so that a folded state is formed, and the attachment 62 is maintained in the state of being folded in two when not in use.

The attachment portion 36 of the attachment 62 has the same configuration as the attachment portion 36 of the attachment 34 as described above. The fixing portion 64 of the attachment 62 has the substantially the same configuration as the fixing portion 38 of the attachment 34, apart from the following points. Namely, the fixing portion 64 is further extended to the opposite side from the tab 54 from the joint position with the bent portion 36a of the attachment portion 36. An extension portion 64a of the fixing portion 64 is fixed to the surface 16b of the first area 30 by its pressure sensitive adhesive layer 46, near the bent portion 36a. The extension portion 64a is fixed to the surface 16b at a portion between the bent portion 36a and the part of the material weakening portion 50 of the separation mechanism 48 closest to the bent portion 36a. Instead of the configuration in which the attachment 62 is manufactured by joining together two strips of adhesive tape, a configuration in which the attachment portion 36 and the fixing portion 64 are manufactured entirely from a single adhesive tape can be adopted.

In the configuration in which the attachment 62 is used instead of the attachment 34, in the method of disposal of the article 10 as described above, the user partially separates the first area 30 from the second area 32 by applying the tensile force F2 (FIG. 4) in the longitudinal direction of the fixing portion 64 via the tab 54, to displace it in the direction of the arrow α (FIG. 10). At this time, the force F2 applied to the fixing portion 38 is concentrated and dispersed between both the bent portion 36a of the attachment portion 36 and the extension portion 64a of the fixing portion 64 fixed on the surface 16b of the first area 30, so the force F2 is transmitted more reliably to the second layer 16, without causing unintentional peeling of the bent portion 36a from the second layer 16. As a result, the force F2 is reliably concentrated at the portion of the material weakening portion 50 of the separation mechanism 48 closest to the bent portion 36a and the extension portion 64a, so the material weakening portion 50 is easily and reliably torn.

An attachment 66 illustrated in FIG. 11 includes the attachment portion 36 installed fixed to the first area 30 of the second layer 16, an intermediate portion 68 that extends from the attachment portion 36, the fixing portion 38 that extends from the intermediate portion 68 and if necessary can be fixed to the second area 32 of the second layer 16, and the tab 54 fixed to the tip of the fixing portion 38. The attachment 66 is provided in the first area 30, folded in three with the intermediate portion 68 overlapped onto the attachment portion 36 and the fixing portion 38 overlapped onto the intermediate portion 68, and, when not in use, is maintained in the state folded in three.

The attachment portion 36 and the fixing portion 38 of the attachment 66 have the same configuration as the attachment portion 36 and the fixing portion 38 of the attachment 34, respectively as described above. The intermediate portion 68 has the configuration of adhesive tape that includes a base member 70 in strip form, and a pressure sensitive adhesive layer 72 provided on a first surface of the base member 70. The attachment 66 is

manufactured by joining together successively in the longitudinal direction one strip of adhesive tape that constitutes the attachment portion 36, one strip of adhesive tape that constitutes the intermediate portion 68, and another strip of adhesive tape that constitutes the fixing portion 38.

The intermediate portion 68 is disposed with the pressure sensitive adhesive layer 72 in opposition to the base member 40 of the attachment portion 36. The intermediate portion 68 is joined to the bent portion 36a of the attachment portion 36 near a first end thereof in the longitudinal direction, by both sensitive adhesive layers 72, 42. A portion 68a of predetermined length at a second end in the longitudinal direction of the intermediate portion 68 is bent toward the base member 70 side. The fixing portion 38 is disposed with the pressure sensitive adhesive layer 46 in opposition to the base member 70 of the intermediate portion 68. The fixing portion 38 is joined near the first end thereof in the longitudinal direction to the portion 68a (hereinafter, referred to as the bent portion 68a) bent towards the base member 70 side of the intermediate portion 68, by both pressure sensitive adhesive layers 46, 72. The intermediate portion 68 is manufactured from the same material as the attachment portion 36 and the fixing portion 38.

In FIG. 11, gaps are formed between the base member 40 of the attachment portion 36 and the pressure sensitive adhesive layer 72 of the intermediate portion 68, and between the base member 70 of the intermediate portion 68 and the pressure sensitive adhesive layer 46 of the fixing portion 38, but these gaps are for ease of understanding of the configuration of the attachment 66, and, when the attachment 66 is not being used, the pressure sensitive adhesive layer 72 of the intermediate portion 68 may be superimposed on the base member 40 of the attachment portion 36, and the pressure sensitive adhesive layer 46 of the fixing portion 38 may be superimposed on the base member 70 of the intermediate portion 68. In addition, as illustrated on the drawings, the tab 54 may be disposed on the base member 70 of the intermediate portion 68, or it may be disposed projecting to the outside of the intermediate portion 68.

The attachment 66 is disposed in the first area 30 of the second layer 16, with the bent portion 36a of the attachment portion 36 on the side that is distant from the material weakening portion 50 of the separation mechanism 48. The bent portion 68a of the intermediate portion 68 is disposed on the side opposite the bent portion 36a of the attachment portion 36, and the tab 54 is positioned on the same side as the bent portion 36a of the attachment portion 36, in other words, is positioned on the side distant from the material weakening portion 50. Instead of the configuration in which the attachment 66 is manufactured by joining together three strips of adhesive tape, a configuration in which the attachment portion 36, the intermediate portion 68, and the fixing portion 38 are manufactured entirely from a single adhesive tape can be adopted.

In the configuration in which the attachment 66 is used instead of the attachment 34, in

the method of disposal of the article 10 as described above, first, the user grips the tab 54, and can apply the force F1 (FIG. 3) to the fixing portion 38, and gradually peel the fixing portion 38 fixed to the intermediate portion 68 by the pressure sensitive adhesive layer 46 from the intermediate portion 68. Next, when the user applies the tensile force F2 (FIG. 4) in the longitudinal direction of the fixing portion 38 via the tab 54, the intermediate portion 68 fixed to the attachment portion 36 by the pressure sensitive adhesive layer 72 is gradually peeled from the attachment portion 36. When substantially the entire intermediate portion 68 has been peeled from the attachment portion 36, the force F2 is transmitted to the attachment portion 36 via the intermediate portion 68, and transmitted to the second layer 16 via the attachment portion 36. The force F2 is concentrated at the portion of the material weakening portion 50 of the separation mechanism 48 closest to the attachment portion 36, so the material weakening portion 50 is progressively torn starting from this portion. As a result, the first area 30 is partially separated from the second area 32, and displaced in the direction of the arrow symbol α (FIG. 11). When the entire material weakening portion 50 has been torn, the first area 30 is folded back with respect to the second area 32 so that it separates from the first layer 14, the same as illustrated in FIG. 5, and can be extended beyond the outer edge of the article main body 18.

In the configuration using the attachment 66 folded in three, the bent portion 36a of the attachment portion 36 is disposed on the side that is distant from the material weakening portion 50, as described above. Therefore, unlike the configurations illustrated in FIG. 4 and FIG. 10, the force F2 applied to the fixing portion 38 is not necessarily concentrated at the portion corresponding to the bottom side of the U-shape of the material weakening portion 50, via the intermediate portion 68 and the attachment portion 36, so in some cases, the material weakening portion 50 may start to tear from another portion. In these cases also, by continuously applying the force F2 to the fixing portion 38, it is possible to tear the entire material weakening portion 50.

The intermediate portion 68 of the attachment 66 can have an extension portion (not illustrated on the drawings) that further extends to the opposite side of the bent portion 68a from the joint position with the bent portion 36a of the attachment portion 36, the same as the fixing portion 64 of the attachment 62 as described above. The extension portion of the intermediate portion 68 is fixed to the surface 16b of the first area 30 by its pressure sensitive adhesive layer 72, near the bent portion 36a. According to this configuration, the same as when the attachment 62 was used, in the disposal method of the article 10 as described above, the material weakening portion 50 is easily and reliably torn.

