

Description

The present invention generally relates to a method and apparatus for manufacturing a slide fastener chain, for use on ski wear, sports wear, other types of clothing, baggage etc., and particularly to a method of manufacturing a slide fastener chain having letters, marks or any other pattern applied to the slide fastener tapes.

Although it is theoretically possible to print or dye any desired patterns, letters or marks onto the slide fastener tapes of a finished slide fastener, in reality this method is very difficult, if not impossible, to apply because the finished slide fastener includes fastener element rows attached to its fastener tapes. For this reason, it is usual for the desired patterns to be either woven into the continuous fastener tapes by such means as Dobby weave or Jacquard weave during the weaving thereof, or printed or dyed on to the continuous fastener tapes before the fastener element rows are attached to said continuous fastener tapes.

However, this conventional method suffers from a disadvantage—the patterns on the opposing continuous fastener tapes tend to be mismatched with each other. Such a mismatch of patterns is not conspicuous if the patterns are small, but if they are large the mismatch stands out, and looks unsightly. Furthermore, if complementary halves of a letter are provided, one half on each of the opposing fastener tapes, a serious mismatch of the letter halves will result in unreadable letters. One source of mismatch of the patterns is intrinsic variations in the stretchability of fabric fastener tapes, and another source is variations in the respective feeding speeds of the opposing fastener tapes caused by various mechanical and physical factors. Since mismatch from these sources is unavoidable, it is considered to be very difficult, if not impossible, to produce a fastener chain with matching patterns applied to the opposing fastener tapes.

With the foregoing difficulties in mind, it is therefore an object of the present invention to provide a method of manufacturing a continuous slide fastener chain which includes a pair of continuous opposing fastener tapes having their respective patterns matched with each other.

According to the present invention, there is provided a method of and apparatus for manufacturing a continuous slide fastener chain as claimed in Claims 1 and 3 respectively; reference is directed to Claims 1 to 4.

Many advantages and features of the present invention will become apparent to those versed in the art, upon making reference to the detailed description and the accompanying drawings in which some preferred structural embodiments incorporating the principles of the present invention

are shown by way of illustrative example.

FIG. 1 is a fragmentary perspective view of an apparatus which is used to practise a method according to the present invention;

FIG. 2 is a block diagram of a control means incorporated in the apparatus of FIG. 1;

FIG. 3 is a time chart showing an example of the output signals generated when a corresponding pair of left and right alignment markers is detected;

FIG. 4(A), 4(B) and 4(C) are enlarged fragmentary perspective views of a slide fastener chain of the concealed type, showing consequential steps of coupling the slide fastener chain;

FIG. 5 is a view similar to FIG. 1 but shows an apparatus according to another embodiment of the present invention;

FIG. 6 shows how an image sensor detects the corresponding pair of left and right alignment markers;

FIG. 7 is a view similar to FIG. 4(C) but shows another example of a continuous slide fastener chain other than the one shown in FIGS. 4(A), 4(B) and 4(C);

FIG. 8 is a view similar to FIG. 1 but shows an apparatus according to another embodiment of the present invention;

FIG. 9 is a fragmentary perspective view of an apparatus according to yet another embodiment of the present invention; and

FIG. 10 is an enlarged fragmentary perspective view of a continuous slide fastener chain manufactured with the apparatus shown in FIG. 9.

FIG. 4(C) shows a fragment of a concealed type slide fastener chain 1A manufactured in accordance with a method according to the present invention. The slide fastener chain 1A comprises a pair of continuous fastener tapes 2, 3 and two rows of interlocking fastener elements 4, 5 sewn to and along the respective folded longitudinal edges 2', 3' thereof. As is better shown in FIG. 4(B), the opposed fastener tapes 2, 3 bear complementary pattern halves 6', 6'', respectively, which produce a single complete pattern 6 when the slide fastener chain 1A is closed, as is shown in FIG. 4(C). As is shown in FIG. 4(A), when manufacturing the slide fastener chain 1A, the fastener tapes 2, 3 having the complementary pattern halves (not visible) on their respective front surfaces are fed in side-by-side with their front surfaces facing downwards; two rows of plastic coiled fastener elements 4, 5 are sewn to the downward-facing front surfaces of the fastener tapes 2, 3 along the inner longitudinal edges 2', 3' thereof; then, the element-carrying edges 2', 3' originally directed downwards are folded upwards over the upward-facing rear surfaces of the fastener tapes 2, 3.

