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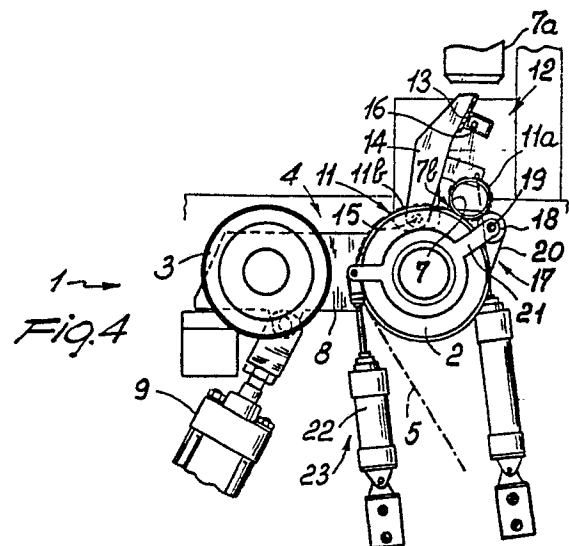
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Device and process for winding an initial edge of a fabric.

It is provided a device for winding an initial edge of a fabric, including: two winding cylinders (2, 3) establishing an operating zone (4) between one another for the formation of a roll (6) of fabric, external to said operating zone (4) developing an initial fabric edge (11), feeding members (7a) suitable for locating a tubular element (7) into a first feeding position (7b) external to said operating zone (4) and in contact to said initial edge (11), lifting means (12) suitable for turning said initial edge (11) onto said tubular element (7) in said first position (7b) and thrust means (17) suitable for rolling said tubular element (7) from said first position (7b) until said operating zone (4). The process includes a first partial pre-winding of the fabric by the turning of said initial edge (11) onto said tubular element (7) in static position, and a following second pre-winding by means of the rotation/ traverse of said tubular element (7) from said first position (7a) to said operating zone (4).



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DEVICE AND PROCESS FOR WINDING AN INITIAL EDGE OF A FABRIC

The present invention has the scope of supplying a device and a process for winding an initial edge of a fabric and refers to the technical field of machines for automatic winding of fabrics and cloths.

As it is well-known actually the winding of the fabrics around tubular elements, generally made of cardboard, is carried out by means of machines including a couple of winding cylinders disposed parallel and not touching with one another, establishing an operating zone between one another in which the fabric to be wound is fed.

The tubular element is foreseen, e.g. for the fall progress into the above mentioned operating zone onto the winding cylinders and in contact therewith, for being rotated with respect to these last cylinders and forming a roll of fabric by means of following windings. At the start of the process, before making these windings, an initial edge or section of the fabric is locked onto the tubular element, e.g. by means of a bi-adhesive band.

The well-known technics generically described above shows an important drawback.

In fact the initial winding of the fabric is empirical and in many cases inadequate and unprecise. It is well-known that an unprecise winding of the initial edge, or showing creases, little pleats or overturnings causes a wide consequence onto the following turns that are wrapped around the tubular element made of cardboard.

During the unwinding phase of the fabric made for its use it is necessary in many cases to reject the folded or irregularly stretched fabric with obvious time and economic wastes.

In this situation the technical scope foreseen by the present invention is to provide a device and a process for winding an initial edge of a fabric that is really suitable for obviating the above mentioned drawbacks.

Within this technical scope an important aim of the invention is to supply a device and a process that allow to obtain a perfect winding of a fabric and in particular the winding of the initial edge thereof, avoiding the formation of irregular folds and stretches in this last edge.

The above mentioned technical and specified scopes are substantially obtained by means of a device used for winding an initial edge of a fabric including at least a first and a second rotating and flanked winding cylinders, establishing an operating zone between one another, in which zone a fabric roll is formed feeding members suitable for feeding a tubular element onto said fabric, and a cutting member of said fabric external to said operating zone, an initial fabric edge being unwound between

said cutting member and said operating zone, characterized in that said feeding members are located with respect to said first and second winding cylinder in a manner suitable for supplying said tubular element into a first position located external to said operating zone and in contact with said initial edge, and in that it is foreseen lifting means active onto said initial edge on the side of said cutting member and suitable for turning said initial edge onto said tubular element in said first position and thrust means active onto said tubular element and suitable for causing the rolling thereof from said first position until said operating zone.

