

METHOD FOR MANUFACTURING ABSORBENT ARTICLES AND A DEVICE FOR MANUFACTURING ABSORBENT ARTICLES

TECHNICAL FIELD

The present invention relates to a method for manufacturing absorbent articles and a device for manufacturing absorbent articles, a respective absorbent articles provided with a liquid-permeable top sheet, a liquid-impermeable back sheet, and an absorber main body intervened between the top sheet and the back sheet.

BACKGROUND ART

In general, in open-type diapers, there is need to provide a side flap (overhang part) overhanging from an absorber main body to the outside in order to facilitate wearing on a wearer's body.

While there is known a method of, in order to provide the side flap, overhanging a side panel member to the outside of the absorber main body and then employing a portion left by trimming as a side flap, this method has entailed a problem that a plenty of wasteful materials are produced due to the trimming.

As a measure to solve this problem, there is known a method for manufacturing diapers, described in Patent Document 1. The method for manufacturing diapers has the following steps.

- (1) The step of fabricating a strip-shaped diaper main body
- (2) The step of fabricating a substantially trapezoidal side flap sheet by means of a strip-shaped sheet.
- (3) The step of attaching the side flap sheet to bilateral circumferential ends of the strip-shaped diaper main body.
- (4) The step of cutting the strip-shaped diaper main body together with the side flap sheet in predetermined dimensions.

Patent Document 1: Japanese Patent Application Laid-open No. 4-261655

SUMMARY OF THE INVENTION

However, in the manufacturing steps of the open-type diaper described above, the side flap should be attached on predetermined portion on bilateral end sides of the strip-shaped diaper main body, while positioning the side flap precisely.

Moreover, in the manufacturing steps of the open-type diaper described above, since the side flap

sheets of two sides are respectively disposed on the strip-shaped diaper main body, the problem such that the attaching process becomes complicated may arise, when the positions of the side flaps in the MD direction (conveyance direction) of the main body line to be transversely coincident with each other.

The present invention has been made in view of the above-described problem, and aims to provide a method for manufacturing absorbent articles and a device for manufacturing absorbent articles, which are capable of preventing an occurrence of a failure caused by the fact that positions of side flaps are not coincident with each other in the MD direction of the main body line, without need to employ advance control.

A characteristic of the present invention is directed to a method for manufacturing absorbent articles, respective absorbent articles provided with a liquid-permeable top sheet, a liquid-impermeable back sheet, and an absorber main body which is interposed between the top sheet and the back sheet. The method comprising: an engagement member disposition step of, in a continuous body of an elongated flap to be continuously conveyed on a flap line, disposing engagement members which can be engaged with another one in a predetermined region, at both sides of the center line taken along a conveyance direction of the flap line; a flap forming step of, on the flap line, forming a flap by cutting the continuous body of the flap line along a direction crossing the conveyance direction of the flap line; and a flap disposition step of, on a continuous body of an elongated absorbent article to be continuously conveyed on a main body line, disposing the flap at a predetermined interval so that a centerline is taken along a conveyance direction of the main body line, wherein, on the flap line, bilateral end sides of the continuous body of the flap are folded back to a centerline side taken along the conveyance direction of the flap line.

As described above, with a method for manufacturing absorbent articles, according to the present invention, there can be provided a method for manufacturing absorbent articles, which is capable of preventing an occurrence of a failure caused by the fact that positions of side flaps are not coincident with each other in the MD direction of the main body line, without need to employ advance control.

BRIEF DESCRIPTION OF THE DRAWINGS

[Fig. 1] Fig. 1 is a view for explaining a method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention.

[Fig. 2] Fig. 2 is a plan view of an absorbent article according to Embodiment 1-1 of the present invention.

[Fig. 3] Fig. 3 is a plan view subsequent to unfolding the absorbent article according to Embodiment 1-1 of the present invention.

[Fig. 4] Fig. 4(a) and Fig. 4(b) are views for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 1 of Embodiment 1-1 of the present invention.

[Fig. 5] Fig. 5(a) and Fig. 5(b) are sectional views of a flap in a state in which the absorbent article according to Exemplary Modification 1 of Embodiment 1-1 of the present invention is not unfolded.

[Fig. 6] Fig. 6 is a plan view subsequent to unfolding the absorbent article according to Exemplary Modification 1 of Embodiment 1-1 of the present invention.

[Fig. 7] Fig. 7 is a plan view subsequent to unfolding the absorbent article according to Exemplary Modification 1 of Embodiment 1-1 of the present invention.

[Fig. 8] Fig. 8 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 2 of Embodiment 1-1 of the present invention.

[Fig. 9] Fig. 9 is a perspective view showing an engagement member disposition mechanism 210 according to Embodiment 1-2 of the present invention.

[Fig. 10] Fig. 10 is a perspective view showing an end side folding-back mechanism 220 according to Embodiment 1-2 of the present invention.

[Fig. 11] Fig. 11 is a perspective view showing a cutting disposition mechanism 230 according to Embodiment 1-2 of the present invention.

[Fig. 12] Fig. 12 is a perspective view showing an entire structure of an absorbent article according to Embodiment 2-1 of the present invention.

[Fig. 13] Fig. 13 is a plan view of the absorbent article according to Embodiment 2-1 of the present invention.

[Fig. 14] Fig. 14 is a developed plan view of the absorbent article according to Embodiment 2-1 of the present invention.

[Fig. 15] Fig. 15 is a view for explaining a method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention.

[Fig. 16] Fig. 16 is a plan view of an absorbent article according to Embodiment 2-2 of the present invention.

[Fig. 17] Fig. 17 is a developed plan view of the absorbent article according to Embodiment 2-2 of the present invention.

[Fig. 18] Fig. 18 is a view for explaining a method for manufacturing absorbent articles, according to Embodiment 2-2 of the present invention.

[Fig. 19] Fig. 19 is a perspective view showing an engagement member disposition mechanism 1210 according to Embodiment 2-3 of the present invention.

[Fig. 20] Fig. 20 is a perspective view showing an end side folding-back mechanism 1220 according to Embodiment 2-3 of the present invention.

[Fig. 21] Fig. 21 is a perspective view showing a cutting disposition mechanism 1230 according to Embodiment 2-3 of the present invention.

[Fig. 22] Fig. 22 is a perspective view showing a cutting disposition mechanism 1250 according to Exemplary Modification of Embodiment 2-3 of the present invention.

[Fig. 23] Fig. 23 is a view for explaining a method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

[Fig. 24] Fig. 24(a) and Fig. 24(b) are views for explaining a flat joint step in the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

[Fig. 25] Fig. 25 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 1 of Embodiment 3-1 of the present invention.

[Fig. 26] Fig. 26 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 2 of Embodiment 3-1 of the present invention.

[Fig. 27] Fig. 27 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 3 of Embodiment 3-1 of the present invention.

[Fig. 28] Fig. 28 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 4 of Embodiment 3-1 of the present invention.

[Fig. 29] Fig. 29 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 5 of Embodiment 3-1 of the present invention.

[Fig. 30] Fig. 30 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 6 of Embodiment 3-1 of the present invention.

[Fig. 31] Fig. 31 is a view for explaining a method for manufacturing absorbent articles, according to Exemplary Modification 7 of Embodiment 3-1 of the present invention.

[Fig. 32] Fig. 32 is a perspective view showing an engagement member disposition mechanism 2310 according to Embodiment 3-2 of the present invention.

[Fig. 33] Fig. 33 is a perspective view showing a fold-back part forming mechanism 2320 according to Embodiment 3-2 of the present invention.

[Fig. 34] Fig. 34 is a perspective view showing a joining mechanism 2330 according to Embodiment 3-2 of the present invention.

EMBODIMENTS FOR CARRYING OUT THE INVENTION

Hereinafter, first, second, and third embodiments according to the present invention will be described with reference to the drawings.

[First Embodiment]

(Embodiment 1-1)

A method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, will be described with reference to Fig. 1 to Fig. 3.

The method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, is capable of manufacturing absorbent articles (see Fig. 2 and Fig. 3), a respective absorbent articles provided with a liquid-permeable top sheet 12b, a liquid-impermeable back sheet 12a, and an absorber main body 10 which is interposed between the top sheet 12b and the back sheet 12a.

Fig. 2 is a view showing a state in which engagement members 30a, 30b are engagingly stopped and then temporarily stopped at a main body of a flap 20 in an open-type diaper which is manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Fig. 3 is a view showing a state in which the engagement members 30a, 30b are disengaged from the main body of the flap 20 and then the flap 20 is open in the open-type diaper which is manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Hereinafter, the method for manufacturing absorbent articles, according to the embodiment, will be described with reference to Fig. 1.

First, the steps to be performed on a flap line on which a flap 20 provided in an absorbent article is conveyed will be described.

In step S11, in a continuous body 120 of an elongated flap to be continuously conveyed on the flap

line, engagement members 30a, 30b which can be engaged with another one in a predetermined region are disposed at both sides of a centerline C taken along an MD direction of the flap line.

Specifically, these engagement members 30a, 30b are joined at bilateral end sides 40a, 40b of the flap continuous body 120 at a predetermined length interval.

In a case where hook members (male members) are disposed as the engagement members 30a, 30b, hook-targeted members (female members) are presumed to be provided as engagement-targeted members in a predetermined region of a front waistline member.

In the embodiment, the front waistline member is comprised of nonwoven cloth; and therefore, even if an hook-targeted member is not provided separately, a predetermined region per se of the front waistline member serves as a hook-targeted member.

In step S12, on the flap line, bilateral end sides 40a, 40b of the flap continuous body 120 are folded back to the side of the centerline C. Specifically, as shown in the sectional view taken along the line B-B', on the flap line, bilateral end sides 40a, 40b of the flap continuous body 120 are folded back upside of the flap continuous body 120.

In addition, in order to prevent a circumstance that the flap continuous body 120 turns up at the time of conveyance, the engagement members 30a, 30b are temporarily stopped by being engagingly stopped at the flap continuous body 120. Further, temporary stoppage may be performed by applying emboss processing or the like to fold-back portions 50a, 50b formed by allowing the bilateral end sides 40a, 40b of the flap 20 to be folded back and then allowing the flap 20 to be superimposed.

In step S13, on the flap line, the flaps 20 is formed by cutting the flap continuous body 120 at a predetermined length interval along a direction (CD direction) crossing in the MD direction of the flap line.

Secondly, the steps to be performed on a main body line on which a continuous body 110 of an absorbent article is to be conveyed will be described.

In step S21, a pulp sheet is ground by means of a grinding mechanism to thereby generate a ground pulp, and when the ground pulp passes through a pulp supply duct, a highly-absorbent polymer (SAP) is mixed in.

Afterwards, a mixture of the ground pulp supplied from the pulp supply duct and the highly-absorbent polymer is laminated in a predetermined shape by means of a lamination drum, thereby molding absorber cores 1.

In step S22, on a sheet-like tissue 2a to be continuously conveyed in the MD direction of the main body line, the absorber cores 1 are placed at a predetermined length interval in the MD direction of the main body line MD.

Afterwards, a sheet-like tissue 2b to be continuously conveyed in the MD direction of the main body line is superimposed on the tissue 2a on which a plurality of absorber cores 1 are placed in the MD direction of the main body line.

In step S23, a top sheet (liquid-permeable) 12b to be continuously conveyed in the MD direction of the main body line is joined after being superimposed on the sheet-like tissue 2a, and then, a back sheet (liquid-impermeable) 12a to be continuously conveyed in the MD direction of the main body line is joined after being superimposed under the sheet-like tissue 2a.

In step S24, a barrier cuffs 3 formed by another member is attached at a respective one of at the bilateral end sides of an absorber main body 10, along the MD direction of the main body line.

