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(54) IMPROVEMENTS IN WARP-KNITTED FASTENER TAPES

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, a corporation duly organized under the laws of Japan, of 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, 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:—

10 This invention relates to slide fasteners and particularly to supporting stringer tapes of a warp-knitted structure for mounting thereon rows of interlocking fastener elements.

15 There are known various types of warp-knitted tapes for use in the field of sliding clasp fasteners. However, due primarily to their coarse network, the knitted tapes have suffered from reduced mechanical strength and less dimensional stability compared to woven fabric tapes, and the fastener elements mounted thereon were prone to become displaced from their properly aligned position or disengaged from the longitudinal inner edge portion of the tape along which they are secured.

20 The present invention is therefore aimed at the provision of a warp-knitted stringer tape having a longitudinal inner edge portion for mounting a row of fastener elements, which edge portion is thickened or otherwise rendered sufficiently bulky by the incorporation of a reinforcing core between adjacent wales and fastening weft threads laid in to fasten the core therebetween in addition to weft threads extending transversely in the system of the tape, and which is thus reinforced to provide increased dimensional stability such that the fastener elements can be retained firmly in position therealong against displacement relative to the tape. The term reinforcing core includes relatively thick threads, stranded yarns and the like which may be of textile or plastics materials. Heretofore, such reinforcing cores

were mostly interwoven with stringer tapes of woven fabric.

According to the invention, there is provided a supporting stringer tape for slide fasteners which comprises a warp-knitted structure comprising wales of longitudinally extending warp stitches connected coursewise by transversely extending threads, a reinforcing core inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, and a first fastening thread interconnecting said two adjacent wales and overlying said reinforcing core and a second fastening thread interconnecting said two adjacent wales and underlying said reinforcing core, said first and second fastening threads extending alternately in opposite directions between said two adjacent wales.

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

Fig. 1 is a diagrammatic view of a warp-knitted stringer tape provided in accordance with a first embodiment of the invention; and

Fig. 2 is a similar view but showing a second embodiment of the invention.

In the drawings, like parts are denoted by like reference numerals.

Referring now to the drawings and Fig. 1 in particular, there is shown a supporting stringer tape T of a warp-knitted structure comprising wales W_1 , W_2 , W_3 , W_4 , and so on which are formed by suitable warp stitches such as open-pillar stitches as shown and transversely extending threads laid in to connect the wales coursewise as is well known in art of warp-knitting. A reinforcing core 11 is provided for strengthening the longitudinal inner edge portion 12 of the tape T along which the fastener elements (not shown) are secured. The core

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11 is inserted in an interwale groove 13 formed between the first or innermost wale W_1 and the second wale W_2 at the longitudinal inner edge portion 12 and extends longitudinally substantially to the full length of the tape T.

In accordance with the invention, there are provided additional transversely extending fastening threads 14, 15 preferably thicker than the threads 10 for fastening the reinforcing core 11 in place between the first and second wales W_1 and W_2 against displacement relative to the tape T. The threads 10 laid in at the longitudinal edge portion 12 are arranged to run alternately over and under the reinforcing core 11. The first fastening thread 14 is laid in from one direction to overlie the core 11, while the second fastening thread 15 is laid in from the opposite direction to underlie the core 11. Successive loops 14a of the first threads 14 alternate with successive loops 15a of the second threads 15 so that their respective turns 14b and 15b are not overlapped or superimposed one upon the other when seen in projection to the place of the stringer tape T. This arrangement ensures that the reinforcing core 11 be stabilized in position with uniform distribution of tension offered by the threads 14, 15 through the length of the tape T, and that thus the longitudinal inner edge portion 12 of the tape T be held sufficiently dimensionally stable to support thereon a row of fastener elements in the proper alignment.

Reference to Fig. 2 shows a modified form of warp-knitted stringer tape T according to the invention which is characterized by the provision of two reinforcing cores 11a and 11b which are likewise accommodated in the interwale groove 13 formed between the first or innermost wale W_1 and the second wale W_2 at the longitudinal inner edge portion 12. It will be seen that the two cores 11a and 11b are superimposed one upon the other with respect to the plane of the stringer tape T and secured in position by two transversely extending fastening threads 14 and 15 provided in addition to the transversely extending threads 10 which constitute the web of the tape T.

The threads 10 extending along the longitudinal inner edge portion 12 of the tape T are arranged to run between the two superimposed cores 11a and 11b. The first and second fastening webs 14 and 15 are laid in from opposite directions with their respective loops 14a and 15a alternating with each other so that the respective turns 14b and 15b of these loops W_1 and W_2 are not overlapped when seen in projection to the plane of the tape T. The first fastening thread 14 overlies the upper reinforcing

core 11a, while the second fastening thread 15 underlies the lower reinforcing core 11b, these fastening threads forming a so-called marquisette pattern with the wales W_1 , W_2 whereby the two superimposed cores 11a and 11b are anchored firmly in position without being displaced relative to each other. The second embodiment just described is advantageous in that the edge portion 12 of the tape is thickened to provide greater stability as regards the dimensions and form of the tape T as desired for mounting fastener elements of relatively large size.

WHAT WE CLAIM IS:—

1. A supporting stringer tape for slide fasteners which comprises a warp-knitted structure comprising wales of longitudinally extending warp stitches connected coursewise by transversely extending threads, a reinforcing core inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, and a first fastening thread interconnecting said two adjacent wales and overlying said reinforcing core and a second fastening thread interconnecting said two adjacent wales and underlying said reinforcing core, said first and second fastening threads extending alternately in opposite directions between said two adjacent wales.