The desired pattern 6 may be woven into the fastener tapes 2, 3 while said fastener tapes are being woven, using Dobby machines or Jacquard machines. Alternatively, after the fastener tapes 2, 3 have been woven or knitted, they may be provided with the desired pattern 6 through printing or dyeing, etc.

FIG. 1 shows an apparatus which is used to practise the method according to the present invention in order to manufacture the slide fastener chain 1A shown in FIG. 4(A).

As is better shown in FIG. 4(A), two series of corresponding alignment markers 8, 9 are applied at intervals longitudinally to the respective fastener tapes 2, 3 on their rear surfaces. The alignment markers 8, 9 may be applied to the fastener tapes 2, 3 after the pattern halves 6', 6' have been provided thereon, but more preferably said alignment markers and the pattern halves (6', 6') are concurrently provided thereon. In any event, the pattern halves 6', 6' must be exactly matched with each other when the alignment markers 8, 9 are applied to the respective slide fastener tapes 2, 3. Furthermore, it is most preferable to apply the alignment markers 8, 9 along the opposing inner longitudinal edges 2', 3', of the fastener tapes 2, 3 as shown in FIG. 4(A). This is because, as the fastener element rows 4, 5 are sewn to the longitudinal edges 2', 3' with the stitches 7, the opposed longitudinal edges 2', 3' are inclined to contract independently from each other due to the stitching, thereby bringing the alignment markers 8, 9 out of register with each other.

FIG. 1 shows part of an apparatus to be used to practise the present invention. As shown in FIG. 1, the continuous fastener tapes 2, 3 are fed intermittently along a horizontal path in side-by-side relation in the direction indicated by the arrow F, with the surfaces bearing the alignment markers 8, 9 facing upwards. From upstream to downstream, the apparatus broadly comprises a guide roller 23, a pair of restraining means 15, 15', detecting means 22 comprising a pair of left and right photosensors 22a, 22b, a fastener element-attaching station 10, and feeding means 19. The restraining means 15, 15' each comprise an upper and a lower brake roller 11, 12; 13, 14 disposed perpendicularly to the horizontal path and an electromagnetic brake 16; 16' disposed by the outer side of the upper roller 11, 13. Each pair of an upper and a lower brake roller 11, 12; 13, 14 are normally forced towards each other to a predetermined extent to hold the continuous fastener tapes 2, 3 under tension therebetween. The electromagnetic brakes, 16, 16' are mounted on the respective brackets 40, 41 connected to a base frame (not shown) of the apparatus and are adapted to brake the upper rollers 11, 13 by means of a voltage

controlled as shown in FIG. 2 so as to restrain the rate of feed of the slide fastener tapes 2, 3. The restraining means 15, 15' are thus adapted to adjust the rates of feed of the right and left fastener tapes 2, 3 independently from each other. Alternatively, the electromagnetic brakes 16, 16' may be mounted by the outer sides of the lower brake rollers 12 and 14.

The braking forces imparted to the right and left brake rollers 11, 12; 13, 14 are adjusted as shown in FIGS. 2 and 3; that is, as soon as the left and right photosensors 22a, 22b detect the alignment markers 8, 9, said photosensors generate the pulse signals MSL, MSR, respectively. The said pulse signals, are input into a main control unit 24. The main control unit 24 comprises a comparator circuit 26 equipped with a timer 25 and an operation circuit 27 which is activated by the pulse signals MSL and MSR. The outputs of the operation circuit 27 are input into the operational amplifiers 28, 29, and the braking forces of the electromagnetic brakes 16, 16' are adjusted by the outputs of said amplifiers.