In step S25, on the continuous body 110 of the elongated absorbent articles to be continuously conveyed on the main body line, the flap 20 formed in step S13 is disposed at a predetermined length interval so that the centerline C is taken along the MD direction of the main body line.

Specifically, the flap 20 formed in step S13 on the flap line is joined by means of a thermoplastic resin on the continuous body 110 of the absorbent article.

Here, the thermoplastic resin may be applied to all over the back side of the flap 20 or the thermoplastic resin may be applied to only part of the back side of the flap 20.

In step S25, the flap 20 may be joined on the continuous body 110 of the absorbent article by means of an emboss roller or ultrasonic thermo compression bonding and the like.

In step S26, on the main body line, the continuous body 110 of the absorbent article is cut at a predetermined length interval along the CD line of the main body line.

With the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention described above, an occurrence of a failure caused by the fact that positions of side flaps in the MD direction of the main body line are not transversely coincident with each other can be prevented without need to employ advanced control.

Specifically, with the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, the flap 20 having its shape integrated to configure left and right side flaps is disposed on the continuous body 110 of the absorbent article, thus enabling the positions of the side flaps in the MD direction of the main body line to be transversely coincident with each other.

In addition, with the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, a portion other than the bilateral end sides 40a, 40b of the flap 20 can be employed as a region of joining with the continuous body 100 of the absorbent article. This makes it possible to strongly maintain a joint strength between the flap 20 and the continuous body 110 of the absorbent article and eliminate a failure that a thermoplastic resin produced in a case where the joint region is small lies off.

Further, with the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, the fold-back portions 50a, 50b formed by ensuring that bilateral end sides of the flap 20 are folded back and then the flap 20 is superimposed on the main body line are engagingly stopped onto the continuous body 110 of the absorbent article. This makes it possible to prevent turning-up during conveyance on the main body line.

With the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention, an absorbent article having one pair of side flaps overhanging from the absorber main body can be manufactured without being subject to a constraint on product features.

(Exemplary Modification 1)

A method for manufacturing absorbent articles, according to Exemplary Modification 1 of Embodiment 1-1 of the present invention, will be described with reference to Fig. 4 to Fig. 7.

Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 1 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention.

With the method for manufacturing absorbent articles, according to Exemplary Modification 1, in step S12, bilateral end sides 41a, 41b of a flap continuous body 120 are presupposed to be folded back on a flap line a plurality of times.

For example, as shown in Fig. 4(a), in step S12, if bilateral end sides 41a, 41b of the flap continuous body 120 are folded back twice on the flap line, engagement members 31a, 31b are oriented upward as shown in Fig. 5(a). Therefore, the engagement members 31a, 31b cannot be engagingly stopped at the flap continuous body 120. Accordingly, these bilateral end sides 41a, 41b may be temporarily stopped at the flap continuous body 120 by means of an emboss roller or ultrasonic thermo compression bonding and the like.

In addition, as shown in Fig. 4(b), in step S12, if bilateral end sides 41a, 41b of the flap continuous body 120 are folded back three times on the flap line, the engagement members 31a, 31b are oriented downward as shown in Fig. 5(b). Therefore, the engagement members 31a, 31b can be engagingly stopped at the flap continuous body 120. Even in this case, the bilateral end sides 41a, 41b may be temporarily stopped at the flap continuous body 120 by means of an emboss roller or ultrasonic thermo compression bonding and the like.

Fig. 6 shows a view subsequent to unfolding an absorbent article manufactured in a case where the bilateral end sides 41a, 41b of the flap continuous body 120 are folded back twice on the flap line in step S12. Fig. 7 shows a view subsequent to unfolding an absorbent article manufactured in a case where bilateral end sides 41a, 41b of the flap continuous body 120 are folded back three times.

With the method for manufacturing absorbent articles, according to Exemplary Modification 1, a length of a flap 20 in the CD direction of the main body line can be well allocated in comparison with that of an absorber main body 10 in the CD direction of the main body line.

(Exemplary Modification 2)

A method for manufacturing absorbent articles, according to Exemplary Modification 2 of Embodiment 1-1 of the present invention, will be described with reference to Fig. 8. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 2 of the present invention will be described, focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 1-1 of the present invention.

First, the steps to be performed on a flap line will be described.

In step S11, in a continuous body 120 of an elongated flap continuously conveyed on the flap line, engagement members 32a, 32b which can be engaged with another one in a predetermined region are disposed at both sides of a centerline C taken along the MD direction of the flap line.

Specifically in the flap continuous body 120, the engagement members 32a, 32b are disposed at a predetermined length interval at both sides in a proximal region of the centerline C taken along the MD direction of the flap line.

In step S12, on the flap line, bilateral end sides 42a, 42b of the flap continuous body 120 are folded back to the side of the centerline C. Specifically, as shown in sectional view B-B', on the flap line, bilateral end sides 42a, 42b of the flap continuous body 120 are folded back upside of the flap continuous body 120.

In addition, in order to prevent a circumstance that the flap continuous body 120 turns up at the time of conveyance, temporary stoppage may be performed by applying emboss processing or the like to fold-back portions 52a, 52b of the flap 20.

In step S12A, a severable line (perforated tear-off line) 42 is formed in the flap continuous body 120 in such a manner enabling the flap continuous body 120 to be divided into two sections along the centerline C.

In step S13, on the flap line, the flap 20 is formed by cutting the flap continuous body 120 at a predetermined length interval along the direction (CD direction) crossing in the MD direction of the flap line.

In step S25 of the main body line, after the flap 20 formed in step S13 on the flap line has been vertically inverted, the flap is joined on the continuous body 110 of the absorbent article by mean of a thermoplastic resin.

(Embodiment 1-2)

Next, a device for manufacturing absorbent article, according to Embodiment 1-2 of the present invention, will be described with reference to Fig. 9 to Fig. 11. The device for manufacturing absorbent articles is provided with: an engagement member disposition mechanism 210; an end side folding-back mechanism 220; and a cutting disposition mechanism 230.

First, the engagement member disposition mechanism 210 according to Embodiment 1-2 of the present invention will be described with reference to the drawings. Fig. 9 is a perspective view showing the engagement member disposition mechanism 210 according to Embodiment 1-2 of the present invention.

As shown in Fig. 9, on a flap line (step 11 described above), in the flap continuous body 120, at both sides of the centerline C taken along the MD direction of the flap line, the engagement member disposition mechanism 210 disposes engagement members 30a, 30b which can be engaged with another one in a predetermined region. In the embodiment, the engagement member disposition mechanism 210 disposes engagement members 30a, 30b at bilateral end sides 40a, 40b of the flap continuous body 120.

The engagement member disposition mechanism 210 is roughly comprised of an upper blade roller 211, a lower blade roller 212, and a transfer roller 213. The upper blade roller 211, the lower blade roller 212, and the transfer roller 213 rotate about a support shaft (not shown), respectively.

The upper blade roller 211 has two blades 211A for cutting a continuous body 140 of the engagement members. A circumferential velocity (V_1) of the upper blade roller 211 is substantially equal to a circumferential velocity (V_2) of the lower blade roller 212.

In addition, the circumferential velocity (V_1) of the upper blade roller 211 is faster than a velocity (V_3) at which the continuous body 140 of two engagement members is supplied to the lower blade roller 212 by means of a drive roller (not shown). The circumferential velocity (V_1) of the upper blade roller 211 is substantially equal to a conveyance velocity (V_4) of the continuous body 120 of the flap that is continuously conveyed by a drive roller (not shown), or alternatively, is slower than the conveyance velocity (V_4) of the flap continuous body 120.

The lower blade roller 212 has two bed blades 212A which comes into contact with the blades 211A, thereby cutting a continuous body 140 of the engagement members. A plurality of adsorption holes 212B for adsorbing the continuous body 140 of the engagement members are formed at the lower blade roller 212. The lower blade roller 212 rotates in an inversed orientation relative to the upper blade roller 211. The circumferential velocity (V_2) of the lower blade roller 212 is substantially equal to the circumferential velocity (V_1) of the upper blade roller 211, as described above.

The transfer roller 213 transfers (attaches), onto the flap continuous body 120, the engagement members 30a, 30b cut by means of the upper blade roller 211 and the lower blade roller 212, between the transfer roller and the lower blade roller 212.

A circumferential velocity (V_5) of the transfer roller 213 is substantially equal to the conveyance velocity (V_4) of the flap continuous body 120. That is, the circumferential velocity (V_5) of the transfer roller 213 is substantially equal to the circumferential velocity (V_1) of the upper blade roller 211 and the circumferential velocity (V_2) of the lower blade roller 212, a respective one of which is described above, or alternatively, is faster than the circumferential velocity (V_1) of the upper blade roller 211 and

the circumferential velocity (V_2) of the lower blade roller 212.

Next, an end side folding-back mechanism 220 according to Embodiment 1-2 of the present invention will be described with reference to the drawings. Fig. 10 is a perspective view showing the end side folding-back mechanism 220 according to Embodiment 1-2 of the present invention.

As shown in Fig. 10, the end side folding-back mechanism 220 folds back bilateral end sides 40a, 40b of the flap continuous body 120 to the side of the centerline C taken along the MD direction of the flap line.

The end side folding-back mechanism 220 is roughly comprised of a large-diameter roller 221, a conveyance roller 222, a foldout center bar 223, and a guide roller 224. The large-diameter roller 221, the conveyance roller 222, and the guide roller 224 rotate about a support shaft (not shown), respectively.

The large-diameter roller 221 comes into contact with a central region 120C of the flap continuous body 120 (the side of the centerline C rather than the bilateral end sides 40a, 40b), and then, sets up the bilateral end sides 40a, 40b together with the guide roller 224 to be described later.

The conveyance roller 222 conveys the flap continuous body 120 in a substantially horizontal state. Namely, the conveyance roller 222 is driven, whereby the flap continuous body 120 is conveyed in a substantially horizontal state.

The foldout center bar 223 retains a fold-back position taken along the MD direction of the flap line when bilateral end sides 40a, 40b are folded back. The foldout center bar 223 extends in the MD direction of the flap line, and is provided in substantially parallel to the continuous body 120 of the flap conveyed by means of the conveyance roller 222.

The guide roller 224 guides the bilateral end sides 40a, 40b in order to fold back the bilateral end sides 40a, 40b to the side of the centerline C. The guide roller 224 is comprised of a set of a guide roller 224A, a guide roller 224B, a guide roller 224C, a guide roller 224D, and a guide roller 224E.

From the guide roller 224A to the guide roller 224E, the bilateral end sides 40a, 40b are folded back via the foldout center bar 223 while the end sides are set up. Namely, from the guide roller 224A to the guide roller 224E, a tilt angle of the bilateral end sides 40a, 40b relative to the central region 120C of the flap continuous body 120 gradually narrows.

After the bilateral end sides 40a, 40b have been folded back by means of the end side folding-back mechanism 220, temporary stoppage may be performed by applying emboss processing or the like relative to the fold-back portions 50a, 50b in order to prevent the flap continuous body 120 from turning-up at the time of conveyance.

Next, a cutting disposition mechanism 230 according to Embodiment 1-2 of the present invention will be described with reference to the drawings. Fig. 11 is a perspective view showing the cutting

disposition mechanism 230 according to Embodiment 1-2 of the present invention.

As shown in Fig. 11, the cutting disposition mechanism 230 forms flaps 20 by cutting the continuous body 120 of the flap along the CD direction of the flap line. In addition, the cutting disposition mechanism 230 disposes the flaps 20 at a predetermined length interval so that the centerline C is taken along the MD direction of the main body line on the continuous body 110 of the absorbent article.

