METHOD OF MANUFACTURING AN ABSORPTIVE ARTICLE
HERSTELLUNGSVERFAHREN FÜR EINEN SAUGFÄHIGEN ARTIKEL
PROCÉDÉ DE FABRICATION D’ARTICLE ABSORBANT

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The present invention relates to a manufacturing method of an absorbent article, in which a web is folded in two in a direction perpendicular to a conveyance direction of the web.

1. Field of the Invention

The present invention relates to a manufacturing method of an absorbent article, in which a web is folded in two in a direction perpendicular to a conveyance direction of the web.

2. Description of the Related Art

Conventionally, in a manufacturing method of an absorbent article such as a disposable diaper, leg circumferential regions (for example, leg holes) are formed on a web on which individual members (for example, a gather, a waterproof sheet, an absorber, and a top sheet) are laminated. The web on which the leg circumferential regions are formed is folded in two at the center line in a direction (Crossing Direction(CD)) perpendicular to a conveyance direction (Machine Direction(MD)) of the web.

For example, in the folding process of folding the web in two, a first half region on one side divided by the center line in the CD is conveyed between multiple rollers which are arranged at predetermined spacing in the conveyance direction of the web. At this time, a second half region on the other side divided by the center line in the CD is folded by guide means towards the first half region using a folding center bar as a reference (for example, see US-2005181921 and US-2008026925).

However, the above-described manufacturing method of an absorbent article has the following problem. That is, the first half region is conveyed with being partially supported by the multiple rollers which are arranged at predetermined spacing. Therefore, the first half region is suspended in the air at portions between the multiple rollers.

At this time, the crotch region of the web on which a waterproof sheet and an absorber are laminated comes into contact with the guide means or the folding center bar, and therefore conveyance of a crotch region gets behind conveyance of a waistline region. Accordingly, the second half region is sometimes folded towards the first half region with the crotch region being twisted. This damages the appearance of the absorbent article or generates a manufacturing failure of the absorbent article in processes after the folding process.

Furthermore, if the second half region is folded towards the first half region with the crotch region being twisted, the twist affects a portion including the waistline regions and the crotch region in both of the first half region and the second half region. Accordingly, a distortion and a deformation entirely spread over the absorbent article. In particular, the twist affects greatly in the absorbent article having a stretching property. Thus, there is room for improvements.

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To solve the above-described problem, an embodiment of the present invention may have the following aspects. An aspect of an embodiment of the present invention may provide a manufacturing method of an absorbent article on a conveyance device (for example, first to fourth conveyance rollers R1 to R4), including the steps of: a leg circumference forming process of forming a leg circumferential region (leg circumferential region 1 D) on a web (web 10) which is continuously fed in a conveyance direction (MD), and a folding process of folding the web in two after the leg circumference forming process, so that a second web half region (second half region 12) on one side divided by a center line (center line CL) in a direction (CD) perpendicular to a conveyance direction of the web comes closer to or overlaps a first half region (first half region 11) on the other side, wherein in the folding process, the first half region is conveyed on a conveyance belt (conveyance belt 122) and the second half region is folded towards the first half region by guide means comprising a plurality of guide rollers that guides the second half region.

Preferably, in the folding process, the first half region is retained in contact with the conveyance belt.

More preferably, substantially the entire width of the first half region is retained in contact with the conveyance belt, with the center line lying over the conveyance belt.

By substantially the entire width, a region between a vicinity of the center line and the opposed edge of the first half region is meant.

The first half region may be conveyed in a state of being sucked on the conveyance belt.

A folding center bar may be provided that coincides with the centerline, such that the web may be folded about the folding center bar. Preferably, a surface of the conveyance belt, on which the first half region is conveyed, is planar, such that the first half region is conveyed in a planar state.

By planar state, it is meant that the first half region conveyed on the conveyance belt is flat, i.e. it lies in a single plane.

Preferably, the driving speed of the conveyance belt is the same as the conveyance speed of the web.

Preferably, in the folding process, an actuator aligns the web in a width direction.

Preferably, the manufacturing method further comprises: a connecting process of connecting the first half region and the second half region at a boundary re-
region between two adjacent absorbent articles on the web, after the folding process; and a cutting process of cutting the boundary region after the connecting process, where-in the web conveyed after the folding process is conveyed with being held between a pair of belts.

[0018] Preferably, between the folding process and the connecting process, the folding center bar, which divides the first half region and the second half region, is positioned between the first half region and the second half region.

