

PATENT SPECIFICATION

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(54) IMPROVED TAPE EDGE REINFORCEMENT FOR SLIDING CLASP FASTENERS

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 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 generally to sliding clasp fasteners and, more particularly to a tape edge reinforcement for insertion longitudinally in a row of helically coiled fastener elements mounted on a tape edge of the sliding clasp fastener.

15 There have heretofore been known various sliding clasp fastener tape edge reinforcements having a warp-knitted structure. Typical prior reinforcements of this type comprise a warp-knitted fabric having 20 wales on its one surface. The reinforcements can be adapted for use with fastener elements of different sizes since the wales of the knit fabric can be varied in width conveniently by selecting various 25 knitting structures or by using knitting yarns of various deniers. However, since it is difficult to increase the height of the wales simply by changing the knitting structures or the knitting yarns, the prior art reinforcements have a drawback in that they are not acceptable for relatively large coil or meandering fastener elements of the type which has a pair of upper and lower 30 legs with a relatively large gap or space defined therebetween.

40 According to the invention, there is provided a tape edge reinforcement for a sliding clasp fastener comprising a plurality of cylindrical, warp-knitted members having needle loops and sinker loops interconnected therewith, said sinker loops extending in diagonally criss-crossed relation to each other and alternately over and 45 under said needle loops, and a connecting

thread laid in weftwise to interconnect said plurality of warp-knitted members transversely in parallel, spaced-apart relation to each other.

The invention will be better understood 50 from the following description taken in conjunction with the accompanying drawings which illustrate preferred embodiments which the invention may assume in practice and in which like reference numerals 55 refer to like or corresponding parts throughout the different views, and wherein;

Figure 1 is a perspective view of a reinforcement embodying the invention; 60

Figure 2 is a schematic diagram illustrating a typical example of warp-knit design employed in a reinforcement embodying the invention;

Figures 3A through 3C are schematic, 65 transverse cross-sectional views each showing a modified form of reinforcement embodying the invention; and

Figures 4A through 4C are transverse cross-sectional views illustrating various 70 forms of reinforcement mounted in helically coiled fastener elements of corresponding shapes and sizes.

In Figure 1, there is shown a tape edge reinforcement 10 embodying the invention 75 and comprising a pair of core members 11 each in the form of twisted or stranded cotton or synthetic fiber yarn, a plastics filament, a metallic wire or the like, a pair of tubular, warp-knitted members 12 wrapped around the core members 11, and a 80 connecting thread 13 interconnecting the warp-knitted members 12 together.

Each tubular member 12 has a warp-knitted structure which is formed by a 85 double needle in a knitting machine such as a double Raschel ("RASCHEL" is a Registered Trade Mark) or a double tricot knitting machine and in which two sets of threads 14 and 15 are arranged so that 90

needle loops 14a and 15a will be fastened to and around the core member 11 by sinker loops 14b and 15b, and the needle loops 14a and 15a will appear on the peripheral surfaces of the tubular members 12. More specifically, this warp-knitted structure of the tubular members 12 is characterized by the arrangement in which the front and back sinker loops 14b, 15b extend warpwise in diagonally criss-crossed relation to each other and urge the respective needle loops 14a, 15a to clinch centrally around the core member 11 as the warp-knitting progresses. This may be accomplished by selecting the mode of operation of the machine in which the front and back guide bars are shogged symmetrically in opposite directions so that the two guide bar threads form alternate underlaps and overlaps interconnected with the respective needle loops 14a and 15a and fastening the latter centrally to and around the core member 11 which is laid in as a warp thread where no shogging takes place. A typical example of design pattern of this warp-knitted structure is illustrated in Figure 2, wherein the needle loops 14a and 15a are shown to be in the form of closed laps, but these may be partly or wholly open laps.

As shown in Figure 2, two warp-knitted members 12 are interconnected transversely in parallel, spaced-apart relation by means of the connecting thread 13 which is laid in weftwise, or alternatively, is knitted with the warp-knitted members 12. The reinforcement 10 may include two or more members 12 of different diameters as will be described below.