Compared with the attachment 66 folded in three, the attachments 34, 62 folded in two use less material in the attachments 34, 62, so the material cost can be reduced. In addition, the attachments 34, 62 that are folded in two have several advantages in connection with the manufacturing process of the article 10. An example of the process of manufacturing the

article 10 that includes the attachment 34 folded in two as illustrated in FIG. 1 will be described below with reference to FIG. 12 and FIG. 13. FIG. 12A illustrates an example of a manufacturing device for the attachment 34. FIG. 12B illustrates an end surface of the laminated tape from which the attachment 34 is configured. FIG. 12C illustrates the laminated tape that constitutes the attachment 34 wound into a roll. FIG. 13 illustrates an example of the manufacturing device of the article 10.

As illustrated in FIG. 12A, a manufacturing device of the attachment 34 (FIG. 1) includes a tape feed unit 80, a laminating unit 82, and a tape winding unit 84. The tape feed unit 80 includes a roll of long adhesive tape 36T to constitute the attachment portion 36 (FIG. 1), a roll of long adhesive tape 38T to constitute the fixing portion 38 (FIG. 1), and a roll of long tape 54T to constitute the tab 54 (FIG. 1). As illustrated in FIG. 12B, the adhesive tape 36T includes a long base member 40T and a pressure sensitive adhesive layer 42T to constitute the base member 40 (FIG. 1) and the pressure sensitive adhesive layer 42 (FIG. 1) of the attachment portion 36. In addition, the adhesive tape 38T includes a long base member 44T and a pressure sensitive adhesive layer 46T to constitute the base member 44 (FIG. 1) and the pressure sensitive adhesive layer 46 (FIG. 1) of the fixing portion 38. A peeling process is carried out in advance on the outer surfaces of the base members 40T and 44T on the side opposite the pressure sensitive adhesive layers 42T and 46T.

The adhesive tape 36T, the adhesive tape 38T, and the tape 54T fed from the respective rolls of the tape feed unit 80 are laminated together in the form illustrated in FIG. 12B in the laminating unit 82. In the laminating unit 82, the tape 54T is continuously bonded to the pressure sensitive adhesive layer 46T along a side edge extending in the longitudinal direction of the adhesive tape 38T. On the other hand, a bent portion 36aT to constitute the bent portion 36a (FIG. 1) of the attachment portion 36 is formed along one side edge extending in the longitudinal direction of the adhesive tape 36T. Next, the adhesive tape 38T to which the tape 54T has been bonded is continuously bonded along the bent portion 36aT of the adhesive tape 36T by both pressure sensitive adhesive layers 42T and 46T. In this way, a long laminated tape 34T to constitute the attachment 34 is manufactured (FIG. 12B). The laminated tape 34T is manufactured so that the pressure sensitive adhesive layer 46T of the adhesive tape 38T is bonded to the base member 40T of the adhesive tape 36T.

The laminated tape 34T manufactured in the laminating unit 82 is fed continuously to the winding unit 84 laminated as it is. In the winding unit 84, the laminated tape 34T is wound onto a roll, with the pressure sensitive adhesive layer 42T of the adhesive tape 36T facing the inside. As a result, in the winding unit 84, the laminated tape 34T is formed in the web form illustrated in FIG. 12C. The laminated tape 34T is stored, transported, and the like, wound in web form.

The following is an example of the dimensions of the laminated tape 34T manufactured by the process as described above. In FIG. 12B, D1 = approximately 60 mm, D2 =

approximately 50 mm, D3 = approximately 5 mm, D4 = approximately 2 mm, D5 = approximately 7 mm. In addition, the thickness of the base member 40T, 44T is approximately 18 μm , and the basis weight of the pressure sensitive adhesive layer 42T, 46T is approximately 35 g/m^2 ,

As illustrated in FIG. 13, a manufacturing device for the article 10 includes a laminated tape feed unit 86, a laminated tape cutting unit 88, and an attachment fixing unit 90. The laminated tape 34T in web form installed in the laminated tape feed unit 86 is continuously fed from the state of being wound up in web form, with the pressure sensitive adhesive layer 42T of the adhesive tape 36T facing upwards. The laminated tape 34T that is fed out is cut in the laminated tape cutting unit 88 at a position CP of a predetermined distance in the longitudinal direction from the tip in the direction of feeding. In this way, the attachment 34 is manufactured.

An attachment roller 94 having a temporary retention surface 92 using vacuum suction or the like on the external peripheral surface thereof is installed in the attachment fixing unit 90 which is provided on the downstream side in the tape feed direction of the laminated tape cutting unit 88. The attachment 34 cut from the laminated tape 34T is temporarily retained on the temporary retention surface 92 of the attachment roller 94 in the attitude with the pressure sensitive adhesive layer 42T facing upwards.

A sheet member 18M with laminated structure that constitutes the article main body 18 (FIG. 1) is continuously supplied to the attachment fixing unit 90 on the opposite side of the attachment roller 94 to the side that is in opposition to the laminated tape cutting unit 88, in an attitude in which a surface 16bM that constitutes the outer surface 16b (FIG. 1) of the second layer 16 is in face-to-face contact with the temporary retention surface 92 of the attachment roller 94. The attachment roller 94 is driven to rotate at a specific angular velocity, and the sheet member 18M is fed to the tangential direction of the attachment roller 94 at a speed corresponding to the tangential velocity of the attachment roller 94. The attachment 34 that is temporarily retained on the temporary retention surface 92 of the attachment roller 94 progressively contacts the surface 16bM of the sheet member 18M as the attachment roller 94 rotates. If the temporary retention surface 92 of the attachment roller 94 has a vacuum suction function, the vacuum suction function is released when the pressure sensitive adhesive layer 42 of the attachment 34 starts to contact the surface 16bM of the sheet member 18M. As a result, the attachment 34 is transferred to the surface 16bM of the sheet member 18M and fixed in the predetermined location. At this time, a predetermined pressure to fix the pressure sensitive adhesive layer 42 of the attachment 34 to the surface 16bM can be applied between the temporary retention surface 92 of the attachment roller 94 and the surface 16bM of the sheet member 18M.

The sheet member 18M with the attachment 34 fixed to the surface 16bM is fed to post processes such as cutting, forming, sealing, and the like. In this way, the article 10 that

includes the attachment 34 and the separation mechanism 48 is manufactured.

In the manufacturing process described above, the overall thickness of the attachment 34 folded in two is less than that of the attachment 66 folded in three, so the external diameter of the roll when the laminated tape 34T is wound in web form can be smaller than the external diameter of the roll when the laminated tape (not illustrated on the drawings) that is folded in three of the same length is wound in web form. In other words, if the external diameter of the roll is the same, it is possible to wind a longer laminated tape 34T in web form than laminated tape folded in three. Therefore, when subject to restriction on the maximum diameter of roll that can be installed in the laminated tape feed unit 86, a roll of laminated tape 34T that is longer than laminated tape that is folded in three can be installed in the laminated tape feed unit 86. As a result, in the process of manufacturing the article 10, it is possible to reduce the frequency of replenishing the roll of the laminated tape 34T installed in the laminated tape feed unit 86, and it is possible to reduce the number of times that the operation is stopped for replenishment, so it is possible to increase the number of articles 10 manufactured per unit time. In addition, by reducing the frequency of replenishing the laminated tape 34T, it is possible to reduce the number of times of operations of joining the rear end of the preceding laminated tape 34T and the front end of the following laminated tape 34T, so the operability is improved, and it is possible to prevent poor yield due to problems associated with joining, and the like. In this way, in the configuration using the attachment 34 folded in two, it is possible to increase the productivity of the article 10 as well as reduce its manufacturing cost.

In the method of disposal of the article 10 described above, the magnitude of the force required to partially separate the first area 30 from the second area 32 by tearing the material weakening portion 50 constituted from perforations (in other words, the ease of separation) was verified by the following tests which were related to the configuration of the material weakening portion 50.

The process of partially separating the first area 30 from the second area 32 described above (FIG. 3 to FIG. 5) was carried out on four types of article 10 having the material weakening portion 50 as illustrated in FIGS. 7A to 7D, and the maximum value of the force F_2 (FIG. 4) was measured. Here, pants-type diapers (FIG. 2) having the same structure were used as the four types of article 10, and attachments 34 each of the same structure were fitted to the stomach area 58 or the back area 60 of the article main body 18. The shortest distance d_{min} (FIG. 7A) between the material weakening portion 50 and the bent portion 36a of the attachment 34 was the same in each case (approximately 5 mm). The material weakening portion 50 was constituted from the perforation 50B (FIG. 8B) in each case.

