



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.04.2010 Bulletin 2010/16

(51) Int Cl.:
A44B 19/34 (2006.01) D04B 21/12 (2006.01)

(21) Application number: **09172973.1**

(22) Date of filing: **14.10.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

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(30) Priority: **17.10.2008 IT TO20080764**

(54) **A stringer with a transversely stretchable warp-knit tape for a slide fastener**

(57) A stringer (S) for a slide fastener (F), comprises a transversely stretchable warp-knit tape (1), having threads (W1- WN) extending longitudinally of the tape (1) and including
an inner, coupling element mounting area (2),
an intermediate, transversely stretchable main portion

(3), and
an outer, stitching area (4).

Wefts (L2, L4) of elastic yarns are laid across the whole respective tape (1) and at least the intermediate main area (3) of the tape (1) is provided with a number of transversely spaced longitudinal gaps or missing threads (W10, W12, ...).

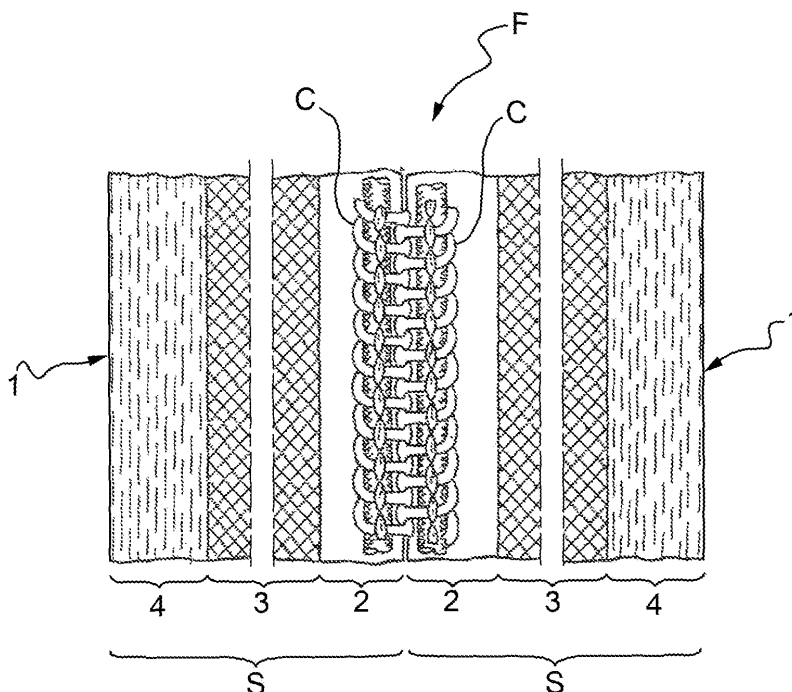


FIG.1

Description

[0001] The present invention generally relates to slide fasteners having stretchable support tapes.

[0002] More specifically, the present invention relates to a stringer for a slide fastener comprising a transversely stretchable warp-knit tape having threads extending longitudinally of the tape, and including an inner, coupling element mounting area; an intermediate, transversely stretchable main area, and an outer, stitching area.

[0003] Such a stringer for a slide fastener is disclosed in Japanese patents JP-57-03504 and JP-43-52901. A stringer with a support tape in which the middle or intermediate area is made laterally stretchable by a laid-in weft of elastic yarn is disclosed in GB-2 081 757 A.

[0004] An object of the present invention is to provide a stringer having an improved transversely stretchable warp-knit tape with improved elastic properties such that it is capable to stretch to an amount of about 30% in the transverse direction.

[0005] This and other objects are achieved according to the invention by a stringer of the initially defined kind, **characterized in that** wefts of elastic yarns are laid across the whole tape, and at least said intermediate main area of the tape is provided with a number of transversely spaced, longitudinal gaps or missing threads.

[0006] Said longitudinal gaps or missing threads can be easily created through the tape by repeatedly omitting a thread from alternative needles across the knitting machine in the area thereof corresponding to the intermediate transversely stretchable main portion of the tape(s).

