

DISPOSABLE ABSORBENT ARTICLE

RELATED FIELD

This disclosure relates to the domain of hygiene products, more particularly, to a disposable absorbent article.

BACKGROUND

The disposable absorbent articles on the market are mainly divided into pant type absorbent articles and long strip type absorbent articles. The pant type absorbent articles possess the advantages of convenient use and leakage prevention, and thus have become popular in recent years. Such absorbent articles include a front waistline region, a rear waistline region and a crotch region between the front waistline region and the rear waistline region, wherein two sides of the front waistline region are respectively connected to two sides of the rear waistline region, and two ends of the crotch region are respectively connected to a bottom end of the front waistline region and a bottom end of the rear waistline region. Further, an absorbent body is disposed on a skin side of the crotch region. However, current products or designs cannot obtain a satisfying use comfort.

SUMMARY

In view of the above problems in the prior art, the object of the present disclosure is to provide a disposable absorbent article possessing the advantages of uniform elasticity in the waistline region, good extensibility and compactness, wear comfort and good breathability.

For these purposes, according to the present disclosure, a disposable absorbent article is provided. The disposable absorbent article comprises a front waistline region, a rear waistline region and a crotch region between the front waistline region and the rear waistline region, wherein two sides of the front waistline region are respectively connected to two sides of the rear waistline region to form a waistline opening, and two sides of the crotch region respectively extend to the front waistline region and the rear waistline region to form a pair of thigh openings. The front waistline region and/or the rear waistline region are provided with at least one extensible region configured as a multilayer composite structure which is elastically extensible along at least a lateral direction. The multilayer composite structure

comprises at least one high molecular polymer elastic film compounded with at least one nonwoven fabric layer, and at least one layer of the multilayer composite structure is provided with a plurality of air-through holes.

According to the above technical concepts, the present disclosure can further include one or more following optional forms.

In some optional forms, the multilayer composite structure is disposed across the whole of the front waistline region and the rear waistline region along the lateral direction, and comprises a first nonwoven fabric layer, a second nonwoven fabric layer and a high molecular polymer elastic film compounded between the first nonwoven fabric layer and the second nonwoven fabric layer. The air-through holes penetrate through the multilayer composite structure.

In some optional forms, the first nonwoven fabric layer, the high molecular polymer elastic film and the second nonwoven fabric layer are compounded by ultrasonic welding, and the air-through holes are formed at the ultrasonic welding points.

In some optional forms, the air-through holes in the multilayer composite structure are arranged with a porosity of no less than 0.5%, preferably 1% to 25%, more preferably 2% to 10%, still more preferably 3% to 5%, and still more preferably 3.5% to 4.5%.

In some optional forms, the elastic film does not extend to the ends of the front waistline region and the rear waistline region, and the ends of the front waistline region and the rear waistline region comprise at least one elastomer compounded between the first nonwoven fabric layer and the second nonwoven fabric layer and extending along the lateral direction.

In some optional forms, the first nonwoven fabric layer extends over the front waistline region, the rear waistline region and the crotch region, while the elastic film and the second nonwoven fabric layer extends over the front waistline region and the rear waistline region.

In some optional forms, the first nonwoven fabric layer extends beyond the elastic film and the second nonwoven fabric layer, and is folded inwards at the end of the waistline opening to cover the second nonwoven fabric layer.

In some optional forms, the second nonwoven fabric layer extends from the rear waistline region to a portion of the crotch region, and at least one elastomer extending curvedly in the lateral direction is compounded between the first nonwoven fabric layer and the second nonwoven fabric layer at a position without the elastic film.

In some optional forms, the extensible region is configured with an extension ratio increasing continuously from the crotch region to the waistline opening.

In some optional forms, the extensible region is configured with an extension ratio of 1.2 to 8.

5 In some optional forms, the extensible region comprises an elastomer content of 5% to 100%, a fineness of 20 to 1240 dtex, and a basic weight of 20 to 200 gsm.

In some optional forms, the elastic film is compounded with the at least one nonwoven fabric layer continuously or discontinuously.

