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DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Sliding Clasp Fastener

We, YOSHIDA KOGYO K. K., 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 sliding clasp fasteners or zippers.

It has been proposed to conceal the fastening elements of a sliding clasp fastener by the arrangement in which the elements are secured at their leg portions to one edge of each of two opposed stringer tapes and the tapes are folded back adjacent to the coupling heads of the elements, whereby the opposed stringer tapes meet closely together at the folds, leaving a seam thereat, when the fastener is closed. When lateral load is exerted to the fastener, such known arrangement has the tendency that the closed junction of the opposed stringers goes apart under the influence of laterally applied load and fails to mask the elements even after the load is removed, and in some instance the elements are apt to split out of engagement.

It is desirable to reduce one or more of these snags.

According to the invention, there is provided a sliding clasp fastener which comprises a pair of stringer tapes each with an inwardly folded edge portion, a row of fastening elements formed from a single synthetic plastics filament into a continuous structure and secured to the lower side of said folded edge portion of each tape, a slider slidably mounted on said stringer tapes for engaging and disengaging said fastening elements, each fastening element including a coupling head, two leg portions extending from the coupling head and a connecting portion connecting one of these two leg portions to an adjacent fastener element, at least one leg having a recess to anchor therein a plurality of sewing threads for securing the element to its associated tape edge and

a spacing material inserted between the two legs of the elements to determine the leg-to-leg spacing of the elements.

Several advantages might accrue from the invention, such as:—

1. Elements are secured with greater firmness to the tapes by as many sewing threads as fill the recesses in the leg portions of the elements, and thus engagement of the elements is rendered more stable.

2. Increased flexibility of the recessed leg portions of the elements urges the opposed stringer tapes to return to normal closed disposition when the lateral load is released.

3. Sewing threads, being accommodated within the recesses of the leg portions of the elements, are saved from wear in contact with a reciprocating slider. This in turn serves to facilitate the sliding motion of the slider. Furthermore, the stitchings thus lying inside the recesses of the elements are prevented from shifting out of position when the fastener is sewn to a garment by a presser foot on a sewing machine.

4. The quantity of sewing threads required to affix the elements to the tapes is reduced considerably by flexing under sewing pressure the recessed legs of the elements against the braid therebetween, and accordingly elongation of the threads under tension is held to a minimum.

These advantages and other features of the invention will be more apparent from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a transverse cross-sectional view of a preferred embodiment of the invention illustrating the fastener in its closed disposition;

Fig. 2 is a transverse cross-sectional view of a modification including a stitch accommodating recess only in the lower leg portion of the element;

Fig. 3 is a similar view of another modification illustrating a recess of different shape provided symmetrically in both the upper and lower leg portions of the element;

Fig. 4 is a similar view to Fig. 3, and illustrates a further modification wherein the element having a recess in both legs is secured in position on the tape simultaneously with the weaving of a stringer tape; and

Fig. 5 is a cross section of a helical element including a stitch accommodating recess in both legs, this element being used in the embodiment of Fig. 1.

Referring to the drawings wherein like numerals refer to like parts, and first to Fig. 1, each of the two opposed stringer tapes 10 has inwardly folded edge portion 11, to the lower side of which is secured a row of continuous helical interlocking elements 12, formed from a single synthetic plastics filament, by means of suitable stitches 13.

Each element 12 includes a coupling head 14, two limb or leg portions 16 and a connecting portion connecting one leg portion 16 to the adjacent fastener element. There is a recess 17 at least in one of its two legs as shown in the various figures of the drawing. Each recess 17 is defined by a neck 18 and formed to a substantially uniform depth in each leg portion of the element 12, Fig. 5, which is employed in the embodiments of Figs. 1 and 4. The recess 17 may be of any suitable geometry but preferably deep enough to accommodate several single-thread stitches or loop chain stitches therein, lest these stitches should protrude into the path of the sliders and wear in frictional contact therewith. The loop portions of sewing threads 13 are disposed substantially inside the recess 17 of the lower leg of the element, while the folded edge portion 11 fits tight against the recess 17 of the upper leg of the element and bears against the neck 18. With this construction, the stitching 13 and the folded edge 11 of the tape are afforded sufficient resistance to displacement when the fastener is subjected to lateral load exerted to force the opposed tapes apart at their junction. This in turn ensures stable inter-engagement between the elements 12 on the mating stringer tapes.

