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(54) WOVEN STRINGER TAPES FOR SLIDING CLASP FASTENERS

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, of No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan; a corporation duly organized under the laws of 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: —

This invention relates to a woven sliding clasp fastener stringer tape and has particular reference to the type of tape in which the coupling means consists of a continuous plastics filament spirally formed and woven into the edge of the tape during the weaving thereof.

While there have been introduced a number of sliding clasp fasteners of this character wherein the coupling fastener members are formed from a single plastics filament and are woven in the edge of the tape at the time the latter is woven, they may be grouped broadly into two categories. One category is where the filament is preformed into a coiled or spirally-arranged construction and such preformed filament acts at a warp thread at the edge of the tape during the weaving operation. The other category is characterized in that a continuous, linear filament is woven on a shuttle loom in a manner similar to a weft thread and formed, in the course of weaving, into a spirally-arranged interlocking structure.

These prior-art devices have many advantages as such, but they also have a certain problem particularly as regards the mechanical strength with which the interengaging coiled filament members are woven in the tape; viz., these members are too loosely anchored in place and lend themselves to displacement or deformation upon the imposition of tension or pull on tape stringers.

More recent devices have been conceived to eliminate this problem by the use of, for instance, a cord or a reinforcing thread for weaving in the filament members more securely to the edge of the tape, which in turn presents a drawback that the filament-woven edge portion of the tape become objectionably thick and complicated.

It is an object of the present invention to provide an improved sliding woven stringer tape of this character which will overcome the above-noted difficulties.

According to the invention there is provided a woven stringer tape for a sliding clasp fastener comprising a helical filament woven in by a plurality of warp threads and having a plurality of elongated loops each of which is unoccupied by warp threads and has its two legs both disposed in the same shed and joined at their one ends to provide a formation for releasably engaging with a corresponding formation on another stringer tape and connecting at their other ends to adjacent loops, the warp threads together embracing said loops along substantially the entire length exclusive of the end formations.

In the accompanying drawings, there are shown for the purpose of illustration certain preferred embodiments which the present invention may assume in practice.

In these drawings:

FIG. 1 is a magnified diagrammatic plan view of a fragment of the woven stringer tape constructed in accordance with the invention;

FIG. 2 is a longitudinal cross-sectional view taken on line I—I of FIG. 1, schematically showing the upper and lower runs of each convolution of the coiled filament as woven in one and the same group of warp thread loops;

FIG. 3 is a weaving diagram for producing the tape shown in FIG. 1;

FIG. 4 is a transverse cross-sectional view taken on line II—II of FIG. 1;

FIGS. 5 to 7 represent a second embodiment of the invention, FIG. 5 being a magnified diagrammatic plan view of a stringer tape

fragment, FIG. 6 being a longitudinal cross-sectional view taken on line III—III of FIG. 5, and FIG. 7 being a weaving diagram for producing the stringer tape shown in FIG. 5;

FIGS. 8 to 10 represent a third embodiment, FIG. 8 being a magnified diagrammatic plan view of a stringer tape fragment, FIG. 9 being a weaving diagram for producing the stringer tape shown in FIG. 8, and FIG. 10 being a transverse cross-sectional view taken on line IV—IV of FIG. 8 showing the tape as folded back to be adapted as a masked sliding clasp fastener;

FIGS. 11 to 13 represent a fourth embodiment, FIG. 11 being a magnified diagrammatic plan view of a tape stringer fragment incorporating a reinforcing thread lock-stitched in the tape, FIG. 12 being a similar view to FIG. 11 but incorporating a reinforcing thread chain-stitched in the tape, and FIG. 13 being a weaving diagram for producing the tape stringer shown either in FIG. 11 or FIG. 12;

FIG. 14 is a magnified diagrammatic perspective view of a fifth embodiment showing a sewn in reinforcement for the inner end portions of the coiled filament;

FIG. 15 is a weaving diagram for producing the stringer tape shown in FIG. 14;

FIG. 16 is a similar view to FIG. 14 but showing a sewn in reinforcement for the outer end portions of the coiled filament;

FIG. 17 is a weaving diagram for producing the stringer tape shown in FIG. 16;

FIG. 18 is a magnified diagrammatic plan view of a sixth embodiment showing a modified weave of the stringer tape;

FIG. 19 is a magnified diagrammatic plan view of a seventh embodiment showing another modification of the weave of the stringer tape;

FIG. 20 is a weaving diagram for producing the stringer tape shown in FIG. 19;

FIG. 21 is a magnified diagrammatic plan view of an eighth embodiment showing a further modification of the weave;

FIG. 22 is a weaving diagram for producing the stringer tape shown in FIG. 21;

FIG. 23 is a magnified diagrammatic plan view of a ninth embodiment showing a still further modification of the weave of the stringer tape;

FIG. 24 is a weaving diagram for producing the stringer tape shown in FIG. 23;

FIG. 25 is a magnified diagrammatic plan view of a tenth embodiment showing still another modification of the weave of the stringer tape;

FIG. 26 is a weaving diagram for producing the stringer tape shown in FIG. 25.