FIG. 3 shows a time chart of the pulse signals MSL, MSR generated by the sensors 22a, 22b when they detect the alignment markers 8, 9. If the pulse signals MSL, MSR generated by the photosensors 22a, 22b are input into the main control unit 24 concurrently, then said control unit is not activated. However, if, as is indicated by the point B in FIG. 3, the pulse signal MSR is delayed relative to the pulse signal MSL by a lag E, then the timer 25 is activated by the leading pulse signal MSL and said timer is stopped by the following pulse signal MSR. The lag E is converted into delay time by the comparator circuit 26. A pulse signal having a duration equivalent to the delay time is output by the comparator 26 and input into the operation circuit 27. Next, the operation circuit 27 converts the lag E into a voltage. In order to cause a delay to the fastener tape 2 corresponding to the lag E, the voltage signal from the operation amplifier 28 controls the electromagnetic brake 16 for the fastener tape 2 whose alignment marker 8 was detected earlier. An analogous procedure ensues if the pulse signal MSL is delayed relative to the pulse signal MSR.

The braking-force-control is effected such that, when the alignment markers 8, 9 come out of register with each other, the braking force is imparted to the brake rollers 11, 12; 13, 14. If the braking force were imparted too suddenly, the fastener tapes 2, 3 would be subjected to severe tension and said fastener tapes 2, 3 might be inclined to stretch detrimentally. Therefore, the outputs into the electromagnetic brakes 16, 16' should not be applied suddenly but should gradually rise to their target values. To achieve this, the operation

circuit 27 contains a fuzzy control circuit (not shown) in which various control algorithms are expressed in if-then-form. Through the fuzzy control circuit, the braking forces are imparted gradually to the fastener tapes 2, 3. Furthermore, if the fastener tapes 2, 3 are subjected to unexpected stresses, the fuzzy control circuit can advantageously control said stresses.

In FIG. 1, the element-attaching station 10 comprises a machine body (not shown) disposed above the horizontal path and a pair of needles 20, 21 mounted thereon so as to vertically reciprocate in and out of the fastener tapes 2, 3 for sewing the two rows of fastener elements 4, 5 along the inner longitudinal edges 2', 3' of the fastener tapes 2, 3. While the needles 20, 21 descend to effect stitches 7, the fastener tapes 2, 3 halt, but while the needles 20, 21 rise out of the fastener tapes 2, 3, said fastener tapes are fed subtly; thus the fastener tapes are fed intermittently.

The guide roller 23 is disposed a little way upstream from the brake rollers 11, 12; 13, 14 and guides the two rows of fastener elements 4, 5 around itself, and then between the lower brake rollers 12, 14 towards the fastener attaching station 10.

The feeding means 19 comprises an upper and a lower feeding roller 19', 19' which are disposed vertically to the horizontal path so as to hold the fastener tapes 2, 3 therebetween. The feeding rollers 19', 19' have axially central respective peripheral driving gears 17, 18. These peripheral driving gears 17, 18 are intermeshed with each other and rotate in opposite directions to feed the fastener tapes 2, 3 between the feeding rollers 19', 19'.

FIG. 7 shows a slide fastener chain 1B comprising a pair of fastener tapes 2, 3 having on their respective front surfaces independent patterns 6a and 6b which are symmetric to each other relative to the coupled element rows 4, 5. The slide fastener chain 1B may be manufactured with the apparatus shown in FIG. 1.

As seen in FIG. 5, two series of alignment markers 8, 9 are attached at intervals along the opposing inner longitudinal edges 2', 3', on the rear surfaces of the fastener tapes 2, 3 in such a manner that the two series of alignment markers 8, 9 are disposed in register with each other when the patterns 6a, 6b on the front surface are matched with each other. In this embodiment, instead of the two photosensors 22a, 22b, a single photosensor 22c is used as a means to detect the two alignment markers 8, 9 on both fastener tapes 2, 3 together. FIG. 6 shows how the photosensor 22c detects a lag E' between the alignment markers 8, 9 on the opposing fastener tapes 2, 3. As an alternative in this embodiment, two photosensors may be used, one for each fastener tape. Further-

more, in this embodiment, instead of the two pairs of brake rollers 11, 12; 13, 14, a pair of presser feet 32, 33 and corresponding ground plates 30, 31 are employed as restraining means 15, 16 to restrain the slide fasteners 2, 3. Each presser foot 32, 33 comprises a base rod 34', 35', a presser foot proper 32', 33' reciprocative axially of said base rod and a compression spring 34, 35 acting between said base rod and said presser foot proper so as to force said presser foot proper downwards. Consequently, the presser feet proper 32', 33' press the slide fastener tapes 2, 3 against the ground plates 30, 31 respectively, to thereby restrain said fastener tapes.