[0007] In a presently preferred embodiment the inner area of the tape has a knit structure including an edge portion provided with a number of transversely spaced, longitudinal gaps or missing threads, and an adjacent strengthened portion having no such gaps.

[0008] According to a still more preferred embodiment, an outer area of the tape has essentially the same knit structure of the inner area of the tape, whereby the coupling elements, such as coupling coils, can be attached to either side of the tape.

[0009] Further objects and advantages of the present invention will become readily apparent from the following description provided merely as a non-limiting example, referring to the annexed drawings, in which:

figure 1 is a plan view of a slide fastener having stringer made in accordance with the present invention; figure 2 is a schematic illustration of the knit construction of a support tape for a stringer according to one embodiment of the present invention; and figure 3 is a schematic illustration of stitches and laid-in yarns composing the knit construction shown in figure 2.

[0010] Figure 1 shows a portion of a slide fastener F comprising two stringers S in accordance with the

present invention. Each stringer S comprises a support tape 1 carrying fastener elements C, for instance coil elements.

[0011] Each fastener element C is sewn on the inner side area of one of the tapes 1.

[0012] As illustrated, each tape 1 is divided widthwise into three areas, namely (from the inner side of the tape) a coupling element mounting area 2, an intermediate transversely stretchable main area 3, and an outer or stitching area 4 at which the tape 1 is sewn onto another member, such a piece of apparel for wearing or a bag.

[0013] The areas 2, 3 and 4 have respective different knit structures.

[0014] Figures 2 and 3 show an exemplar knit construction of a support tape 1 for a stringer according to one embodiment of the present invention. The tape shown therein has a warp-knit structure in which N threads extend longitudinally of the tape 1.

[0015] In the knit construction exemplified in figures 2 and 3, the knit structure of the tape includes N=57 threads.

[0016] As illustrated in figure 2, the intermediate main area 3 of the tape 1 is provided with a number of transversely spaced, longitudinal gaps, in correspondence of what should be threads W10, W12 ... and all subsequent even-numbered threads up to thread W48. Said gaps of the intermediate main area 3 of the tape 1 correspond to missing threads and are created by repeatedly omitting a thread from alternative needles across the needle field of the warp-knitting machine corresponding to the intermediate main area of the tape.

[0017] As shown in figure 2, in a preferred embodiment the inner area 2 of the tape 1 has essentially a knit structure including an edge portion 2a provided with a number of transversely spaced, longitudinal gaps or missing threads, and an adjacent strengthened portion 2b having no such gaps. In the exemplar embodiment shown in figure 2, the longitudinal gaps of the edge portion 2a of the inner area 2 are formed as missing threads in correspondence the positions of what should be threads W2 and W4.

[0018] In the preferred embodiment of figure 2 the outer area 4 of the tape 1 has essentially the same knit structure of the inner area 2, and includes an edge portion 4a provided with a number of transversely spaced, longitudinal gaps or missing threads and an adjacent strengthened portion 4b having no such gaps.

[0019] The knit structure of edge portion 4a corresponds to that of edge portion 2a, and the knit structure of section 4b essentially corresponds to that of section 2b.

[0020] With reference to the embodiment in figure 2, since the inner area 2 and the outer area 4 of the tape 1 have essentially the same knit structure, the coupling elements C could be attached to either side of the tape 1. This involves the advantage of reduced weaving costs.

[0021] Reverting now again to the intermediate main area 3, the knit construction thereof essentially includes a knit structure unit transversely repeated for a number

of times (20 times in the exemplar embodiment shown).

[0022] The repeated knit structure unit comprises a gap or missing thread and an adjacent thread chain-stitched in the (1-0/1-0) pattern. Thus, in the embodiment shown in figure 2, the intermediate area 3 includes 20 chain stitches L1 (see also figure 3) at positions W11, W13, ... and all subsequent odd-numbered positions up to position W47 (figure 2).

[0023] Still with reference to figure 2, the edge portion 2a of the inner tape area 2 includes chain-stitched threads W1, W3, W5 alternating with gaps or missing threads at the positions which should correspond to threads W2 and W4, with in-laid wefts of the (0-0/3-3) pattern. The chain stitches of edge portion 2a are also of the (1-0/1-0) pattern, like those of the intermediate area 3, and have been thus again indicated L1.