In FIG. 1 of the drawings, there is shown part of a woven stringer tape T which constitutes one of a pair of stringer tapes for a sliding clasp fastener. This tape consists of a web section W and a fastener section Wf constituting an edge of the tape, both sections consisting of a plurality of warp threads interwoven with loops of a continuous weft thread. The fastener section Wf has a continuous, helical fastener lament F woven into the edge of the tape. As already stated, the lament F is woven by a plurality of warp threads in a similar manner as is the weft thread. The lament F is a continuous, helical structure consisting of a series of elongated loops projecting outwardly of the tape edge and each loop having a head 100 to engage and couple with a corresponding head of a loop in an opposed stringer tape (not shown), two legs 111 one substantially superimposed on the other and a connecting portion 112 interconnecting adjacent runs.

As seen in Figs. 1 and 2, the woven filament section Wf comprises a first plurality of warp threads 1, 3, 5, 7, 9 which alternately overlie and underlie successive ones of the elongated loops and a second plurality of warp threads 2, 4, 6, 8, 10 which alternately underlie and overlie the same successive ones of the elongated loops. All these threads are external of the loops (as best seen in Figs. 14 and 16) and are sufficient in number substantially to cover each leg 111, the dense arrangement of warp threads thus obtained serving to reinforce the tape.

Throughout the various embodiments shown, both legs 111 of a loop of the filament F are accommodated, one superimposed on the other, in one shed of warp threads Wp as illustrated particularly in FIG. 2 or FIG. 6, which constitutes an important aspect of the present invention. Another important aspect is that the warp threads are sufficient in number to cover substantially the entire length of the legs 111 between the heads 100 and the connecting portions 112 of each loop in the fastener section Wf. These two basic arrangements according to the invention assure a weaving-in of the filament F to the edge of the tape with greater security than is achieved in the prior-art devices. It will be also understood that the tape T may be rendered substantially thin and pliable as a whole due to the accommodation of both legs 111 in one shed of warp threads.

The weaving diagram shown in FIG. 3 is utilized to explain the weave of the tape in FIG. 1, and it is known as a plain weave. The left-hand side of this diagram represents the weave of the web section W, and the right-hand side represents the weave of the fastener section Wf. The black squares correspond to an up position of the warp thread Wa, and the white squares to a down position thereof. This principle applies to the other weaving diagrams shown. FIG. 4 shows a transverse cross-sectional view of the tape T shown in FIG. 1.

The second embodiment shown in FIGS.

5 to 7 is characterized in that the fastener filament is woven in at sheds Wp which alternate with sheds Ws which contain only loops of weft. This tape construction is suitable particularly for a relatively large fastener filament. The web section W is a two-and-two twill weave, while the fastener section Wf is a plain weave, as diagrammatically shown in FIG. 7.

The third embodiment appears in FIGS. 8 to 10 and is intended for use as a tape for a masked sliding clasp fastener. Contrary to the rest of the tapes shown, the filament F in this embodiment is woven in place in a manner such that the head 100 of each loop may project inwardly of the edge of the tape. FIG. 10 shows this masked type of tape with the web section W folded back near the head 100, so as to cause this head to protrude clear of the tape. The folded part of the tape is reinforced by weaving this part with a plain weave. As shown in the weaving diagram of FIG. 9, the 1st to 5th warp threads of the web section W are in plain weave nearest the fastener filament, while the remaining 6th to 13th warp threads are in two-and-two twill weave. The fastener section Wf consists of a plain weave.

The fourth embodiment, FIGS. 11 to 13, is similar to the first embodiment shown in FIGS. 1 to 4, except for the provision of a reinforcing sewing thread sewn on the tape after weaving to hold the filament F securely in position on the tape. The tape T shown in FIG. 11 has the thread S sewn thereon by lock-stitch, while this stiffener S is chain-stitched in the tape T of FIG. 12. The weave of these two tapes is plain both in the web and fastener sections, as seen from the weaving diagram of FIG. 13.