The process for winding an initial fabric edge is characterized in that it includes: the installation of a tubular element in a first position overlapped to an initial edge of a fabric to be wound and external to the operating zone for the winding of the said fabric; the fulfilment of a first partial prewinding of said fabric onto said tubular element by the turning of a part of said initial edge onto said initial edge, let in a substantially static position; and the fulfilment of a following prewinding of said fabric onto said tubular element from said first position to said operating zone by means of rotation/traverse.

Further characteristics of the invention shall be shown by the following description of a preferred but not limited fulfilment form of a device and a process for winding an initial edge of a fabric, made making reference to the annexed drawing tables, in which:

Figure 1 is a lateral view of the device according to the invention;

Figures 2, 3 and 4 show in sequence the positions of the device corresponding to the first work phases;

Figure 4a shows in perspective view a part of the device shown in Figure 1;

Figure 5 shows a following work position of the device; and

Figure 6 shows a plan view of a part of the device of Figure 1.

With reference to the above mentioned figures the device according to the invention is generally indicated with the reference number **1**. It includes a first winding cylinder **2** and a second winding cylinder **3**, establishing an operating zone **4** between one another, corresponding to the feeding zone of fabric **5** to be wound.

The winding cylinders **2** and **3** are suitable for supporting a fabric roll **6** wound around a tubular element **7** generally made of cardboard

The second winding cylinder **3** is supported by a bracket **8** turning around the axle of the first winding cylinder **2** and driven by the pneumatic

cylinder 9, for ejecting the fabric roll 6 from the operating zone 4 by the lifting thereof, when the winding is completed.

A cutting member 10 is foreseen on the side of the first winding cylinder 2, externally to the operating zone 4.

Therefore the fabric 5 shows an initial edge 11 defined by the fabric section unwinding, during the cutting phase from the cutting member 10 until the operating zone 4.

The device 1 foresees feeding members 7a of the tubular element 10 that are well known and represented in the Figures 1 and 4 with the schematic illustration of a feeding orifice, by which each tubular element 7 is supplied by simple fall.

According to the invention, the feeding members 7a are located in a manner suitable for adjusting a first position 7b (illustrated in Figure 2) of the tubular element 7 onto the initial edge 11 bearing onto the first winding cylinder 2, externally to the operating zone 4. In practice the tubular element 7 is oriented parallel to the main axle 2a of the first winding cylinder 2.

Some lifting means 12 are suitable for fulfilling a first prewinding of the initial edge 11 around the tubular element 7 by the lifting of the related initial edge 11. The lifting means 12 include a crosspiece 13, made substantially by a plate element parallel to the tubular element 7 and adjacent therewith, housed in rest position under the initial edge 11 (Figure 2) and driving members 14, established by arms joined to the plate element 13, turning around a rotation axle 15 parallel to the tubular element 7 and disposed on the side of the first winding cylinder 2.

The arms 14 are suitable for lifting the plate element from a rest position, in which this last element is located substantially tangential to the first winding cylinder 2, to a lifted position (Figure 4) in which the same plate element is located substantially in radial direction with respect to the first winding cylinder 2.

Practically the arms 14 lift the plate element 13 along a trajectory adjacent to the surface of the tubular crosspiece 7, located statically into the above mentioned first position 7b, in a manner suitable for winding around this last tubular element a first part 11a of the initial edge 11 included between the cutting member 10 and the tubular element 7

It must be noticed that a substantial section of the first part 11a is supported by the same crosspiece 13.

Suitably the lifting means 12 include blowing members 16 joined to the crosspiece 13, directed to the lower face of the initial edge 11 and positioned thereunder, extending substantially along all the width of the crosspiece 13 in a direction par-

allel to the winding cylinders 2 and 3.

The lifting means 12 can also include the mechanical members for positioning and pressing the initial edge 11 onto the tubular element 7, e.g. made-up of pressure cylinders that operate for a short time pressing some shaped ends towards the tubular element 7. These ends can push and position correctly the more rigid fabrics, such as e.g. the fabrics foreseen for the manufacture of tents and curtains, against the tubular element.

