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(54) A METHOD OF PRODUCING A SLIDING CLASP
 FASTENER

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 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo,
 Japan, a corporation duly organized under the
 laws of Japan, do hereby declare the inven-
 tion, for which we pray that a patent may be
 granted to us, and the method by which it is
 to be performed, to be particularly described
 in and by the following statement:—

This invention relates to a method of pro-
 ducing a sliding clasp fastener comprising
 carrier tapes of a knitted structure, and is
 more particularly directed to a method in
 which a double row of inter-engaged fastener
 elements is sewn to a warp-knitted tape.

Known methods of this description include
 bringing two carrier tapes closely together
 in edge-to-edge abutting relation and laying
 two inter-engaged element rows on the tapes
 for sewing longitudinally along their abutted
 edges. However, there are always encountered
 some irregularities in the movement of carrier
 tapes while in transit from the supply roll to
 the sewing machine sometimes due to irregu-
 lar rotation of the roll, frictional resistance
 of the tape guides and other various operat-
 ing reasons. This would often result in irregu-
 larities in the pitch of fastener elements sewn
 on the tapes.

According to the invention there is pro-
 vided a method of producing a sliding clasp
 fastener, which method comprises the steps
 of:

- a) sewing two inter-engaged rows of
 fastener elements on a knitted double
 carrier tape with coupling head por-
 tions of said elements held in align-
 ment with a water-soluble seam ex-
 tending longitudinally and centrally
 thereof;
- b) dissolving said seam and thus separ-
 ating the said double carrier tape into
 identical halves along the said seam;
 and
- c) applying a slider and end stops on the
 thus separated stringer tapes, and cut-

ting the tapes to a desired product
 length.

The invention will be described by way
 of example with reference to the accompany-
 ing drawings in which:

Fig. 1 is a perspective view of a warp-
 knitted carrier tape for attaching fastener
 elements thereon in accordance with the inven-
 tion;

Fig. 2 is a perspective view of the tape
 to which two inter-engaged rows of elements
 are being sewn;

Fig. 3 is a perspective view of the tape
 carrying elements thereon and separated into
 two opposite stringers;

Fig. 4 is a perspective view of a sliding
 clasp fastener finished in accordance with
 the invention;

Fig. 5 is a diagrammatic view on enlarged
 scale of a knit pattern of a portion of the
 carrier tape used for making a sliding clasp
 fastener in accordance with the invention;

Fig. 6 is a perspective view of a tape of
 increased width for use in a method in accord-
 ance with the invention;

Fig. 7 is a view similar to Fig. 6 but
 showing the tape of Fig. 6 separated width-
 wise into a plurality of carrier tapes of a
 desired product width similar to the tape
 shown in Fig. 1; and

Fig. 8 is a diagrammatic view on enlarged
 scale of a knit pattern of a segment of the
 tape shown in Fig. 6.

Referring now to the drawings and Fig. 1
 in particular, there is shown a double carrier
 tape T made of a warp-knitted fabric and
 provided with a seam 10 of a water-soluble
 synthetic fiber such as polyvinyl alcohol.
 The seam 10 extends longitudinally and
 centrally of the carrier tape T and defines
 a separation line along which the tape is split
 into identical halves T₁ and T₂ in the manner
 hereinafter described. There is provided a
 weft thread 10b of any synthetic fiber which
 is soluble in contact with water, as shown in

Fig. 5, and which constitutes the above-mentioned seam 10.

A double row of elements, i.e. two rows E of fastener elements which have been previously interengaged, is applied on the carrier tape T with coupling head portions C of the engaged elements E_a held in alignment with the seam 10 and is thus sewn closely therealong with needles N carrying sewing threads 11 and extending from a sewing machine (not shown) in the manner illustrated in Fig. 2. More specifically, the two inter-engaged rows of elements are sewn onto the tape T with two parallel lines of stitching S running over leg portions L of the elements and extending in parallel with an opposite sides of the seam 10.

The double carrier tape T having inter-engaged rows of elements thus sewn therein is now immersed in water, preferably warm water, either pure or otherwise, whereupon the seam 10 is dissolved so as to separate the tape into identical stringer halves T₁, T₂ now having opposed edges 12 along which the rows of elements are secured, as shown in Fig. 3. The seam 10 may be conveniently dissolved by immersing the tape T in a dyeing bath or cleaning water bath usually provided in a fastener making factory.

The resulting fastener chain F is now provided, for each fastener, with slider 13 and end stops 14, 14' respectively, at predetermined intervals and cut to a desired product length as illustrated in Fig. 4.

Reference to Figs. 6, 7 and 8, inclusive, shows a modification of the carrier tape embodying the invention. As shown in Fig. 6, there is provided a relatively wide tape TS of a warp-knitted structure which is provided lengthwise with a plurality of alternate water soluble seams 10a, 10b which are dissolvable at two different temperatures. A suitable synthetic fiber may be treated so that it becomes water-soluble at a temperature of say about 65°C for use as a first group of seams 10a. Similarly, the second group seams 10b may be formed by a synthetic fiber which is water-soluble at about 90°C. These groups of seams alternate at predetermined intervals on the tape TS, and the first group 10a defines a plurality of separation line along which the wide tape is first separated into sections T_n by immersion in water at about 65°C, each of which sections constitutes a double carrier tape T similar to that which is shown in Fig. 1. Each tape-section T_n contains the second seam 10b which defines a separation line along which the inter-engaged rows of elements are secured to

the tape in the manner previously described. Thereafter, the double carrier tape T carrying the inter-engaged element rows is further immersed in water at 90°C thereby dissolving the second seam 10b and separating the tape into identical halves as above described.