The cutting disposition mechanism 230 is roughly comprised of an upper blade roller 231, a lower blade roller 232, and a transfer roller 233. The upper blade roller 231 has two blades 231A for cutting the flap continuous body 120. The lower blade roller 232 has two bed blades 232A which comes into contact with the blades 231A, thereby cutting the flap continuous body 120. A plurality of adsorption holes 232B for adsorbing the flap continuous body 120 are formed at the lower blade roller 232.

The configurations of the upper blade roller 231, the lower blade roller 232, and the transfer roller 233 are similar to those of the upper blade roller 211, the lower blade roller 212, and the transfer roller 213 in above-described the engagement member disposition mechanism 210. Therefore, a description of the cutting disposition mechanism 230 is omitted

(Another first embodiment)

For example, the sequential order described in the method for manufacturing absorbent articles is not limitative in particular, it is sufficient if absorbent articles can be manufactured, and it is a matter of course that the sequential order can be appropriately selected according to an object.

While the present invention has been thus described in detail by way of employing the above-described embodiments, it is apparent to one skilled in the art that the present invention is not limitative to the embodiments described in the specification. The present invention can be carried out as modified and altered aspects without deviating from the gist and scope of the present invention defined by the claims. Therefore, the description of the present specification is intended for illustrative explanation, and does not have any limitative meaning to the present invention.

The entire contents of Japanese Patent Application Laid-open No. 2008-094112 (filed on March 31, 2008) and Japanese Patent Application No. 2009-074770 (filed on March 25, 2009) are incorporated in the present specification by reference.

[Second Embodiment]

(Background art)

In general, in open-type diapers, there is need to provide a side flap (overhang part) overhanging from the absorber main body to the outside in order to facilitate attachment to a body.

While there is known a method of overhanging a side panel material to the outside of the absorber main body and then employing a portion left due to trimming as a side trap, this method has entailed a problem that a plenty of wasteful materials are produced due to the trimming.

As a measure to solve this problem, the method of manufacturing diapers, described in Patent Document 1, is known.

The diaper manufacturing method has the following steps of:

(1) disposing a plurality of absorbers at a web having a first side end side and a second side end side in a state in which these members are spaced from each other in the MD direction (in the longitudinal direction of the web); and

(2) isolating the web in the CD direction (in the widthwise direction of the web) so that the web is divided into a first group in which the first side end side is an elongated part of diaper (equivalent to a side flap) and a second group in which the second side end side is an elongated part and so that the absorber is included in a respective one of the first and second groups.

(Patent Document 1) Japanese Patent Application Laid-open No. 2003-102777

(Disclosure of the Invention)

However, the above-described diaper manufacturing method has entailed a problem that there is subjected to a constraint on product features that the product shape is formed in a substantial T shape.

In addition, in the above-described diaper manufacturing method, since elongated webs to be continuously conveyed are alternately isolated in a nested shape, the webs after isolated are conveyed in a state in which an elongated part of diaper is not continuous, and there has been a problem that an unstable conveyance state is established.

Further, in the conveyance state, in a case where the folding-back step is applied to a diaper, there has been a problem that a very complicated step is required.

Therefore, the present invention has been made in view of the above-described problem, and aims to provide a method for manufacturing absorbent articles and a device for manufacturing absorbent articles, which are capable of material consumption at the time of forming a side flap without need to employ a complicated step, by establishing a stable conveyance state.

A characteristic of the present invention is directed to a method for manufacturing absorbent articles, a respective absorbent articles provided with a front waistline member, a back waistline member, and an inside leg member for connecting the front waistline member and the back waistline member to each other. The method comprising: an engagement member disposition step of in a continuous body of an elongated flap to be continuously conveyed on a flap line, disposing engagement members which can be engaged with another one in a predetermined region, at both sides of a centerline taken along a conveyance direction of the flap line; a flap forming step of, on the flap line, cutting the continuous body of the flap along a direction crossing a conveyance direction of the flap line to thereby form a flap; and a flap disposition step of on a line, disposing the flap on a continuous body of the front waistline member or the back waistline member so that the centerline is orthogonal to a conveyance direction of the main body line, wherein bilateral end sides of the continuous body of the flap are folded back to the centerline side on the flap line.

As described above, according to the present invention, there can be provided a method for manufacturing absorbent articles and a method for manufacturing absorbent articles, which are capable of restraining material consumption at the time of forming a side flap without need to employ a complicated step by establishing a stable conveyance state.

(Embodiment 2-1)

A method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, will be described with reference to Fig. 12 to Fig. 15.

The method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, is capable of manufacturing absorbent articles (see Fig. 12 to Fig. 14), a respective absorbent articles provided with a front waistline member 1020b, a back waistline member 1020a, and crotch member (absorber main body) 1010 for engaging the front waistline member 1020b and the back waistline member 1020a.

Fig. 12 is a perspective view showing an entire structure of an open-type diaper (absorbent article) manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Fig. 13 is a view showing a state in which engagement members 1040a, 1040b are temporarily stopped after being engagingly stopped at the main body of the flap 1030 in an open-type diaper manufactured in the method for manufacturing absorbent articles, according to the embodiment.

Fig. 14 is a view showing a state in which the flap 1030 (fold-back portions 1051a, 1051b) is open in the open-type diaper manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Hereinafter, the method for manufacturing absorbent articles, according to the embodiment, will be described with reference to Fig. 15.

As shown in Fig. 15, in the method for manufacturing absorbent articles, according to the embodiment, there is presupposed to be employed: a flap line for conveying a continuous body 1130 of an elongated flap; an absorber line for conveying a continuous body 1110 of an elongated inside leg member; and a main body line for conveying one pair of a continuous body 1120b of a front waistline member and a continuous body 1120a of a back waistline member, a respective one of which is formed in an elongated shape.

While the embodiment, as shown in Fig. 15, describes an example of a case in which the MD direction (conveyance direction) of the flap line, the MD direction of the main body line, and the MD direction of the absorber line are identical to each other, the present invention is not limitative thereto.

First, a description will be furnished with respect to the steps to be performed on an absorber line on which an absorber provided at the inside leg member 1011 is conveyed.

In step S1011, a pulp sheet is ground by means of a crusher, a ground pulp is generated, and when the ground pulp passes through a pulp supply duct, a highly absorbent polymer (SAP) is mixed in.

Afterwards, a mixture of the ground pulp supplied from the pulp supply duct and the highly absorbent polymer is laminated in a predetermined shape by means of a lamination drum, thereby molding absorber cores 1001.

In step S1012, on a sheep-like tissue 1002a to be continuously conveyed in the MD direction of the absorber line, the absorber cores 1001 are placed at a predetermined length interval in the MD direction of the absorber line.

Afterwards, a sheet-like tissue 1002b to be continuously conveyed in the MD direction of the absorber line is superimposed on the tissue 1002a on which a plurality of absorbent cores 1001 are placed along the MD direction of the absorber line.

In step S1013, a top sheet (liquid-permeable) 1012b to be continuously conveyed in the MD direction of the absorber line is joined after being superimposed on the sheet-like tissue 1002b, and then, a back sheet (liquid-impermeable) 1012a to be continuously conveyed in the MD direction of the absorber line is joined after being superimposed under the sheet-like tissue 1002a.

In step S1014, a barrier cuffs 1003 formed by another member is attached to both side ends of the crotch member 1010 along the MD direction of the absorber line.

In step S1015, the continuous bodies 1110 of the crotch member (absorber bodies) to be continuously conveyed in the MD direction of the absorber line are conveyed by means of rotation of a rotary drum and are cut along the CD direction at a predetermined length interval by means of a cutter roller disposed to be opposed to an outer circumferential face of the rotary drum, thereby forming the crotch member 1010.

Second, a description will be furnished with respect to the steps to be performed on the flap line on which a flap 1030 provided at the back waistline member 1020a is conveyed.

In step S1021, in a continuous body 1130 of an elongated flap to be continuously conveyed on a flap line, engagement members 1040a, 1040b which can be engaged with another one in a predetermined region of the front waistline member 1020b are disposed at both sides of the centerline C taken along the MD direction of the flap line.

Specifically, the engagement members 1040a, 1040b are joined with each other at a predetermined length interval at bilateral end sides 1050a, 1050b of the flap continuous body 1130.

In a case where hook members (male members) are disposed as engagement members 1040a, 1040b, hook-targeted members (female members) are presupposed to be provided as engagement-targeted members in a predetermined region of the front waistline member 1020b.

In the embodiment, the front waistline member 1020b is comprised of nonwoven cloth; and therefore, even if the hook-targeted member is not provided separately, the predetermined region per se of the front waistline member 1020b serves as the hook-targeted member.

In step S1022, on a flap line, bilateral end sides 1050a, 1050b of the flap continuous body 1130 are folded back to the side of the centerline C and the engagement members 1040a, 1040b disposed at the bilateral end sides 1050a, 1050b are temporarily stopped after engagingly stopped at the flap continuous body 1130.

Temporary stoppage may be performed by further applying emboss processing or the like, after the bilateral end sides 1050a, 1050b have been engagingly stopped at the flap continuous body 1130 by means of the engagement members 1040a, 1040b.

As described later, the bilateral end sides 1050a, 1050b of the flap continuous body 1130 are presupposed to be folded back to the side of the centerline C so that a width in a direction crossing the centerline C in the flap 1030 is shorter than a cutting interval of the front waistline member 1120b and the back waistline member 1120a.

In step S1023, on a flap line, a flap 1030 is formed by cutting the flap continuous body 1130 at a predetermined length interval along a direction (CD direction) crossing the MD direction of the flap line.

A cutout part in a predetermined shape (for example, in a curved shape taken along the groin, for example) in part of the bilateral end sides 1050a, 1050b temporarily stopped at the flap continuous body 1130 prior to cutting the flap continuous body 1130.

Alternatively, a cutout part in a predetermined shape (in a curved shape taken along the groin, for example) may be formed in part of the bilateral end sides 1050a, 1050b temporarily stopped at the flap 1030 after cutting the flap continuous body 1130.

Third, a description will be furnished with respect to the steps to be performed on a main body line on which the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are conveyed.

In step S1031, one pair of the continuous bodies of the waistline members (the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member), a respective one of which is formed in an elongated shape, are generated from nonwoven cloth, and then, are conveyed in the MD direction of the main body line.

The continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member may have elasticity.

In step S1032, between the continuous body 1120b of the elongated front waistline and the

continuous body 1120a of the elongated back waistline member, to be continuously conveyed on the main body line, the crotch member 1010 formed in step S1015 on the absorber line are disposed in a state in which these members are spaced from each other in the MD direction of the main body line.

In step S1033, on the main body line, the flap 1030 formed in step S1023 is disposed on the continuous body 1120a of the back waistline member so that the centerline C is orthogonal to the MD direction of the main body line.

Specifically in step S1033, on the main body line, the flap 1030 and the continuous body 1120a of the back waistline member are joined with each other so that a respective one of the flaps 1030 corresponds to a respective one of regions 1020A configuring one absorbent article (back waistline member 1020a) in the continuous body 1120a of the back waistline member.

After the flap 1030 formed in step S1023 on the flap line has been rotated by 90 degrees, the rotated flap is joined on the continuous body 1120a of the back waistline member by means of a thermoplastic resin.

The thermoplastic resin may be applied all over the back side of the flap 1030 or the thermoplastic resin may be applied to only part of the back side of the flap 1030.

In step S1033, the flap 1030 may be joined on the continuous body 1120a of the back waistline member by means of an emboss roller or ultrasonic thermo compression bonding and the like. In addition, in step S1033, the flap 1030 may be disposed so as to cover end parts of the crotch member 1010, on the continuous body 1120a of the back waistline member.

In step S1034, on the main body line, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are cut at a predetermined length interval along the CD direction of the main body line.