Further the device 1 foresees thrust means 17, suitable for fulfilling a second pre-winding of the initial edge 11 onto the tubular element 7, used on this last tubular element for causing a rotation/traverse thereof along the surface of the first winding cylinder 2, until a final position in conjunction to the operating zone 4.

The thrust means 17 include a contact body 18, including at least a roll located near the tubular element 7 and parallel thereto and driven rotatably around its axle 19, on which it is mounted idle, by a fixed belt 20, partially wound around the axle and the partially wound around the first winding cylinder 2. The contact body 18 is suitable for causing the tubular element 7 to apply tangential thrusts that cause the above mentioned rotation/traverse, for winding therearound a second part 11b of the initial edge 11, included between the first position 7b and the operating zone 4.

Further the thrust means 12 include some oscillating members 23 formed by lever elements 21, rotatably hinged around the main axle 2a of the first winding cylinder 2 and driven by a pneumatic cylinder 22. The lever elements 21 support the said roll at one end and allow the traverse thereof between an initial position, adjacent to the first position (7b) of the tubular element 7 (Figure 4) to a final position in conjunction to an intermediate position of the tubular element 7 (Figure 5) near to the operating zone 4. From the intermediate position the tubular element 7 goes ahead by inertia and gravity forces, making a rotation/traverse onto the first winding cylinder 2 until the centre of the operating zone 4 (Figure 5).

The running of the device 1, that was described above mainly under the structural point of view, occurs as follows.

After having made the former winding of the fabric 5 and ejected the fabric roll 6 from the device 1 by the bracket 8, the cutting of fabric 5 is made using the cutting member 10.

In this manner it is established the initial edge 11, supported at least partially by the crosspiece 13.

A new tubular element 7 is brought into the first position 7b thereof (Figure 2) by means of the feeding members 7b by simple fall. Then the crosspiece 13 is lifted in cooperation with the blowing

members 16, making a first pre-winding of the first part 11a of the initial edge 11 around the tubular element 7. The movement of the arms 14 and the air cause the stretch of the fabric onto the tubular element 7 avoiding the formation of creases.

Then it is completed the pre-winding by the contact body 18 that causes the rolling of the tubular element 7 towards the operating zone 4. This last tubular element 7 is caused to rotate and traverse onto the winding cylinder 2.

It must be underlined that the translation of the tubular element 7 towards the operating zone 4 occurs by means of a contact body rotatably driven by the belt 20. In this manner the initial edge 11 is not submitted to irregular stretches or to wrappings in the area loaned onto the first winding cylinder 2.

The device according to the invention fulfils a process, that belongs to the invention too.

The process foresees that at first (Figure 2) a tubular element 7 is located in a first position 7a overlapped to an initial edge 11 of a fabric 5 to be wound and external to an operating zone 4 for winding the said fabric 5.

The first position 7a is foreseen substantially intermediate between the operating zone 4 and a first part 11a of the initial edge 11, supplied with free end.

Then it is made a first partial pre-winding onto the tubular element (Figures 3 and 4) letting the said tubular element in a static position and turning the first part 11a thereonto.

In particular the first pre-winding is carried out locating the first part 11a in free bearing onto a crosspiece 13 and moving the crosspiece 13 from a position flanked to the tubular element 7 and a position substantially overlapped to the tubular element 7, until the complete sliding of the first part 11a onto the tubular element 7.

At last it is made a second pre-winding of the fabric 5 onto the tubular element 7 by the rotation/traverse of the said tubular element onto the initial edge 11 from the first position 7a to the operating zone 4.

In particular the second pre-winding is carried out applying thrusts substantially tangential to the surface of the tubular element 7, tending to turn the same tubular element.

We underline that during the rotation/traverse of the tubular element 7, the translation is the consequence of the rotation and the viceversa is not true.

The rotation stretches the fabric 5 and causes by reaction a translation only when the fabric is well stretched.