[0019] The absorbent article may be a disposable diaper with a waistline member, the web may include a waistline region corresponding to the waistline member and a crotch region positioned between one side of the waistline region and the other side of the waistline region, the leg circumference region may be provided on both sides of the crotch region, the waistline region may have a stretching property in a conveyance direction of the web, and the crotch region may have a stretching property in a direction crossing the conveyance direction of the web.

[0020] The present invention can provide a manufacturing method of an absorbent article, which can prevent a manufacturing failure of an absorbent article.

[0021] Advantageous effects afforded by the features described above are discussed generally in the section of the description entitled (3) Operation and Effects.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Fig. 1 is a schematic view showing a manufacturing method of an absorbent article 1 according to an exemplary embodiment of the present embodiment. Fig. 2 is a view showing a web 10 (absorbent article 1) according to an exemplary embodiment of the present embodiment. Fig. 3 is a side view showing a folding device 100 according to an exemplary embodiment of the present embodiment. Fig. 4 is a perspective view showing the folding device 100 according to an exemplary embodiment of the present embodiment. Fig. 5 is a view seen from the direction of an arrow (a view seen from the direction of the arrow A in Fig. 4) showing the folding device 100 according to an exemplary embodiment of the present embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] An exemplary embodiment of the present invention will be described below by referring to the drawings. Specifically, the description will be given of: (1) Manufacturing Method of Absorbent Article; (2) Configuration of Folding Device; (3) Operation and Effects; and (4) Other Embodiments.

[0024] In the following description of the drawings, same or similar reference symbols are given to denote same or similar portions. However, it should be noted that the drawings are schematic and ratios of dimensions and the like are different from actual ones.

[0025] Therefore, specific dimensions and the like should be determined by taking into consideration the following description. Moreover, as a matter of course, also among the drawings, there are included portions in which dimensional relationships and ratios are different from each other.

(1) Manufacturing Method of Absorbent Article

[0026] Firstly, the manufacturing method of an absorbent article 1 according to the present embodiment will be described by referring to Figs. 1 and 2. Fig. 1 is a schematic view showing the manufacturing method of an absorbent article 1 according to the present embodiment. Fig. 2 is a view showing a web 10 (the absorbent article 1) according to the present embodiment. Note that the absorbent article 1 according to the present embodiment is a disposable diaper with waistline members, however, the present invention is applicable to the manufacture of alternative absorbent articles, as will be readily appreciated by those skilled in the art.

[0027] As shown in Fig. 1, the manufacturing method of the absorbent article 1 may include a leg circumference forming process, a folding process, a connecting process, and a cutting process. However, in alternative embodiments one or more of the connecting process and the cutting process may be omitted.

(1-1) Member Mounting Process

[0028] To form the web used in the manufacturing process of the present embodiment a member mounting process may be used. In such a member mounting process, individual members are mounted on the web 10 (for example, a continuum of an outer sheet). The individual members may include, for example, as shown in Fig. 2(a), gathers (a fit gather 20 and a leg gather 30), a waterproof sheet 40, an absorber 50, and a top sheet 60. It will be readily appreciated by the skilled person that the individual members selected and the combination of such members will depend upon the absorbent article to be produced. For example, if the waterproof sheet 30 and topsheet 50 have stretching properties, the gathers may be omitted. Alternatively, the web may be provided with additional members to suit alternative absorbent article designs.

[0029] Here, as shown in Figs. 2(a) to Fig. 2(c), the web 10 includes waistline regions 1A and 1B corresponding to waistline members (waistline portions) of the absorbent article 1, a crotch region 1C positioned between the waistline regions 1A and 1B, and leg circumferential regions 1D positioned on both sides of the crotch region 1C.

[0030] The waistline regions 1A and 1B have a stretching property in a conveyance direction (MD) of the web.
10. For example, the waistline regions 1A and 1B may have a stretching property in the MD by being provided with the fit gather 20 or may have a stretching property in the MD by forming the web 10 itself using a sheet having a stretching property.

[0031] The crotch region 1C has a stretching property in a direction (CD) perpendicular to the MD. For example, the crotch region 1C may have a stretching property in the CD by being provided with the leg gather 30 or may have a stretching property in the CD by forming the web 10 itself using a sheet having a stretching property.

(1-2) Leg Circumference Forming Process

[0032] In the leg circumference forming process, leg circumferential regions 1D (for example, leg holes) are formed in the web 10 on which the individual members are mounted by cut rollers 200.