FIG. 8 shows still another embodiment of the present invention. In contrast to the preceding embodiments, the fastener tapes 2, 3 are fed horizontally with the pattern-bearing surfaces 6a, 6b facing upwards. Two series of alignment markers 8, 9 are applied at intervals along the respective opposing inner longitudinal edges 2', 3' of the fastener tapes 2, 3, such that the alignment markers 8, 9 on said fastener tapes are in register with each other when the patterns 6a, 6b on the fastener tapes 2, 3 are exactly matched with each other. In contrast to the preceding embodiments, the fastener elements rows 4, 5 are fed downwards.

A slide fastener chain 1C shown in FIG. 10 is manufactured in the following way. As is shown in FIG. 9, a continuous metal wire 38 whose cross-section is substantially U-shape is sliced into individual metal elements 39. Then, the thus-formed elements 39, 39 are clamped to the beaded edge 36 provided along the inner longitudinal edges 2', 3' of the fastener tapes 2, 3. Thereafter, the beaded edge 36 is folded flat over the rear surface of the fastener tape 2, 3, so that a concealed type slide fastener chain 1C is produced as shown in FIG. 10. Complementary pattern halves 6', 6' are provided on the respective front surfaces of the opposing fastener tapes 2, 3. As shown in FIG. 9, a pair of fastener tapes 2, 3 are fed vertically downwards with their front surfaces mutually parallel and facing each other. A pair of photosensors 22a, 22b are disposed in opposed relation to each other, with the two fastener tapes 2, 3 fed therebetween. Two series of alignment markers 8, 9 (the series 8 is omitted from FIG. 9 for clarity) are provided on the rear surface of the fastener tapes 2, 3 adjacent to the beaded edges 36, 36.

With the method according to the present invention set forth hereinabove, the following advantages are obtained.

Since the two fastener tapes are fed in a controlled manner such that the respective series of alignment markers on the fastener tapes are disposed in register with each other at all times, patterns provided on the fastener tapes are com-

pletely exempt from mismatching.

Furthermore, if alignment markers are provided along the inner longitudinal edge of a fastener tape, which is the edge most susceptible to mechanically and physically caused mismatching of the patterns, the preciseness of matching patterns on the opposed fastener tapes will be enhanced.

Obviously, various modifications and variations of the present invention are possible in light of the above description. It is therefore to be understood that, within the scope of the appended claims, the invention may be practised otherwise than as specifically described.

Claims

1. A method of manufacturing a slide fastener chain including a pair of continuous fastener tapes (2, 3) having their respective patterns (6', 6', 6a, 6b) matched with each other and two rows of continuous fastener elements (4, 5) mounted along the inner longitudinal edges (2', 3') of said fastener tapes, the method comprising the steps of:

feeding the opposing continuous fastener tapes (2, 3) bearing their respective patterns (6', 6', 6a, 6b) side-by-side towards an element-attaching station (10); and attaching the two rows of continuous fastener elements (4, 5) to the inner longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) at the element-attaching station; characterized in that the method further includes:

(a) applying two series of corresponding alignment markers (8, 9) to the continuous fastener tapes (2, 3) at intervals longitudinally thereof while said tapes have their respective patterns (6', 6', 6a, 6b) matched with each other;

(b) detecting the corresponding alignment markers (8, 9) during the feed of the opposing continuous fastener tapes (2, 3); and

(c) controlling the respective rates of feed of the opposing fastener tapes (2, 3) in such a way as to let said fastener tapes continue to feed if the corresponding alignment markers (8, 9) prove to be in register with each other, and to restrain the rate of feed of the leading fastener tape (2) so as to bring the corresponding alignment markers (8, 9) into register, if the corresponding alignment markers (8, 9) prove to be out of register with each other; and in that:

the attachment of the two rows of continuous fastener elements (4, 5) to the longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) is effected with the alignment markers (8, 9) in register with each

other.