Specifically, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are cut so that a length L3 of the front waistline member 1020b in the widthwise direction of an absorbent article is equal to a length L2 of the back waistline member 1020a in the widthwise direction of the absorbent article.

A width L1 in a direction crossing the centerline C in the flap 1030 is shorter than a predetermined length interval (pitch) L2 which is a cutting interval of the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member.

While the foregoing embodiment describes an example in which the flap 1030 having the engagement members 1040a, 1040b disposed to be able to engage with another one in a predetermined region of the front waistline member 1020b is configured so as to be disposed on the continuous body 1120a of the back waistline member, the present invention is not limitative thereto. It is also applicable to an example in which the flap 1030 having the engagement members 1040a, 1040b disposed to be able to engage with another one in a predetermined region of the back

waistline member 1020a is configured so as to be disposed on the continuous body 2120b of the front waistline member.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, described above, absorbent articles having one pair of side flaps overhanging from an absorber main body can be manufactured without being subject to a constraint on product features.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, crotch member 1010 can be continuously conveyed on the main body line, thus making it possible to achieve a stable conveyance state and turning over absorbent articles without applying a complicated step.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, the flap 1030 is fixed by means of the engagement members 1040a, 1040b, thus making it possible to prevent turning-up during conveyance.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, the width L1 in the direction crossing the centerline C in the flap 1030 is shorter than a predetermined length interval (pitch) L2, thus making it possible to prevent cutting of the bilateral end sides 1050a, 1050b of the flap 1030 due to a cutting shift in the main body line.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are continuously conveyed, so that an end part of the continuous body 1120b of the front waistline member and an end part of the continuous body 1120a of the back waistline member can be folded back and superimposed on each other. Thus, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member, a respective one of which is superimposed, can be cut simultaneously and an open-type diaper and a pants-type diaper can be manufactured in accordance with the same cutting step. Therefore, the open-type diaper and the pants-type diaper can be manufactured without need to change the cutting step and the cutter per se for cutting.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, the flap 1030 is disposed so as to cover end parts of the crotch member 1010, on the continuous body 1120a of the back waistline member, thus making it possible to prevent a circumstance that a SAP configuring the absorber core 1001 or ground pulp leaks.

With the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention, a portion other than the bilateral end sides 1050a, 1050b of the flap 1030 can be employed as a region of joining with the back waistline member 1020a. Thus, a joint strength between the flap 1030 and the back waistline member 1020a can be strongly maintained and a failure that a thermoplastic resin produced in a case where a joint region is small lies off can be eliminated.

(Embodiment 2-2)

A method for manufacturing absorbent articles, according to Embodiment 2-2 of the present invention, will be described with reference to Fig. 16 to Fig. 18. Hereinafter, the method for manufacturing absorbent articles, according to Embodiment 2-2 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 2-1 of the present invention.

Fig. 16 is a view showing a state in which engagement members 1041a, 1041b are temporarily stopped after engagingly stopped at a back waistline member 1020a in an open-type diaper manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Fig. 17 is a view showing a state in which a severable line (perforated tear-off line) 1050 to be described later is severed and a flap 1030 opens in the open-type diaper manufactured by the method for manufacturing absorbent articles, according to the embodiment.

Hereinafter, the method for manufacturing absorbent articles, according to the embodiment, will be described with reference to Fig. 18.

First, the step to be performed on a absorber line is identical to that to be performed on the absorber line in the method for manufacturing absorbent articles, according to Embodiment 2-1, described above. Therefore, a duplicate description is omitted.

Second, the steps to be performed on a flap line will be described.

In step S1021A, in a continuous body 1130 of an elongated flap to be continuously conveyed on the flap line, engagement members 1041a, 1041b which can be engaged with another one in a predetermined region of a front waistline member 1020b are disposed at both sides of a centerline C taken along the MD direction of a flap line.

Specifically in the flap continuous body 1130, the engagement members 1041a, 1041b are disposed at predetermined length intervals at both sides in a proximal region of the centerline C taken along the MD direction of the flap line.

In addition, one engagement member may be disposed across the centerline C in place of disposing the two engagement members 1041a, 1041b at both sides of the centerline C as engagement members.

In step S1022A, on the flap line, bilateral end sides 1050a, 1050b of the flap continuous body 1130 are folded back to the side of the centerline C. Specifically, as shown in the sectional view taken along the line B-B', on the flap line, the bilateral end sides 1050a, 1050b of the flap continuous body 1130 are folded back upside of the flap continuous body 1130.

In order to prevent a situation that turnover occurs at the time of conveyance of the flap continuous body 1130, temporary stoppage may be performed by applying emboss processing or the like to the fold-back portions 1051a, 1051b of the flap 1030.

In step S1022B, a severable line (perforated tear-off line) 1050 is formed in the flap continuous body 1130 in such a manner enabling the flap continuous body 1130 to be divided into two sections along the centerline C.

The severable line 1050 may be formed in step S1021A, S1022A, or S1023. In addition, the severable line 1050 may be formed in a linear shape or may be formed in a curved shape as long as it is taken along the centerline C.

Further, in any step on the flap line, a cutout part in a predetermined shape (a curved shape taken along the groin, for example) may be formed in part of the proximal region of the centerline C described above.

Third, the steps to be performed on a main body line will be described. The steps S1031 and S1032 are identical to the steps S1031 and S1032 in the method for manufacturing absorbent articles, according to Embodiment 2-1, described above; and therefore, a duplicate description is omitted.

In step S1033A, on the main body line, a flap 1030 formed in step S1023 is disposed on a continuous body 1120a of a back waistline member so that the centerline C is orthogonal to the MD direction of the main body line.

Specifically, the flap 1030 formed in step S1023 on the flap line is rotated by 90 degrees and is vertically inverted; and thereafter, the resultant flap is joined on a continuous body 1120a of the back waistline member by means of a thermoplastic resin.

Specifically in step S1033A, on the main body line, the flap 1030 and the continuous body 1120a of the back waistline member are joined with each other so that a respective one of the flaps 1030 correspond to a respective one of the regions 1020A configuring one absorbent article (back waistline member 1020a) in the continuous body 1120a of the back waistline member.

In step S1033, it is preferable that the flap 1030 is joined on the continuous body 1120a of the back waistline member by means of an emboss roller or ultrasonic thermo compression bonding. Further, a thermoplastic resin may be applied all over the back side corresponding to the fold-back portions 1051a, 1051b of the flap 1030, or alternatively, a thermoplastic resin may be applied to only part of the back side corresponding to the fold-back portions 1051a, 1051b of the flap 1030.

In step S1034, on the main body line, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are cut along the CD direction of the main body line at a predetermined length interval.

Specifically, the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member are cut so that a length L3 of the front waistline member 1020b in the widthwise direction of an absorbent article is equal to a length L2 of the back waistline member 1020a in the widthwise direction of the absorbent article.

A length L1 in a direction crossing the centerline C in the flap 1030 is shorter than a predetermined length interval (pitch) L2 which is a cutting interval of the continuous body 1120b of the front waistline member and the continuous body 1120a of the back waistline member.

With the method for manufacturing absorbent articles, according to Embodiment 2-2 of the present invention, described above, a severable line 1050 is formed along a centerline of the flap 1030, and the flap 1030 is not divided into two sections, thus making it possible to prevent a circumstance that turnover occurs during conveyance on the main body line.

(Embodiment 2-3)

Next, a device for manufacturing absorbent articles, according to Embodiment 2-3 of the present invention, will be described with reference to Fig. 19 to Fig. 21. The device for manufacturing absorbent articles is provided with: an engagement member disposition mechanism 1210; an end side folding-back mechanism 1220; and a cutting disposition mechanism 1230.

First, the engagement member disposition mechanism 1210 according to embodiment 2-3 of the present invention will be described with reference to the drawings. Fig. 19 is a perspective view showing the engagement member disposition mechanism 1210 according to Embodiment 2-3 of the present invention.

As shown in Fig. 19, in a continuous body 1130 of an elongated flap to be continuously conveyed on a flap line (in the step S21 described above), at both sides of a centerline C taken along the MD direction, the engagement member disposition mechanism 1210 disposes engagement members 1042a, 1042b which can be engaged with another one in a predetermined region. In the embodiment, the engagement member disposition mechanism 1210 disposes the engagement members 1042a, 1042b at bilateral end sides 1050a, 1050b of the flap continuous body 1130.

The engagement member disposition mechanism 1210 is roughly comprised of an upper blade roller 1211, a lower blade roller 1212, and a transfer roller 1213. The upper blade roller 1211, the lower blade roller 1212, and the transfer roller 1213 rotate around a support shaft (not shown), respectively.

The upper blade roller 1211 has two blades 1211A for cutting a continuous body 1140 of the engagement members. A circumferential velocity (V_1) of the upper blade roller 1211 is substantially equal to a circumferential velocity (V_2) of the lower blade roller 1212.

In addition, the circumferential velocity (V_1) of the upper blade roller 1211 is faster than a velocity (V_3) at which the continuous body 1140 of the two engagement members is supplied to the lower blade roller 1212 by means of a drive roller (not shown). The circumferential velocity (V_1) of the upper blade roller 1211 is substantially equal to a conveyance velocity (V_4) of a continuous body 1130 of a flap to be continuously conveyed by means of a drive roller (not shown) or is slower than the conveyance velocity (V_4) of the flap continuous body 1130.

The lower blade roller 1212 has two bed blades 1212A which come into contact with the blades 1211A, thereby cutting the continuous body 1140 of the engagement members. A plurality of adsorption holes 1212B for adsorbing the continuous body 1140 of the engagement members are formed on the lower blade roller 1212. The lower blade roller 1212 rotates in a backward direction relative to the upper blade roller 1211. The circumferential velocity (V_2) of the lower blade roller 1212 is substantially equal to the circumferential velocity (V_1) of the upper blade roller 1211, as described above.

The transfer roller 1213 transfers (attaches), onto the flap continuous body 1130, the engagement members 1042a, 1042b cut by means of the upper blade roller 1211 and the lower blade roller 1212, between the transfer roller and the lower blade roller 1212.

A circumferential velocity (V_5) of the transfer roller 1213 is substantially equal to the conveyance velocity (V_4) of the flap continuous body 1130. That is, the circumferential velocity (V_5) of the transfer roller 1213 is substantially equal to the circumferential velocity (V_1) of the upper blade roller 1211 and the circumferential velocity (V_2) of the lower blade roller 1212, described above, or alternatively, is faster than the circumferential velocity (V_1) of the upper blade roller 1211 and the circumferential velocity (V_2) of the lower blade roller 1212.

Next, an end side folding-back mechanism 1220 according to Embodiment 2-3 of the present invention will be described with reference to the drawings. Fig. 20 is a perspective view showing the end side folding-back mechanism 1220 according to Embodiment 2-3 of the present invention.

As shown in Fig. 20, the end side folding-back mechanism 1220 folds back bilateral end sides 1050a, 1050b of the flap continuous body 1130 to the side of the centerline C taken along the MD direction of the flap line.

The end side folding-back mechanism 1220 is roughly comprised of a large-diameter roller 1221, a conveyance roller 1222, a foldout center bar 1223, and guide rollers 1224. The large-diameter roller 1221, the conveyance roller 1222, and the guide rollers 1224 rotate around a support shaft (not shown), respectively.

The large-diameter roller 1221 comes into contact with a central region 1120C of the flap continuous body 1130 (the side of the centerline C rather than the bilateral end sides 1050a, 1050b) and then sets up the bilateral end sides 1050a, 1050b together with the guide rollers 1224 to be described later.

The conveyance roller 1222 conveys the flap continuous body 1130 in a substantially horizontal state. Namely, the conveyance roller 1222 is driven, whereby the flap continuous body 1130 is conveyed in a substantially horizontal state.