Figures 3A through 3C show some preferred modified forms of reinforcement embodying the invention. A reinforcement 10a shown in Figure 3A comprises a warp-knitted member 12a of a large diameter and a warp-knitted member 12a' of a smaller diameter, both members being cylindrical in shape and having the core member 11 excluded therefrom. The cylindrical members 12a and 12a' are interconnected by the connecting thread 13. In Figure 3B, a reinforcement 10b comprises a large-diameter tubular member 12b wrapped around the core member 11 and a small-diameter tubular member 12b' wrapped around the core member 11, both members being interconnected by the connecting thread 13. A reinforcement 10c shown in Figure 3C is formed with an additional large-diameter warp-knitted member 12a combined with the reinforcement 10a of Figure 3A. The added member 12a is likewise connected to the reinforcement 10a by a connecting thread 13.

Figures 4A through 4C illustrate the reinforcements inserted through a long-

itudinally extending space defined in continuous formation of fastener elements, which are each in the form for example of a helical coil, and secured with the fastener elements to one side of a carrier tape 19 by means for example of sewing threads 20. The reinforcements have particular utility for widely varied shapes and sizes of fastener elements because they can be constituted by a wide selection of warp-knitted members. For example, as shown in Figure 4A, the reinforcement 10 shown in Figure 1 is used with the fastener element 16 having a pair of parallel legs 21, 22 connected by a connecting portion 23. In Figure 4B, the reinforcement 10a is inserted in the fastener element 17 having a pair of legs 24, 25 which converge toward a connecting portion 26. The reinforcement 10c shown in Figure 3C is adapted for the fastener element 19 which is relatively large and has a pair of curved legs 27, 28 connected by a connecting portion 29, as shown in Figure 4C. These reinforcements 10, 10a and 10c have their warp-knitted members disposed for partial contact with the element legs and, preferably, have their outermost members 12, 12a', and 12a', engaged at their outer peripheral surfaces with the connecting portions 23, 26 and 29, respectively to stabilize the position of the inserted warp-knitted members. The sewing threads 20 may be arranged to pass between the adjacent warp-knitted members in the fastener elements and, as shown in Figures 4A and 4B, extend across the innermost warp-knitted members.

Advantageously, the reinforcements can be changed in diameter and be used for various forms of fastener elements since a choice is available of diameters of the warp-knitted members by using knitting yarns of various deniers or core members of various diameters to adapt the members to various sizes and shapes of the spaces in the fastener elements.

Furthermore, the reinforcement including at least two warp-knitting members which are high in density and stable in structure can, when disposed within the space in the fastener elements, stabilize the position and posture of the fastener elements over extended periods of use of the sliding clasp fastener. Because the reinforcements are held only in partial contact with the coiled fastener elements, and the sewing threads 13 are prevented from passing through the warp-knitted members, the reinforcements can retain the desired flexibility of the resultant sliding clasp fastener. In addition, the reinforcement having the round peripheral surfaces allows sewing needles to pass the fastener tape along predetermined positions between the adjacent warp-knitted members.

While certain preferred embodiments of the invention have been described in detail, it is to be understood that various changes and modifications may be made therein without departing from the scope of the appended claims.

WHAT WE CLAIM IS:—

1. A tape edge reinforcement for a sliding clasp fastener comprising a plurality of cylindrical, warp-knitted members having needle loops and sinker loops interconnected therewith, said sinker loops extending in diagonally criss-crossed relation to each other and alternately over and under said needle loops, and a connecting thread laid in weftwise to interconnect said plurality of warp-knitted members transversely in parallel, spaced-apart relation to each other.
2. A tape edge reinforcement as claimed in claim 1, including a core member disposed centrally in each of said

warp-knitted members and secured in position by said sinker loops.

3. A tape edge reinforcement as claimed in claim 1, wherein some of said plurality of cylindrical, warp-knitted members are smaller in diameter than the others.

4. A tape edge reinforcement substantially as herein described with reference to and as illustrated in any one of Figures 1, 2, 3A, 3B, 3C, 4A, 4B and 4C of the accompanying drawings.

5. A sliding clasp fastener comprising a tape with a tape edge reinforcement as claimed in any preceding claim.

6. A sliding clasp fastener as claimed in claim 5, wherein the tape edge reinforcement is inserted longitudinally in a row of helically coiled fastener elements mounted on a tape edge of the sliding clasp fastener.

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warp-knitted members and secured in position by said sinker loops.

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