10 In some optional forms, the disposable absorbent article further comprises an absorbent body extending from the crotch region to the front waistline region and the rear waistline region, wherein two sides of the absorbent body are provided with a protective enclosure, and two sides of the protective enclosure are folded inwards to cover at least one elastomer extending in a longitudinal direction to form a three-dimensional protective enclosure.

15 In some optional forms, two ends of the absorbent body in the longitudinal direction are covered with a protective sheet.

Compared with the current products, the disposable absorbent article according to the present disclosure at least possesses the following advantages:

20 1. The front waistline region and/or the rear waistline region are provided with at least one extensible region which is elastically extensible along at least the lateral direction, which can meet the requirement of the body size of the users and their movements, and the extensible region has uniform elasticity in the whole waistline region, high conformity with the human body, wear comfort and elegant appearance, and does not cause trace and swelling easily.

25 2. The extensible region is a multilayer composite structure comprising at least one nonwoven fabric layer and at least one high molecular polymer elastic film. It is provided with a plurality of air-through holes on the multilayer composite structure, thus it has good breathability and high comfort, and prevents the skin from generating eczema and itching in the heat and humid conditions.

30 **BRIEF DESCRIPTION OF THE DRAWINGS**

Other features and advantages of the present disclosure will be better understood with

reference to the following detailed description when taken in conjunction with the accompanying drawings, and the same reference numerals in the drawings indicate the same or similar members, in which:

Fig.1 is a schematic view of a first embodiment of the absorbent article according to the present disclosure;

Fig.2 is a schematic view of the embodiment of Fig.1 after unfolding, showing partial sectional structure;

Fig.3 is an enlarged sectional schematic view of the front waistline region or the rear waistline region in the embodiment of Fig.1.

Fig.4 is a schematic view of a second embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure;

Fig.5 is a schematic view of a third embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure;

Fig.6 is a schematic view of a fourth embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure;

Fig.7 is a schematic view of a fifth embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure;

Fig.8 is a schematic view of a sixth embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure; and

Fig.9 is a schematic view of a seventh embodiment of the absorbent article according to the present disclosure after unfolding, showing partial sectional structure.

DETAILED DESCRIPTION OF THE INVENTION

The implementation and use of the embodiments are discussed in detail below. However, it should be understood that the discussed embodiments of the present disclosure are only illustrative of the specific embodiments of the present disclosure and are not intended to limit the scope of the disclosure. In the description, the orientation representations of the structural positions of various components, such as up, down, top, bottom, etc., are not absolute, but rather relative. These orientation representations are appropriate when the various components are arranged as shown in the figures, but change accordingly when the positions of the various components in the drawings change.

As used herein, “front” refers to a side facing the abdomen of the human body, and “rear” refers to a side facing the back of the human body. “Lateral direction” refers to a direction along the waistline of the human body, and “longitudinal direction” refers to a direction along the length of the human body, more specifically, a direction from one of the abdomen and the back to the other through the crotch. “Inside” refers to the skin side that is close to the human body, and “outside” refers to the opposite side that is far away from the human body. “Side” refers to an edge that extends in the longitudinal direction, and “end” refers to an edge that extends in the lateral direction.

As used herein, “disposable absorbent articles” include, but are not limited to, pant-type sanitary napkins, panty-type closed diapers, defecation training pants or incontinence patient panties. Each type of absorbent article includes a front waistline region that primarily fits the abdomen of the human body, a rear waistline region that primarily fits the back of the human body, and a crotch region between the two regions, wherein two sides of the front waistline region and two sides of the rear waist region are respectively connected to form a waistline opening, and two sides of the crotch region extend to the front waistline region and the rear waistline region and are connected to each other to form a pair of thigh openings. Further, in the crotch region, the absorbent article further includes an absorbent body disposed on the crotch region.

As used herein, “liquid permeable surface layer” refers to a nonwoven fabric having hot melt fibers with surface hydrophilic treatment and permeability to liquid, comprising a liquid permeable surface layer and a liquid permeable guide layer. “Liquid-impermeable bottom layer” refers to a breathable film layer, a cast film layer or a composite base film layer of a breathable film layer and a nonwoven fabric which is applied to an absorbent article to block the outward penetration of a liquid.