[0024] The in-laid wefts of the edge portion 2a have been indicated L3.

[0025] The above-description of edge portion 2a also applies to the outer edge portion 4a.

[0026] As it can be seen in figure 2, the general knit construction of the tape 1 also includes a first weft of the pattern (0-0, N-N), indicated L2 (see also figure 3), and a second weft of the pattern (N-N, 0-0), indicated L3; both said wefts L2, L3 are laid in across the whole tape 1.

[0027] The chain stitches L1 of the tape are conveniently made with polyester yarn, and also the in-laid wefts L3 are made with polyester yarn.

[0028] The wefts L2 and L4 which are laid in across the whole tape 1 are conveniently made with polytrimethyleneterephthalate yarn.

[0029] The strengthened portions 2b, 4b of the inner and outer areas 2, 4 are the portions which in use the slider comes into contact with, and which helps to resist tape wear due to friction.

[0030] A slide fastener, manufactured using two tapes according to the present invention, having at rest an overall width of 65 mm (in the closed condition) has been successfully transversely stretched up to an overall width of 88 mm, thus with a width increase of more than 30%.

[0031] Obviously, without affecting the principle of the invention the embodiments and the constructional details may be widely varied with respect to what has been described and illustrated purely by way of a non-limiting example, without thereby departing from the scope of the invention as defined in the accompanying claims.

Claims

1. A stringer (S) for a slide fastener (F), comprising a transversely stretchable warp-knit tape (1), having threads (W1-WN) extending longitudinally of the tape (1) and including
 - an inner, coupling element mounting area (2),
 - an intermediate, transversely stretchable main portion (3), and
 - an outer, stitching area (4);

the stringer (S) being **characterized in that** wefts (L2, L4) of elastic yarns are laid across the whole respective tape (1) and at least said intermediate main area (3) of the tape (1) is provided with a number of transversely spaced longitudinal gaps or missing threads (W10, W12, ...).

2. A stringer according to claim 1, wherein the inner area (2) of the tape (1) has a knit structure including an edge portion (2) provided with a number of transversely spaced, longitudinal gaps or missing threads (W2, W4), and an adjacent strengthened portion (2b) having no such gaps.
3. A stringer according to claim 2, wherein the outer area (4) of the tape (1) has essentially the same knit structure of the inner area (2) of the tape, whereby the coupling elements (C) can be attached to either side of the tape (1).
4. A stringer according to any preceding claims, wherein said intermediate main area (3) has a knit structure unit transversely repeated for a number of times and comprising a gap or missing thread and an adjacent thread chain-stitched in the (1-0/1-0) pattern.
5. A stringer according to claim 2 or claim 3, or claim 4 when dependent on claim 2 or claim 3, wherein said edge portion (2a) of the inner tape area (2) includes chain stitched threads (W1, W3, ...) alternating with gaps or missing threads (W2, W4), with in-laid wefts (L3) of the (0-0/3-3) pattern.
6. A stringer according to any preceding claims wherein the tape (1) includes N threads, including said gaps or missing threads, and comprises a first weft (L2) of the pattern (0-0, N-N) and a second weft (L4) of the pattern (N-N, 0-0), laid in across the tape (1).
7. A stringer according to any preceding claims, wherein said wefts (L2, L4) laid across the whole tape (1) are made with polymethyleneterephthalate yarn.
8. A stringer according to any of claims 2-7, wherein the chain stitches (L1) are made of polyester yarn.
9. A stringer according to claim 5 or any claims dependent from the claim 5, wherein said in-laid wefts (L3) of the (0-0/3-3) pattern are made with polyester yarn.