For the four types of article 10 having the configurations described above, after the fixing portion 38 of the attachment 34 had been separated from the attachment portion 36 (FIG. 3), the force F_2 was applied in the longitudinal direction of the fixing portion 38 using a tensile testing machine (Orientec Co., Ltd., RTG-1225), the material weakening portion 50 was

progressively torn (FIG. 4), and the maximum value of the force F2 was measured until the first area 30 opened out and had folded back with respect to the second area 32 (FIG. 5). The measurement results are shown in Table 1.

Table 1

	FIG. 7A	FIG. 7B	FIG. 7C	FIG. 7D
F2(N)	1	0.7	4	4

In addition, of the above four types of article 10, articles 10 having the material weakening portion 50 illustrated in FIGS. 7A and 7C were prepared in which the proportion of the area of the first area 30 relative to the area in plan view of the article main body 18 illustrated on the drawing (in other words, the area ratio) was varied, and for each, the maximum value of the force F2 was measured by the same method as described above. The measurement results are shown in Table 2. The maximum distance between the attachment 34 fixed to the first area 30 and the material weakening portion 50 for each area ratio is indicated as dmax (FIG. 7A). In addition, for reference, the area ratio and the maximum distance dmax of the first area 30 in the article 10 illustrated in FIG. 7B are shown.

Table 2

	FIG. 7A				FIG. 7B	FIG. 7C	
Area ratio (%)	5	10	30	50	5	70	90
dmax (mm)	5	15	30	50	5	80	100
F2 (N)	0.7	1	2	4	0.7	4	5

In addition, for each of the above four types of article 10, the dimensions of the perforation 50B (relationship between length of perforation holes L1 (FIG. 8) and gap to adjacent perforation hole L2 (FIG. 8)) was varied, and it was judged whether it was possible to tear the material weakening portion 50 and partially separate the first area 30 from the second area 32, in tensile tests the same as described above. The results of this judgment are shown in Table 3.

Table 3

L1 (mm)	L2 (mm)	Separation judgment
1.5	0.5	Acceptable
2.5	1	Acceptable
3.5	1.5	Acceptable
4.5	2	Unacceptable
6	3	Unacceptable

The following items were verified from the results of each of the tests as described above.

The magnitude of the force F_2 required to tear the material weakening portion 50 constituted from the perforation 50B and partially separate the first area 30 from the second area 32 did not depend on the configuration of the material weakening portion 50, for example it was possible with a force of not less than approximately 0.5 N and not more than approximately 5 N, and, for example with a force of not less than approximately 1 N and not more than approximately 4 N. If the force F_2 exceeds approximately 5 N, in some cases, the operation to partially separate the first area 30 from the second area 32 along the material weakening portion 50 can be difficult. If the force F_2 was less than approximately 0.5 N, in some cases, the material weakening portion 50 unintentionally tore during normal usage and not during disposal of the article 10.

It is possible to adjust the force F_2 within the range described above as appropriate by selecting the area ratio of the first area 30 and the dimensions of the perforation 50B. Here, the area ratio of the first area 30 can be, for example, not less than approximately 5% and not more than approximately 90%, regardless of the configuration of the material weakening portion 50, also, it can be, for example, not less than approximately 5% and not more than approximately 70%. For the same structure of attachment 34, if the area ratio of the first area 30 is increased, the maximum distance $d_{\max}$ between the attachment 34 and the material weakening portion 50 is increased, but $d_{\max}$ can be, for example, not less than approximately 5 mm and not more than approximately 100 mm, or, for example, not less than approximately 5 mm and not more than approximately 30 mm. The smaller the area ratio of the first area 30, the smaller the force F_2 that is required, and as the area ratio of the first area 30 is increased, the force F_2 that is required increases.

Of the dimensions of the perforation 50B, the gap L_2 of the perforated holes can be, for example, not less than approximately 0.5 mm and less than approximately 2 mm, and, for example, not less than approximately 0.5 mm and less than approximately 1.5 mm. If the gap L_2 is not less than approximately 2 mm, it becomes difficult to tear the perforation 50B and partially separate the first area 30 from the second area 32, even if the length of the perforated holes L_1 is increased. The smaller the gap L_2 between the perforated holes, the smaller the force F_2 that is required, and as the gap L_2 between the perforated holes increases, the force F_2 that is required increases.

Claims

What is claimed is:

1. A disposable absorbent article, comprising: a first layer having a liquid absorbent core; a liquid impermeable second layer that covers the first layer, and that includes a first area and a second area adjacent to each other;
an attachment fixed to the first area of the second layer; and
a separation mechanism that enables the first area of the second layer to partially separate from the second area as a result of an external force applied to the attachment.
2. The disposable absorbent article according to claim 1, wherein the attachment includes an attachment portion that is installed fixed to the first area, and a fixing portion that extends from the attachment portion, the fixing portion being installed to the first area while being superimposed on the attachment portion.
3. The disposable absorbent article according to claim 1 or 2, wherein the attachment includes a tab capable of receiving a tensile force as the external force on the terminal end of the attachment.
4. The disposable absorbent article according to any one of claims 1 to 3, wherein the separation mechanism includes a material weakening portion formed at the boundary between the first area and the second area, that enables tearing of the second layer due to the external force.
5. The disposable absorbent article according to any one of claims 1 to 4, wherein the second layer is bonded to the first layer, and the separation mechanism includes an adhesive force reduction portion in which the adhesive force of the second layer with respect to the first layer is lower in the first area than in the second area.
6. The disposable absorbent article according to any one of claims 1 to 5, wherein the disposable absorbent article is a diaper, the first layer and the second layer include a crotch area, a stomach area that extends from the crotch area, and a back area on a side opposite the stomach area and that extends from the crotch area, and the first area is provided in at least one of the stomach area and the back area.
7. The disposable absorbent article according to claim 6, wherein the first area is provided continuous with the stomach area, the back area, and the crotch area.

8. The disposable absorbent article according to any one of claims 1 to 7, comprising one or more first areas, and one or more attachments in the one or more first areas.