In the disposable absorbent article, in order to improve the compactness to the surface of the human body, an appropriate portion such as a thigh circumference or a waistline circumference is generally imparted with extensibility. As a method of imparting waistline extensibility, the following three methods can be employed:

1. A method of horizontally arranging and fixing a plurality of elongated elastic extensible members such as rubber bands in a state of extending in the lateral direction.
2. A method of placing the elastic film in a region extending in the lateral direction and

fixing it.

3. A method of placing the elastic nonwoven fabric in a region extending in the lateral direction and fixing it.

All of the above methods can better impart waistline extensibility. However, the first method uses the rubber band, thus the extensibility is unevenly distributed in the waistline region; and the rubber band is tight at the time of use, and the body feels uncomfortable. The second method and the third method also cannot provide extensibility in the entire waistline region, but provide extensibility in a partial region such as only two sides of the waistline region or the front and rear waistline regions, thus the extensibility on the entire waistline is not uniform.

In order to further improve the use comfort of the absorbent article, the present disclosure advantageously provides at least one extensible region in the front waistline region and/or the rear waistline region, and the extensible region is configured as a multilayer composite structure which is elastically extensible in at least the lateral direction. The multilayer composite structure comprises at least one high molecular polymer elastic film compounded with at least one nonwoven fabric layer, and at least one layer in the multilayer composite structure is provided with a plurality of air-through holes. Therefore, the multi-directional functions such as uniform waistline elasticity, comfortable compactness, size adjustment, dry and breathability are realized through the extensible region and the air-through holes. However, it should be understood that the deformation and extension of the extensible region in other directions (e.g., in longitudinal direction or oblique orientation) is not excluded.

The high molecular polymer elastic film may be any conventional one-component or multi-component high molecular polymer such as, but not limited to, polyethylene, polypropylene, polycarbonate, polyvinylchloride, polystyrene, polyurethane, and combinations thereof.

As an example, a plurality of extensible regions can be arranged in a circular, rectangular or polygonal form on the front waistline region and/or the rear waistline region.

In various embodiments, the extensible region can also be integrally formed with the front waistline region and/or the rear waistline region.

In some embodiments, the multilayer composite structure of the extensible region is

disposed across the whole of the front waistline region and the rear waistline region along the lateral direction, and comprises a first (outer) nonwoven fabric layer and a second (inner) nonwoven fabric layer, and a high molecular polymer elastic film disposed between the two layers. Alternatively, the multilayer composite structure may also be composed of a nonwoven fabric layer and a high molecular polymer elastic film, and the nonwoven fabric layer or the high molecular polymer elastic film constitutes a skin side close to the human body. The nonwoven fabric layer is a single-component or multi-component single-layer or multi-layer composite structure, and has a fineness of 0.1 to 7 dtex and a basis weight of 5 to 60 gsm, preferably 10 gsm to 25 gsm. The high molecular polymer elastic film has an elastomer content of 5% to 100%, a fineness of 20 to 1240 dtex, and a basis weight of 20 to 200 gsm. Further, the composite process of the high molecular polymer elastic film and the nonwoven fabric layer includes, but is not limited to, adhesive bonding, ultrasonic welding, hot melt pressing, mechanical connecting, or a combination thereof.

In some embodiments, the extension ratio of the extensible region is preferably 1.2 to 8, more preferably 1.5 to 4. The extension ratio refers to a ratio of the lateral width of the extensible region in the ultimate extended state to the lateral width in the non-extended state. Alternatively, the extensible region is configured with an extension ratio continuously increasing from the crotch region to the waistline opening, and by continuously changing in the extending direction, the change of the contraction amount becomes continuous, satisfying the requirement that the waistline opening region has stronger contraction than the crotch region.

In some embodiments, it is also conceivable to provide an elastomer or a belt-like extensible nonwoven fabric in the waistline opening region without changing the extension ratio of the extensible region, so as to meet the requirement for an increase in the elasticity of the waistline opening.