2. A method according to claim 1, the two series of alignment markers (8, 9) being applied to the respective inner longitudinal edges (2', 3') of the continuous fastener tapes (2, 3).

3. Apparatus for manufacturing a slide fastener chain including a pair of continuous fastener tapes (2, 3) having their respective patterns (6', 6', 6a, 6b) matched with each other and two rows of continuous fastener elements (4, 5) mounted along the inner longitudinal edges (2', 3') of said fastener tapes, the apparatus comprising: means for feeding the opposing continuous fastener tapes (2, 3) bearing their respective patterns (6', 6', 6a, 6b) side-by-side towards an element-attaching station (10); and means for attaching the two rows of continuous fastener elements (4, 5) to the inner longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) at the element-attaching station; characterized in that the apparatus further includes:

(a) means for applying two series of corresponding alignment markers (8, 9) to the continuous fastener tapes (2, 3) at intervals longitudinally thereof while said tapes have their respective patterns (6', 6', 6a, 6b) matched with each other;

(b) detector means for detecting the corresponding alignment markers (8, 9) during the feed of the opposing continuous fastener tapes (2, 3);

(c) control means for automatically controlling the respective rates of feed of the opposing fastener tapes (2, 3), said control means being operative in such a way as to let said fastener tapes continue to feed if the corresponding alignment markers (8, 9) prove to be in register with each other, and said control means being operative to restrain the rate of feed of the leading fastener tape (2) so as to bring the corresponding alignment markers (8, 9) into register, if the corresponding alignment markers (8, 9) are detected by said detector means to be out of register with each other; and

means for attaching the two rows of continuous fastener elements (4, 5) to the longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) with the alignment markers (8, 9) in register with each other.

4. Apparatus according to claim 3, wherein the means for applying the two series of alignment markers (8, 9) is adapted to apply them to the



pletely exempt from mismatching.

Furthermore, if alignment markers are provided along the inner longitudinal edge of a fastener tape, which is the edge most susceptible to mechanically and physically caused mismatching of the patterns, the preciseness of matching patterns on the opposed fastener tapes will be enhanced.

Obviously, various modifications and variations of the present invention are possible in light of the above description. It is therefore to be understood that, within the scope of the appended claims, the invention may be practised otherwise than as specifically described.

Claims

1. A method of manufacturing a slide fastener chain including a pair of continuous fastener tapes (2, 3) having their respective patterns (6', 6', 6a, 6b) matched with each other and two rows of continuous fastener elements (4, 5) mounted along the inner longitudinal edges (2', 3') of said fastener tapes, the method comprising the steps of:
 - feeding the opposing continuous fastener tapes (2, 3) bearing their respective patterns (6', 6', 6a, 6b) side-by-side towards an element-attaching station (10); and attaching the two rows of continuous fastener elements (4, 5) to the inner longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) at the element-attaching station; characterized in that the method further includes:
 - (a) applying two series of corresponding alignment markers (8, 9) to the continuous fastener tapes (2, 3) at intervals longitudinally thereof while said tapes have their respective patterns (6', 6', 6a, 6b) matched with each other;
 - (b) detecting the corresponding alignment markers (8, 9) during the feed of the opposing continuous fastener tapes (2, 3); and
 - (c) controlling the respective rates of feed of the opposing fastener tapes (2, 3) in such a way as to let said fastener tapes continue to feed if the corresponding alignment markers (8, 9) prove to be in register with each other, and to restrain the rate of feed of the leading fastener tape (2) so as to bring the corresponding alignment markers (8, 9) into register, if the corresponding alignment markers (8, 9) prove to be out of register with each other; and in that:
 - the attachment of the two rows of continuous fastener elements (4, 5) to the longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) is effected with the alignment markers (8, 9) in register with each

other.