It will be thus understood that the rate of production of fastener tapes of this character and hence complete product fasteners is increased manifoldly and that fastener elements can be mounted on the tapes without encountering objectionable irregularities in the element pitch.

The carrier tape of Figs. 6, 7 and 8 forms the subject matter of our copending Patent Application No. 17730/74 (Serial No. 1,370,150) to which reference is directed.

WHAT WE CLAIM IS:—

1. A method of producing a sliding clasp fastener which method comprises the steps of:

- a) sewing two inter-engaged rows of fastener elements on a knitted double carrier tape with coupling head portions of said elements held in alignment with a water-soluble seam extending longitudinally and centrally thereof;
- b) dissolving said seam and thus separating the said double carrier tape into identical halves along the said seam; and
- c) applying a slider and end stops on the thus separated stringer tapes, and cutting the tapes to a desired product length.

2. A method as claimed in claim 1 wherein said double carrier tape is initially separated from at least one other double carrier tape by dissolving at least one respective other water-soluble seam joining the at least one other double carrier tape to the first-mentioned double carrier tape.

3. A method as claimed in claim 2 wherein the temperature at which the or each other seam is dissolved is lower than the temperature at which the first-mentioned seam is dissolved.

4. A method as claimed in claim 3 wherein the or each other seam dissolves at about 65°C and the first-mentioned seam dissolves at about 60°C.

5. A method as claimed in any preceding claim wherein the or each seam is formed by a water-soluble synthetic fibre.

6. A method as claimed in claim 5 wherein said synthetic fibre is polyvinyl alcohol.

7. A method substantially as herein described.



Fig. 5, and which constitutes the above-mentioned seam 10.

A double row of elements, i.e. two rows E of fastener elements which have been previously interengaged, is applied on the carrier tape T with coupling head portions C of the engaged elements Ea held in alignment with the seam 10 and is thus sewn closely therealong with needles N carrying sewing threads 11 and extending from a sewing machine (not shown) in the manner illustrated in Fig. 2. More specifically, the two inter-engaged rows of elements are sewn onto the tape T with two parallel lines of stitching S running over leg portions L of the elements and extending in parallel with an opposite sides of the seam 10.

The double carrier tape T having inter-engaged rows of elements thus sewn therein is now immersed in water, preferably warm water, either pure or otherwise, whereupon the seam 10 is dissolved so as to separate the tape into identical stringer halves T₁, T₂ now having opposed edges 12 along which the rows of elements are secured, as shown in Fig. 3. The seam 10 may be conveniently dissolved by immersing the tape T in a dyeing bath or cleaning water bath usually provided in a fastener making factory.

The resulting fastener chain F is now provided, for each fastener, with slider 13 and end stops 14, 14' respectively, at predetermined intervals and cut to a desired product length as illustrated in Fig. 4.

Reference to Figs. 6, 7 and 8, inclusive, shows a modification of the carrier tape embodying the invention. As shown in Fig. 6, there is provided a relatively wide tape TS of a warp-knitted structure which is provided lengthwise with a plurality of alternate water soluble seams 10a, 10b which are dissolvable at two different temperatures. A suitable synthetic fiber may be treated so that it becomes water-soluble at a temperature of say about 65°C for use as a first group of seams 10a. Similarly, the second group seams 10b may be formed by a synthetic fiber which is water-soluble at about 90°C. These groups of seams alternate at predetermined intervals on the tape TS, and the first group 10a defines a plurality of separation line along which the wide tape is first separated into sections T_n by immersion in water at about 65°C, each of which sections constitutes a double carrier tape T similar to that which is shown in Fig. 1. Each tape section T_n contains the second seam 10b which defines a separation line along which the inter-engaged rows of elements are secured to

the tape in the manner previously described. Thereafter, the double carrier tape T carrying the inter-engaged element rows is further immersed in water at 90°C thereby dissolving the second seam 10b and separating the tape into identical halves as above described.

It will be thus understood that the rate of production of fastener tapes of this character and hence complete product fasteners is increased manifoldly and that fastener elements can be mounted on the tapes without encountering objectionable irregularities in the element pitch.

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1. A method of producing a sliding clasp fastener which method comprises the steps of:

- a) sewing two inter-engaged rows of fastener elements on a knitted double carrier tape with coupling head portions of said elements held in alignment with a water-soluble seam extending longitudinally and centrally thereof;
- b) dissolving said seam and thus separating the said double carrier tape into identical halves along the said seam; and
- c) applying a slider and end stops on the thus separated stringer tapes, and cutting the tapes to a desired product length.

2. A method as claimed in claim 1 wherein said double carrier tape is initially separated from at least one other double carrier tape by dissolving at least one respective other water-soluble seam joining the at least one other double carrier tape to the first-mentioned double carrier tape.

3. A method as claimed in claim 2 wherein the temperature at which the or each other seam is dissolved is lower than the temperature at which the first-mentioned seam is dissolved.

4. A method as claimed in claim 3 wherein the or each other seam dissolves at about 65°C and the first-mentioned seam dissolves at about 60°C.

5. A method as claimed in any preceding claim wherein the or each seam is formed by a water-soluble synthetic fibre.

6. A method as claimed in claim 5 wherein said synthetic fibre is polyvinyl alcohol.

7. A method substantially as herein des-



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cribed with reference to and as illustrated
in the accompanying drawings.

8. A sliding clasp fastener produced by a
method as claimed in any preceding claim.

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