

PATENT SPECIFICATION

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(54) SLIDING CLASP FASTENER STRINGER

(71) We, YOSHIDA KOGYO K. K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumicho, 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:-

The present invention relates to a sliding clasp fastener stringer having a row of continuous fastener elements made of thermoplastic synthetic resin.

As is well known in the art, a row of filamentary fastener elements is attached to one longitudinal edge of an elongate sliding clasp fastener stringer by means of sewing threads. Such elongate fastener stringer is cut off into desired lengths each having an element-free gap through which a slider is to be assembled.

The stringer tape is prone to become raveled where it has been severed conventionally by a cutter, and the sewing threads which are broken by the cutter near the element-free gap allow fastener elements to loosen and come off. This has led to a drawback in that a slider cannot easily be attached, and the loosened fastener elements can prevent top and bottom end stops from being applied thereto at precise locations.

Various attempts have been made to eliminate the problems. One such effort is a plastic film bonded around the cut edges of the tape and fastener elements. It has also been proposed to impregnate the stringer tape with a synthetic resin solution. Such prior procedures, however, are disadvantageous in that extra process steps are involved and in that the fastener elements once loosened cannot be properly restored to the fixed position. Furthermore, since the fastener stringer is cut substantially at a right angle to its general plane, the synthetic resin material tends to create sharp cut edges

which are injurious to the skin or the garments.

According to the present invention, there is provided a sliding clasp fastener stringer comprising: a stringer tape including thermoplastics synthetic fibers; a row of continuous fastener elements made of thermoplastics synthetic resin and mounted on and along one longitudinal edge of said stringer tape; reinforcing means extending along said row of continuous fastener elements and including thermoplastics synthetic fibers; and sewing threads fixing said fastener elements and said reinforcing means to said stringer tape, said sewing threads including thermoplastics synthetic fibers, and there being a cut edge whereat said stringer tape, one of said fastener elements, said reinforcing means, and said sewing threads are all fused together.

The invention will now be described by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of a sliding clasp fastener, with a portion shown reversed, comprising a pair of fastener stringers constructed according to the invention;

Figure 2 is an enlarged cross-sectional view of a cut edge portion of one of the stringers shown in Figure 1;

Figure 3 is a view similar to Figure 2, showing a cut edge portion of a modified stringer;

Figure 4 is a fragmentary plan view of the stringers to which a top end stop is applied;

Figure 5 is a fragmentary plan view of the stringers having a bottom end stop attached thereto;

Figure 6 is a fragmentary plan view of the stringers with a separable bottom end stop mounted thereon;

Figure 7 is a plan view of a sliding clasp fastener including a pair of sliding clasp fastener stringers provided in accordance with a modification of the invention;

Figure 8 is a fragmentary enlarged pers-

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pective view of the fastener shown in Figure 7;

Figure 9 is an enlarged cross-sectional view taken along line IX - IX of Figure 7;

Figure 10 is an enlarged cross-sectional view taken along line X - X of Figure 8; and

Figure 11 is a fragmentary plan view of a pair of sliding clasp fastener stringers according to a modified form of the invention.

As shown in Figure 1, a sliding clasp fastener 12 comprises a pair of fastener stringers 13,14 each including a stringer tape 15 and a row of continuous fastener elements 16 of the meandering or zigzag type mounted on and along one longitudinal edge of the tape 15. The stringer tape 15 is of a woven or knitted structure including yarns either of naturally occurring fibers blended with thermoplastics synthetic resin fibers, or of solely synthetic resin fibers. The tape 15 may alternatively be of a union fabric formed with naturally occurring fibers and thermoplastics resin fibers.

Each fastener element 16 includes a pair of upper and lower legs 17,18 (Figure 2), the fastener elements 16 being disposed astride the stringer tape 15 with their upper and lower legs 17,18 respectively on the opposite surfaces of the tape 15. An elongate reinforcing member 19 such as a braid extends along the row of fastener elements 16 and is disposed on one side of the lower legs 18 of the elements 16 which is remote from the stringer tape 15, the braid 19 including thermoplastics synthetic resin fibers.

As better illustrated in Figure 2, the row of fastener elements 16 and the braid 19 are fixed to the stringer tape 15 by means of sewing threads 20 such as of double locked stitch that is composed of needle threads 21 and looper threads 22. The needle threads 21 penetrate the braid 19 and extend around the lower element legs 18, and the looper threads 22 surround the upper element legs 17, thereby holding the fastener elements 16 in position on the stringer tape 15. The sewing threads 20 include or may be formed solely with thermoplastics synthetic resin fibers.

The pair of fastener stringers 13,14 with the element rows intermeshed is cut off from a continuous elongate blank of paired stringers (not shown), and at the same time is provided with an upper element-free gap or space 23 in its upper end portion and a lower element-free gap or space 24 in its lower end portion, the element-free gaps 23,24 being formed typically by stamping out the stringers 13,14. The cutting and stamping-out operation on the fastener stringers 13,14 is carried out by means of a punch (not shown) with heat generated as by a high-frequency or an ultrasonic welder, or an electric heater, so as to enable the cut edges and ends of the tapes 15,15, fastener elements 16, sewing

threads 20, and braid 19 to be melted and fused simultaneously with the cutting and stamping-out operation, the cut edges and ends on solidification preventing raveling of the tape fabric yarns, sewing threads and braid yarns, and sticking up of the fastener elements 16 from the stringer tapes 15,15.