The foldout center bar 1223 retains a fold-back position taken along the MD direction of the flap line when bilateral end sides 1050a, 1050b are folded back. The foldout center bar 1223 extends in the MD direction of the flap line and is provided in substantially parallel to the continuous body 1130 of

the flap conveyed by means of the conveyance roller 1222.

The guide rollers 1224 guide the bilateral end sides 1050a, 1050b in order to fold back the bilateral end sides 1050a, 1050b to the side of the centerline C. A set of the guide rollers 1224 is made up of a guide roller 224A, a guide roller 224B, a guide roller 224C, a guide roller 224D, and a guide roller 224E.

From the guide roller 224A to the guide roller 224E, the bilateral end sides 1050a, 1050b are folded back via the foldout center bar 1223 while the end sides are set up. Namely, from the guide roller 224A to the guide roller 224E, a tilt angle of the bilateral end sides 1050a, 1050b relative to the central region 1120C of the flap continuous body 1130 gradually narrows.

Temporary stoppage may be performed by applying emboss processing or the like to the fold-back portions 1051a, 1051b formed by the bilateral end sides 1050a, 1050b being folded back and the flap 1030 being superimposed in order to prevent the flap continuous body 1130 from turnover at the time of conveyance after the bilateral end sides 1050a, 1050b have been folded back by means of the end side folding-back mechanism 1220.

Next, a cutting disposition mechanism 1230 according to Embodiment 2-3 of the present invention will be described with reference to the drawings. Fig. 21 is a perspective view showing the cutting disposition mechanism 1230 according to Embodiment 2-3 of the present invention.

As shown in Fig. 21, a flap 1030 is formed by cutting the flap continuous body 1130 at predetermined length intervals along the CD direction of a flap line. In addition, the cutting disposition mechanism 1230 disposes the flap 1030 on a continuous body 1120a of a back waistline member so that a centerline C is orthogonal to the MD direction of a main body line.

Specifically, the cutting disposition mechanism 1230 is roughly comprised of a continuous body cutting roller 1231 and a rotary drum 1232.

The continuous body cutting roller 1231 is comprised of: a blade roller 1231A having a blade (not shown); and a bed blade roller 1231B having a bed blade (not shown). A circumferential velocity (V_8) of the blade roller 1231A is substantially equal to a circumferential velocity (V_9) of the bed blade roller 1231B.

The rotary drum 1232 has a plurality of adsorptive pad 1233 for adsorbing the flap 1030 that is cut by means of the blade roller 1231A and the bed blade roller 1231B. The rotary drum 1232 rotates about a support shaft 232A, thereby disposing the flap 1030 adsorbed by the adsorptive pad 1233 onto a continuous body 1120a of a back waistline member. A circumferential velocity (V_{10}) of the rotary drum 1232 is substantially equal to a conveyance velocity (V_{11}) of a continuous body 1120b of a front waistline member and a continuous body 1120a of a back waistline member.

The rotary drum 1232 rotates the adsorptive pads by 90 degrees by means of a rotary mechanism (not shown) while conveying the adsorptive pads 1233 up to an upward part of the continuous body

1120a of the back waistline member. In this manner, the cutting disposition mechanism 1230 rotates the flap 1030 by 90 degrees and vertically inverts the flap, and then, allows the flap to be joined with the continuous body 1120a of the back waistline member.

(Exemplary Modifications)

Hereinafter, a cutting disposition mechanism 1250 according to exemplary modifications of Embodiment 2-3 of the present invention will be described with reference to the drawings. Fig. 22 is a perspective view showing the cutting disposition mechanism 1250 according to the exemplary modification. Like constituent elements of the cutting disposition mechanism 1230 according to Embodiment 2-3 described above are designated by like reference numerals, and differences therebetween will be mainly described.

In the method for manufacturing absorbent articles, according to the present invention, on the main body line, the flap 30 is disposed on the continuous body 1120a of the back waistline member so that the centerline C is orthogonal to the MD direction of the main body line. In Embodiment 2-3 described above, after the flap 1030 has been rotated by 90 degrees and has been vertically inverted, the flap 1030 is joined on the continuous body 1120a of the back waistline member. In contrast to this, in the exemplary modification, the flap 1030 is joined on the continuous body 1120a of the back waistline member without the flap 1030 being rotated by 90 degrees and vertically inverted.

As shown in Fig. 22, a cutting disposition mechanism 1250 according to the exemplary modification forms a flap 1030 by cutting a flap continuous body 1130 at predetermined length intervals. In addition, the cutting disposition mechanism 1250 disposes the flap 1030 onto a continuous body of a back waistline member without rotating the cut and formed flap 1030.

Specifically, the cutting disposition mechanism 1250 cuts the flap continuous body 1130 conveyed by an endless belt 1251 at predetermined length intervals and attaches the continuous body onto a continuous body 1120a of the back waistline member by means of a thermoplastic resin or the like.

The cutting disposition mechanism 1250 has: an upper blade roller 1253 rotating about an axial core 1252; and a lower blade roller 1255 rotating about an axial core 1254.

At the upper blade roller 1253, a plurality of blades 1253A are provided to be arranged at a predetermined interval on an outer circumference of the upper blade roller 1253 and in substantially parallel to the axial core 1252. At the lower blade roller 1255, a suction hole 1255A is provided for suctioning a flap 1030 formed by ensuring that the flap continuous body 1130 is cut; and a bed blade (not shown) is provided for cutting the flap continuous body 1130 between the bed blade and the blades 1253A.

On a circumferential face of the lower blade roller 1255, a first zone Z1 is provided for bringing the flap continuous body 1130 into intimate contact therewith at a weak adhesion force; and a second zone Z2 is provided for bringing the flap 1030 formed by ensuring that the flap continuous body 1130 is cut, into intimate contact therewith at a given adhesion force which is stronger than that in the first zone Z1.

The flap continuous body 1130, when passing through the first zone Z1, adsorbs onto a circumferential face of the lower blade roller 1255 by means of the suction hole 1255A formed in the first zone Z1 while slipping the circumferential face of the lower blade roller 1255. At this time, a flap 1030 is formed by ensuring that the flap continuous body 1130 is cut between the blade 1253A and the bed blade.

The flap 1030, when passing through the second zone Z2, comes into intimate contact with the circumferential face of the lower blade roller 1255 by means of the suction hole 1255A formed in the second zone Z2, without slipping the circumferential face of the lower blade roller 1255. Then, the flap 1030 approaches a continuous body 1120a of a back waistline member by means of the lower blade roller 1255, and is attached onto the continuous body 1120a of the back waistline member.

(Another second embodiment)

The sequential order described in the method for manufacturing absorbent articles, for example, is not limitative in particular; it is sufficient if the absorbent articles can be manufactured; and it is a matter of course that the sequential order can be appropriately selected according to its purpose.

While the present invention has been thus described in detail by way of the foregoing embodiments, it is apparent to one skilled in the art that the present invention is not limitative to the embodiments described in the specification. The present invention can be carried out as modified and altered aspects without deviating from the gist and scope of the present invention defined by the claims. Therefore, the descriptive matters of the present specification are intended for illustrative explanation, and do not have any limitative meaning to the present invention.

The entire contents of Japanese Patent Application Laid-open No. 2008-094064 (filed on March 31, 2008) and Japanese Patent Application No. 2009-074773 (filed on March 25, 2009) are incorporated in the present specification by reference.

[Third Embodiment]

(Background art)

In general, in an open-type diaper, there is need to provide a side flap overhanging from an absorber main body to the outside in order to facilitate wearing on a wearer's body.

A manufacturing method to provide a side flap in the open-type diaper in the following steps is known (Patent Document 1, for example).

(1) The step of forming a severable line along the CD direction (the direction crossing in the conveyance direction) between each first belt part planar fastener and each second belt part planar fastener which are arranged along the CD direction in a continuous body (continuous belt part) of a flap.

(2) The step of forming a joint region in the CD direction by arranging the continuous body (continuous belt part) of a flap along one end part of a continuous body of a diaper main body.

(Patent Document 1) Japanese Patent Application Laid-open No. 2006-340862

(Disclosure of the invention)

However, in the above-described method for manufacturing open-type diapers, the severable line and the MD direction (conveyance direction) are orthogonal to each other on a flap line for conveying the flap continuous body (continuous belt part). Therefore, there has been a problem that, if a breakage strength of the cutoff line is strengthened so as to disallow the severable line to be cut on the flap line, it becomes difficult for a user of the manufactured diaper to cut the severable line.

In addition, in the above-described method for manufacturing open-type diapers, in a case where the strength of the severable line is weakened so as to enable the user of the manufactured diaper to cut a severable line which can be severed, the severable line may be cut while the flap continuous body is conveyed on the flap line, and there has been a problem that the flap continuous body (continuous belt part) cannot be continuously conveyed on the flap line or advanced control is needed to continuously convey the flap continuous body (continuous belt part) on the flap line, resulting in a complicated manufacturing facility.

The present invention has been made in view of the above-described problem, and aims to provide a method for manufacturing absorbent articles and a device for manufacturing absorbent articles, which are capable of forming a side flap which a user can readily unfold, while achieving continuous conveyance of the flap continuous body (continuous belt part) on the flap line without need to employ advanced control.

A characteristic of the present invention is directed to a method for manufacturing absorbent articles, a respective absorbent articles provided with a front waistline member, a back waistline member, and crotch member for connecting the front waistline member and the back waistline member to each other. The method comprising: a fold-back part forming step of forming a pair of fold-back parts, which can be folded back in a conveyance direction of the flap line and an opposite direction to the conveyance direction, part of a region configuring one flap in a continuous body of an elongated flat to be continuously conveyed on a flap line, and disposing engagement members which can be engaged with another one in a predetermined region, in a respective one of said one pair of fold-back parts; and a joining step of joining the continuous body of the flap and a continuous body of the front waistline member or the back waistline member of the flap so that a respective one of the regions configuring said one flap corresponds to a respective one of the regions configuring one of the absorbent articles in the continuous body of the front waistline member or the back waistline member.

As described above, according to the present invention, there can be provided a method for manufacturing absorbent articles and a device for manufacturing absorbent articles, which are capable of forming a side flap which a user can readily unfold, while achieving continuous conveyance of a flap continuous body (continuous belt part) on the flap line without need to employ advanced control.

(Embodiment 3-1)

A method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention,

will be described with reference to Fig. 23 and Fig. 24.

The method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention, is capable of manufacturing absorbent articles, for example, open-type diapers, comprising a front waistline member 2020b, a back waistline member 2020a, and crotch member (absorber main body) 2010 for connecting the front waistline member 2020b and the back waistline member 2020a to each other.

Hereinafter, a method for manufacturing absorbent articles, according to the embodiment, will be described with reference to Fig. 23.

As shown in Fig. 23, in the method for manufacturing absorbent articles, there is supposed to be employed: a flap line for conveying a continuous body 2130 of an elongated flap; an absorber line for conveying a continuous body 2110 of an elongated inside leg member; and a main body line for conveying one pair of a continuous body 2120b of a front waistline member and a continuous body 2120a of a back waistline member, a respective one of which is formed in an elongated shape.

While the embodiment, as shown in Fig. 23, describes an example of a case in which the MD line (conveyance direction) of a flap line, the MD line of a main body line, and the MD line of an absorber line are identical to each other, the present invention is not limitative thereto.

First, a description will be furnished with respect to the step to be performed on an absorber line on which absorbers provided at the crotch member 2010 are conveyed.

In step S2011, a pulp sheet is ground by means of a grinding mechanism to thereby generate a ground pulp, and when the ground pulp passes through a pulp supply duct, a highly-absorbent polymer (SAP) is mixed in.

Afterwards, a mixture of the ground pulp supplied from the pulp supply duct and the highly absorbent polymer is laminated in a predetermined shape by means of a lamination drum, thereby molding absorber cores 2001 (absorber).