As described above, the absorbent article of the present disclosure simultaneously has good breathability which encompasses the breathability of the front waistline region and/or the rear waistline region itself, as well as the breathability of the extensible region. For the extensible region, a plurality of air-through holes may be formed in at least one layer of the multilayer composite structure, and the air-through holes may be small holes visible to the naked eyes or micro holes not visible to the naked eyes. The air-through holes may be

uniformly arranged only in the high molecular polymer elastic film or on both the high molecular polymer elastic film and the nonwoven fabric layer. Alternatively, the air-through holes are arranged in a straight line, a broken line or a wavy line on the extensible region. The high molecular polymer elastic film is compounded with at least one nonwoven fabric layer by ultrasonic welding. In the compounding process, the ultrasonic welding device is in vibration contact with the welding bump on the bottom roller at a high frequency (for example, 20k Hz) high speed, and the heat is generated by friction to cause the high molecular polymer elastic film to be fusion-bonded to at least one nonwoven fabric layer, and the welding bump on the bottom roller corresponds to the pattern shape (for example, a wave shape) of the air-through holes, and the air-through holes are formed at the ultrasonic welding points.

In some embodiments, the air-through holes only penetrate through the high molecular polymer elastic film without penetrating through the nonwoven fabric layer. In other embodiments, the air-through holes penetrate through various layers of the multilayer composite structure.

Alternatively, the air-through holes uniformly arranged in the extensible region or the multilayer composite structure have a single hole area of 0.05 to 20 mm², preferably 0.1 to 4 mm², more preferably 0.2 to 1 mm², and still more preferably 0.3 to 0.5 mm². The number of the air-through holes per square meter of the extensible region or the multilayer composite structure in the extended state, that is, the number of bumps per square meter on the ultrasonic welding bottom roller, is 1000 to 150,000, preferably 10,000 to 130,000, more preferably 60,000 to 120,000, and still more preferably 95,000 to 110,000. The porosity is no less than 0.5%, preferably 1% to 25%, more preferably 2% to 10%, still more preferably 3% to 5%, and still more preferably 3.5% to 4.5%. The above-mentioned single hole area refers to the cross-sectional area of a single air-through hole in the high molecular polymer elastic film in the ultimate extended state of the multilayer composite structure. Porosity refers to the ratio of the total cross-sectional area of all air-through holes in the ultimate extended state of the multilayer composite structure to the total area of the multilayer composite structure.

In some embodiments, the porosity of the air-through holes uniformly disposed in the extensible region or the multilayer composite structure is 0.5% to 1%. In other embodiments, the porosity of the air-through holes uniformly disposed in the extensible region or the multilayer composite structure is 1% to 2%. In still other embodiments, the porosity of the air-

through holes uniformly disposed in the extensible region or the multilayer composite structure is 2% to 3%. In still other embodiments, the porosity of the air-through holes uniformly disposed in the extensible region or the multilayer composite structure is 5% to 8%.

In one embodiment, the air-through holes of the extensible region or the multilayer composite structure has a diameter of about 0.7 mm, a single hole area of about 0.385 mm², and a number of air-through holes per square meter of about 103,400.

In some embodiments, the air-through holes in the extensible multilayer composite structure are not uniformly distributed, that is, there are regions where the air-through holes are dense and regions where the air-through holes are sparse. In other embodiments, the air-through holes are only distributed in a portion of the region of the extensible multilayer composite structure.

It should be understood that the parameter limits such as the single hole area, the porosity, the elastomer content, the basis weight, the extension ratio, and the fineness can be appropriately changed according to actual needs, and are generally within the above range. Further, the above elastomer may be any one of various known elastic members such as rubber band, lycra silk, spandex or the like.

The technical solutions of the optional embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawing.

Figs.1-3 illustrate a first embodiment of an absorbent article according to the present disclosure. In this embodiment, the absorbent article is a pant type sanitary napkin 1, comprising a front waistline region 11, a rear waistline region 12 and a crotch region 13 between the front waistline region 11 and the rear waistline region 12, wherein two sides of the front waistline region 11 are respectively connected to two sides of the rear waistline region 12 to form a waistline opening 14. For example, a lateral side 111 of the front waistline region 11 is connected to a lateral side 121 of the rear waistline region 12 by ultrasonic welding or hot roll bonding and any other suitable means. Alternatively, after the absorbent article is used, it can be quickly removed by disconnecting the lateral sides. Additionally, two sides of the crotch region 113 extend to the front waistline region 11 and the rear waistline region 12 and connected to each other to form a pair of thigh openings 15. For example, in this embodiment, the crotch region 13 has a front connecting portion 131 and a rear connecting portion 132 at two ends. The front connecting portion 131 is connected to the skin

side of the front waistline region 11 for example by an adhesive, and the rear connecting portion 132 is connected to the skin side of the rear waistline region 12 for example by an adhesive.