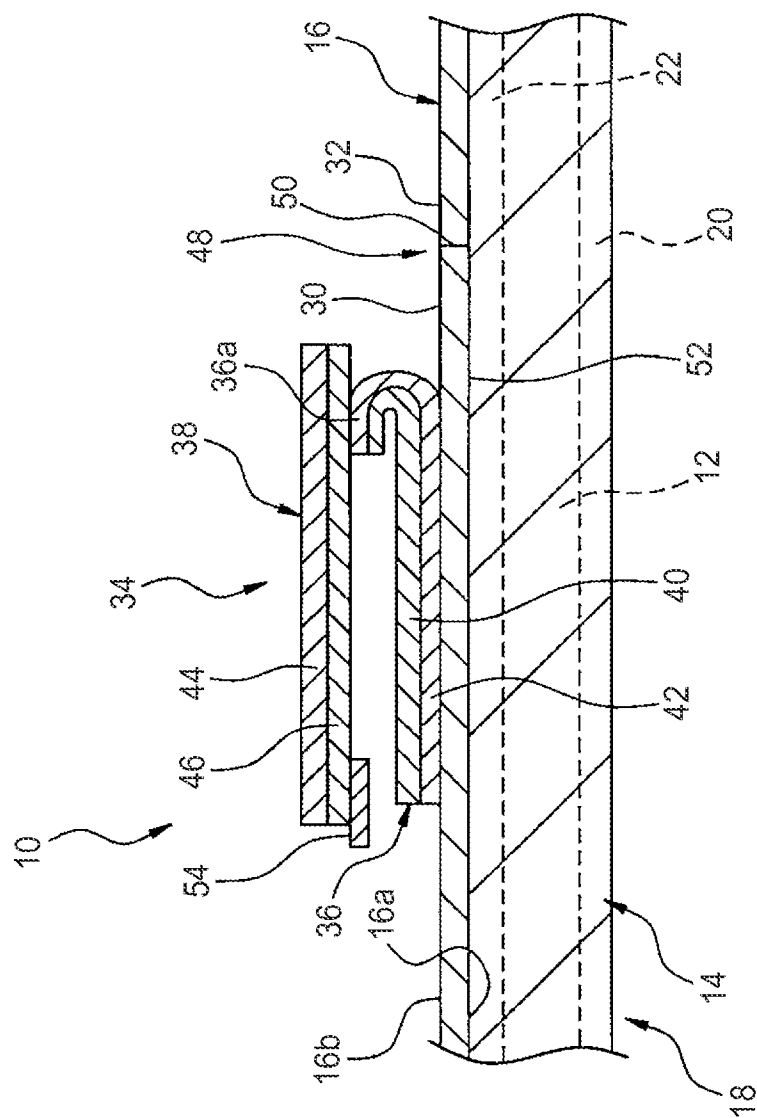


FIG. 1

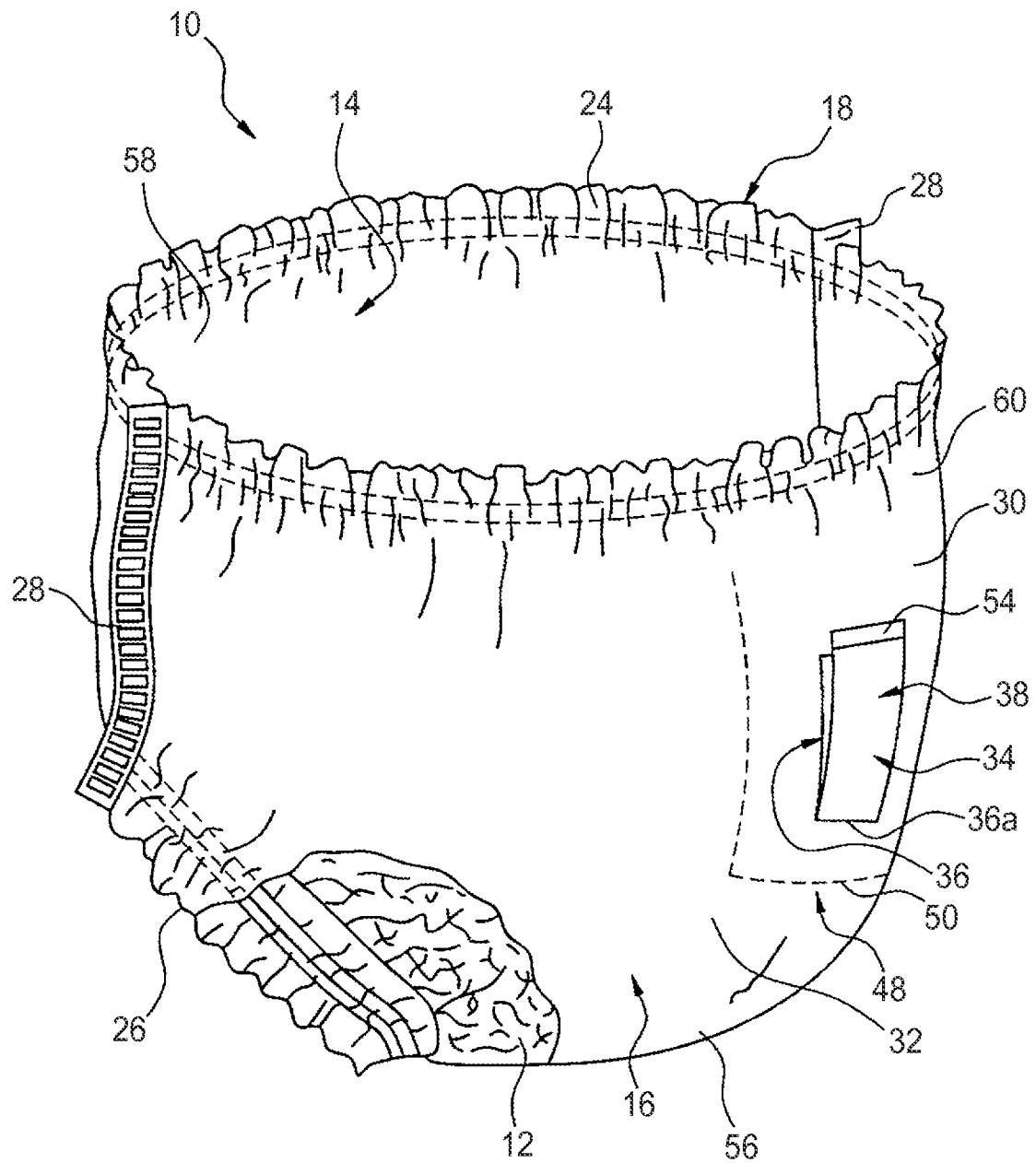


FIG. 2

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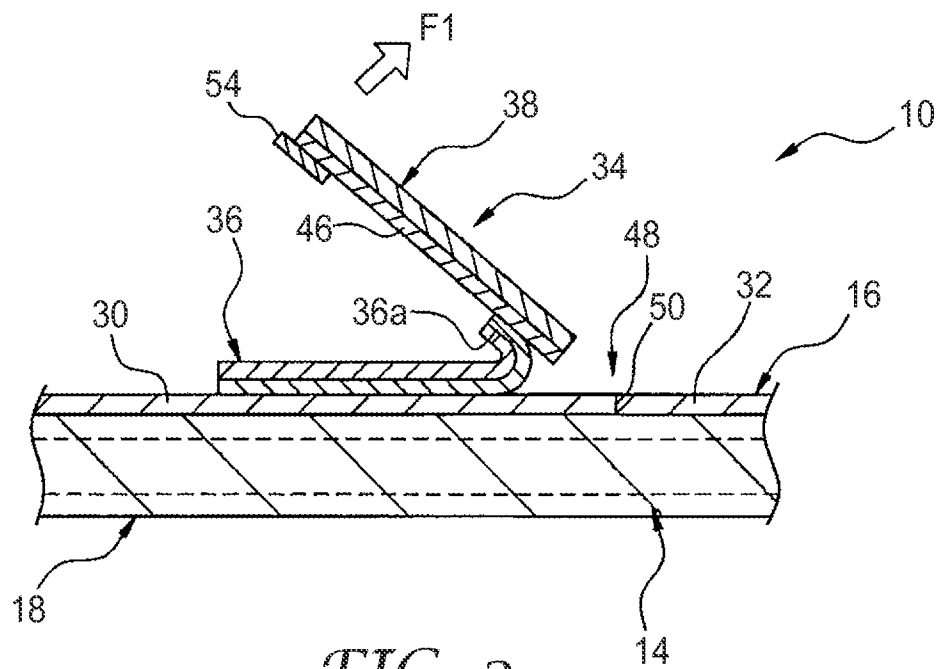