The fifth embodiment, FIGS. 14 to 17, is similar to the fourth embodiment just described, except that a reinforcing thread Sk is sewn on the tape after weaving using a more complex type of chain stitch. In the tape T shown in FIG. 14, the reinforcing thread Sk fastens the inner ends of the limbs 111 of the filament F securely to the edge of the tape. The reinforcing thread Sk in the case of FIG. 16 anchors the outer ends of the limbs 111. The weaving diagrams for producing these two tapes T are shown in FIGS. 15 and 17, respectively.

In FIG. 18 there is shown a sixth embodiment of the invention in which the woven fastener section Wf consists of a modified weave in which the woven fastener section Wf consists of a two-and-two weave, while the web section W consists of a two-and-two twill weave and has alternate weft loops which do not extend into the fastener section Wf thus permitting the weave of the woven fastener section Wf to be nearly as dense as that of the web section W and the tape T to be rendered relatively thin and hence, pliable.

The seventh embodiment, FIGS. 19 and 20, show a weave modification wherein the 1st to 10th warp threads of the woven fastener section Wf are in rib weave with the 11th and 12th warps in plain weave.

In the eighth embodiment, FIGS. 21 and 22, the woven fastener section Wf of the tape T has the 1st and 2nd warp threads woven in plain weave, the 3rd to 10th in two-and-two rib weave, and the 11th and 12th in plain weave.

The ninth embodiment, FIGS. 23 and 24, is similar to the eighth embodiment just described, except that the 3rd to 10th warp threads are woven in two-and-two twill weave.

In FIGS. 25 and 26, there is shown a tenth embodiment of the invention chosen for purposes of illustration. The woven fastener section Wf of the tape T appearing in this last embodiment has the 1st and 2nd warp threads woven in plain weave, the 3rd to 4th in two-and-two rib weave, the 5th to 8th in 3/1 and 1/3 weave, the 9th and 10th in two-and-two rib weave, and the 11th and 12th in plain weave.

It will be understood that the present invention is not to be limited to the precise forms which have been advanced, but various modifications and changes may be made therein without departing from the scope of the appended claims. For instance, the warp threads may be of nylon or other strong material for further increasing the strength with which the filament is fixed to the tape edge.

WHAT WE CLAIM IS:—

1. A woven stringer tape for a sliding clasp fastener comprising a helical filament woven in by a plurality of warp threads and having a plurality of elongated loops each of which is unoccupied by warp threads and has its two legs both disposed in the same shed and joined at their one ends to provide a formation for releasably engaging with a corresponding formation on another stringer tape and connecting at their other ends to adjacent loops, the warp threads together embracing said loops along substantially the entire length thereof exclusive of the end formations.

2. A woven stringer tape as claimed in claim 1, wherein a first set of said plurality of warp threads passes alternately over and under successive loops of the helical filament and a second set of said plurality of warp threads passes alternately under and over said successive loops.

3. A woven stringer tape as claimed in claim 1 or 2, wherein a loop of a continuous weft thread is inserted in each of said sheds such that said elongated loops are separated by a loop of weft thread.

4. A woven stringer tape as claimed in claim 1, wherein a sewing thread stiffener is provided to fasten said loops together.

5. A woven stringer tape as claimed in

5 to 7 is characterized in that the fastener filament is woven in at sheds Wp which alternate with sheds Ws which contain only loops of weft. This tape construction is suitable particularly for a relatively large fastener filament. The web section W is a two-and-two twill weave, while the fastener section Wf is a plain weave, as diagrammatically shown in FIG. 7.

The third embodiment appears in FIGS. 8 to 10 and is intended for use as a tape for a masked sliding clasp fastener. Contrary to the rest of the tapes shown, the filament F in this embodiment is woven in place in a manner such that the head 100 of each loop may project inwardly of the edge of the tape. FIG. 10 shows this masked type of tape with the web section W folded back near the head 100, so as to cause this head to protrude clear of the tape. The folded part of the tape is reinforced by weaving this part with a plain weave. As shown in the weaving diagram of FIG. 9, the 1st to 5th warp threads of the web section W are in plain weave nearest the fastener filament, while the remaining 6th to 13th warp threads are in two-and-two twill weave. The fastener section Wf consists of a plain weave.