Figure 2 also shows a cut end of the row of fastener elements 16, in which the upper leg 17 of an extreme fastener element is wrapped by the stringer tape 15 and the looper threads 22 which are fused with the element and extend toward the braid 19 under tension in coalescing relation with the tape 15. The lower leg 18 of the extreme fastener element is wrapped by the braid 19, the needle threads 21 and the stringer tape 15 which is fused with the element, and extends toward and is fused at its distal end with the braid 19. Accordingly, the extreme fastener element 16 at the cut edge is held stably in position on the stringer tape 15 against loosening therefrom. Furthermore, the sewing threads 20, stringer tape 15, and braid 19 are united together at the cut end and are prevented from fraying, thereby giving such cut end a neat and smooth appearance.

According to a modified structure shown in Figure 3, the stringer 13(14) is turned upside down, and the lower leg 18 of the extreme fastener element at the cut edge is covered by the stringer tape 15, needle threads 21, and braid 19 which is fused with the lower leg 18 and extends therearound toward the upper leg 17. The stringer tape 15 which extends in coalescing relation around the upper leg 17 away from the lower leg 18, is fused with the braid 19, the upper leg 17 being enclosed by the stringer tape 15 and the looper threads 22.

A slider 25 (Figure 1) is furnished onto the pair of fastener stringers 13,14 through the upper element-free gap 23 bounded by the neatly finished cut edges of the stringers 13,14. As shown in Figures 4 and 5, a top end stop 26 including a pair of stop halves 27,28 and a bottom end stop 29, both made of synthetic resin, are formed on the upper and lower end portions, respectively, adjacent to the upper and lower element-free gaps 23,24 of the stringers 13,14, thereby confining the slider 25 for movement along the rows of fastener elements 16 between the top end stop 26 and the bottom end stop 29.

Figure 6 illustrates a separable bottom end stop 30 formed by moulding plastics material on the lower end portion of the stringers 13,14.

A modification illustrated in Figures 7 to 10 inclusive comprises a pair of sliding clasp fastener stringers 31,32 each having cut edges 33,34 that are neatly finished by fusing thermoplastics synthetic resin contained in sliding clasp fastener components such as a stringer tape 35, sewing threads 36, a braid

37, and a row of zigzag type fastener elements 38. The cut edge 33 is disposed solely in each stringer tape 35 and extends transversely and longitudinally thereof. The cut edge 34 is disposed in a longitudinal marginal edge portion of each stringer taper 35 on which the fastener elements 38 are mounted. the cut edge 34 extending transversely of the stringer tape 35. The cut edges 33,34 have substantially flat surfaces 39,40, respectively, slanted with respect to the plane of the stringer tape 35. Such slanted cut surfaces 39,40 are formed by a punch (not shown) having complementary slanted surfaces that can be pressed with heat against the cut edges 33,34 when the fastener stringers 31,32 are cut off and element-free gaps 41,42 are produced by the punch.

As shown in Figure 9, the slanted cut edge 33 of the stringer tape 35 includes fused fabric yarns, some of which are kept stretched at the surface 39 by the correspondingly slanted punch surface.

Figure 10 illustrates extreme one of the fastener elements 38, the upper leg 43 of which is fused with the sewing threads 36 therearound extending under tension toward the braid 37 which is located remotely from the upper leg 43. The stringer tape 35 extends around the lower leg 44 of the extreme element away from the upper leg 43 toward the braid 37, the portion of the stringer tape 35 which extend beyond the lower leg 44 being disposed substantially parallel to the tensioned sewing threads 36 and being fused therewith at the slanted surface 40. The distal ends of the sewing threads 36 and stringer taper 35 are united integrally with the braid 37 against raveling. With the cut edge 34 thus shaped and fused, the extreme fastener element 38 is held securely in position by the tightened sewing threads 36 at the slanted edge surface 40. Such slanted cut edge 34 provides a guide surface which is relatively wide and is free of burrs, thereby allowing a slider 45 (Figure 8) to be attached smoothly onto the stringers 31,32. In addition, when the fastener is attached to a garment, such gradually inclined cut edges are not harmful to the skin or other materials which might get in contact with such edges.

In Figure 11, a pair of sliding clasp fastener stringers 46,47 each include a row of helically coiled fastener elements 48 sewn with threads 49 to one longitudinal edge of a fastener stringer tape 50, the fastener elements 48 being positionally stabilized by means of a reinforcing filling core 51 including thermoplastic synthetic fibers and extending through the row of coiled fastener elements 48. The fastener stringers 46,47 have a transverse cut edge 52 which is fused and has a slanted surface 53 as with the embodiment shown in Figures 7 to 10 inclusive.