FIG. 3

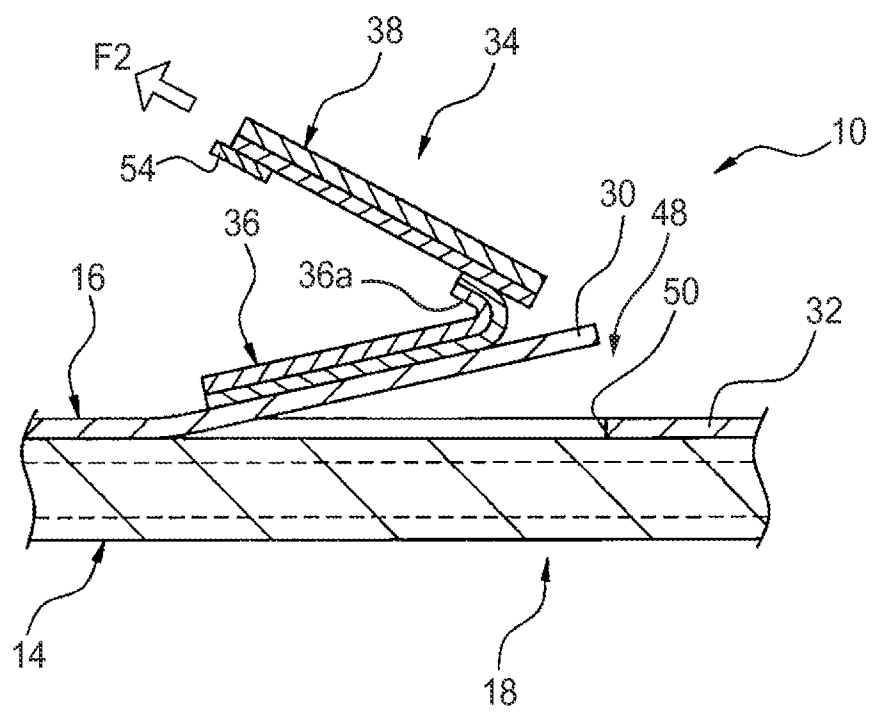


FIG. 4

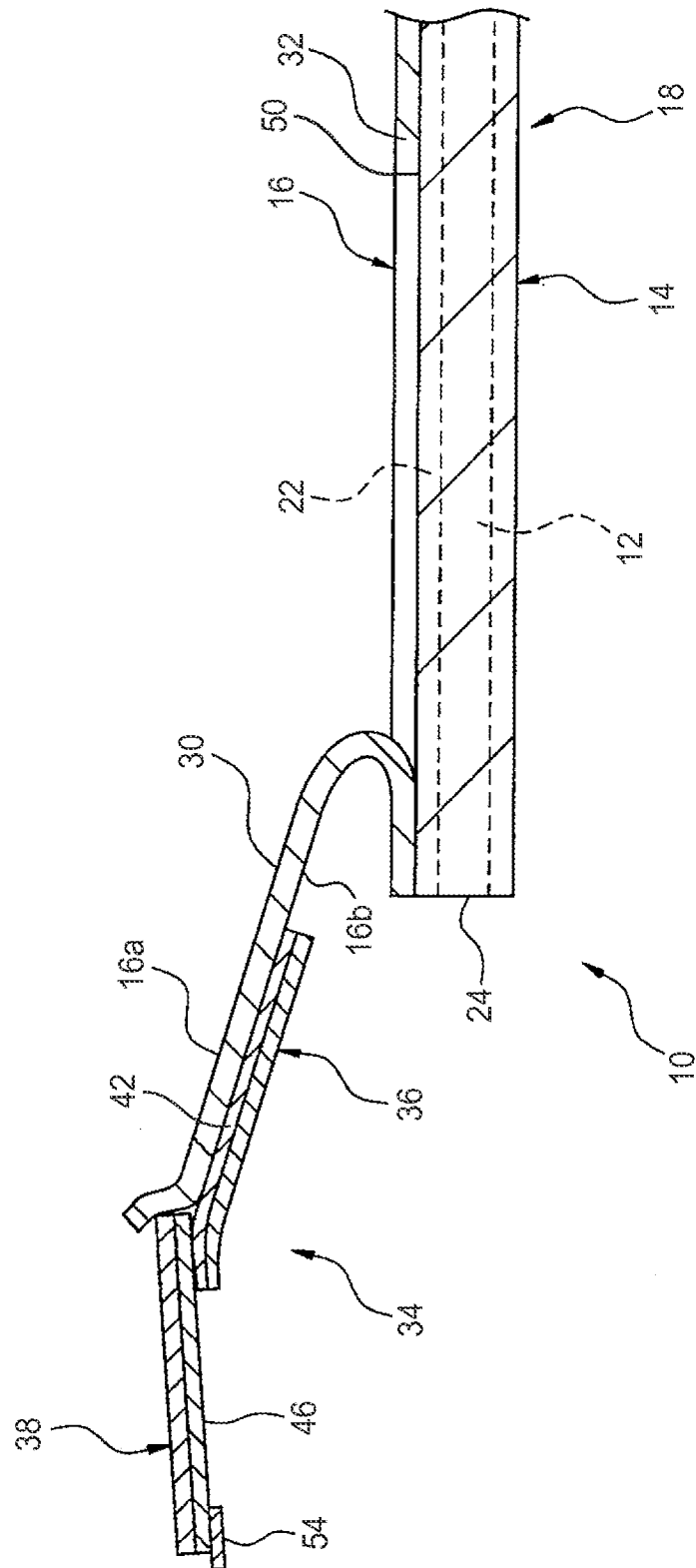


FIG. 5

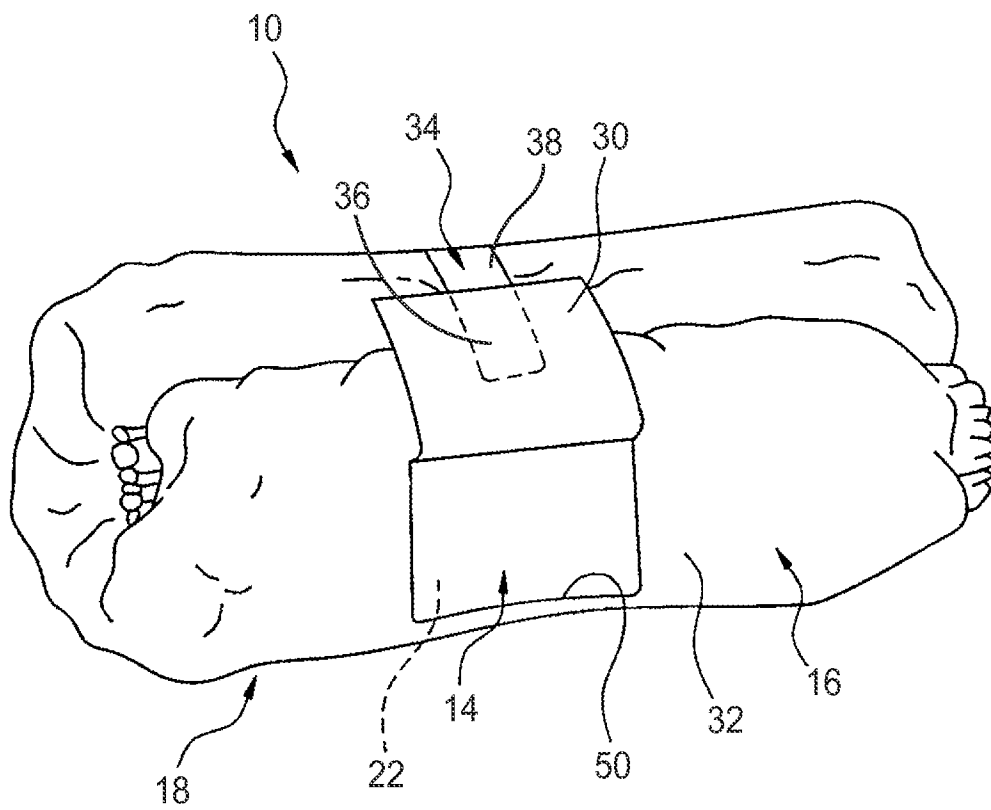


FIG. 6

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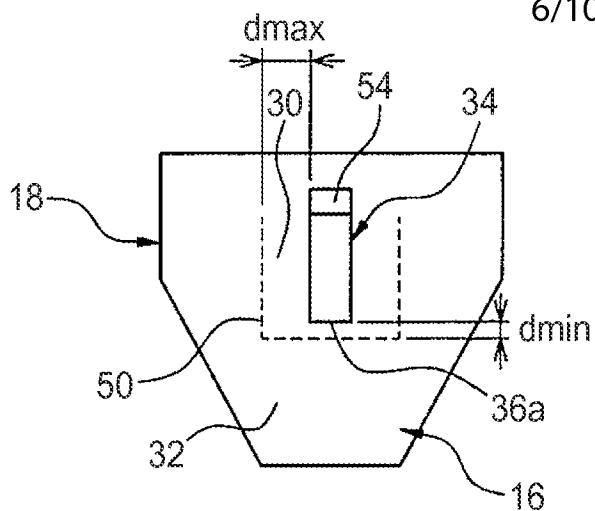