In the embodiment of Fig. 2 there is provided a recess 17, similar to that shown in Fig. 5, in the lower leg portion only of the element for anchoring the looped threads.

The element 12 shown in the embodiment of Fig. 3 has symmetrical recesses 17 in its two leg portions 16 and differs from the element shown in Fig. 5 in that the recesses 17 are formed progressively deeper toward the connecting portion 15 and terminated by a neck 18 which is longer than that of Fig. 5 and against which is borne the extreme end 19 of the folded tape. This modification ensures greater resistance of both the folded edge 11 and the stitching 13 to lateral displacement.

A spacing braid 20 is inserted between the legs 16 of the elements 12 and extends

longitudinally of the entire length of the fastener to serve as a spacing material. The braid 20 may be preferably formed from soft resilient material such as a fibrous cord, and it serves on one hand to prevent the sewing threads 13 from shifting out of position and on the other hand, to control the spacing between the legs of the elements when the latter are flexed toward each other under sewing pressure. It will be seen that the braid 20 is thinner in the embodiments of Figs. 1 and 3 than it is in the embodiment of Fig. 2. This is because in the embodiments of figures 1 and 3 both the upper and lower legs of the element are recessed and hence are elastically flexed toward each other by the thread until the two legs abut firmly against the braid when the elements are sewn to the folded edges 11 of the tape 10, whereas in the embodiment of Fig. 2 where the recess 17 is formed only in the lower leg of the element, it is not necessary to consider the flexing of the upper leg portion under normal sewing pressure.

Thus, the braid 20 substantially determines the spacing between the two legs 16 of the elements when the latter are secured in position on the tape.

The modification illustrated in Fig. 4 differs from the basic embodiment of Fig. 1 in that the elements 12 are anchored to the tape edge by warps and wefts of the weaving threads simultaneous with the forming of stringer tapes, said warps serving as the spacing material and taking the place of the braid 20.

While the elements 12 of a helical form have been dealt with herein for purposes of illustration, it will be understood that the invention may be applied to elements of a meandering form as well.

WHAT WE CLAIM IS:—

1. A sliding clasp-fastener comprising a pair of stringer tapes each with an inwardly folded edge portion, a row of fastening elements formed from a single synthetic plastics filament into a continuous structure and secured to the lower side of said folded edge portion of each tape, a slider slidably mounted on said stringer tapes for engaging and disengaging said fastening elements, each fastening element including a coupling head, two leg portions extending from the coupling head and a connecting portion connecting one of these leg portions to an adjacent fastener element, at least one leg having a recess to anchor therein a plurality of sewing threads for securing the element to its associated tape edge, and a spacing material inserted between the two legs of the elements to determine the leg-to-leg spacing of the elements.

2. A fastener as claimed in claim 1 wherein the spacing material is a spacing braid.

Fig. 4 is a similar view to Fig. 3, and illustrates a further modification wherein the element having a recess in both legs is secured in position on the tape simultaneously with the weaving of a stringer tape; and

Fig. 5 is a cross section of a helical element including a stitch accommodating recess in both legs, this element being used in the embodiment of Fig. 1.

Referring to the drawings wherein like numerals refer to like parts, and first to Fig. 1, each of the two opposed stringer tapes 10 has inwardly folded edge portion 11, to the lower side of which is secured a row of continuous helical interlocking elements 12, formed from a single synthetic plastics filament, by means of suitable stitches 13.

