

United States Patent

[11] 3,594,874

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 [21] Appl. No. **718,161**
 [22] Filed **Apr. 2, 1968**
 [45] Patented **July 27, 1971**
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 [32] Priority **Apr. 15, 1967**
 [33] **Japan**
 [31] **43/21,434**

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[54] **SLIDE FASTENER**
4 Claims, 5 Drawing Figs.

[52] U.S. Cl. 24/205.1
 [51] Int. Cl. A44b 19/1,
 A44b 19/34
 [50] Field of Search 24/205.1 C,
 205.16 C, 205.13 C

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ABSTRACT: A sliding clasp fastener of flexible concealed fashion including a row of elements on each stringer tape, said element having a recess at least in one of its two leg portions for anchoring sewing threads. The sewing threads interconnect the flexible elements to the stringer tape in such a manner that the flexible elements are maintained in a normally flexed condition.

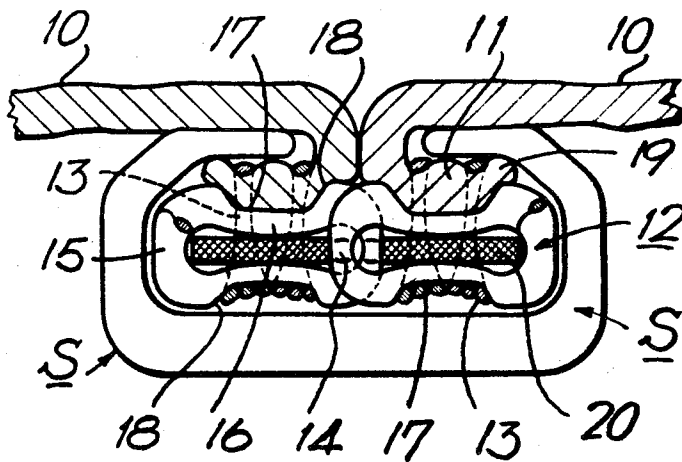


FIG. 1

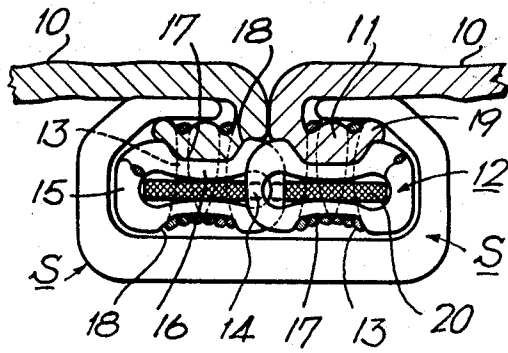


FIG. 2

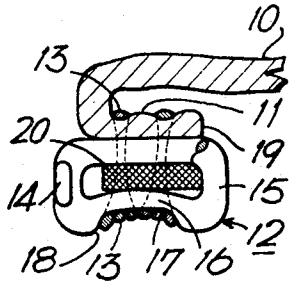


FIG. 4

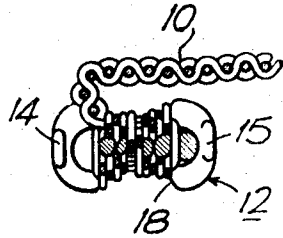


FIG. 3

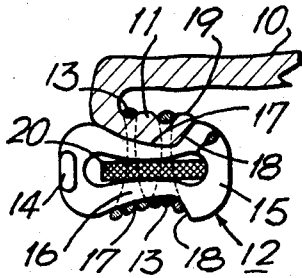
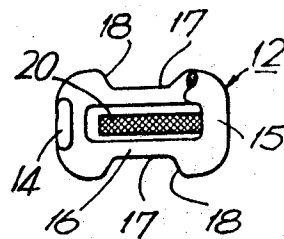


FIG. 5



SLIDE FASTENER

This invention relates to sliding clasp fasteners or zippers, and more particularly to a sliding clasp fastener of the concealed fashion of which fastening elements are masked from external view.

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.

The present invention has as its object the provision of an improved sliding clasp fastener of the concealed type which substantially overcomes the aforementioned drawbacks of the conventional fasteners.

According to the invention, there is provided a sliding clasp fastener which essentially comprises a pair of stringer tapes each with an inwardly folded edge portion, a row of fastening elements formed from a single synthetic plastic filament into a continuous helical structure and secured to the lower side of the folded edge portion of each tape, a slider slidably mounted on said stringer tapes for engaging and disengaging said fastening elements, each element including a coupling head, a connecting portion opposite thereto and two leg portions, at least one of which legs having a recess to anchor therein a plurality of sewing threads securing the element to the tape edge and a spacing braid inserted between the legs of the elements and determining the leg-to-leg spacing of the elements.

The advantages which will accrue from the inventive concept of the invention just briefed may be enumerated as follows:

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 since they do not 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 inserted 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 an inwardly folded marginal edge portion 11, to the lower side of which is secured a row or column of continuous helical interlocking flexible elements 12 by means of suitable threads on stitches 13.

The element 12 includes a coupling head 14, a connecting portion 15 and two limb or leg portions 16 extending therebetween, and this element is provided according to the invention with a recess 17 at least in one of its two legs as shown in the various figures of the drawing. This 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 tightly wound single-thread stitches or loop chain stitches therein, lest these stitches should protrude into the path of the slider 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 tightly against the recess 17 and bears against the neck 18. With this construction, the stitching 13 cooperates with the folded edge 11 of the tape to maintain the flexible elements 12 in a normally flexed condition thereby providing sufficient resistance to displacement when the fastener is subjected to a lateral load tending to force the opposed tapes apart at their junction. This in turn ensures stable interengagement 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 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.

Designated at 20 is a spacing braid inserted between the legs 16 of the elements 12 and extending longitudinally of the entire length of the fastener. 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, 3 and 4 than it is in the embodiment of FIG. 2. This is because in the former embodiments both the upper and lower legs of the element are recessed and hence caused elastically flex there toward each other until they 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 taking the place of the braid 20 and serving the same purpose.

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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.

It will be further understood that various changes in the form of the fastener illustrated may be made without departing from the scope of the appended claims.

I claim:

1. A sliding clasp fastener of the concealed element type which comprises a pair of stringer tapes each having a folded-under edge portion, a row of fastening elements disposed on the underside of each of said folded-under edge portions of said tapes, each said row of fastening elements comprising a helical coil of filamentary material each element of which comprises a coupling head portion, a connecting portion and upper and lower flexible leg portions extending there between with a space between said upper and lower leg portions, a braid of resilient material extending longitudinally inside said coil in said space, and stitches of securing thread extending

through said folded-under edge portion of each said tape and through said braid and around under the lower leg portions of said elements to secure said elements to said tape, said lower leg portions being recessed relative to said head portion and connecting portion sufficiently to receive said thread in the recess and said thread being under tension to preflex said leg portions toward one another against said braid.

2. A sliding clasp fastener according to claim 1 in which upper leg portions of said elements are also recessed to provide recesses in which said folded-under edge portion of said tape is received.

3. A sliding clasp fastener according to claim 1, in which said recesses are of graduated depth with a greater depth near the coupling head portions of said elements.

4. A sliding clasp fastener according to claim 1, in which said recessed leg portions are of reduced cross sectional area providing greater flexibility.

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