(1-3) Folding Process

[0033] In the folding process, the web 10 on which the leg circumferential regions 1D are formed is folded in two by a folding device (see, Figs. 3 and 4) to be described later at the center line CL in the CD of the web 10. That is, the web is folded in two in such a way that a second half region 12 on one side divided by the center line CL would come closer to or overlap a first half region 11 on the other side thereof. With this, a side edge portion 12a of the second half region 12 may match a side edge portion 11a of the first half region 11 (see, Fig. 2(b)).

(1-4) Connecting Process

[0034] In the connecting process, boundary regions 10A (see, Fig. 2(b)) of individual absorbent articles 1 on the web 10 folded in two are connected by a connecting device 300. For example, the boundary regions 10A are connected by a supersonic method, a heat embossing method, or the like. Note that a folding center bar 130 to be described later may be used between the folding process and the connecting process.

(1-5) Cutting Process

[0035] In the cutting process, using a cutting device 400 with a cutting blade 401, one portion of the boundary regions 10A on the web 10 is cut in the CD to form an absorbent article 1 (see, Fig. 2(c)).

[0036] Here, the web 10 which is preferably conveyed after the folding process is conveyed between a first sandwich belt 501 and a second sandwich belt 502 (see, Figs. 3 and 4) to be described later. For example, the web 10 may be conveyed by being sandwiched by the first sandwich belt 501 and the second sandwich belt 502 between the folding process and the connecting process and/or between the connecting process and the cutting process.

(2) Configuration of Folding Device

[0037] Next, the configuration of the folding device 100 according to the present embodiment will be described by referring to Figs. 3 to 5. Fig. 3 is a side view showing the folding device 100 according to the present embodiment. Fig. 4 is a perspective view showing the folding device 100 according to the present embodiment. Fig. 5 is a view seen from the direction of an arrow (a view seen from the direction of the arrow A in Fig. 4) showing the folding device 100 according to the present embodiment.

[0038] As shown in Figs. 3 and 4, the folding device 100 may be provided between the cut rollers 200 forming the above-described leg circumferential regions 1D and the sandwich belt conveyor 500 sandwiching the web 10 conveyed after the folding process.

[0039] Note that the web 10 may be fed to the pair of the cut rollers 200 through a first conveyance roller R1. The web 10 may be fed to the folding device 100 through a second conveyance roller R2, a third conveyance roller R3, a fourth conveyance roller R4, and a fifth conveyance roller R5. Note that the first to fourth conveyance rollers R1 to R4 may be arranged to respectively rotate around shafts thereof.

[0040] The folding device 100 with the guide means 140 may include a large diameter roller 110, a conveyance belt conveyor 120, a folding center bar 130, position detecting means 150, and position control means 160. The present embodiment all of these elements are included, however, in alternative embodiments one or more of the large diameter roller 110, the folding center bar 130, the position detecting means 150 and the position control means 160 may be omitted.

[0041] The large diameter roller 110 is preferably provided between the fifth conveyance roller R5 and the guide means 140. The large diameter roller 110 conveys the first half region 11 of the web 10 between the large diameter roller 110 and a conveyance belt conveyor 120 to be described later. The large diameter roller 110 maintains the first half region 11 in a substantially horizontal state. The large diameter roller 110 has a width exceeding half the width of the web 10 which is folded in two. Note that the large diameter roller 110 rotates around a shaft thereof.

[0042] The conveyance belt conveyor 120 may be provided between the large diameter roller 110 and the sandwich belt conveyor 500. The conveyance belt conveyor 120 conveys the first half region 11 in a substantially horizontal state in relation to a supporting surface 101 of the folding device 100.

[0043] The conveyance belt conveyor 120 may be formed of the conveyance belt 122 winding around the multiple rollers 121, driving means (unillustrated) causing the conveyance belt 122 to wind around the multiple rollers 121, and suction means 123 sucking in outer air.

[0044] The conveyance belt 122 drives in a substantially horizontal state in relation to the supporting surface 101 of the folding device 100. It is preferable that a driving speed v1 of the conveyance belt 122 be the same as a
conveyance speed $v_2$ of the web 10. In the conveyance belt 122, multiple suction holes 124 sucking in the first half region 11 (see, Figs. 4 and 5) are formed. That is, with the suction of the suction means 123 through the suction holes 124, the first half region 11 is conveyed on the conveyance belt 122 while being sucked. The suction force retains the first half region 11 in contact with the surface of the conveyance belt. The first half region is thus maintained parallel to the supporting surface 101, i.e. substantially horizontal.

The folding center bar 130 may be provided in at least a position between a vicinity of the fifth conveyance roller R5 and the above-described connecting device 300 (see, Fig. 1) by way of a side of the sandwich belt conveyor 500. The folding center bar 130 divides the first half region 11 and the second half region 12 and is positioned between the first half region 11 and the second half region 12 (that is, in the center line CL in the CD of the web 10).