2. A method according to claim 1, the two series of alignment markers (8, 9) being applied to the respective inner longitudinal edges (2', 3') of the continuous fastener tapes (2, 3).
3. Apparatus for manufacturing a slide fastener chain including a pair of continuous fastener tapes (2, 3) having their respective patterns (6', 6', 6a, 6b) matched with each other and two rows of continuous fastener elements (4, 5) mounted along the inner longitudinal edges (2', 3') of said fastener tapes, the apparatus comprising: means for feeding the opposing continuous fastener tapes (2, 3) bearing their respective patterns (6', 6', 6a, 6b) side-by-side towards an element-attaching station (10); and means for attaching the two rows of continuous fastener elements (4, 5) to the inner longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) at the element-attaching station; characterized in that the apparatus further includes:
 - (a) means for applying two series of corresponding alignment markers (8, 9) to the continuous fastener tapes (2, 3) at intervals longitudinally thereof while said tapes have their respective patterns (6', 6', 6a, 6b) matched with each other;
 - (b) detector means for detecting the corresponding alignment markers (8, 9) during the feed of the opposing continuous fastener tapes (2, 3);
 - (c) control means for automatically controlling the respective rates of feed of the opposing fastener tapes (2, 3), said control means being operative in such a way as to let said fastener tapes continue to feed if the corresponding alignment markers (8, 9) prove to be in register with each other, and said control means being operative to restrain the rate of feed of the leading fastener tape (2) so as to bring the corresponding alignment markers (8, 9) into register, if the corresponding alignment markers (8, 9) are detected by said detector means to be out of register with each other; and
 - means for attaching the two rows of continuous fastener elements (4, 5) to the longitudinal edges (2', 3') of the opposing fastener tapes (2, 3) with the alignment markers (8, 9) in register with each other.
4. Apparatus according to claim 3, wherein the means for applying the two series of alignment markers (8, 9) is adapted to apply them to the



respective inner longitudinal edges (2', 3') of the continuous fastener tapes (2, 3).

Patentansprüche

1. Verfahren zur Herstellung einer Reißverschlußkette mit zwei fortlaufenden Tragbändern (2, 3), deren jeweilige Muster (6', 6', 6a, 6b) zueinander ausgerichtet sind, und mit zwei fortlaufenden Kuppelgliederreihen (4, 5), die entlang den inneren Längsrändern (2', 3') der Tragbänder angebracht sind, wobei das Verfahren die Schritte umfaßt:

Zuführen der ihre jeweiligen Muster (6', 6', 6a, 6b) tragenden gegenüberliegenden fortlaufenden Tragbänder (2, 3) Seite an Seite zu einer Kuppelglieder-Anbringstation (10); und Anbringen der beiden fortlaufenden Kuppelgliederreihen (4, 5) an den inneren Längsrändern (2', 2') der gegenüberliegenden Tragbänder (2, 3) in der Kuppelglieder-Anbringstation; dadurch gekennzeichnet, daß das Verfahren ferner umfaßt:

- (a) Anbringen von zwei Reihen entsprechender Ausrichtmarkierungen (8, 9) an den fortlaufenden Tragbändern (2, 3) in Längsabständen derselben, während die jeweiligen Muster (6', 6', 6a, 6b) der Tragbänder zueinander ausgerichtet sind;
- (b) Ermitteln der zusammengehörigen Ausrichtmarkierungen (8, 9) während der Zuführung der gegenüberliegenden fortlaufenden Tragbänder (2, 3); und
- (c) Steuern der jeweiligen Zuführgeschwindigkeit der gegenüberliegenden Tragbänder (2, 3) derart, daß die Zuführung der Tragbänder fortgesetzt wird, wenn sich erweist, daß die zusammengehörigen Ausrichtmarkierungen (8, 9) miteinander fluchten, und daß die Zuführgeschwindigkeit des voreilenden Tragbandes (2) gedrosselt wird, um die zusammengehörigen Ausrichtmarkierungen (8, 9) zur Deckung zu bringen, wenn sich erweist, daß die zusammengehörigen Ausrichtmarkierungen (8, 9) nicht miteinander fluchten; und

daß die Befestigung der beiden fortlaufenden Kuppelgliederreihen (4, 5) an den Längsrändern (2', 3') der gegenüberliegenden Tragbänder (2, 3) durchgeführt wird, wobei die Ausrichtmarkierungen (8, 9) miteinander fluchten.