Fig.2 illustrates a structure view of the pant type sanitary napkin of the present embodiment after unfolding. As shown in the drawing, the front waistline region 11, the crotch region 13 and the rear waistline region 12 after unfolding have a I-shaped structure. The front waistline region 11, the crotch region 13 and the rear waistline region 12 are three generally dependent members, and are connected together in the manufacturing process. A multilayer composite structure is disposed across the whole of the front waistline region 11 and the rear waistline region 12 along the lateral direction, and comprises a first nonwoven fabric layer 161, a second nonwoven fabric layer 162 and an elastic film 163 compounded between the first nonwoven fabric layer 161 and the second nonwoven fabric layer 162, as shown in Fig.3. In a preferable embodiment, a plurality of air-through holes penetrate through the multi-layer composite structure. The crotch region 13 is illustrated to have a rectangular sheet shape, and comprises a liquid permeable surface layer 133 at the skin side and a liquid impermeable bottom layer 134 at the outer side. An absorbent body 17 is arranged in the crotch region 13. In this embodiment, the absorbent body 17 has an absorbent core 171 arranged between the liquid permeable surface layer 133 and the liquid impermeable bottom layer 134. The absorbent core 171 may be superabsorbent fiber material which can be glued with the liquid permeable surface layer 133 and the liquid impermeable bottom layer 134 of the crotch region 13, or be configured to be absorbent material covered between a core liquid permeable cover layer and a core liquid impermeable bottom layer. The side edges of the core liquid permeable cover layer and the core liquid impermeable bottom layer are connected to each other and also connected to the liquid permeable surface layer 133 and the liquid impermeable bottom layer 134 of the crotch region 13.

In this embodiment, it can be seen from Fig.2 that the elastic film 163 does not extend to the ends of the front waistline region and the rear waistline region, and the ends of the front waistline region and the rear waistline region comprise at least one elastomer 18 such as an elastic rubber band compounded between the first nonwoven fabric layer 161 and the second nonwoven fabric layer 162 and extending along the lateral direction. The first and second nonwoven fabric layers have a single-component single-layer structure with a fineness of

0.1~7dtex and a basic weight of 10~60gsm. The elastic film 163 has an elastomer content of 5% to 100%, a fineness of 20 to 1240 dtex, and a basic weight of 20 to 200 gsm. The extensible region can be elastically extensible by 1.5 to 8 times in the waistline direction, and is wrinkled in a natural state, so that when being worn, the front waistline region 11 and the rear waistline region 12 have uniform elastic extensibility on the entire surface, and can be extended and adjusted along at least the lateral direction and the longitudinal direction, and are naturally contracted after being worn, so that the pant body fits the human skin without a tightening feeling.

It should be understood that the elastomer 18 disposed at the ends of the front waistline region and the rear waistline region enables the waistline opening to have an increased extension ratio to meet the user's requirement for a snug compactness. Meanwhile, in order to improve the comfort of the pant type sanitary napkin, the thigh openings may also be provided with an elastic contraction structure (not shown). For example, the thigh openings may be preferably provided with at least one elastic rubber band elongated in the longitudinal direction and arranged side by side in the lateral direction. During preparation, the elastic rubber band is extended according to a certain extension ratio, and is adhered to the opening edges of the waistline opening and the thigh openings by hot melt bonding according to a predetermined arc and length, and the extended elastic rubber band is restored to the natural state after formation so that the waistline opening and the thigh openings are contracted to form a wrinkle portion, thereby preventing a body fluid leakage during use.