WHAT WE CLAIM IS:

1. A sliding clasp fastener stringer comprising: a stringer tape including thermoplastics synthetic fibers; a row of continuous fastener elements made of thermoplastics synthetic resin and mounted on and along one longitudinal edge of said stringer tape; reinforcing means extending along said row of continuous fastener elements and including thermoplastics synthetic fibers; and sewing threads fixing said fastener elements and said reinforcing means to said stringer tape, said sewing threads including thermoplastics synthetic fibers, and there being a cut edge whereat said stringer tape, one of said fastener elements, said reinforcing means, and said sewing threads are all fused together.

2. A sliding clasp fastener stringer according to claim 1, said sewing threads and said stringer tape jointly wrapping and retaining said one fastener element at said cut edge.

3. A sliding clasp fastener stringer according to claim 1, said reinforcing means comprising a braid mounted on one side of said continuous fastener elements which is remote from said stringer tape, said braid wrapping and retaining said one fastener element at said cut edge.

4. A sliding clasp fastener stringer according to claim 1, said cut edge having a substantially flat surface slanted with respect to the plane of said stringer tape.

5. A sliding clasp fastener stringer according to claim 4, said reinforcing means comprising a braid mounted on one side of said continuous fastener elements which is remote from said stringer tape, said stringer tape and said sewing threads extending at an angle to said braid at said flat surface.

6. A sliding clasp fastener stringer according to claim 1, said stringer tape having a fused cut edge having a substantially flat surface with respect to the plane of the tape.

7. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figures 1, 2, 4, 5 and 6 of the accompanying drawings.

8. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figure 3 of the accompanying drawings.

9. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figures 7, 8, 9 and 10 of the accompanying drawings.

10. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figure 11 of the accompanying drawings.

37, and a row of zigzag type fastener elements 38. The cut edge 33 is disposed solely in each stringer tape 35 and extends transversely and longitudinally thereof. The cut edge 34 is disposed in a longitudinal marginal edge portion of each stringer taper 35 on which the fastener elements 38 are mounted, the cut edge 34 extending transversely of the stringer tape 35. The cut edges 33,34 have substantially flat surfaces 39,40, respectively, slanted with respect to the plane of the stringer tape 35. Such slanted cut surfaces 39,40 are formed by a punch (not shown) having complementary slanted surfaces that can be pressed with heat against the cut edges 33,34 when the fastener stringers 31,32 are cut off and element-free gaps 41,42 are produced by the punch.

As shown in Figure 9, the slanted cut edge 33 of the stringer tape 35 includes fused fabric yarns, some of which are kept stretched at the surface 39 by the correspondingly slanted punch surface.

Figure 10 illustrates extreme one of the fastener elements 38, the upper leg 43 of which is fused with the sewing threads 36 therearound extending under tension toward the braid 37 which is located remotely from the upper leg 43. The stringer tape 35 extends around the lower leg 44 of the extreme element away from the upper leg 43 toward the braid 37, the portion of the stringer tape 35 which extend beyond the lower leg 44 being disposed substantially parallel to the tensioned sewing threads 36 and being fused therewith at the slanted surface 40. The distal ends of the sewing threads 36 and stringer taper 35 are united integrally with the braid 37 against raveling. With the cut edge 34 thus shaped and fused, the extreme fastener element 38 is held securely in position by the tightened sewing threads 36 at the slanted edge surface 40. Such slanted cut edge 34 provides a guide surface which is relatively wide and is free of burrs, thereby allowing a slider 45 (Figure 8) to be attached smoothly onto the stringers 31,32. In addition, when the fastener is attached to a garment, such gradually inclined cut edges are not harmful to the skin or other materials which might get in contact with such edges.

In Figure 11, a pair of sliding clasp fastener stringers 46,47 each include a row of helically coiled fastener elements 48 sewn with threads 49 to one longitudinal edge of a fastener stringer tape 50, the fastener elements 48 being positionally stabilized by means of a reinforcing filling core 51 including thermoplastic synthetic fibers and extending through the row of coiled fastener elements 48. The fastener stringers 46,47 have a transverse cut edge 52 which is fused and has a slanted surface 53 as with the embodiment shown in Figures 7 to 10 inclusive.

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2. A sliding clasp fastener stringer according to claim 1, said sewing threads and said stringer tape jointly wrapping and retaining said one fastener element at said cut edge.

3. A sliding clasp fastener stringer according to claim 1, said reinforcing means comprising a braid mounted on one side of said continuous fastener elements which is remote from said stringer tape, said braid wrapping and retaining said one fastener element at said cut edge.

4. A sliding clasp fastener stringer according to claim 1, said cut edge having a substantially flat surface slanted with respect to the plane of said stringer tape.

5. A sliding clasp fastener stringer according to claim 4, said reinforcing means comprising a braid mounted on one side of said continuous fastener elements which is remote from said stringer tape, said stringer tape and said sewing threads extending at an angle to said braid at said flat surface.

6. A sliding clasp fastener stringer according to claim 1, said stringer tape having a fused cut edge having a substantially flat surface with respect to the plane of the tape.

7. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figures 1, 2, 4, 5 and 6 of the accompanying drawings.

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10. A sliding clasp fastener stringer substantially as herein described with reference to and as illustrated in Figure 11 of the accompanying drawings.



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