2. Verfahren nach Anspruch 1, wobei die zwei Reihen von Ausrichtmarkierungen (8, 9) an den jeweiligen inneren Längsrändern (2', 3') der fortlaufenden Tragbänder (2, 3) angebracht werden.

3. Vorrichtung zur Herstellung einer Reißverschlußkette mit zwei fortlaufenden Tragbändern (2, 3), deren jeweilige Muster (6', 6', 6a, 6b) zueinander ausgerichtet sind, und mit zwei fortlaufenden Kuppelgliederreihen (4, 5), die entlang den inneren Längsrändern (2', 3') der Tragbänder angebracht sind, wobei die Vorrichtung umfaßt: Mittel zum Zuführen der ihr jeweiligen Muster (6', 6', 6a, 6b) tragenden gegenüberliegenden fortlaufenden Tragbänder (2, 3) Seite an Seite zu einer Kuppelglieder-Anbringstation (10); und Mittel zum Anbringen der beiden fortlaufenden Kuppelgliederreihen (4, 5) an den inneren Längsrändern (2', 3') der gegenüberliegenden Tragbänder (2, 3) in der Kuppelglieder-Anbringstation; dadurch gekennzeichnet, daß die Vorrichtung ferner umfaßt:

- (a) Mittel zum Anbringen von zwei Reihen entsprechender Ausrichtmarkierungen (8, 9) an den fortlaufenden Tragbändern (2, 3) in Längsabständen derselben, während die jeweiligen Muster (6', 6', 6a, 6b) der Tragbänder zueinander ausgerichtet sind;
- (b) Detektormittel zur Ermittlung der zusammengehörigen Ausrichtmarkierungen (8, 9) während der Zuführung der gegenüberliegenden fortlaufenden Tragbänder (2, 3);
- (c) Steuermittel zur automatischen Steuerung der jeweiligen Zuführgeschwindigkeit der gegenüberliegenden Tragbänder (2, 3), wobei die Steuermittel derart wirksam sind, daß die Tragbänder weiterhin zugeführt werden, wenn sich erweist, daß die zusammengehörigen Ausrichtmarkierungen (8, 9) miteinander fluchten, und wobei die Steuermittel wirksam sind, die Zuführgeschwindigkeit des voreilenden Tragbandes (2) zu drosseln, um die zusammengehörigen Ausrichtmarkierungen (8, 9) zur Deckung zu bringen, wenn die Detektormittel feststellen, daß die zusammengehörigen Ausrichtmarkierungen (8, 9) nicht miteinander fluchten; und

Mittel zum Befestigen der beiden fortlaufenden Kuppelgliederreihen (4, 5) an den Längsrändern (2', 3') der gegenüberliegenden Tragbänder (2, 3), wobei die Ausrichtmarkierungen (8, 9) miteinander fluchten.

4. Vorrichtung nach Anspruch 3, wobei die Mittel zum Anbringen der zwei Reihen von Ausrichtmarkierungen (8, 9) geeignet sind, diese an den jeweiligen inneren Längsrändern (2', 3') der fortlaufenden Tragbänder (2, 3) anzubringen.



Revendications

1. Procédé de fabrication d'une chaîne de fermeture à glissière qui comprend une paire de rubans-supports (2, 3) continus, dont les motifs respectifs (6', 6'', 6a, 6b) coïncident l'un avec l'autre, et deux rangées d'éléments d'accouplement continu (4, 5) montées le long des bords longitudinaux intérieurs (2', 3') desdits rubans-supports, ledit procédé comprenant les étapes consistant à :

- amener les rubans-supports (2, 3) continus placés en vis-à-vis, qui portent leurs motifs respectifs (6', 6'', 6a, 6b), côte-à-côte en direction d'un poste (10) de fixation des éléments, et
- fixer, au niveau dudit poste (10) de fixation des éléments, les deux rangées d'éléments d'accouplement continu (4, 5) aux bords longitudinaux intérieurs (2', 3') desdits rubans-supports (2, 3) placés en vis-à-vis,

caractérisé en ce que le procédé comprend en outre :