The folding center bar 130 extends in the MD and is preferably provided substantially parallel to the conveyance belt 122. Also, the folding center bar 130 is preferably positioned on the conveyance belt 122 (see, Figs. 4 & 5). Most preferably, the folding center bar lies above the conveyance belt and coincides with the center line. The folding center bar may act as a folding guide about which the web is folded and lie between the first and second half regions when they are folded.

The guide means 140 is preferably provided between the fifth conveyance roller R5 and the sandwich belt conveyor 500. The guide means 140 preferably guides the second half region 12 in a way that the side edge portion 12a of the second half region 12 is flush with the side edge portion 11a of the first half region 11.

The guide means 140 may be formed of one pair of first guide rollers 141, one pair of second guide rollers 142, a third guide roller 143, one pair of fourth guide rollers 144, and a fifth guide roller 145.

The first guide rollers 141 raise the second half region 12 through the folding center bar 130. As shown in Fig. 5, from the first guide rollers 141 to the fifth guide roller 145, an inclination angle $\alpha$ (a folding angle of the crotch region 1C) of the second half region 12 in relation to the first half region 11 becomes gradually smaller. Note that the first to fifth guide rollers 141 to 145 preferably respectively rotate around shafts thereof.

The position detecting means 150 may be provided between the fifth guide roller 145 and the sandwich belt conveyor 500. The position detecting means 150 detects a position where the side edge portion 11 a of the first half region 11 and the side edge portion 12a of the second half region 12 are conveyed.

The position detecting means 150 may be formed of a first sensor 151 which detects a position where the side edge portion 11a of the first half region 11 is conveyed and a second sensor 152 which detects a position where the side edge portion 12a of the second half region 12 is conveyed. The first sensor 151 and the second sensor 152 may supply to the position control means 160 positional data showing detected positions where the both side edge portions 11a and 12a are being conveyed.

The position control means 160 may be provided between the fifth guide roller 145 and the sandwich belt conveyor 500. The position control means 160 aligns the web 10 in the width direction (CD). The position control means 160 is preferably formed of an oscillating roller 170 and an actuator 180.

The oscillating roller 170 changes the position of the web 10 in the width direction (CD). Specifically, the oscillating roller 170 rotates in response to the actuator 180 to be described later so as to change the positions where the side edge portion 11a of the first half region 11 and the side edge portion 12a of the second half region 12 are conveyed.

The oscillating roller 170 may be formed of a first oscillating roller 171 and a second oscillating roller 172. The first oscillating roller 171 changes the position where the side edge portion 11a of the first half region 11 is conveyed by coming into contact with the first half region 11, and the second oscillating roller 172 changes the position where the side edge portion 12a of the second half region 12 is conveyed by coming into contact with the second half region 12.

The actuator 180 rotates the oscillating roller 170. The actuator 180 may be formed of a first actuator 181 which rotates the first oscillating roller 171 and a second actuator 182 which rotates the second oscillating roller 172.

The first actuator 181 has data (first scheduled data) previously inputted therein which shows a schedule of the side edge portion 11a of the first half region 11 that is to pass the first sensor 151. The first actuator 181 compares the positional data supplied from the first sensor 151 and the first scheduled data, and rotates the first oscillating roller 171 in order to match the both side edge portions 11a and 12a of the web 10 which is folded in two.

Similarly, the second actuator 182 has data (second scheduled data) previously inputted therein which shows a schedule of the side edge portion 12a of the second half region 12 that is to pass the second sensor 152. The second actuator 182 compares the positional data supplied from the second sensor 152 and the second scheduled data, and rotates the second oscillating roller 172 in order to match the both side edge portions 11a and 12a of the web 10 which is folded in two.

The web 10 which passes the folding device 100 to be folded in two is preferably conveyed to the sandwich belt conveyor 500. The sandwich belt conveyor 500 at least includes a first sandwich belt 501 winding around multiple rollers R10, a second sandwich belt winding around multiple rollers R20, and driving means (unillustrated) which causes the first sandwich belt 501 and the second sandwich belt 502 to respectively wind around the multiple rollers R10 and around the multiple rollers R20. The two-folded web 10 is sandwiched by the
first sandwich belt 501 and the second sandwich belt 502.

(3) Operation and Effects

[0059] In general, in prior art arrangements, a non-continuous of the absorbent article 1 or the like is divided in the conveyance direction, and thus is conveyed by a belt. On the other hand, in alternative prior art arrangements, a continuum of the web 10 or the like is not conveyed by a belt before being cut in the cutting process.