FIG. 7A

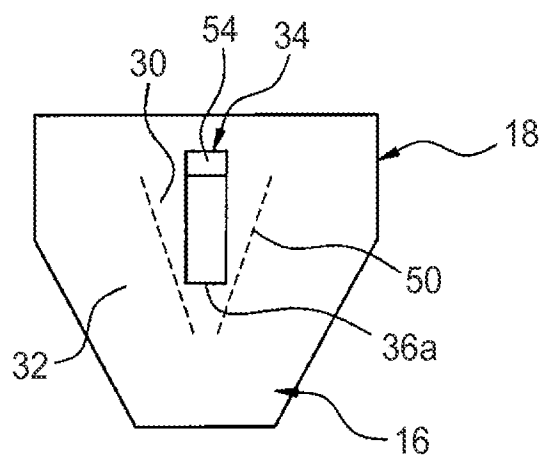


FIG. 7B

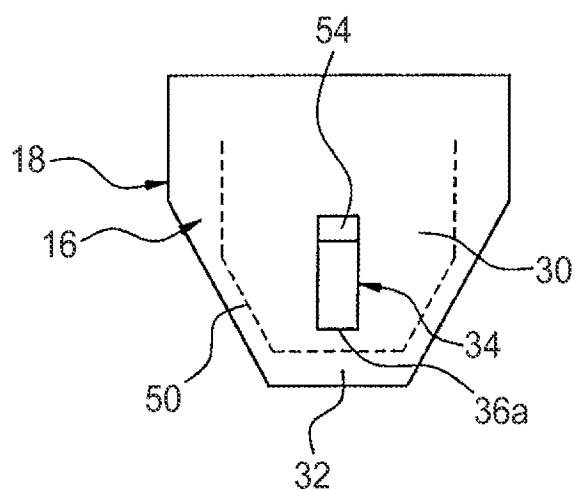


FIG. 7C

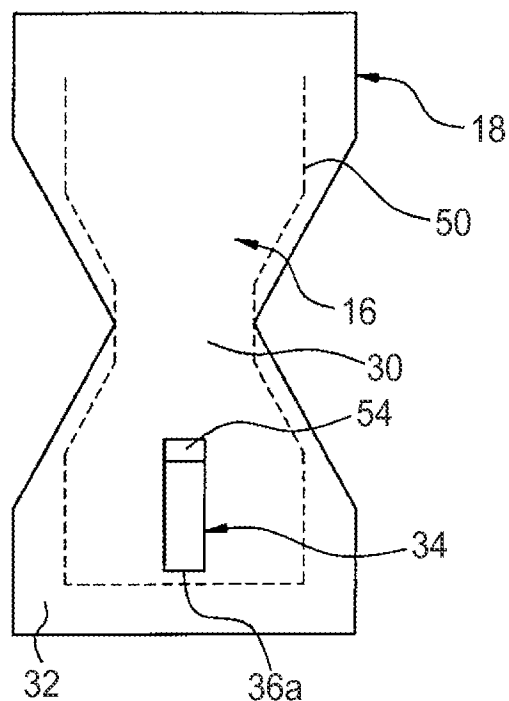
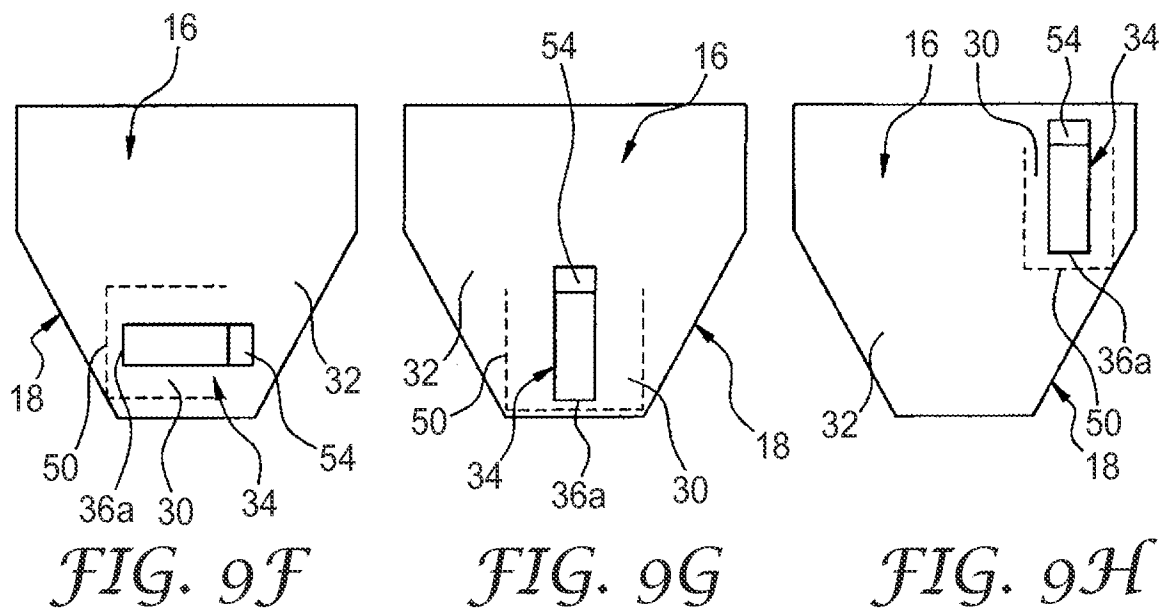
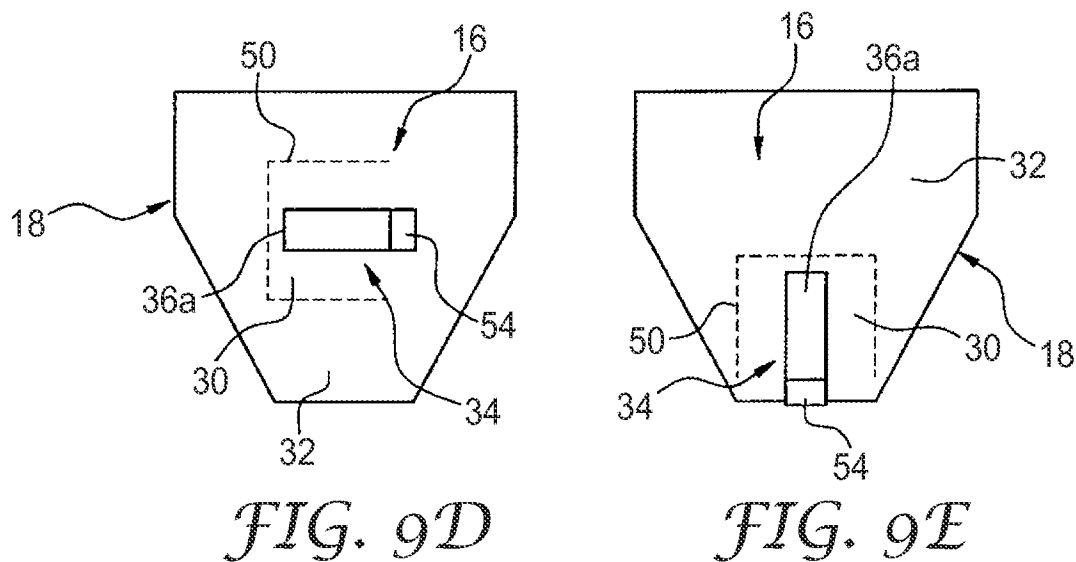
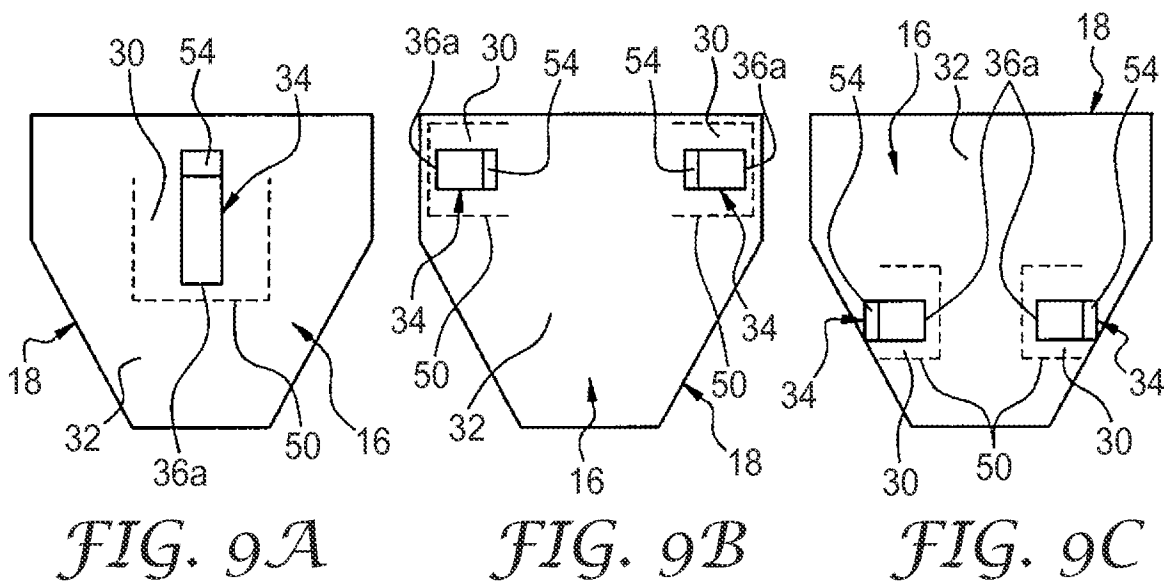