- (a) l'application de deux séries de repères d'alignement correspondants (8, 9) sur les rubans-supports continus (2, 3) à certains intervalles dans le sens longitudinal de ceux-ci alors que lesdits rubans-supports ont leurs motifs respectifs (6', 6'', 6a, 6b) en coïncidence,
- (b) la détection des repères d'alignement correspondants (8, 9) pendant l'avancée des rubans-supports (2, 3) continus placés en vis-à-vis, et
- (c) la commande des vitesses respectives d'avancée des rubans-supports (2, 3) placés en vis-à-vis de manière à ce que lesdits rubans-supports continuent à avancer si les repères d'alignement correspondants (8, 9) s'avèrent être en coïncidence l'un avec l'autre et de manière à limiter la vitesse d'avancée du ruban-support qui est en avance (2) pour amener les repères d'alignement correspondants (8, 9) en coïncidence l'un avec l'autre si les repères d'alignement correspondants (8, 9) s'avèrent ne pas être en coïncidence l'un avec l'autre, et en ce que la fixation des deux rangées d'éléments d'accouplement continu (4, 5) aux bords longitudinaux intérieurs (2', 3') desdits rubans-supports (2, 3) placés en vis-à-vis est effectuée alors que les repères d'alignement correspondants (8, 9) sont en coïncidence l'un avec l'autre.

2. Procédé selon la revendication 1, dans lequel les deux séries de repères d'alignement (8, 9)

sont appliquées aux bords longitudinaux intérieurs respectifs (2', 3') des rubans-supports continus (2, 3).

3. Appareil de fabrication d'une chaîne de fermeture à glissière qui comprend une paire de rubans-supports (2, 3) continus, dont les motifs respectifs (6', 6'', 6a, 6b) coïncident l'un avec l'autre, et deux rangées d'éléments d'accouplement continu (4, 5) montées le long des bords longitudinaux intérieurs (2', 3') desdits rubans-supports,

ledit appareil comprenant :

- un moyen pour amener les rubans-supports (2, 3) continus placés en vis-à-vis, qui portent leurs motifs respectifs (6', 6'', 6a, 6b), côte-à-côte en direction d'un poste (10) de fixation des éléments, et
- un moyen pour fixer, au niveau dudit poste (10) de fixation des éléments, les deux rangées d'éléments d'accouplement continu (4, 5) aux bords longitudinaux intérieurs (2', 3') desdits rubans-supports (2, 3) placés en vis-à-vis,

caractérisé en ce que ledit appareil comprend en outre :

- (a) un moyen pour appliquer deux séries de repères d'alignement correspondants (8, 9) sur les rubans-supports continus (2, 3) à certains intervalles dans le sens longitudinal de ceux-ci alors que lesdits rubans-supports ont leurs motifs respectifs (6', 6'', 6a, 6b) en coïncidence,
- (b) un moyen de détection pour détecter les repères d'alignement correspondants (8, 9) pendant l'avancée des rubans-supports (2, 3) continus placés en vis-à-vis, et
- (c) un moyen de commande pour régler automatiquement les vitesses respectives d'avancée des rubans-supports (2, 3) placés en vis-à-vis, ledit moyen de commande agissant de manière à ce que lesdits rubans-supports continuent à avancer si les repères d'alignement correspondants (8, 9) s'avèrent être en coïncidence l'un avec l'autre et ledit moyen de commande agissant de manière à limiter la vitesse d'avancée du ruban-support qui est en avance (2) pour amener les repères d'alignement correspondants (8, 9) en coïncidence l'un avec l'autre si les repères d'alignement correspondants (8, 9) sont détectés par ledit moyen de détection comme n'étant pas en coïncidence l'un avec l'autre, et

- un moyen pour fixer les deux rangées d'éléments d'accouplement continu (4, 5) aux bords longitudinaux intérieurs (2', 3') desdits rubans-supports



(2, 3) placés en vis-à-vis avec les repères d'alignement correspondants (8, 9) en coïncidence l'un avec l'autre.

4. Appareil selon la revendication 3, dans lequel le moyen pour fixer les deux séries de repères d'alignement (8, 9) sont aptes à les appliquer aux bords longitudinaux intérieurs respectifs (2', 3') des rubans-supports continus (2, 3).

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