In step S2012, on a sheep-like tissue 2002a to be continuously conveyed in the MD direction of the absorber line, the absorber cores 2001 are placed at predetermined length intervals in the MD direction of the absorber line.

Afterwards, a sheet-like tissue 2002b to be continuously conveyed in the MD direction of the absorber line is superimposed on the tissue 2002a on which a plurality of absorbent cores 2001 are placed along the MD direction of the absorber line.

In step S2013, a top sheet (liquid-permeable) 2012b to be continuously conveyed in the MD direction of the absorber line is joined after being superimposed on the sheet-like tissue 2002b, and then, a back sheet (liquid-impermeable) 2012a to be continuously conveyed in the MD direction of the absorber line is joined after being superimposed under the sheet-like tissue 2002a.

In step S2014, a barrier cuffs 2003 which is formed by another member is attached to both side ends of the crotch member 2010 along the MD direction of the absorber line.

In step S2015, the continuous bodies 2110 of the crotch member 2010 (absorber bodies) to be continuously conveyed in the MD direction of the absorber line are conveyed by means of rotation of a rotary drum and are cut along the CD direction at predetermined length intervals by means of a cutter roller disposed in opposite to an outer circumferential face of the rotary drum.

Second, a description will be furnished with respect to the steps to be performed on the flap line on which a flap 2030 provided at the back waistline member 2020a is conveyed.

In step S2021, engagement members 2040a, 2040b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous body 2130 of an elongated flap to be continuously conveyed on a flap line.

Specifically, the engagement members 2040a, 2040b are joined with each other at predetermined length intervals in the flap continuous body 2130. A length of a respective one of the engagement members 2040a, 2040b is presupposed to be shorter than that of the flap continuous body 2130 in the CD direction of the flap line.

In a case where hook members (male members) are disposed as engagement members 2040a, 2040b, hook-targeted members (female members) are presupposed to be provided as engagement-targeted members in a predetermined region of the front waistline member 2020b.

In the embodiment, the front waistline member 2020b is comprised of nonwoven cloth; and therefore, even if the hook-targeted member is not provided separately, the predetermined region per se of the front waistline member 2020b serves as the hook-targeted member.

In step S2022, one pair of fold-back parts 2050a, 2050b which can be folded back an MD direction (conveyance direction) of a flap line and in an opposite direction to the MD direction are formed in a region including a respective one of the engagement members 2040a, 2040b in part of the region 2030A mentioned above.

As shown in Fig. 24(a), the fold-back part 2050a is presupposed to be formed by: one first notched part (first slit) 2050a3 formed along the CD direction (conveyance direction) of the flap line; and two second notched parts (second slits) 2050a1, 2050a2 formed along the MD direction of the flap line.

On the other hand, the fold-back part 2050b is presupposed to be formed by: one first notched part (first slit) 2050b3 formed along the CD direction of the flap line; and two second notched parts (second slits) 2050b1, 2050b2 formed along the MD direction of the flap line.

As shown in Fig. 24(b), the fold-back part 2050b is folded back in the MD direction of the flap line in a hinged manner, and even if the fold-back part 2050a is folded back in an opposite direction to the MD

direction of the flap line, the flap continuous body 2130 is not cut and folded back the entire region in the CD direction of the flap line, thus making it possible to avoid a circumstance that accidental fold-back occurs during continuous conveyance.

At least part of the first notched parts (first slits) 2050a3, 2050b3 and the second notched parts (second slits) 2050a1, 2050a2, 2050b1, 2050b2 may be comprised of a severable line such as a perforated tear-off line.

In particular, it is preferable that at least part of the first cutting lines (first slits) 2050a3, 2050b3 is comprised of a severable line such as a perforated tear-off line. With this configuration, it is possible to prevent a circumstance that the fold-back parts 2050a, 2050b turn up when the flap continuous body 2130 is continuously conveyed on the flap line.

In addition, the first notched parts (first slits) 2050a3, 2050b3 and the second notched parts (second slits) 2050a1, 2050a2, 2050b1, 2050b2 may be formed in a linear shape or may be formed in a curved shape.

Further, the sequential order of the abovementioned step S2201 and step S2022 may be reversed. That is, in step S2022, one pair of fold-back parts 2050a, 2050b has been formed in part of the region 2030A configuring one flap 2030 in the continuous body 2130 of an elongated flap to be continuously conveyed on the flap line; and thereafter, the engagement members 2040a, 2040b which are engaged in a predetermined region may be disposed at a respective one of such one pair of fold-back parts 2050a, 2050b.

Third, a description will be furnished with respect to the step to be performed on the main body line on which the continuous body 2120b of the front waistline member and the continuous body 2120a of the back waistline member are conveyed.

In step S2031, one pair of the continuous bodies of the waistline members (the continuous body 2120b of the front waistline member and the continuous body 2120a of the back waistline member), a respective one of which is formed in an elongated shape, are generated from nonwoven cloth, and then, are conveyed in the MD direction of the main body line.

The continuous body 2120b of the front waistline member and the continuous body 2120a of the back waistline member may have elasticity.

In step S2032, between the continuous body 2120b of the elongated front waistline and the continuous body 2120a of the elongated back waistline member, to be continuously conveyed on the main body line, the crotch member 2010 formed in step S2015 on the absorber line are disposed in a state in which these members are spaced from each other in the MD direction of the main body line.

In step S2033, on the main body line, the flap continuous body 2130 and the continuous body 2120a of the back waistline member are joined with each other so that a respective one of the regions 2030A configuring one flap 2030 in the flap continuous body 2130 corresponds to a respective one of

the regions 2020A configuring one absorbent article (back waistline member 2020a) in the continuous body 2120a of the back waistline member.

That is, in the absorbent article, the flap continuous body 2130 and the continuous body 2120a of the back waistline member are joined with each other so that the engagement members 2040a, 2040b are disposed in the vicinity of the center of the back waistline member 2020a.

Specifically, it is preferable that the region 2030A and the region 2020A are joined with each other along an end part in the widthwise direction of the absorbent article.

In step S2033, it is preferable that the flap continuous body 2130 is joined on the continuous body 2120a of the back waistline member by means of an emboss roller or ultrasonic thermo compression bonding and the like. Further, a thermoplastic resin may be applied to all over the back side of the flap continuous body 2130 or a thermoplastic resin may be applied to only part of the back side of the flap continuous body 2130.

In step S2033, the engagement members 2040a, 2040b disposed at one pair of fold-back parts 2050a, 2050b, respectively, may be engagingly stopped at the continuous body 2120a of the back waistline member.

In step S2034, on the main body line, the continuous body 2120b of the front waistline member and the continuous body 2120a of the back waistline member are cut along the CD direction of the main body line at predetermined length intervals.

Specifically, the continuous body 2120b of the front waistline member and the continuous body 2120a of the back waistline member are cut so that a length L3 of the front waistline member 2020b in the widthwise direction of the absorbent article is equal to a length L2 of the back waistline member 2020a in the widthwise direction of the absorbent article.

While the foregoing embodiment describes an example in which the flap continuous body 2130 having the engagement members 2040a, 2040b disposed to be able to engage with another one in a predetermined region of the front waistline member 2020b is configured so as to be disposed on the continuous body 2120a of the back waistline member, the present invention is not limitative thereto. It is also applicable to an example in which the flap continuous body 2130 having the engagement members 2040a, 2040b disposed to be able to engage with another one in a predetermined region of the back waistline member 2020a, are configured so as to be disposed on the continuous body 2120b of the front waistline member.

With the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention, one pair of fold-back parts 2050a, 2050b are formed so as to disable the flap continuous body 2130 to be cut all over in the CD direction of the flap line. This makes it possible to avoid a circumstance that: the flap continuous body cannot be continuously conveyed on the flap line due to the fact that the flap can be readily unfolded by a user of the manufactured diaper and is cut on the flap line; or alternatively, advanced control is required to continuously convey the flap continuous

body on the flap line, resulting in complicated manufacturing facility.

With the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention, in place of disposing a respective one of the flaps 2030 formed by cutting the flap continuous body 2130 on the continuous body 2120a of the back waistline member, the flap continuous body 2130 is disposed on the continuous body 2120a of the back waistline member, thus eliminating a need for a complicated facility with high precision.

With the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention, the continuous body 3120b of the front waistline member and the continuous body 3120a of the back waistline member are continuously conveyed, so that an end part of the continuous body 3120b of the front waistline member and an end part of the continuous body 3120a of the back waistline member can be readily folded back and superimposed on each other. Therefore, the continuous body 3120b of the front waistline member and the continuous body 3120a of the back waistline member, a respective one of which is superimposed, can be cut simultaneously, and an open-type diaper and a pants-type diaper can be manufactured in the same cutting step. Therefore, the open-type diaper and the pants-type diaper can be manufactured without need to change the cutting step and a cutter per se for cutting.

(Exemplary Modification 1)

A method for manufacturing absorbent articles, according to Exemplary Modification 1 of Embodiment 3-1, will be described with reference to Fig. 25. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 1 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 25, among the steps to be performed on a flap line, in step S2021, the engagement members 2041a, 2041b which are disposed to be able to engage with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in the continuous body 2130 of an elongated flap to be continuously conveyed on a flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back parts 2051a, 2051b which can be folded back in an MD direction of the flap line and an opposite direction to the MD direction are formed, respectively, in region including a respective one of the engagement members 2041a, 2041b.

As shown in Fig. 25, such one pair of fold-back parts 2051a, 2051b are presupposed to be formed by: one first cutout part (first trimming) 2510 which is formed along the CD direction of the flap line; and four second notched parts (second slits) 2051a1, 2051a2, 2051b1, 2051b2 which are formed along the MD direction of the flap line.

The first cutout part (first trimming) 2510, as shown in Fig. 25, is provided in the vicinity of a central region in the CD direction of the flap line.

In this case, it is preferable that at least part of the second notched parts (second slits) 2051a1, 2051a2, 2051b1, 2051b2 is comprised of a severable line such as a perforated tear-off line. With this configuration, it is possible to prevent a circumstance that, when the flap continuous body 2130 is continuously conveyed on the flap line, the fold-back parts 2051a, 2051b turn up.

(Exemplary Modification 2)

A method for manufacturing absorbent articles, according to Exemplary Modification 2 of Embodiment 3-1, will be described with reference to Fig. 26. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 2 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 26, among the steps to be performed on a flap line, in step S2021, the engagement members 2042a, 2042b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous body 2130 of an elongated flap to be continuously conveyed on the flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back part 2052a, 2052b which can be folded back in an MD direction of the flap line and an opposite direction to the MD direction are formed, respectively, in region including a respective one of the engagement members 2042a, 2042b.

As shown in Fig. 26, such one part of fold-back parts 2052a, 2052b are presupposed to be formed by: one first cutout part (first trimming) 2520 which is formed along the CD direction of the flap line and two second notched parts (second slits) 2052a1, 2052b1 which are formed along the MD direction of the flap line.

The first cutout part (first trimming) 2520, as shown in Fig. 26, is provided from a central region leading up to an end part X in the CD direction of the flap line.

In this case, it is preferable that at least part of the second notched part (second slits) 2052a1, 2052b1 is comprised of a severable line such as a perforated tear-off line. With this configuration, it is possible to prevent a circumstance that, when a flap continuous body 2130 is continuously conveyed on the flap line, the fold-back parts 2052a, 2052b turn up.