2. A supporting stringer tape as claimed in claim 1 wherein said transversely extending threads at the longitudinal inner edge portion of the tape are arranged to pass alternately over and under said reinforcing core.

3. A supporting stringer tape for slide fasteners which comprises a warp-knitted structure comprising wales of longitudinally extending warp stitches connected coursewise by transversely extending threads, two reinforcing cores superimposed one upon the other with respect to the plane of the tape and inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, a first fastening thread interconnecting said two adjacent wales and overlying the upper one of said two reinforcing cores and a second fastening thread interconnecting said two adjacent wales and underlying the lower one of said cores, said first and second fastening threads extending alternately in opposite directions between said two adjacent wales and said transversely extending threads at the longitudinal inner edge portion of the tape passing between said upper and lower cores.

4. A supporting stringer tape as claimed in any preceding claim, wherein the interconnections between said first and second fastening threads and the said two adjacent

11 is inserted in an interwale groove 13 formed between the first or innermost wale W_1 and the second wale W_2 at the longitudinal inner edge portion 12 and extends 5 longitudinally substantially to the full length of the tape T.

In accordance with the invention, there are provided additional transversely extending fastening threads 14, 15 preferably 10 thicker than the threads 10 for fastening the reinforcing core 11 in place between the first and second wales W_1 and W_2 against displacement relative to the tape T. The threads 10 laid in at the longitudinal 15 edge portion 12 are arranged to run alternately over and under the reinforcing core 11. The first fastening thread 14 is laid in from one direction to overlie the core 11, while the second fastening thread 15 is laid 20 in from the opposite direction to underlie the core 11. Successive loops 14a of the first threads 14 alternate with successive loops 15a of the second threads 15 so that their respective turns 14b and 15b are not 25 overlapped or superimposed one upon the other when seen in projection to the place of the stringer tape T. This arrangement ensures that the reinforcing core 11 be stabilized in position with uniform distribution of tension offered by the threads 14, 30 15 through the length of the tape T, and that thus the longitudinal inner edge portion 12 of the tape T be held sufficiently dimensionally stable to support thereon a 35 row of fastener elements in the proper alignment.

Reference to Fig. 2 shows a modified form of warp-knitted stringer tape T according to the invention which is characterized by the provision of two reinforcing 40 cores 11a and 11b which are likewise accommodated in the interwale groove 13 formed between the first or innermost wale W_1 and the second wale W_2 at the longitudinal inner edge portion 12. It will be 45 seen that the two cores 11a and 11b are superimposed one upon the other with respect to the plane of the stringer tape T and secured in position by two transversely 50 extending fastening threads 14 and 15 provided in addition to the transversely extending threads 10 which constitute the web of the tape T.

The threads 10 extending along the longitudinal inner edge portion 12 of the tape T are arranged to run between the two 55 superimposed cores 11a and 11b. The first and second fastening webs 14 and 15 are laid in from opposite directions with their respective loops 14a and 15a alternating 60 with each other so that the respective turns 14b and 15b of these loops W_1 and W_2 are not overlapped when seen in projection to the plane of the tape T. The first fastening 65 thread 14 overlies the upper reinforcing

core 11a, while the second fastening thread 15 underlies the lower reinforcing core 11b, these fastening threads forming a so-called marquisette pattern with the wales W_1 , W_2 whereby the two superimposed cores 11a 70 and 11b are anchored firmly in position without being displaced relative to each other. The second embodiment just described is advantageous in that the edge portion 12 of the tape is thickened to provide greater 75 stability as regards the dimensions and form of the tape T as desired for mounting fastener elements of relatively large size.

WHAT WE CLAIM IS:—

1. A supporting stringer tape for slide fasteners which comprises a warp-knitted structure comprising wales of longitudinally 85 extending warp stitches connected coursewise by transversely extending threads, a reinforcing core inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, and a first 90 fastening thread interconnecting said two adjacent wales and overlying said reinforcing core and a second fastening thread interconnecting said two adjacent wales and underlying said reinforcing core, said first 95 and second fastening threads extending alternately in opposite directions between said two adjacent wales.

2. A supporting stringer tape as claimed in claim 1 wherein said transversely extending threads at the longitudinal inner 100 edge portion of the tape are arranged to pass alternately over and under said reinforcing core.

3. A supporting stringer tape for slide 105 fasteners which comprises a warp-knitted structure comprising wales of longitudinally extending warp stitches connected coursewise by transversely extending threads, two reinforcing cores superimposed one upon 110 the other with respect to the plane of the tape and inserted between two adjacent wales at the longitudinal inner edge portion of the tape along which a row of fastener elements is secured, a first fastening thread 115 interconnecting said two adjacent wales and overlying the upper one of said two reinforcing cores and a second fastening thread interconnecting said two adjacent wales and underlying the lower one of said cores, said 120 first and second fastening threads extending alternately in opposite directions between said two adjacent wales and said transversely extending threads at the longitudinal inner edge portion of the tape passing between 125 said upper and lower cores.

4. A supporting stringer tape as claimed in any preceding claim, wherein the interconnections between said first and second fastening threads and the said two adjacent 130



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wales are spaced one from another longitudinally along the said two adjacent wales.

5. A supporting stringer tape as claimed in any preceding claim, wherein said first and second fastening threads are thicker and stronger than said transversely extending threads.

6. A supporting stringer tape substan-

tially as herein described with reference to the accompanying drawings.

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