[0060] For example, when a continuum is conveyed by a belt, the continuum may sag or be pulled in the conveyance direction unless a conveyance speed of the continuum matches a driving speed of the belt. Moreover, installation of a belt conveyor is required, which results in an increase of a cost. For this reason, the use of the belt for conveying a continuum causes unnecessary worry.

[0061] Meanwhile, the web 10 (the first half region 11 and the second half region 12) is formed of a soft material. That is, the waistline regions 1A and 1B have a stretching property in the MD and the crotch region 1C has a stretching property in the CD. The crotch region 1C generally has higher rigidity than that of the waistline regions 1A and 1B if it is provided with the waterproof sheet 40 and the absorber 50.

[0062] Conventionally, it has been said that the web 10 having a stretching property is difficult to be conveyed. In particular, it has been said that the second half region 12 is difficult to fold to the first half region 11 in the folding process. As described in the background of the invention, the first half region having a stretching property is conveyed with being partially supported by the multiple rollers provided at predetermined spacing, and is suspended in the air in portions between the multiple rollers.

[0063] At this time, the crotch region 1C of the web 10 on which the waterproof sheet 40 and the absorber 50 are laminated comes in contact with the guide means 140 that guides the second half region 12. Accordingly, there is a case where the second half region 12 is folded towards the first half region 11 with the crotch region 1C being twisted. This results in disfigurement of the absorbent article 1 or a manufacturing failure of the absorbent article 1 in the folding process can prevent the conveyance of the second half region 12 falling behind the conveyance of the first half region 11.

[0064] Furthermore, if the second half region 12 is folded towards the first half region 11 with the crotch region 1C being twisted, the twist affects portions from the waistline regions 1A and 1B to the crotch region 1C. Accordingly, a distortion and a deformation entirely spread over the absorbent article. In particular, the twist affects greatly on the absorbent article having a stretching property.

[0065] In addition, in the conventional art, the web is suspended in the air between the multiple rollers. For this reason, the first half region 11 easily sags and thus is not conveyed stably. In particular, it is also difficult to match the side edge portion 12a of the second half region 12 and the side edge portion 11a of the first half region 11, since the second half region 12 is being folded while the first half region 11 is conveyed with being suspended in the air.

[0066] In contrast, in the present embodiment, in the folding process, the first half region 11 is conveyed on the conveyance belt 122 and the second half region 12 is folded towards the first half region 11 by the guide means 140 that guides the second half region 12.

[0067] Accordingly, the first half region 11 including the crotch region 1C, which may have higher rigidity than those of the waistline regions 1A and 1B, is conveyed on the conveyance belt 122. Therefore, even when the crotch region 1C of the web 10, which may comprise the waterproof sheet 40 and the absorber 50, comes in contact with the folding center bar 130 or the guide means 140, the present embodiment can prevent the conveyance of the second half region 12 falling behind the conveyance of the first half region 11.

[0068] Accordingly, the present embodiment can reduce the case that the second half region 12 is folded towards the first half region 11 with the crotch region 1C being twisted. Moreover, significant disfigurement of the absorbent article 1 or a manufacturing failure of the absorbent article 1 in the folding process can be prevented.

[0069] In addition, the second half region 12 is folded based on the first half region 11 conveyed on the conveyance belt 122. At this time, the first half region 11 is continuously conveyed. Preferably, in a planar state. The first half region 11 is not suspended in the air and does not sag on the conveyance belt 122. For this reason, the first half region 11 can be stably conveyed on the conveyance belt 122 and the side edge portion 12a of the second half region 12 easily matches the side edge portion 11a of the first half region 11 (that is, folding accuracy is improved).

[0070] In particular, the first half region 11 may be conveyed in a state of being sucked on the conveyance belt 122. Accordingly, the first half region 11 is easily held substantially horizontally on the conveyance belt 122, and therefore the first half region 11 can be more stably conveyed. Moreover, the driving speed v₁ of the conveyance belt 122 may be the same as the conveyance speed v₂ of the web 10, so that the first half region 11 can be prevented from sagging or being pulled in the conveyance direction.

[0071] Furthermore, a folding center bar 130 may be provided, positioned on the conveyance belt 122, so that the first half region 11 is sucked to a vicinity of the center line CL located between the first half region 11 and the second half region 12 on the conveyance belt 122. Accordingly, misalignment of the first half region 11 and the second half region 12 in the MD can be further prevented and the side edge portion 12a of the second half region 12 can more easily match the side edge portion 11a of the first half region 11.