It should also be understood that when preparing, the elastic film 163 is extended at a preset extension ratio and placed in an elastic recovery range; then, two nonwoven fabric layer 161, 162 having the same size as the elastic film 163, are respectively attached to two sides of the elastic film 163, and are compounded by a discontinuous or continuous compounding manner. After the completion of the compounding, in the non-extended state, the nonwoven fabric layers 161, 162 are elastically deformed to form wrinkles with the elastic film 163. The discontinuous or continuous compounding manner may be hot rolling, chemical bonding or ultrasonic welding. Finally, physical perforation is performed on the front waistline region 11 and the rear waistline region 12, and preferably, the diameters of both sides of the nonwoven fabric layer and the elastic film 163 are kept uniform.

In a preferred embodiment, the nonwoven fabric layers 161, 162 and the elastic film 163

are compounded together using an ultrasonic welding process to form a multilayer composite structure. Air-through holes penetrating through the three-layer structure of the nonwoven fabric layer 161, the elastic film 163, and the nonwoven fabric layer 162 are formed at almost every ultrasonic welding point. By using ultrasonic welding compounding process, the extensible composite structure does not need to add glue, which reduces the risk to the health of the user due to flow of glue caused by the sweat immersion in the user's waist. The dense air-through holes formed in most or even the entire area of the waistline region greatly improve the permeability of the waistline region, reduce the possibility of the sweat immersion in the user's waistline, and improve user comfort and further reduce the possible risk to the health of the user.

Alternatively, the air-through holes uniformly arranged in the multilayer composite structure have a single hole area of 0.05 to 20 mm², preferably 0.1 to 4 mm², more preferably 0.2 to 1 mm², and still more preferably 0.3 to 0.5 mm². The number of the air-through holes per square meter in the ultimate extended state of the multilayer composite structure, that is, the number of bumps per square meter on the ultrasonic welding bottom roller, is 1000 to 150,000, preferably 10,000 to 130,000, more preferably 60,000 to 120,000, still more preferably 95,000 to 110,000. The porosity is no less than 0.5%, preferably 1% to 25%, more preferably 2% to 10%, still more preferably 3% to 5%, still more preferably 3.5% to 4.5%.

Fig.4 illustrates a second embodiment according to the present disclosure. In this embodiment, a pant type sanitary napkin 2 comprises a front waistline region 21 and a rear waistline region 22. An absorbent core 271 of an absorbent body 27 is arranged between a liquid permeable surface layer 233 and a liquid impermeable bottom layer 234 of the crotch region. As compared with the above embodiment, the difference is that a lateral side 221 of the rear waistline region 22 is connected with a strip fastener 222, and accordingly, a lateral side 211 of the front waistline region 21 is provided with a connecting portion for cooperating and connecting with the strip fastener 222. When being worn, the strip fastener 222 may be connected with the connecting portion, without connecting the lateral side 211 of the front waistline region 21 and the lateral side 221 of the rear waistline region 22. The connection between the strip fastener 222 and the connecting portion may be gluing or snap compactness connection, thereby obtaining a quick and easy wearing and removing. It should be understood that the strip fastener may also be arranged in the front waistline region.

Fig.5 illustrates a third embodiment according to the present disclosure. In a pant-type sanitary napkin 3 of this embodiment, two sides of a crotch region 33 with an absorbent body 17 thereon extend to a front waistline region 31 and a rear waistline region 32 and formed in one piece. An elastic film 363 is compounded between a first nonwoven fabric layer 361 and a second nonwoven fabric layer 362 and comprises at least one elastomer 38 arranged at the ends of the front waistline region and the rear waistline region. The first nonwoven fabric layer 361 is a whole piece extending in the front waistline region 31, the rear waistline region 32 and the crotch region 33. The elastic film 363 and the second nonwoven fabric layer 362 extend in the front waistline region 31 and the rear waistline region 32, as shown by the dotted lines in the drawing.

Alternatively, the nonwoven fabric layers 361 and 362 may be a multi-component multilayer composite structure having a fineness of 0.1 to 7 dtex and a basis weight of 5 to 60 gsm. Alternatively, the fabric of the elastic film 363 is a treated elastic microporous film material, and the air-through holes formed therein are invisible to the naked eye. Since the elastic film 363 is provided with a plurality of air-through holes, the elastic film 363 can be sequentially compounded with the other two nonwoven fabric layers 361 and 362 at the time of preparation, and it does not need to perform a physical perforation in the whole composite layer structure after the completion of the compounding.

