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(54) A TAPE FOR A SLIDING CLASP FASTENER

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, of No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, a Corporation duly organized under the laws of Japan, do hereby declare the invention, 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 tape for a sliding clasp fastener and is more particularly directed to a warp-knitted tape specially adapted for producing a sliding clasp fastener by a novel method which is the subject of our co-pending patent application No. 54331/71 (Serial No. 1,370,149). Known methods of applying a double row of inter-engaged fastener elements to a warp-knitted tape 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 irregular rotation of the roll, frictional resistance of the tape guides and other various operating reasons. This would often result in irregularities in the pitch of fastener elements sewn on the tapes.

The method which is the subject of our co-pending patent application No. 54331/71 (Serial No. 1370149) of producing a sliding clasp fastener 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.

According to the present invention there is provided a tape for a sliding clasp fastener the tape having a warp-knitted structure including a first group of seams and a second group of seams, both groups of seams being made of a water-soluble synthetic fiber and extending alternately at predetermined intervals and longitudinally of the tape, said first group of seams being dissolvable in water at a lower temperature than that at which said second group of seams is dissolvable.

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

Fig. 1 is a perspective view of a warp-knitted carrier tape for attaching fastener elements thereon;

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 finished sliding clasp fastener;

Fig. 5 is a diagrammatic view on enlarged scale of a knit pattern of a portion of the carrier tape embodying the invention;

Fig. 6 is a perspective view of a tape embodying the invention;

Fig. 7 is a view similar to Fig. 6 but showing the tape separated widthwise 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

5 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.

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

20 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 and on opposite sides of the seam 10.

25 The double carrier tape T having inter-engaged rows of elements thus sewn thereon 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 drying bath or cleaning water bath usually provided in a fastener making factory.

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

35 Reference to Figs. 6, 7 and 8, inclusive, shows a 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

45 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 lines 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.

WHAT WE CLAIM IS:—

1. A tape for a sliding clasp fastener, the tape having a warp-knitted structure including a first group of seams and a second group of seams, both groups of seams being made of a water-soluble synthetic fiber and extending alternately at predetermined intervals and longitudinally of the tape, said first group of seams being dissolvable in water at a lower temperature than that at which said second group of seams is dissolvable.
2. A tape as defined in claim 1 wherein said synthetic fiber is polyvinyl alcohol.
3. A tape as defined in claim 1 wherein said first group of seams dissolves at about 65°C and said second group of seams dissolves at about 90°C.
4. A tape substantially as herein described with reference to and as illustrated in the accompanying drawings.

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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.

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Reference to Figs. 6, 7 and 8, inclusive, shows a 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

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