The fourth embodiment, FIGS. 11 to 13, is similar to the first embodiment shown in FIGS. 1 to 4, except for the provision of a reinforcing sewing thread sewn on the tape after weaving to hold the filament F securely in position on the tape. The tape T shown in FIG. 11 has the thread S sewn thereon by lock-stitch, while this stiffener S is chain-stitched in the tape T of FIG. 12. The weave of these two tapes is plain both in the web and fastener sections, as seen from the weaving diagram of FIG. 13.

The fifth embodiment, FIGS. 14 to 17, is similar to the fourth embodiment just described, except that a reinforcing thread Sk is sewn on the tape after weaving using a more complex type of chain stitch. In the tape T shown in FIG. 14, the reinforcing thread Sk fastens the inner ends of the limbs 111 of the filament F securely to the edge of the tape. The reinforcing thread Sk in the case of FIG. 16 anchors the outer ends of the limbs 111. The weaving diagrams for producing these two tapes T are shown in FIGS. 15 and 17, respectively.

In FIG. 18 there is shown a sixth embodiment of the invention in which the woven fastener section Wf consists of a modified weave in which the woven fastener section Wf consists of a two-and-two weave, while the web section W consists of a two-and-two twill weave and has alternate weft loops which do not extend into the fastener section Wf thus permitting the weave of the woven fastener section Wf to be nearly as dense as that of the web section W and the tape T to be rendered relatively thin and hence, pliable.

The seventh embodiment, FIGS. 19 and 20, show a weave modification wherein the 1st to 10th warp threads of the woven fastener section Wf are in rib weave with the 11th and 12th warps in plain weave.

In the eighth embodiment, FIGS. 21 and 22, the woven fastener section Wf of the tape T has the 1st and 2nd warp threads woven in plain weave, the 3rd to 10th in two-and-two rib weave, and the 11th and 12th in plain weave.

The ninth embodiment, FIGS. 23 and 24, is similar to the eighth embodiment just described, except that the 3rd to 10th warp threads are woven in two-and-two twill weave.

In FIGS. 25 and 26, there is shown a tenth embodiment of the invention chosen for purposes of illustration. The woven fastener section Wf of the tape T appearing in this last embodiment has the 1st and 2nd warp threads woven in plain weave, the 3rd to 4th in two-and-two rib weave, the 5th to 8th in 3/1 and 1/3 weave, the 9th and 10th in two-and-two rib weave, and the 11th and 12th in plain weave.

It will be understood that the present invention is not to be limited to the precise forms which have been advanced, but various modifications and changes may be made therein without departing from the scope of the appended claims. For instance, the warp threads may be of nylon or other strong material for further increasing the strength with which the filament is fixed to the tape edge.

WHAT WE CLAIM IS:—

1. A woven stringer tape for a sliding clasp fastener comprising a helical filament woven in by a plurality of warp threads and having a plurality of elongated loops each of which is unoccupied by warp threads and has its two legs both disposed in the same shed and joined at their one ends to provide a formation for releasably engaging with a corresponding formation on another stringer tape and connecting at their other ends to adjacent loops, the warp threads together embracing said loops along substantially the entire length thereof exclusive of the end formations.

2. A woven stringer tape as claimed in claim 1, wherein a first set of said plurality of warp threads passes alternately over and under successive loops of the helical filament and a second set of said plurality of warp threads passes alternately under and over said successive loops.

3. A woven stringer tape as claimed in claim 1 or 2, wherein a loop of a continuous weft thread is inserted in each of said sheds such that said elongated loops are separated by a loop of weft thread.

4. A woven stringer tape as claimed in claim 1, wherein a sewing thread stiffener is provided to fasten said loops together.

5. A woven stringer tape as claimed in

claim 1, wherein the tape has a web section and a filament section.

6. A woven stringer tape as claimed in claim 5 wherein both the web section and the filament section are in plain weave.

7. A woven stringer tape as claimed in claim 5, wherein either the web section or the filament section has a twill weave.

8. A woven stringer tape as claimed in claim 5, wherein said filament section is partly in rib weave.

9. A woven stringer tape as claimed in claim 5, wherein the filament section is a combination of plain, twill and rib weaves.

10. A woven stringer tape as claimed in any one of the preceding claims wherein the helical filament is made of synthetic plastics material.

11. A woven stringer tape substantially as herein described with reference to Figs. 1 to 4, or Figs. 5 to 7, or Figs. 8 to 10, or Figs. 11 to 13, or Figs. 14 and 15, or Figs. 16 and 17, or Fig. 18, or Figs. 19 and 20, or Figs. 21 and 22, or Figs. 23 and 24, or Figs. 25 and 26.

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