[0072] In the present embodiment, in the folding process, the oscillating roller 170 may be rotated by the ac-
In the present embodiment, the web 10 being conveyed between the processes performed after the folding process (for example, between the folding process and the connecting process and between the connecting process and the cutting process) may be conveyed between the pair of the sandwich belts (the first sandwich belt 501 and the second sandwich belt 502). Accordingly, the web 10 can be conveyed with the side edge portion 11a of the first half region 11 and the side edge portion 12a of the second half region 12 matching each other. Thus, a manufacturing failure of the absorbent article 1 can be further suppressed.

(3) Other Embodiments

As described above, the content of the present invention has been disclosed by using an embodiment of the present invention. However, it should be understood that the present invention is not limited to the previously described embodiment.

The conveyance rollers are described to be the first to fifth conveyance rollers R1 to R5 and the guide rollers are described to be the first to fifth guide rollers 141 to 145. However, the configuration is not limited to this. For example, the number of the conveyance rollers and the guide means 140 may be, as a matter of course, any number.

The conveyance belt conveyor 120 is described to convey the first half region 11 horizontally in parallel to the supporting surface 101 of the folding device 100. However, the configuration is not limited to this. For example, the first half region 11 may be conveyed in an inclined state in relation to the supporting surface 101 of the folding device 100. In this case, the conveyance belt 122 is driven in an inclined state in relation to the supporting surface 101 of the folding device 100.

The conveyance belt conveyor 120 is described to include the suction means 123. However, the configuration is not limited to this, and any means may be employed other than the suction means 123 as long as the means can attach the web 10 onto the conveyance belt 122.

The actuator 180 is described to rotate the oscillating roller 170 so that the oscillating roller 170 aligns the web 10 in the width direction (CD). However, the configuration is not limited to this, and the actuator 180 may, for example, directly align the web 10 in the width direction (CD).

From this disclosure, various alternative embodiments, examples, and operational techniques will be apparent for a person skilled in the art. Accordingly, the technical scope of the present invention is defined only by the particular matters contained in the scope of claims which is appropriate from this disclosure.

Note that, Japanese Patent Application No. 2008-222490 (filed on August 29, 2008) may be useful for understanding the disclosure.

Industrial Applicability

As has been described above, the manufacturing method of an absorbent article according to the present invention is capable of preventing a manufacturing failure of an absorbent article. The manufacturing method is thus advantageous in an absorbent article such as a disposable diaper.

Claims

1. A manufacturing method of an absorbent article, comprising the steps of:

   - a leg circumference forming process (200) of forming a leg circumferential region on a web (10) which is continuously fed in a conveyance direction (MD), on a conveyance device; and
   - a folding process (100) of folding the web (10) in two after the leg circumference forming process, so that a second web half region (12) on one side of a center line (CL) in a direction perpendicular to the conveyance direction (MD) of the web (10) comes closer to or overlaps a first half region (11) on the other side of the center line (CL), wherein in the folding process, the first half region (11) is conveyed on a conveyance belt (122) and the second half region (12) is folded towards the first half region (11) by a guide means (140) comprising a plurality of guide rollers that guides the second half region (12).

2. The manufacturing method of an absorbent article according to claim 1, wherein in the folding process, the first half region (11) is retained in contact with the conveyance belt (122).

3. The manufacturing method of an absorbent article according to claim 2, wherein in the folding process, substantially the entire width of the first half region (11) is retained in contact with the conveyance belt (122) with the center line (CL) lying over the conveyance belt.

4. The manufacturing method of an absorbent article according to any preceding claim, wherein in the folding process, the first half region (11) is conveyed in a state of being sucked on the conveyance belt (122).

5. The manufacturing method of an absorbent article
according to any preceding claim, wherein a folding center bar (130) is provided that coincides with the centerline (CL), such that the web may be folded about the folding center bar (130).

6. The manufacturing method of an absorbent article according to any preceding claim, wherein a surface of the conveyance belt (122), which supports the first half region (11), is planar, such that the first half region is conveyed in a planar state.

7. The manufacturing method of an absorbent article according to any preceding claim, wherein the driving speed of the conveyance belt (122) is the same as the conveyance speed of the web (10).

8. The manufacturing method of an absorbent article according to any one of claims 1 or 2, wherein in the folding process, an actuator aligns the web in a width direction.

9. The manufacturing method of an absorbent article according to any one of claims 1 to 3, further comprising,

- a connecting process of connecting the first half region (11) and the second half region (12) at a boundary region between two adjacent absorbent articles on the web (10), after the folding process and
- a cutting process of cutting the boundary region after the connecting process, wherein the web conveyed after the folding process is conveyed with being held between a pair of belts.