Each element 12 includes a coupling head 14, two limb or leg portions 16 and a connecting portion connecting one leg portion 16 to the adjacent fastener element. There is a recess 17 at least in one of its two legs as shown in the various figures of the drawing. Each recess 17 is defined by a neck 18 and formed to a substantially uniform depth in each leg portion of the element 12, Fig. 5, which is employed in the embodiments of Figs. 1 and 4. The recess 17 may be of any suitable geometry but preferably deep enough to accommodate several single-thread stitches or loop chain stitches therein, lest these stitches should protrude into the path of the sliders and wear in frictional contact therewith. The loop portions of sewing threads 13 are disposed substantially inside the recess 17 of the lower leg of the element, while the folded edge portion 11 fits tight against the recess 17 of the upper leg of the element and bears against the neck 18. With this construction, the stitching 13 and the folded edge 11 of the tape are afforded sufficient resistance to displacement when the fastener is subjected to lateral load exerted to force the opposed tapes apart at their junction. This in turn ensures stable inter-engagement between the elements 12 on the mating stringer tapes.

In the embodiment of Fig. 2 there is provided a recess 17, similar to that shown in Fig. 5, in the lower leg portion only of the element for anchoring the looped threads.

The element 12 shown in the embodiment of Fig. 3 has symmetrical recesses 17 in its two leg portions 16 and differs from the element shown in Fig. 5 in that the recesses 17 are formed progressively deeper toward the connecting portion 15 and terminated by a neck 18 which is longer than that of Fig. 5 and against which is borne the extreme end 19 of the folded tape. This modification ensures greater resistance of both the folded edge 11 and the stitching 13 to lateral displacement.

A spacing braid 20 is inserted between the legs 16 of the elements 12 and extends

longitudinally of the entire length of the fastener to serve as a spacing material. The braid 20 may be preferably formed from soft resilient material such as a fibrous cord, and it serves on one hand to prevent the sewing threads 13 from shifting out of position and on the other hand, to control the spacing between the legs of the elements when the latter are flexed toward each other under sewing pressure. It will be seen that the braid 20 is thinner in the embodiments of Figs. 1 and 3 than it is in the embodiment of Fig. 2. This is because in the embodiments of figures 1 and 3 both the upper and lower legs of the element are recessed and hence are elastically flexed toward each other by the thread until the two legs abut firmly against the braid when the elements are sewn to the folded edges 11 of the tape 10, whereas in the embodiment of Fig. 2 where the recess 17 is formed only in the lower leg of the element, it is not necessary to consider the flexing of the upper leg portion under normal sewing pressure.

Thus, the braid 20 substantially determines the spacing between the two legs 16 of the elements when the latter are secured in position on the tape.

The modification illustrated in Fig. 4 differs from the basic embodiment of Fig. 1 in that the elements 12 are anchored to the tape edge by warps and wefts of the weaving threads simultaneous with the forming of stringer tapes, said warps serving as the spacing material and taking the place of the braid 20.

While the elements 12 of a helical form have been dealt with herein for purposes of illustration, it will be understood that the invention may be applied to elements of a meandering form as well.

WHAT WE CLAIM IS:—

1. A sliding clasp-fastener comprising a pair of stringer tapes each with an inwardly folded edge portion, a row of fastening elements formed from a single synthetic plastics filament into a continuous structure and secured to the lower side of said folded edge portion of each tape, a slider slidably mounted on said stringer tapes for engaging and disengaging said fastening elements, each fastening element including a coupling head, two leg portions extending from the coupling head and a connecting portion connecting one of these leg portions to an adjacent fastener element, at least one leg having a recess to anchor therein a plurality of sewing threads for securing the element to its associated tape edge, and a spacing material inserted between the two legs of the elements to determine the leg-to-leg spacing of the elements.

2. A fastener as claimed in claim 1 wherein the spacing material is a spacing braid.



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3. A fastener as claimed in claim 1 wherein the spacing material is an integral part of the stringer tape, for example the warps of the weaving threads constituting the stringer tape.

5 4. A fastener as claimed in any one of the preceding claims wherein the other leg has a recess for anchoring the folded edge portion of the tape, the recesses of the two legs being of substantially uniform depth.

10 5. A fastener as claimed in any one of claims 1 to 3 wherein said recess is formed

progressively deeper toward the connecting portion of the element and defined by a neck against which is borne an extreme end of the folded edge portion of the tape.

15

6. A sliding clasp fastener substantially as described with reference to and as shown in the accompanying drawings.

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