(Exemplary Modification 3)

A method for manufacturing absorbent articles, according to Exemplary Modification 3 of Embodiment 3-1, will be described with reference to Fig. 27. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 3 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 27, among the steps to be performed on a flap line, in step S2021, the engagement members 2043a, 2043b which can be engaged with another one in a predetermined region are

disposed in part of a region 2030A configuring one flap 2030 in a continuous body 2130 of an elongated flap to be continuously conveyed on the flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back part 2053a, 2053b which can be folded back in an MD direction of the flap line and an opposite direction to the MD direction are formed, respectively, in region including a respective one of the engagement members 2043a, 2043b.

As shown in Fig. 27, such one part of fold-back parts 2053a, 2053b is presupposed to be formed by: one first cutout part (first trimming) 2530 which is formed along the CD direction of the flap line and two second notched parts (second slits) 2053a1, 2053b1 which are formed along the MD direction of the flap line.

The first cutout part (first trimming) 2530, as shown in Fig. 27, is provided from a central region leading up to an end part X in the CD direction of the flap line.

In this case, it is preferable that at least part of the second notched part (second slits) 2053a1, 2053b1 is comprised of a severable line such as a perforated tear-off line. With this configuration, it is possible to prevent a circumstance that, when a flap continuous body 2130 is continuously conveyed on the flap line, the fold-back parts 2053a, 2053b turn up.

(Exemplary Modification 4)

A method for manufacturing absorbent articles, according to Exemplary Modification 4 of Embodiment 3-1, will be described with reference to Fig. 28. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 4 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 28, among the steps to be performed on a flap line, in step S2021, the engagement members 2044a, 2044b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous body 2130 of an elongated flap to be continuously conveyed on the flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back part 2054a, 2054b which can be folded back in an MD direction of the flap line and in an opposite direction to the MD direction are formed, respectively, in region including a respective one of the engagement members 2044a, 2044b.

As shown in Fig. 28, such one part of fold-back parts 2054a, 2054b are presupposed to be formed by: one first cutout part (first trimming) 2540 which is formed along the CD direction of the flap line; and one second cutout part (second trimming) 2541 which is formed along the MD direction of the flap line.

The first cutout part (first trimming) 2540, as shown in Fig. 28, is provided all over from a central

region to an end part X in the CD direction of the flap line.

(Exemplary Modification 5)

A method for manufacturing absorbent articles, according to Exemplary Modification 5 of Embodiment 3-1, will be described with reference to Fig. 29. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 5 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 29, among the steps to be performed on a flap line, in step S2021, the engagement members 2045a, 2045b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous flap 2130 of an elongated flap to be continuously conveyed on the flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back part 2055a, 2055b which can be folded back in an MD direction of the flap line and an opposite direction to the MD direction are formed, respectively, in region including a respective one of the engagement members 2045a, 2045b.

As shown in Fig. 29, such one part of fold-back parts 2055a, 2055b are presupposed to be formed by: one first cutout part (first trimming) 2550 formed along the CD direction of the flap line; and one second cutout part (second trimming) 2551 formed along the MD direction of the flap line.

The first cutout part (first trimming) 2550, as shown in Fig. 29, is provided all over from a central region to an end part Y (end part Y is opposite to the end part X) in the CD direction of the flap line.

(Exemplary Modification 6)

A method for manufacturing absorbent articles, according to Exemplary Modification 6 of Embodiment 3-1, will be described with reference to Fig. 30. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 6 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 30, among the steps to be performed on a flap line, in step S2021, the engagement members 2046a, 2046b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous flap 2130 of an elongated flap to be continuously conveyed on the flap line.

In step S2022, in part of the aforementioned region 2030A, one pair of fold-back part 2056a, 2056b which can be folded back in an MD direction of the flap line and an opposite direction to the MD direction are formed, respectively, in a region including a respective one of the engagement members 2046a, 2046b.

As shown in Fig. 30, such one part of fold-back parts 2056a, 2056b are presupposed to be formed

by: one first cutout part (first trimming) 2560 which is formed along the CD direction of the flap line; and two second cutout part (second trimmings) 2561a, 2561b which are formed along the MD direction of the flap line.

The first cutout part (first trimming) 2560, as shown in Fig. 30, is provided all over from the second cutout part 2561a to the second cutout part 2561b in the CD direction of the flap line.

(Exemplary Modification 7)

A method for manufacturing absorbent articles, according to Exemplary Modification 7 of Embodiment 3-1, will be described with reference to Fig. 31. Hereinafter, the method for manufacturing absorbent articles, according to Exemplary Modification 7 of the present invention, will be described focusing on differences from the method for manufacturing absorbent articles, according to Embodiment 3-1 of the present invention.

As shown in Fig. 31, among the steps to be performed on the flap line, in step S2021, four engagement members 2047a, 2047b, 2048a, 2048b which can be engaged with another one in a predetermined region are disposed in part of a region 2030A configuring one flap 2030 in a continuous body 2130 of an elongated flap to be continuously conveyed on a flap line.

In step S2022, in part of the abovementioned region 2030A, two fold-back parts 2057b, 2058b which can be folded back in the MD direction of the flap line are formed respectively in a region including a respective one of the engagement member 2047b, 2048b; and two fold-back parts 2057a, 2058a which can be folded back in an opposite direction to the MD direction of the flap line are formed, respectively, in a region including a respective one of the engagement members 2047a, 2048a.

As shown in Fig. 31, the fold-back part 2057a is presupposed to be formed by: one first notched part (first slit) 2057a3 formed along the CD direction of the flap line; and two second notched parts (second slits) 2057a1, 2057a2 formed in the MD direction of the flap line.

In addition, the fold-back part 2058a is presupposed to be formed by: one first notched part (first slit) 2058a3 which is formed along the CD direction of the flap line; and two second notched parts (second slits) 2058a1, 2058a2 which are formed in the MD direction of the flap line.

Further, the fold-back part 2057b is presupposed to be formed by: one first notched part (first slit) 2057b3 which is formed along the CD direction of the flap line; and two second notched parts (second slits) 2057b1, 2057b2 which are formed in the MD direction of the flap line.

Furthermore, the fold-back part 2058b is presupposed to be formed by: one first notched part (first slit) 2058b3 which is formed along the CD direction of the flap line; and two second notched parts (second slits) 2058b1, 2058b2 which are formed in the MD direction of the flap line.

A configuration may be provided in such a manner as to dispose four or more engagement members in part of a region 2030A configuring one flap 2030 in the flap continuous body 2130 in step S2021 and to form two or more fold-back parts in a region including the engagement members in step

S2022.

In this case, it is preferable that at least part of the first notched parts (first slits) 2057a3, 2057b3, 2058a3, 2058b3 is comprised of a severable line such as a perforated tear-off line. With this configuration, it is possible to prevent a circumstance that, when the flap continuous body 2130 is continuously conveyed on the flap line, the fold-back parts 2057a, 2057b, 2058a, 2058b turn up.

(Embodiment 3-2)

Next, a device for manufacturing absorbent articles, according to Embodiment 3-2 of the present invention, will be described with reference to Fig. 32 to Fig. 34. The device for manufacturing absorbent articles is provided with an engagement member disposition mechanism 2310, a fold-back part forming mechanism 2320, and a joining mechanism 2330.

First, the engagement member disposition mechanism 2310 according to Embodiment 3-2 of the present invention will be described with reference to the drawings. Fig. 32 is a perspective view showing an engagement member disposition mechanism 2310 according to Embodiment 3-2 of the present invention.

As shown in Fig. 32, in a continuous member 2130 of an elongated flap to be continuously conveyed on a flap line (in step S2021 mentioned above), the engagement member disposition mechanism 2310 disposes engagement members 2040a, 2040b which can be engaged with another one in a predetermined region.

The engagement member disposition mechanism 2310 has: an upper blade roller 2313 rotating about an axial core 2312; and a lower blade roller 2315 rotating about an axial core 2314.

At the upper blade roller 2313, a plurality of blades 2313A are provided to be arranged at predetermined intervals on an outer circumference of the upper blade roller 2313 and along the axial core 2312. At the lower blade roller 2315, a suction hole 2315A is provided for suctioning engagement members 2040a, 2040b formed by allowing a continuous body 2140 of the engagement members to be cut; and a bet blade (not shown) is provided for cutting the continuous body 2140 of the engagement members between the bed blade and each of the blades 2313A.

On a circumferential face of the lower blade roller 2315, a first zone Z1 is provided for bringing the continuous body 2140 of the engagement members with a predetermined adhesive force; and a second come Z2 is provided for bringing the engagement members 2040a, 2040b that are formed by ensuring that the continuous body 2140 of the engagement members, into intimate contact with each other, at a given adhesion force which is stronger than that in the first zone Z1.

The continuous member 2140 of the engagement members, when passing though the first zone Z1, adsorbs onto the circumferential face of the lower blade roll 2315 by means of the suction hole 2315A formed in the first zone Z1 while slipping the circumferential face of the lower blade roller 2315. At this time, the engagement members 2040a, 2040b are formed by the continuous body 2140 of the engagement members being cut between each of the blades 2313A and the bet blade.

The engagement members 2040a, 2040b, when passing through the second zone Z2, comes into intimate contact with the peripheral face of the lower blade roller 2315 by means of the suction hole 2315A formed in the second zone Z2 without slipping the circumferential face of the lower blade roller 2315. Afterwards, the engagement members 2040a, 2040b approaches the flap continuous body 2130 by means of rotation of the lower blade roller 2315, and is attached onto the flap continuous body 2130.

Next, the fold-back part forming mechanism 2320 according to Embodiment 3-2 of the present invention will be described with reference to the drawings. Fig. 33 is a perspective view showing the fold-back part forming mechanism 2320 according to Embodiment 3-2 of the present invention.

As shown in Fig. 33, in part of a region configuring one flap 2320 in the flap continuous body 2130, the fold-back part forming mechanism 2320 forms one pair of fold-back parts 2050a, 2050b which can be folded back in an MD direction of a flap line and in an opposite direction to the MD direction.

The fold-back part forming mechanism 2320 has: a cutter roller 2321 rotating about a support shaft (not shown); and a pinch roller 2322 for pinching the flap continuous body 2130 between the pinch roller and the cutter roller 2321.

A circumferential velocity (V_7) of the cutting roller 2321 is substantially equal to a conveyance velocity (V_4) of the flap continuous body 2130. A fold-back processing blade 2321A for forming fold-back parts 2050a, 2050b is formed at the cutting roller 2321. The fold-back processing blade 2321A corresponds to the shape of the fold-back part 2050a, 2050b.

Next, the joining mechanism 2330 according to Embodiment 3-2 of the present invention will be described with reference to the drawings. Fig. 34 is a perspective view showing the joining mechanism 2330 according to Embodiment 3-2 of the present invention.

As shown in Fig. 34, the joining mechanism 2330 bonds the flap continuous body 2130 and the continuous body 2120a of the back waistline member with each other so that each of the regions configuring one flap 2030 corresponds to each of the regions configuring one absorbent article in the continuous body 2120a of the back waistline member.

On the main body line (step S2033 mentioned above), the joining mechanism 2330 bonds the flap continuous body 2130 and the continuous body 2120a of the back waistline member with each other so that the MD direction of the flap line corresponds to the MD direction of the main body line. The joining mechanism 2330 has one pair of rollers 2331, 2332. A circumferential velocity (V_8) of such one pair of rollers 2331, 2332 is substantially equal to a conveyance velocity (V_4) of the flap continuous body 2130.

The roller 2331 guides the continuous body 2130 of a flap to be conveyed, onto the continuous body 2120a of the back waistline member. On the other hand, the roller 2332 is opposed to the roller 2331 with the continuous body 2120a of the back waistline member and the flap continuous body 2130

being sandwiched therebetween. One pair of rollers 2331, 2332 tightly holds the continuous body 2120a of the back waistline member and the flap continuous body 2130 therebetween. In this manner, the joining mechanism 2330 bonds the continuous body 2120a of the back waistline member and the flap 2030 with each other.