10. The manufacturing method of an absorbent article according to any one of claims 1 to 4, wherein between the folding process and the connecting process, the folding center bar (130), dividing the first half region (11) and the second half region (12), is positioned between the first half region and the second half region.

11. The manufacturing method of an absorbent article according to any one of claims 1 to 5, wherein the absorbent article is a disposable diaper with a waistline member, the web includes a waistline region corresponding to the waistline member and a crotch region positioned between one side of the waistline region and the other side of the waistline region, the leg circumference region is provided on both sides of the crotch region, the waistline region has a stretching property in a conveyance direction of the web, and the crotch region has a stretching property in a direction crossing the conveyance direction of the web.

Patentansprüche

1. Ein Herstellungsverfahren für einen saugfähigen Artikel, das die folgenden Schritte beinhaltet:

- einen Beinumfangsbildungsprozess (200) zum Bilden einer Beinumfangsregion auf einer Bahn (10), die auf einer Fördereinrichtung kontinuierlich in einer Förderrichtung (MD) zugeführt wird;
- einen Faltprozess (100) zum Falten der Bahn (10) zur Hälfte nach dem Beinumfangsbildungsprozess, so dass eine zweite Bahnhalbregion (12) auf einer Seite einer Mittellinie (CL) in einer zu der Förderrichtung (MD) der Bahn (10) senkrechten Richtung sich einer ersten Halbregion (11) auf der anderen Seite der Mittellinie (CL) annähert oder sie überdeckt, wobei die erste Halbregion (11) im Faltprozess auf einem Förderband (122) befördert wird und die zweite Halbregion (12) durch ein Führungsmittel (140), das eine Vielzahl von Führungswalzen beinhaltet, die erste Halbregion (11) in dem Faltprozess in Kontakt mit dem Förderband (122) festgehalten wird.

2. Herstellungsverfahren für einen saugfähigen Artikel gemäß Anspruch 1, wobei die erste Halbregion (11) in dem Faltprozess in Kontakt mit dem Förderband (122) festgehalten wird.

3. Herstellungsverfahren für einen saugfähigen Artikel gemäß Anspruch 2, wobei im Wesentlichen die gesamte Breite der ersten Halbregion (11) in dem Faltprozess in Kontakt mit dem Förderband (122) festgehalten wird, wobei die Mittellinie (CL) über dem Förderband liegt.

4. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der vorhergehenden Ansprüche, wobei die erste Halbregion (11) im Faltprozess in einem an das Förderband (122) angesaugten Zustand befördert wird.

5. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der vorhergehenden Ansprüche, wobei eine Faltnitinstange (130) bereitgestellt wird, die mit der Mittellinie (CL) zusammenfällt, so dass die Bahn um die Faltnitinstange (130) gefaltet werden kann.

6. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der vorhergehenden Ansprüche, wobei eine Oberfläche des Förderbands (122), welche die erste Halbregion (11) stützt, planar ist, so dass
die erste Halbregion in einem planaren Zustand befördert wird.

7. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der vorhergehenden Ansprüche, wobei die Antriebsgeschwindigkeit des Förderbands (122) die gleiche wie die Fördergeschwindigkeit der Bahn (10) ist.

8. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der Ansprüche 1 oder 2, wobei ein Aktor in dem Faltprozess die Bahn in einer Breitenrichtung ausrichtet.

9. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der Ansprüche 1 bis 3, das ferner Folgendes beinhaltet:

   einen Verbindungsprozess zum Verbinden der ersten Halbregion (11) und der zweiten Halbregion (12) in einer Grenzregion zwischen zwei benachbarten saugfähigen Artikeln auf der Bahn (10) nach dem Faltprozess und einen Schneideprozess zum Schneiden der Grenzregion nach dem Verbindungsprozess, wobei die nach dem Faltprozess beförderte Bahn befördert wird, während sie zwischen einem Paar Bänder gehalten wird.

10. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der Ansprüche 1 bis 4, wobei die Faltmittenstange (130), welche die erste Halbregion (11) und die zweite Halbregion (12) teilt, zwischen dem Faltprozess und dem Verbindungsprozess zwischen der ersten Halbregion und der zweiten Halbregion positioniert ist.

