A warp-knitted tape for slide fasteners is provided with a web portion having wales projecting symmetrically from both surfaces and a marginal edge portion adapted for mounting thereon slide fastener elements. The marginal edge portion of the tape is thickened sufficiently to permit the legs of the fastener elements to be clamped fast on the tape astride of the marginal edge portion.

6 Claims, 3 Drawing Figures
WARP KNITTED TAPE FOR SLIDE FASTENERS

BACKGROUND OF THE INVENTION

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

There are known various types of warp-knitted tapes for use in the field of slide fasteners or zippers. Warp-knitted tapes of the known type are basically constructed with longitudinally extending chain stitches which form a multiplicity of wales and transversely extending lapping threads laid in to connect the wales coursewise. However, due primarily to their structural characteristics, the knitted tapes are known to be inferior to woven fabric tapes in respect of the qualities of mechanical strength and dimensional stability; that is, they have the inherent problem of “stretch” which occurs warpwise or weftwise when they are subjected to external stresses exerted in normal use of the slide fastener.

Many attempts have been made to provide knitted tapes of a quality comparable to woven fabric tapes such that they can be readily used as slide fastener tapes for securely supporting thereon the rows of fastener elements against displacement or detachment. Such attempts have proven to be successful in so far as concerns the type of fastener elements which is arranged to be mounted on and secured to one and the same surface of the fastener tape. However, the prior-art knitted fastener tapes were not satisfactory for supporting the type of fastener elements which is designed to be mounted astride of a marginal edge of the tape.

SUMMARY OF THE INVENTION

It is therefore the primary object of the present invention to provide an improved warp-knitted tape for use as a slide fastener tape capable of securely supporting the rows of interlocking fastener elements which are designed to be mounted with their leg portions astride of a longitudinal marginal edge of the tape.

Another object of the invention is to provide a warp-knitted slide fastener tape which is comparable in mechanical strength and dimensional stability to a woven fabric tape.

A further object of the invention is to provide a warp-knitted slide fastener tape which is provided at one longitudinal edge with a swollen or thickened margin projecting uniformly on both surfaces of the tape, such margin serving to retain the row of fastener elements securely in properly aligned position against displacement.

These objects and other features of the invention will appear clear from the following detailed description taken in connection with the accompanying drawings which illustrate by way of example certain preferred embodiments and in which like reference characters refer to like parts throughout the different views.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic view illustrating the construction of a warp-knitted fastener tape provided in accordance with the invention;

FIG. 2 is a transverse cross-sectional view of the tape of FIG. 1 diagrammatically illustrating the manner in which an interlocking fastener element is mounted astride of an edge of the tape; and

FIG. 3 is a transverse cross-sectional view of a modification of the warp-knitted tape of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and FIG. 1 in particular, there is shown a warp-knitted fastener tape 10 which substantially comprises a web portion 11 and adjoining marginal edge portion 12. The web portion 11 is constructed with chain stitches 13 which form a plurality of longitudinally extending wales W and with transversely extending lapping threads 14 which are laid in to connect the wales W coursewise.

An inspection of FIG. 1 will show that the chain stitch 13 has a closed lap 13a alternating with an open lap 13b in each course of the knitted structure and that the lapping threads 14 consist of two different groups of lapping threads 14a and 14b having their respective lapping points or U-turns 14d and 14f disposed in alternate courses, the arrangement being that the resulting web portion 11 has a double-faced knit structure in which the wales W project symmetrically from both surfaces of the tape. This is better depicted in FIG. 2, and this double-layer knit system renders the tape 10 physically rugged and dimensionally stable as required in the art of slide fasteners. Another important aspect of the invention resides in the provision of the marginal edge portion 12 of the tape 10 to which the fastener elements E are to be secured and which is formed by tricot stitches 15 extending across and inter-knitted with wales W1 to Wn. These tricot stitches are knitted by means of a double knitting needle arrangement so that a first group of tricot stitches 15a are knitted in the lay of 2-0-4-6 and a second group of tricot stitches 15b in the lay of 4-6-2-0. This knitting design is intended to render the marginal edge portion 12 bulky and strong, with the result that the portion 12 has substantially circular cross-section as seem in FIGS. 2 and 3. To this end, there may be used a reinforcing core member 16 inserted centrally between adjacent wales W2 and W3 and extending lengthwise of the tape 10 so as to cause the marginal edge portion 12 to become more swollen and projected uniformly on both sides of the tape 10.