(Other third embodiment)

The sequential order described in the method for manufacturing absorbent articles, for example, is not limitative in particular; it is sufficient if the absorbent articles can be manufactured; and as a matter of course, the sequential order can be appropriately selected according to its purpose.

While the present invention has been thus described in detail by way of the foregoing embodiments, it is apparent to one skilled in the art that the present invention is not limitative to the embodiments described in the specification. The present invention can be carried out as modified and altered aspects without deviating from the gist and scope of the present invention defined by the claims. Therefore, the descriptive matters of the present specification are intended for the purpose of illustrative explanation, and do not have any limitative meaning to the present invention.

The entire contents of Japanese Patent Application Laid-open No. 2008-094065 (filed on March 31, 2008) and Japanese Patent Application No. 2009-074778 (filed on March 25, 2009) are incorporated in the present specification by reference.

INDUSTRIAL APPLICABILITY

As described above, with a method for manufacturing absorbent articles, according to the present invention, there can be provided a method for manufacturing absorbent articles, which is capable of preventing an occurrence of a failure caused by the fact that positions of side flaps are not coincident with each other in the MD direction of the main body line, without need to employ advance control.

In addition, with absorbent articles according to the present invention, there can be provided a manufacturing method which is capable of achieving a stable conveyance state and restraining material consumption at the time of forming a side flap, without need to employ a complicated step.

Further, with the absorbent articles according to the present invention, there can be provided a method for manufacturing absorbent articles, which is capable of forming a side flap which a user can readily unfold, while achieving continuous conveyance of a flap continuous body (continuous belt part) on a flap line without need to employ advanced control.

What is claimed is:

1. A method for manufacturing absorbent articles, respective absorbent articles provided with a liquid-permeable top sheet, a liquid-impermeable back sheet, and an absorber main body which is interposed between the top sheet and the back sheet, said method comprising:
 - an engagement member disposition step of, in a continuous body of an elongated flap to be continuously conveyed on a flap line, disposing engagement members which can be engaged with another one in a predetermined region, at both sides of the center line taken along a conveyance direction of the flap line;
 - a flap forming step of, on the flap line, forming a flap by cutting the continuous body of the flap line along a direction crossing the conveyance direction of the flap line; and
 - a flap disposition step of, on a continuous body of an elongated absorbent article to be continuously conveyed on a main body line, disposing the flap at a predetermined interval so that a centerline is taken along a conveyance direction of the main body line,wherein, on the flap line, bilateral end sides of the continuous body of the flap are folded back to a centerline side taken along the conveyance direction of the flap line.
2. The method for manufacturing absorbent articles, as set forth in claim 1, wherein:
 - in the engagement member disposition step, the engagement members are disposed at the bilateral end sides of the continuous body of the flap; and the bilateral end sides of the continuous body of the flap are folded back to the centerline side.
3. The method for manufacturing absorbent articles, as set forth in claim 2, wherein:
 - the bilateral end sides of the continuous body of the flap are folded back to the centerline side; and the engagement members disposed at the bilateral end sides are engagingly stopped at the continuous body of the flap.
4. The method for manufacturing absorbent articles, as set forth in claim 1, wherein:
 - in the engagement member disposition step, in the continuous body of the flap, the engagement members are disposed at both sides of a proximal region of the centerline taken along the conveyance direction of the flap line; and a severable line enabling the continuous body of the flap to be divided into two sections along the centerline is formed.
5. The method for manufacturing absorbent articles, as set forth in claim 1, wherein: the bilateral end sides of the continuous body of the flap are folded back a plurality of times.
6. The method for manufacturing absorbent articles, as set forth in claim 1, wherein, in the flap disposition step, the flap is joined on the continuous body of the absorbent article.
7. A device for manufacturing absorbent articles, respective absorbent articles provided with a liquid-permeable top sheet, a liquid-impermeable back sheet, and an absorber main body interposed between the top sheet and the back sheet, said device comprising:
 - an engagement member disposition mechanism of, in a continuous body of an elongated flap to be continuously conveyed on a flap line, disposing engagement members which can be engaged with another one in a predetermined region, at both sides of a center line taken along a

conveyance direction of the flap line;

an end side folding-back mechanism of folding back the bilateral end sides of the continuous body of the flap to a side of the centerline along the conveyance direction of the flap line; and

a cutting disposition mechanism of forming the flap by cutting the continuous body of the flap along a direction crossing the conveyance direction of the flap line and on a continuous body of an elongated absorbent article, disposing the flap at a predetermined interval so that the centerline is taken along a conveyance direction of a main body line.

8. A method for manufacturing absorbent articles, a respective absorbent articles provided with a front waistline member, a back waistline member, and crotch member connecting the front waistline member and the back waistline member to each other, said method comprising:

an engagement member disposition step of, in a continuous body of an elongated flap to be continuously conveyed on a flap line, disposing engagement members which can be engaged with another one in a predetermined region, at both sides of a centerline taken along a conveyance direction of the flap line;

a flap forming step of, on the flap line, forming a flap by cutting the continuous body of the flap along the direction crossing the conveyance direction of the flap line;

a flap disposition step of on a main body line, disposing the flap on a continuous body of the front waistline member or the back waistline member so that the centerline is orthogonal to a conveyance direction of the main body line,

wherein, on the flap line, bilateral end sides of the continuous body of the flap are folded back to the side of the centerline.

9. The method for manufacturing absorbent articles, as set forth in claim 8, comprising a waistline member cutting step of, on the main body line, setting a continuous body of the front waistline member and a continuous body of the back waistline member at a predetermined length interval along a direction crossing a conveyance direction of the main body line,

wherein: a width in a direction crossing the centerline in the flap is shorter than the predetermined length interval.

10. The method for manufacturing absorbent articles, as set forth in claim 8, wherein:

in the engagement member disposition step, the engagement members are disposed at lateral end sides of the continuous body of the flap; and the bilateral end sides of the continuous body of the flap are folded back to the side of the centerline.

11. The method for manufacturing absorbent articles, as set forth in claim 10, wherein:

the bilateral end sides of the continuous body of the flap are folded back to the centerline side; and the engagement members disposed at the bilateral end sides are engagingly stopped at the continuous body of the flap.

12. The method for manufacturing absorbent articles, as set forth in claim 10, comprising a step of forming a cutout part in a predetermined shape in part of the bilateral end sides.

13. The method for manufacturing absorbent articles, as set forth in claim 8, wherein:

in the engagement member disposition step, in the continuous body of the flap, the engagement members are disposed at both sides of a proximal region of a centerline taken along the conveyance direction of the flap line; and a severable line enabling the continuous body of the flap to be divided into two sections along the centerline is formed.

14. The method for manufacturing absorbent articles, as set forth in claim 13, comprising a step of forming a cutout part in a predetermined shape in part of the proximal region.

15. The method for manufacturing absorbent articles, as set forth in claim 1, wherein: in the flap disposition step, the flap is joined on the continuous body of the front waistline member or the back waistline member.

16. The method for manufacturing absorbent articles, as set forth in claim 8, comprising a crotch member disposition step of disposing the crotch member so as to be spaced from each other in the conveyance direction of the main body line, between a continuous body of the front waistline member which is formed in an elongated shape and a continuous body of the back waistline member which is formed in an elongated shape, a respective one of which is to be continuously conveyed on the main body line.

17. The method for manufacturing absorbent articles, as set forth in claim 8, wherein: in the flap disposition step, the flap is disposed so as to cover end parts of the crotch member.

18. The method for manufacturing absorbent articles, as set forth in claim 9, wherein: in the waistline member cutting step, the continuous body of the front waistline member and the continuous body of the back waistline member are cut so that a length of the front waistline member in a widthwise direction of the absorbent article is equal to a length of the back waistline member in the widthwise direction of the absorbent article.

19. A device for manufacturing absorbent articles, a respective absorbent articles provided with a front waistline member, a back waistline member, and crotch member connecting the front waistline member and the back waistline member to each other, said device comprising:

an engagement member disposition mechanism configured to dispose engagement members which can be engaged with another one in a predetermined region, at both sides of a centerline taken along a conveyance direction of the flap line, in a continuous body of an elongated flap to be continuously conveyed on a flap line;

an end side folding-back mechanism configured to fold back bilateral end sides of the continuous body of the flap to a side of the centerline; and

a cutting disposition mechanism configured to form the flap by cutting the continuous body of the flap along a direction crossing the conveyance direction of the flap line and, disposing the flap on a continuous body of the front waistline member or the back waistline member so that the centerline is orthogonal to a conveyance direction of the main body line.

20. A method for manufacturing absorbent articles, a respective absorbent articles provided with a front waistline member, a back waistline member, and crotch member connecting the front waistline

member and the back waistline member to each other, said method comprising:

a fold-back part forming step of, in part of a region configuring one flap in a continuous body of an elongated flap to be continuously conveyed on a flap line, forming one pair of fold-back parts which can be folded back in a conveyance direction of the flap line and an opposite direction to the conveyance direction, and disposing engagement members which can be engaged with another one in a predetermined region, at a respective one of said one pair of fold-back parts; and

a joining step of joining a continuous body of the flap and a continuous body of the front waistline member or a continuous body of the back waistline member so that a respective one of regions configuring said one flap corresponds to a respective one of regions configuring said one absorbent article of the front waistline member or the back waistline member.

21. The method for manufacturing absorbent articles, as set forth in claim 20, wherein:

in the fold-back part forming step, said one pair of fold-back parts are formed by at least one of a first notched part and a first cutout part formed along a direction crossing the conveyance direction of the flap line and at least one of a second notched part and a second cutout part formed along the conveyance direction of the flap line.

22. The method for manufacturing absorbent articles, as set forth in claim 20, wherein:

in the joining step, a respective one of the engagement members which is disposed at a respective one of said one pair of fold-back parts, is engagingly stopped at the continuous body of the front waistline member or the back waistline member.

23. The method for manufacturing absorbent articles, as set forth in claim 20, comprising

a crotch member disposition step of disposing the crotch member so as to be spaced from each other in a conveyance direction of the main body line, between an elongated front waistline member continuous body and an elongated back waistline continuous body to be continuously conveyed on a main body line.

24. The method for manufacturing absorbent articles, as set forth in claim 20, wherein,

in the joining step, the continuous body of the flap and the continuous body of the front waistline member or the back waistline member are joined with each other.

25. The method for manufacturing absorbent articles, as set forth in claim 20, wherein,

in the joining step, the continuous body of the flap and the continuous body of the front waistline member or the back waistline member are joined with each other so that a respective one of the flaps covers end parts of an absorber main body placed on the crotch member.

26. The method for manufacturing absorbent articles, as set forth in claim 20, comprising

a waistline member cutting step of cutting the continuous body of the front waistline member and the continuous body of the back waistline member so that a length of the front waistline member in a widthwise direction of the absorbent article is equal to a length of the back waistline member in a widthwise direction of the absorbent article.

27. A device for manufacturing absorbent articles, a respective absorbent articles provided with a

front waistline member, a back waistline member, and crotch member connecting the front waistline member and the back waistline member to each other, said device comprising:

an engagement member disposition mechanism configured to dispose engagement members which can be engaged with another one in a predetermined region, in a continuous body of an elongated flap to be continuously conveyed on a flap line;

a fold-back part forming mechanism configured to form one pair of fold-back parts which can be folded back in a conveyance direction and an opposite direction to the conveyance direction of the flap line in part of a region configuring one flap in a continuous body of the flap; and

a joining mechanism configured to join a continuous body of the flap and a continuous body of the front waistline member or a continuous body of the back waistline member so that a respective one of regions configuring said one flap corresponds to a respective one of regions configuring said one absorbent article of the front waistline member or the back waistline member.