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"WOVEN SLIDE FASTENER STRINGER"

The present invention relates generally to a slide fastener, and more particularly to a woven slide fastener stringer including a woven stringer tape and a row of fastener coupling elements woven into the stringer tape along a longitudinal edge thereof.

Woven slide fastener stringers are known of a type in which a row of fastener coupling elements in the form of a coiled or zigzag-shaped filament is woven into a woven stringer tape along a longitudinal edge thereof simultaneously with the weaving of the tape. In order to provide a firm attachment of the coupling elements to the tape, a high degree of tension is applied on the successive weft yarns while the latter are being woven into the tape. Consequently, the prior stringer tape has a closely woven structure which does not allow a sewing needle to penetrate smoothly therethrough. The closeness of this woven structure increases progressively from a tape portion adjacent to the coupling-element-supporting tape edge to that adjacent to a selvedge of the tape at which side the weft yarns are tightened. With such prior slide fastener, easy and proper sewing operation is difficult to achieve. Moreover, the prior fastener stringer, when attached to a garment, tends to become wavy or puckered.

French Patent No. 1,542,750 discloses a woven stringer tape having a coarsely woven portion so that a sewing needle can

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penetrate smoothly therethrough. However, the coarsely woven portion is disposed adjacent to the tape edge along which a row of fastener coupling elements is attached. With this arrangement, a firm and proper attachment of the coupling elements to the tape is difficult to achieve.

According to the present invention there is provided a woven slide fastener stringer comprising:

(a) a stringer tape woven of warp and weft yarns: and

(b) a row of fastener coupling elements woven into said stringer tape along one longitudinal edge thereof;

(c) said stringer tape including a first marginal portion disposed adjacent to said longitudinal edge, a second marginal portion disposed adjacent to the other longitudinal edge, and an intermediate portion extending between said first and second marginal portions, said intermediate portion having a woven structure coarser than that of said first marginal portion, the number of interlacings of said warp and weft yarns per unit area in said intermediate portion being smaller than that in said first marginal portion, characterised in that said warp yarns in said intermediate portion include laterally spaced apart groups of warp yarns, in each of which groups some of the warp yarns of the group overlie others of the warp yarns of the group in the thickness of the material, the spaces between the groups

each being devoid of any warp yarn overlying another warp yarn in the thickness of the material.

The invention will be described by way of example with reference to the accompanying drawings in which a preferred embodiment of the present invention is shown by way of illustrative example. In the drawings:-

Figure 1 is a fragmentary schematic plan view of a modified woven slide fastener stringer;

Figure 2 is a cross-sectional view taken along line II-II of Figure 1; and

Figures 3 to 6 are schematic transverse cross-sectional views of a portion of a stringer tape shown in Figures 1 and 2, illustrating the manner in which individual weft yarns are interlaced with warp yarns.

Figures 1 and 2 show a woven slide fastener stringer 20 having a stringer tape 21. The stringer tape 21 includes a first marginal portion 22 adjacent to the coupling-element-supporting tape edge, a second marginal portion 23 adjacent to the other longitudinal tape edge, i.e., a selvedge 26, and an intermediate portion 24 extending between the first and second marginal portions 22, 23. The weft yarns 13 extend over one of the warp yarns 12 and under the next alternately across the first marginal portion 22. At the second marginal portion 23 two

pairs of the warp yarns 12 are interlaced with the weft yarns 13 in "plain weave" so that the weft yarns 13 can be prevented from being excessively tightened.

As best shown in Figure 2, the intermediate tape portion 24 includes a plurality of groups 25 of the warp yarns 12, there being a single warp yarn 12a interposed between adjacent groups 25. Each group 25 includes two pairs of warp yarns 12b, 12c and 12d, 12e (Figure 4).

In each group 25 of warp yarns 12b, 12c, 12d, 12e, the warp yarns 12b, 12c respectively overlie the warp yarns 12d, 12e in the thickness of the material, see Figure 2. The group 25 are spaced apart from each other and each of the spaces between the groups is devoid of any warp yarn overlying another warp yarn in the thickness of the material, each such space having but the single warp yarn 12a.

Figures 3 to 6 illustrate the manner in which the individual weft yarns 13a, 13b, 13c, 13d are interlaced with the warp yarns 12a, 12b, 12c, 12d, 12e. The first weft yarns 13a (Figure 3) extend (from left to right) through a space between the warp yarns 12b, 12c, then under the warp yarns 12d, 12e, and over the single warp yarn 12a and repeat the same until they traverse, and then they are returned across the warps threads in the same weaving pattern to thereby insert double picks. The second weft yarns 13b (Figure 4) extend over the warp yarns 12b, 12c, then through a space between the warp yarns

12d, 12e, and under the single warp yarn 12a and repeat the same until they traverse, and then they are returned across the warp threads in the same weaving pattern to thereby insert double picks. The third weft yarns 13c (Figure 5) extend under the warp yarns 12b, 12c, then through a space between the warp yarns 12d, 12e, and over the single warp yarn 12a and repeat the same until they traverse, and then they are returned across the warp threads in the same weaving pattern to thereby insert double picks. The fourth weft yarns 13d (Figure 6) extend through a space between the warp yarns 12b, 12c, then over the warp yarns 12d, 12e, and under the single warp yarn 12a and repeat the same until they traverse, and then they are returned across the warp threads in the same weaving pattern to thereby insert double picks.

The stringer tape 21 has a sufficiently coarse and thick woven structure, enabling the slide fastener stringer 20 to be sewn to a garment easily and properly.

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CLAIMS:-

1. A woven slide fastener stringer comprising:

(a) a stringer tape woven of warp and weft yarns; and

(b) a row of fastener coupling elements woven into said stringer tape along one longitudinal edge thereof;

(c) said stringer tape including a first marginal portion disposed adjacent to said longitudinal edge, a second marginal portion disposed adjacent to the other longitudinal edge, and an intermediate portion extending between said first and second marginal portions, said intermediate portion having a woven structure coarser than that of said first marginal portion, the number of interlacings of said warp and weft yarns per unit area in said intermediate portion being smaller than that in said first marginal portion, characterised in that said warp yarns in said intermediate portion include laterally spaced apart groups of warp yarns, in each of which groups some of the warp yarns of the group overlie others of the warp yarns of the group in the thickness of the material, the spaces between the groups each being devoid of any warp yarn overlying another warp yarn in the thickness of the material.

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