FIG. 7D

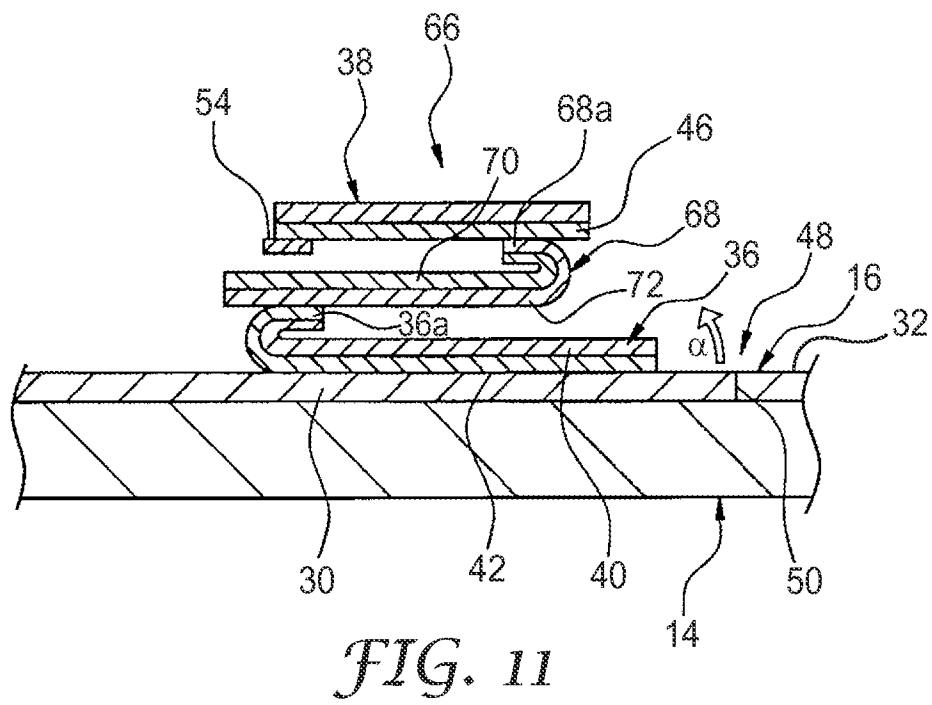
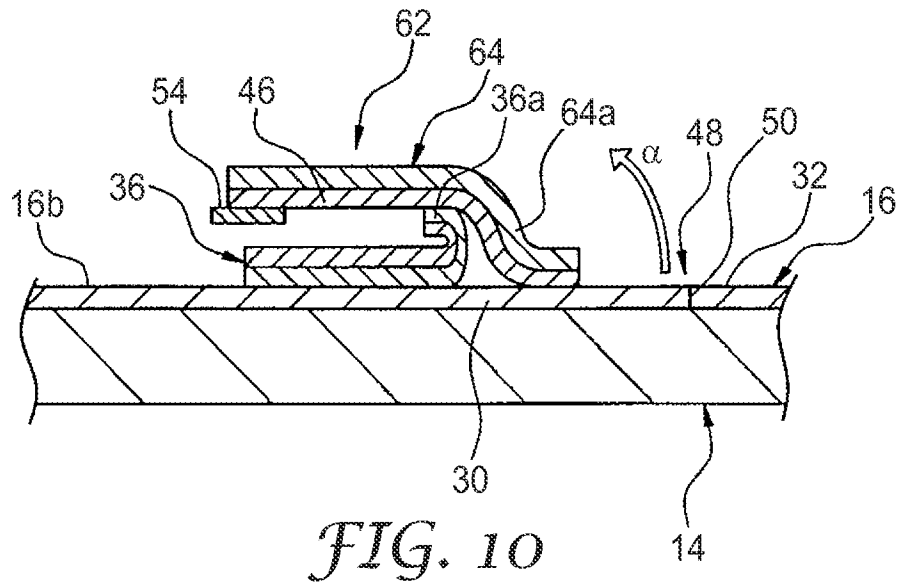
FIG. 8A 50A

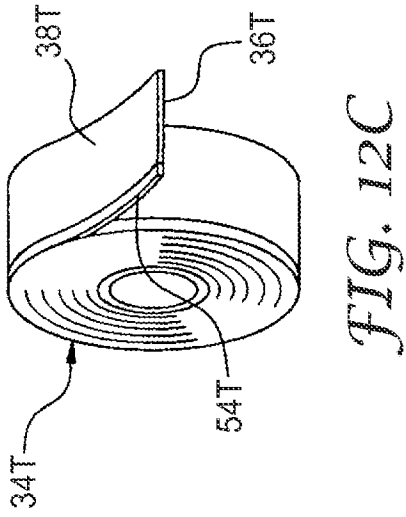
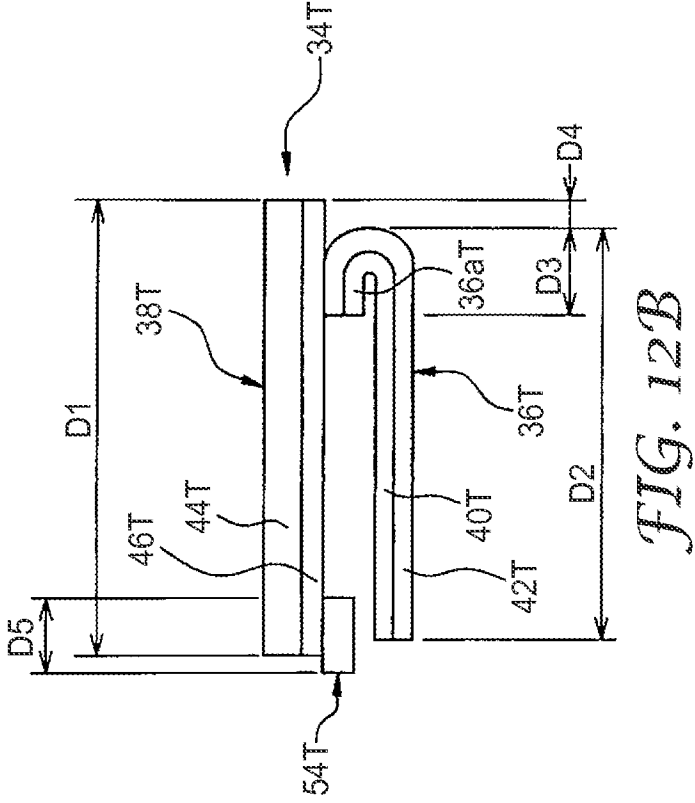
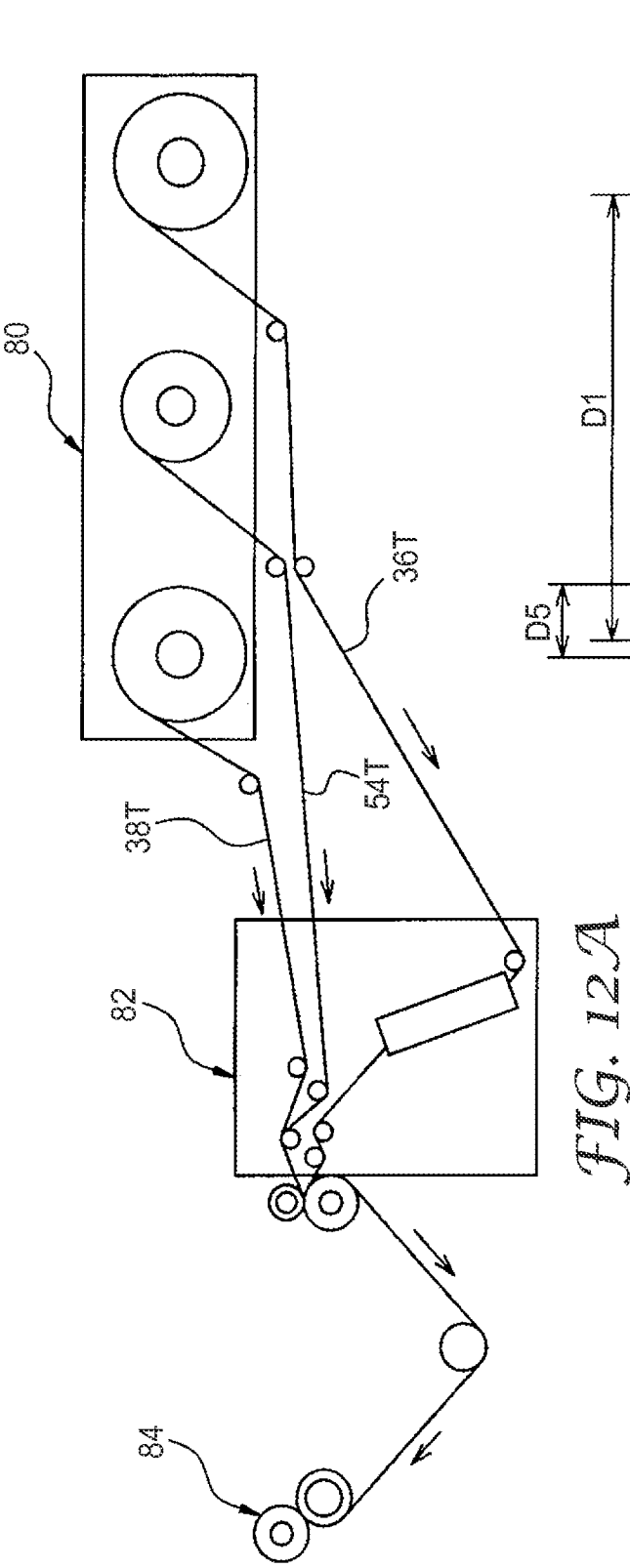
FIG. 8B 50B

FIG. 8C 50C



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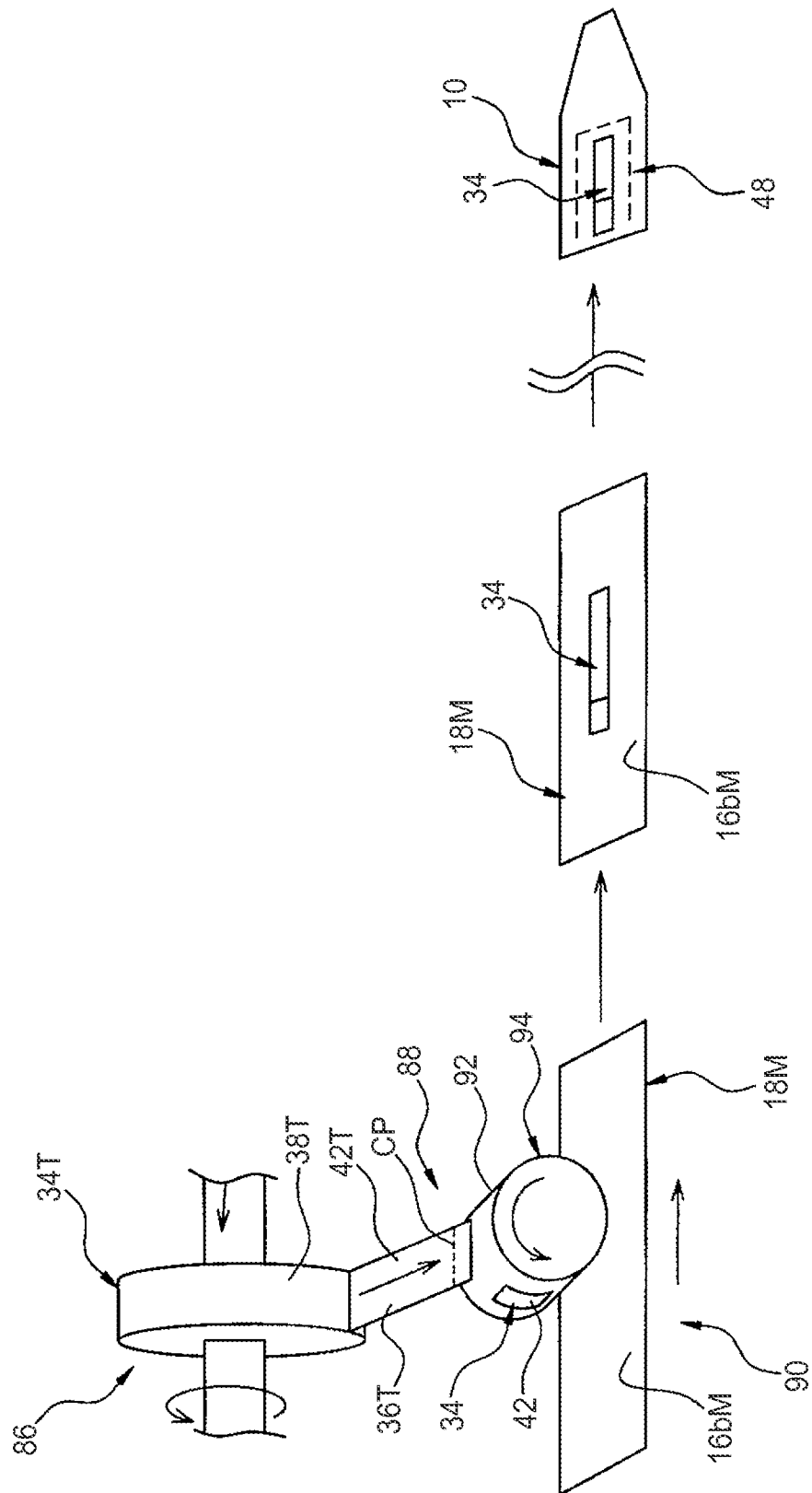


FIG. 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/076139**A. CLASSIFICATION OF SUBJECT MATTER****A61F 13/505(2006.01)i, A61F 13/49(2006.01)i, A61F 13/15(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61F 13/505; A61F 13/15; A61F 13/56; A61F 13/47; A61F 13/551; A61F 13/20; A61F 13/49

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: absorbent article, absorption, disper, force, tensile, separation, attachment, strip, tape

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010-117314 A1 (SCA HYGIENE PRODUCTS AB) 14 October 2010 See abstract; claims 1-3,5; page 7, lines 16-18; page 15, line 34 - page 16, line 3; page 17, lines 18-29; page 18, lines 4-9; page 20, lines 19-26; and figures 4b-8.	1,3
Y		2
Y	US 5575784 A (AMES-OOTEN, K. Q. et al.) 19 November 1996 See abstract; claim 1; column 10, lines 23-39; column 10, line 62 - column 11, line 8; and figures 1,4-5.	2
A		1,3
A	US 2008-0103470 A1 (SAMUELSSON, A. et al.) 1 May 2008 See abstract; claims 1-2,6-7,15; paragraphs [0011]-[0015], [0039], [0042]-[0044], [0046], [0052], [0054]-[0055], [0059]-[0065]; and figures 1-6c.	1-3
A	US 2003-0153891 A1 (MOLEE, K. J.) 14 August 2003 See abstract; claim 1; paragraphs [0001], [0010]-[0011], [0093]-[0098]; and figures 5a-6.	1-3
A	US 6371949 B1 (SOGA, H. et al.) 16 April 2002 See abstract; claim 1; column 1, lines 48-59; column 3, lines 44-54; column 4, lines 32-45; and figures 1-5.	1-3



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

02 April 2014 (02.04.2014)

Date of mailing of the international search report

03 April 2014 (03.04.2014)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/076139

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 7
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 7 is unclear, because it refers to multiple dependent claim 6 which does not comply with PCT Rule 6.4(a).
3. ☒ Claims Nos.: 4-6,8
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2013/076139

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010-117314 A1	14/10/2010	None	
US 05575784 A	19/11/1996	AU 1997-63096 A CA 2236312 A1 EP 0858308 A1 EP 0858308 B1 JP 10-512480 A MX 9803527 A WO 97-16146 A1	22/05/1997 09/05/1997 12/01/2000 14/05/2003 02/12/1998 29/11/1998 09/05/1997
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US 2003-0153891 A1	14/08/2003	None	
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