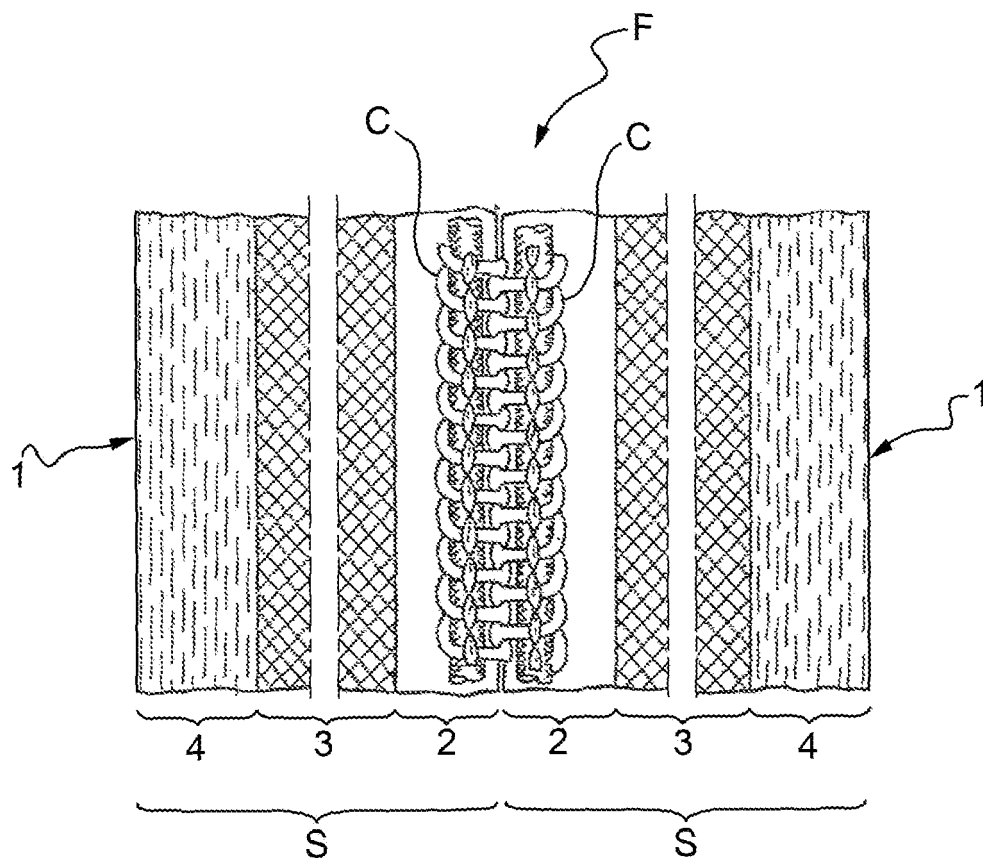


FIG.1

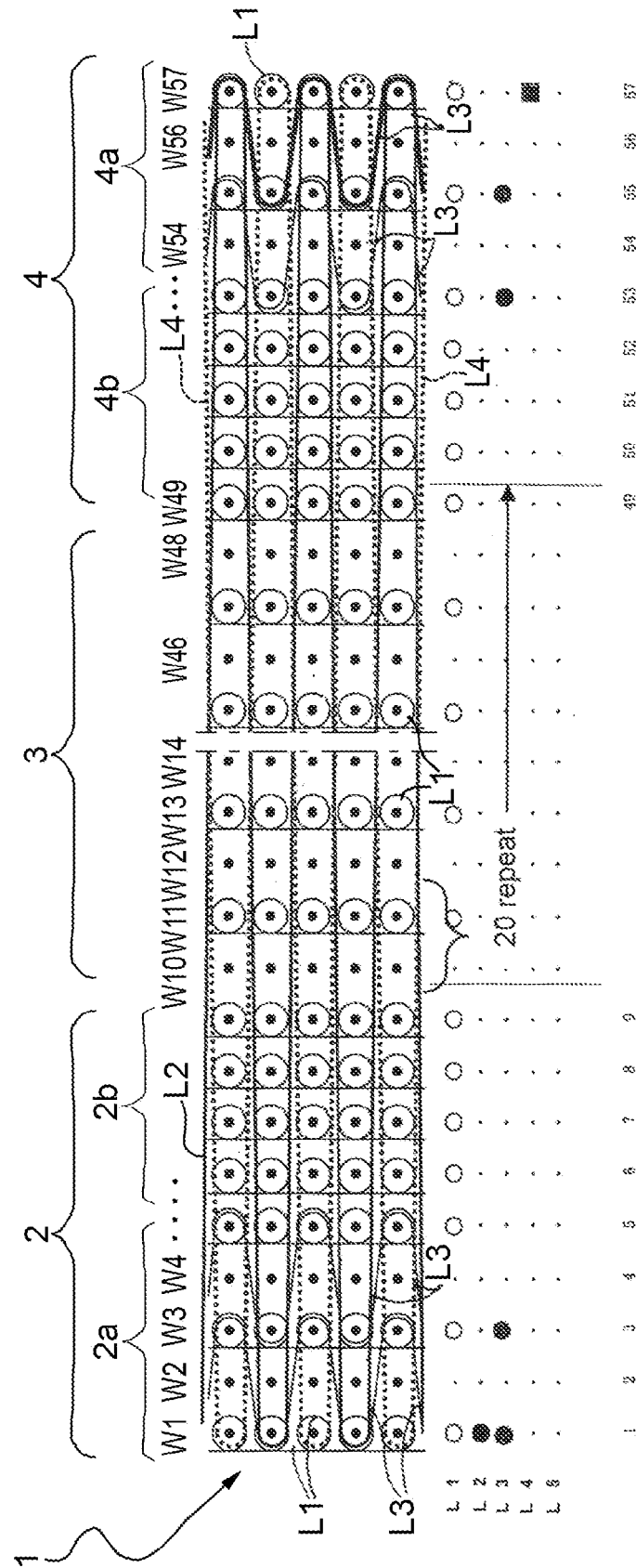


FIG. 2

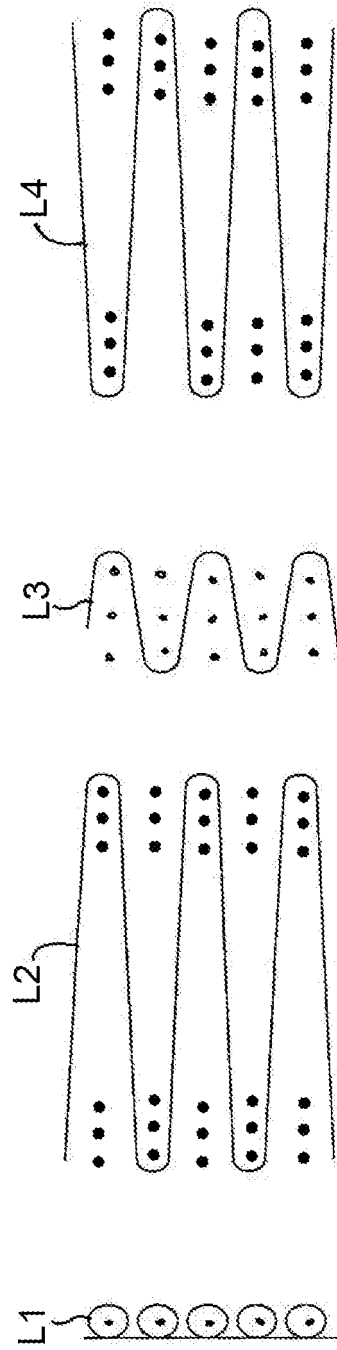


FIG. 3



EUROPEAN SEARCH REPORT

Application Number
EP 09 17 2973

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A	----- US 4 444 026 A (MATSUDA YOSHIO [JP]) 24 April 1984 (1984-04-24) * column 3, line 50 - line 60; figure 9 *	1	
A	----- EP 1 839 514 A (YKK CORP [JP]) 3 October 2007 (2007-10-03) * paragraph [0069]; figure 5 *	1	
A	----- US 6 766 669 B1 (TUNG HUNG JUI [TW]) 27 July 2004 (2004-07-27) * claims; figures *	1	
A	----- GB 2 023 678 A (MOLINIER SA) 3 January 1980 (1980-01-03) * the whole document *	1	
A	----- GB 263 203 A (THEODOR VORCK; PAUL ZIMMERMANN) 22 December 1926 (1926-12-22) * the whole document *	1	TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 January 2010	Examiner Debard, Michel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 17 2973

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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