Fig.6 illustrates a fourth embodiment similar to the embodiment shown in Fig.5. In this embodiment, a first nonwoven fabric layer 461 of a pant-type sanitary napkin 4 extends over a front waistline region 41, a rear waistline region 42 and a crotch region 43, and an elastic film 463 and a second nonwoven fabric layer 462 extend over the front waistline region 41 and the rear waistline region 42, and an absorbent body 47 covers the crotch region 43 and extends to the front waistline region 41 and the rear waistline region 42. Further, the first nonwoven fabric layer 461 extends beyond the elastic film 463 and the second nonwoven fabric layer 462, and is folded inwards at the ends of the front waistline region 41 and the rear waistline region 42 and covers the second nonwoven fabric layer 462. Alternatively, the inwardly folded portion 464 of the first nonwoven fabric layer 461 substantially covers at least one elastomer 48 disposed in the waistline opening.

Alternatively, in this embodiment, the porosity of the air-through holes in the multilayer composite structure formed by the first nonwoven fabric layer 461, the elastic film 463 and

the second nonwoven fabric layer 462 is 1% to 25%, preferably 2% to 10%, more preferably 3% to 5%, and still more preferably 3.5% to 4.5%.

Fig.7 illustrates a fifth embodiment similar to the embodiment shown in Fig.5. In this embodiment, a first nonwoven fabric layer 561 of a pant-type sanitary napkin 5 extends over a front waistline region 51, a rear waistline region 52 and a crotch region, and an elastic film 563 extends over the front waistline region 51 and the rear waistline region 52, and an absorbent body 57 covers the crotch region and extends to the front waistline region 51 and the rear waistline region 52. In this embodiment, a second nonwoven fabric layer 562 extending over the rear waistline region 52 extends to a portion of the crotch region, and, in addition to the elastomer 58 disposed in the waistline opening, at least one elastomer 59 curvedly extending in the lateral direction is compounded between the first nonwoven fabric layer 561 and the second nonwoven fabric layer 562 at a position without elastic film. Thereby, the compactness and comfort of the crotch region is particularly enhanced.

Fig.8 illustrates a sixth embodiment similar to the embodiment shown in Fig.5. In this embodiment, a first nonwoven fabric layer 661 of a pant-type sanitary napkin 6 extends over a front waistline region 61 and a rear waistline region 62 and a crotch region, and an elastic film 663 extends over the front waistline region 61 and the rear waistline region 62, and an absorbent body 67 covers the crotch region and extends to the front waistline region 61 and the rear waistline region 62. In this embodiment, two sides of an absorbent body 67 are provided with a protective enclosure 674, the side edges of which are folded inwards and cover at least one elastomer (not shown) extending in the longitudinal direction to form a three-dimensional protective enclosure 675 so as to help avoiding a body fluid leakage when the user is in a position such as lying on the side. The protective enclosure 674 can be made from a skin-friendly nonwoven fabric layer material.

As can also be seen in Fig. 8, a protective sheet 676 may be provided at both ends of the absorbent body 67, preferably a sheet-like structure made of a high flexible nonwoven fabric material. The protective sheet 676 covers the end of the absorbent body 67 and is connected to the second nonwoven fabric layer 662 by hot roll bonding. In this way, it can avoid the ends of the absorbent body 67 and the side protective enclosure from directly contacting the human body when being worn, and thus the human skin is not scratched.

Fig.9 illustrates a seventh embodiment similar to the embodiment shown in Fig.5,

wherein an absorbent body 77 of a pant-type sanitary napkin 7 covers a crotch region 73 and extends to a front waistline region 71 and a rear waistline region 72, and at least one elastomer 78 is arranged in the front waistline region and the rear waistline region. In this embodiment, the lateral sides of the rear waistline region 72 are connected with a strip fastener 722. Accordingly, the lateral sides of the front waistline region 71 may be provided with a connecting portion for cooperating and connecting with the strip fastener 722, for example a tape or a buckle. It should be understood that the strip fastener may also be disposed on the front waistline region.

The technical contents and technical features of the present disclosure have been disclosed above, but it should be understood that under the creative idea of the present disclosure, those skilled in the art can make various changes and improvements to the above disclosed concepts, which are all belong to the protection scope of the present disclosure. The description of the above embodiments is illustrative and not restrictive, and the scope of the present disclosure is defined by the claims.

Claims

1. A disposable absorbent article comprising a front waistline region, a rear waistline region and a crotch region between the front waistline region and the rear waistline region, two sides of the front waistline region being respectively connected to two sides of the rear waistline region to form a waistline opening, and two sides of the crotch region respectively extending to the front waistline region and the rear waistline region to form a pair of thigh openings;

wherein the front waistline region and/or the rear waistline region are provided with at least one extensible region configured as a multilayer composite structure which is elastically extensible along at least a lateral direction; and

wherein the multilayer composite structure is disposed across the whole of the front waistline region and the rear waistline region along the lateral direction, and comprises a first nonwoven fabric layer, a second nonwoven fabric layer and a high molecular polymer elastic film compounded between the first nonwoven fabric layer and the second nonwoven fabric layer; and

wherein the first nonwoven fabric layer, the high molecular polymer elastic film and the second nonwoven fabric layer are compounded by ultrasonic welding, and a plurality of air-through holes penetrating through the multilayer composite structure are formed at the ultrasonic welding points.

2. A disposable absorbent article according to claim 1, wherein the air-through holes in the multilayer composite structure are arranged with a porosity of 1% to 25%.

3. A disposable absorbent article according to claim 2, wherein the air-through holes in the multilayer composite structure are arranged with a porosity of 2% to 10%.

4. A disposable absorbent article according to claim 3, wherein the air-through holes in the multilayer composite structure are arranged with a porosity of 3% to 5%.

5. A disposable absorbent article according to any one of claims 1 to 4, wherein the elastic

film does not extend to the ends of the front waistline region and the rear waistline region, and the ends of the front waistline region and the rear waistline region comprise at least one elastomer compounded between the first nonwoven fabric layer and the second nonwoven fabric layer and extending along the lateral direction.

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6. A disposable absorbent article according to claim 5, wherein the first nonwoven fabric layer extends over the front waistline region, the rear waistline region and the crotch region, while the elastic film and the second nonwoven fabric layer extend over the front waistline region and the rear waistline region.

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7. A disposable absorbent article according to claim 6, wherein the first nonwoven fabric layer extends beyond the elastic film and the second nonwoven fabric layer, and is folded inwards at the end of the waistline opening to cover the second nonwoven fabric layer.

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8. A disposable absorbent article according to claim 6, wherein the second nonwoven fabric layer extends from the rear waistline region to a portion of the crotch region, and at least one elastomer extending curvedly in the lateral direction is compounded between the first nonwoven fabric layer and the second nonwoven fabric layer at a position without the elastic film.

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9. A disposable absorbent article according to claim 6, wherein the extensible region is configured with an extension ratio increasing continuously from the crotch region to the waistline opening.

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10. A disposable absorbent article according to claim 6, wherein the extensible region is configured with an extension ratio of 1.2 to 8.

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11. A disposable absorbent article according to claim 6, wherein the extensible region comprises an elastomer content of 5% to 100%, a fineness of 20 to 1240 dtex and a basic weight of 20 to 200 gsm.

12. A disposable absorbent article according to claim 6, wherein the elastic film is compounded with at least one nonwoven fabric layer continuously or discontinuously.

13. A disposable absorbent article according to claim 6, wherein further comprising an absorbent body extending from the crotch region to the front waistline region and the rear waistline region; and wherein two sides of the absorbent body are provided with a protective enclosure, and two sides of the protective enclosure are folded inwards to cover at least one elastomer extending in a longitudinal direction to form a three-dimensional protective enclosure.

14. A disposable absorbent article according to claim 13, wherein two ends of the absorbent body in the longitudinal direction are covered with a protective sheet respectively.