Claims

5 1) A device for winding an initial edge of a fabric, including at least a first and a second rotating and flanked winding cylinder (2, 3), establishing an operating zone (4) between one another, in which zone a roll (6) of fabric (5) is formed, feeding members (7a) suitable for feeding a tubular element (7) onto said fabric (5), and a cutting member (10) of said fabric (5) external to said operating zone (4), an initial edge (11) of fabric (5) being unwound between said cutting member (10) and said operating zone (4),

10 -characterized in that said feeding members (7a) are located with respect to said first and second winding cylinder (2, 3) in a manner suitable for supplying said tubular element (7) into a first position located external to said operating zone (4) and in contact with said initial edge (11),

15 -and in that it is foreseen lifting means (12) active onto said initial edge (11) on the side of said cutting member (10) and suitable for turning said initial edge (11) onto said tubular element (7) in said first position (7b),

20 -and thrust means (17) active onto said tubular element (7) and suitable for causing the rolling thereof from said first position (7b) until said operating zone (4).

25 2) A device according to Claim 1, characterized in that said lifting means (12) include a crosspiece (13), parallel to said tubular element (7) and located between said tubular element, in said first position (7b), and said cutting member (10), said crosspiece (13) being housed in rest position under said initial edge (11) and driving members (14) of said crosspiece (13) being suitable for lifting the same crosspiece along a trajectory adjacent to said tubular element (7) in said first position (7b).

30 3) A device according to Claim 2, characterized in that said crosspiece (13) is provided with a plate element suitable for supporting a part of said initial edge (11) and in which said driving elements (14) are made up of arms joined to said crosspiece (13) and turning around a rotation axle (15) parallel to said tubular element (7).

35 4) A device according to Claim 1, characterized in that said lifting means (12) include blowing members (16) located under said initial edge (11) and directed towards said initial edge (11).

40 5) A device according to Claim 4, characterized in that said blowing members (16) are mobile along a trajectory substantially adjacent to said tubular element (7) in a manner suitable for winding around this last element a first part (11a) of said initial edge (11) included between said cutting member (10) and said tubular element (7).

45 6) A device according to Claims 2 and 6, characterized in that said blowing members (6) are joined to said crosspiece (13) and mobile therewith.

50 7) A device according to Claim 1, character-

ized in that said thrust means (17) include at least a contact body (18) defined by at least a roll located near said tubular element (7) and rotating around an axle (19) parallel to said tubular element (7), said contact body (18) being suitable for causing said tubular element (7) to apply tangential thrusts onto the said tubular element (7) and oscillating members (23) suitable for translating said contact body (18) from an initial position adjacent to said first position (7b) to an end position near said operating zone (4) in a manner suitable for moving said tubular element (7) towards said operating zone (4).

8) A device according to Claim 7, characterized in that said oscillating members (23) include at least a lever element (21) rotatably hinged onto the axle of said first winding cylinder (2) and rotatably sustaining said contact body (18) and at least a drive cylinder (22) suitable for causing the oscillation of said lever element (21) in a manner suitable for translating said contact body (18) between said initial and final position, and in that said contact body (18) is driven rotatably by means of a fixed belt (20) foreseen at least between said initial position and said final position of said contact body (18) and partially wound onto one end thereof.

9) A process for winding an initial fabric edge, characterized in that it includes:

- the installation of a tubular element (7) in a first position (7a) overlapped to an initial edge (1) of a fabric (5) to be wound and external to an operating zone (4) for the winding of said fabric (5);
- the fulfilment of a first partial pre-winding of said fabric (5) onto said tubular element (7) by means of the turning of a part of said initial edge (11) onto said tubular element (7), let in substantially static position;
- and the fulfilment of a following second pre-winding of said fabric (5) onto said tubular element (7) by the rotation/traverse of said tubular element (7) from said first position (7a) to said operating zone (4).

10) A process according to Claim 9, characterized in that said first pre-winding is made locating said initial edge (11) in free bearing onto a crosspiece (13) and by the traverse of said crosspiece (13) from a position flanked to said tubular element (7) until a position substantially overlapped to said tubular element (7) until the sliding of said initial edge (11) that is lifted over said tubular element (7).

11) A process according to Claim 9, characterized in that said second pre-winding is made applying thrusts substantially tangential to the surface of said tubular element (7) causing the turning of the same tubular element (7).

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