11. Herstellungsverfahren für einen saugfähigen Artikel gemäß einem der Ansprüche 1 bis 5, wobei der saugfähige Artikel eine Wegwerfwindel mit einem Taillenteil ist, die Bahn eine Taillenregion, welche dem Taillenteil entspricht, und eine Schrittregion, welche zwischen einer Seite der Taillenregion und der anderen Seite der Taillenregion positioniert ist, umfasst, die Beinumfangsregion auf beiden Seiten der Schrittregion bereitgestellt ist, die Taillenregion eine Dehnegenschaft in einer Förderrichtung der Bahn aufweist und die Schrittregion eine Dehnegenschaft in einer die Förderrichtung der Bahn kreuzenden Richtung aufweist.

Revendications

1. Une méthode de fabrication d’un article absorbant, comprenant les étapes consistant en :

   un procédé de mise en forme d’une circonférence de jambe (200) pour former une région de circonférence de jambe sur une toile (10) qui est amenée en continu dans un sens de transport (SM), sur un dispositif de transport ; et un procédé de pliage (100) pour plier la toile (10) en deux après le procédé de mise en forme d’une circonférence de jambe, de sorte qu’une deuxième demi-région de toile (12) sur un côté d’une ligne centrale (LC) dans un sens perpendiculaire au sens de transport (SM) de la toile (10) se rapproche de ou chevauche une première demi-région (11) sur l’autre côté de la ligne centrale (LC), dans laquelle lors du procédé de pliage, la première demi-région (11) est transportée sur une bande de transport (122) et la deuxième demi-région (12) est pliée vers la première demi-région (11) par un moyen de guidage (140) comprenant une pluralité de rouleaux de guidage qui guident la deuxième demi-région (12).

2. La méthode de fabrication d’un article absorbant selon la revendication 1, dans laquelle lors du procédé de pliage, la première demi-région (11) est maintenue en contact avec la bande de transport (122).

3. La méthode de fabrication d’un article absorbant selon la revendication 2, dans laquelle lors du procédé de pliage, sensiblement toute la largeur de la première demi-région (11) est maintenue en contact avec la bande de transport (122), la ligne centrale (LC) reposant au-dessus de la bande de transport.

4. La méthode de fabrication d’un article absorbant selon n’importe quelle revendication précédente, dans laquelle lors du procédé de pliage, la première demi-région (11) est transportée par aspiration sur la bande de transport (122).

5. La méthode de fabrication d’un article absorbant selon n’importe quelle revendication précédente, dans laquelle une barre centrale de pliage (130) est prévue qui coïncide avec la ligne centrale (LC), de sorte que la toile puisse être pliée autour de la barre centrale de pliage (130).

6. La méthode de fabrication d’un article absorbant selon n’importe quelle revendication précédente, dans laquelle une surface de la bande de transport (122), qui supporte la première demi-région (11), est plane, de sorte que la première demi-région est transportée dans un état plan.

7. La méthode de fabrication d’un article absorbant selon n’importe quelle revendication précédente, dans laquelle la vitesse de circulation de la bande de transport (122) est identique à la vitesse de transport de
la toile (10).

8. La méthode de fabrication d'un article absorbant selon n'importe laquelle des revendications 1 ou 2, dans laquelle lors du procédé de pliage, un actionneur aligne la toile dans un sens de la largeur.

9. La méthode de fabrication d'un article absorbant selon n'importe laquelle des revendications 1 à 3, comprenant en outre, un procédé de raccordement pour raccorder la première demi-région (11) et la deuxième demi-région (12) au niveau d'une interface entre deux articles absorbants adjacents sur la toile (10), après le procédé de pliage et un procédé de découpage pour découper l'interface après le procédé de raccordement, dans laquelle la toile transportée après le procédé de pliage est transportée en étant retenue entre une paire de bandes.

10. La méthode de fabrication d'un article absorbant selon n'importe laquelle des revendications 1 à 4, dans laquelle entre le procédé de pliage et le procédé de raccordement, la barre centrale de pliage (130), divisant la première demi-région (11) et la deuxième demi-région (12), est positionnée entre la première demi-région et la deuxième demi-région.

11. La méthode de fabrication d'un article absorbant selon n'importe laquelle des revendications 1 à 5, dans laquelle l'article absorbant est une couche jetable avec un élément de taille, la toile inclut une région de taille correspondant à l'élément de taille et une région d'entrejambe positionnée entre un côté de la région de taille et l'autre côté de la région de taille, la région de circonférence de jambe est prévue sur les deux côtés de la région d'entrejambe, la région de taille présente une propriété d'étirage dans un sens de transport de la toile, et la région d'entrejambe présente une propriété d'étirage dans un sens croisant le sens de transport de la toile.
REFERENCES CITED IN THE DESCRIPTION

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