The lapping threads 14c serving to connect the marginal edge portion 12 with the web portion 11 are preferably stronger and greater in density than the remaining lapping threads 14.

In order to facilitate the manufacture of warp-knitted fastener tapes 10 according to the invention, there may be used a connecting threads 17 for separably connecting adjacent ones of a plurality of tapes 10 widewise. This connecting thread 17 may be for example dissolvable in water so that the tapes 10 may be separated to individual widths when they are treated with water as in dyeing process at the finishing stage of the slide fastener manufacture.

FIG. 3 illustrates a modification of the warp-knitted fastener tape 10 which has been described with reference to FIGS. 1 and 2. This modification is characterized by the provision of a double-layer knit structure only at limited areas of the web portion 11 immediately adjacent the swollen marginal edge portion 12, while the remaining web areas are constructed with a single-layer knit wherein the wales W are formed only on one surface of the tape 10.

Advantageously, the warp-knitted fastener tape 10 in either of the two embodiments disclosed can allow the fastener elements E to be clamped fast thereon with
their upper and lower legs $E_a$ and $E_b$ mounted astride of the marginal edge portion 12 in the properly aligned position and in parallel to the plane of the tape web. Being thus firmly anchored into position on the marginal edge portion 12 of the tape 10, the fastener elements $E$ can maintain their proper operative posture over extended lengths of time against severe stresses applied to the slide fastener in use.

What is claimed is:

1. A warp-knitted tape for a slide fastener, which comprises a web portion and a marginal edge portion extending longitudinally of the web portion and adapted to carry a row of coupling elements each having a pair of spaced-apart legs extending in a transverse direction to said row of coupling elements, said web portion comprising chain stitches forming a plurality of longitudinally extending wales and at least two different groups of transversely extending lapping threads laid in to connect said wales coursewise, and said marginal edge portion comprising chain stitches forming a plurality of longitudinally extending wales and two different groups of tricot stitches extending across and interknitted with said wales whereby said marginal edge portion is thickened and projects symmetrically with respect to the plane of the tape to accommodate securing said row of coupling elements to the marginal edge portion with the legs of the elements mounted astride of said marginal edge portion.

2. A warp-knitted tape as defined in claim 1 in which a reinforcing core member 1 is inserted centrally into said marginal edge portion.

3. A warp-knitted tape as defined in claim 1 in which said web portion and said marginal edge portion are connected together by lapping threads which are thicker and stronger than the remaining lapping threads in said web portion.

4. A warp-knitted tape as defined in claim 1 wherein said web portion is provided over its entire region with a plurality of wales projecting symmetrically from opposite surfaces of the tape.

5. A warp-knitted tape as defined in claim 1 wherein said web portion is provided solely at a limited width region adjacent said marginal edge portion with a plurality of wales projecting symmetrically from opposite surfaces of the tape.

6. A warp-knitted tape as defined in claim 1 wherein one group of said two different groups of tricot stitches forming said marginal edge portion are laid in the lay of 2/0/4-6 and the other group in the lay of 4-6/2-0.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,926,017 Dated December 16, 1975

Inventor(s) YOSHI MATSUDA

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the title page, left column, after line 7, there is inserted:

"Claims priority, application Japan, October 24, 1973, No. 48-123303.

Signed and Sealed this eleventh Day of May 1976

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks