

[54] CONCEALED ZIP FASTENERS

[75] Inventor: **Ikuo Takamatsu**, Uozushi, Japan

[73] Assignee: **Yoshida Kogyo Kabushiki Kaisha**, Tokyo, Japan

[22] Filed: **Aug. 7, 1972**

[21] Appl. No.: **278,473**

[30] Foreign Application Priority Data

Aug. 12, 1971 Japan..... 46-72406

[52] U.S. Cl. **24/205.1 C, 24/205.16 C**

[51] Int. Cl. **A44b 19/10, A44b 19/32**

[58] Field of Search **24/205.1 C, 205.16 C**

[56] References Cited

UNITED STATES PATENTS

3,136,016	6/1964	Firing.....	24/205.1 C
3,149,387	9/1964	Ruhrmann	24/205.13 C
3,337,928	8/1967	Glindmeyer.....	24/205.1 C
3,430,304	3/1969	Swainson	24/205.1
3,596,343	8/1971	Uhrig	24/205.1 C

FOREIGN PATENTS OR APPLICATIONS

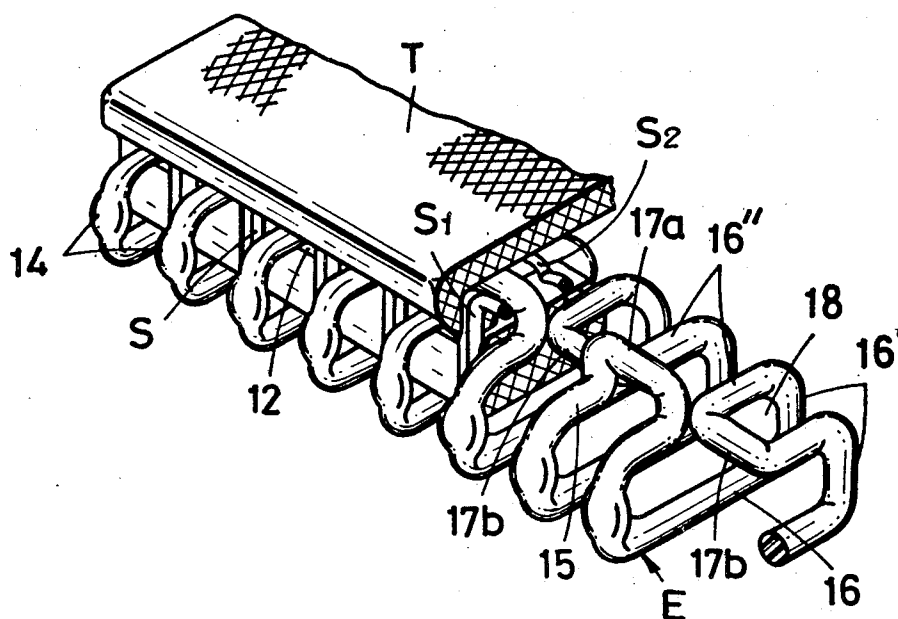
280,025 12/1967 Australia..... 24/205.16

Primary Examiner—Bernard A. Gelak
Attorney, Agent, or Firm—Robert E. Burns;
 Emmanuel J. Lobato; Bruce L. Adams

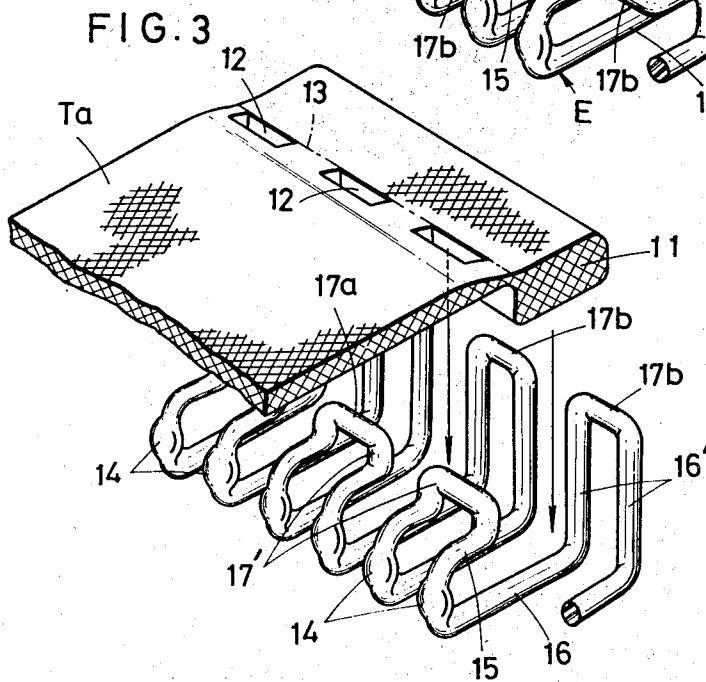
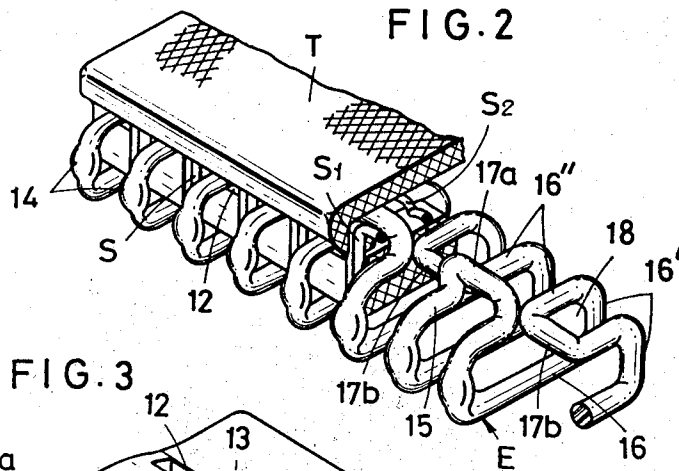
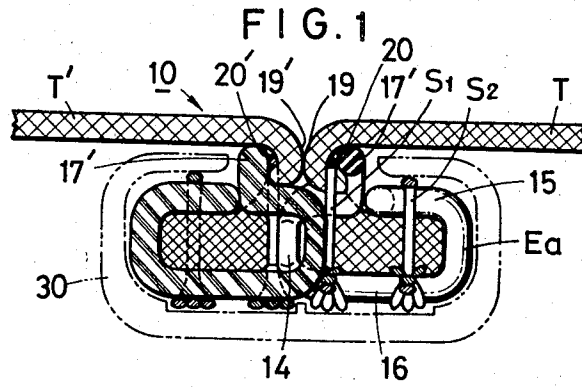
[57] ABSTRACT

A concealed zip fastener is provided with a series of spaced element-receiving openings aligned longitudinally along a reinforced marginal edge of each of two opposed carrier tapes and defining a line of fold along which the tape is folded. These openings are adapted to hold therein a portion of an interlocking fastener element of a meandering form. A row of fastener elements is secured to the folded edge of the tape by a line of stitchings running closely along said series of openings in a manner that the tape resists lateral displacement when lateral stresses are applied in a direction to pull apart the junction of the opposed tapes.

6 Claims, 9 Drawing Figures



SHEET 1 OF 2



CONCEALED ZIP FASTENERS

This invention relates to zip fasteners, more particularly to a slider-operated fastener of the concealed or masked type which in its closed disposition substantially simulates a garment seam.

Zip fasteners having two rows of interlocking fastener elements formed from a continuous filament or wire and secured to respective folded edges of opposed stringer tapes are well known, and such fasteners when closed by the slider mask the elements from external view, only leaving a linear seam in the junction of the opposed tapes.

There are known basically two forms of fastener elements adapted for such "concealed fasteners;" one is a spring coil or helix form such as shown in FIG. 8, and the other is a meander or zig-zag form such as shown in FIG. 9. The former type of fastener has interlocking elements simply sewn to the folded marginal edge portions of the opposed tapes, and is liable to crack open at the junction of the tapes when lateral forces are applied in the direction of the arrow, viz. in a direction to split the two tapes apart. The latter type of concealed fastener has the folded edges of two opposed tapes embedded between and sewn to the leg portions of the meandering elements and is liable to suffer from deformation of the elements under the influence of the above-mentioned lateral forces.

Whereas, it is the primary object of the present invention to provide improved concealed or masked zip fasteners which will substantially overcome the above-noted disadvantages of the conventional fasteners.

A more specific object of the invention is to provide a concealed or masked zip fastener having mounted thereon rows of interlocking fastener elements of a meander structure, which can maintain its fastening elements in the correct interlocked posture without being shifted out of position or physically deformed under severe stresses applied particularly in a direction to force apart the two opposed tapes.

These and other objects and advantages of the present invention will appear clear from the following detailed description taken in connection with the accompanying drawing which illustrate in non-limiting sense certain preferred embodiments and in which:

FIG. 1 is a transverse sectional view of a representative form of one of the most preferred embodiments;

FIG. 2 is a perspective view of the fastener of FIG. 1 with part cut away;

FIG. 3 is a perspective view of the same utilized to explain the manner in which the fastener elements are secured to their carrier tape;

FIG. 4 is a transverse sectional view of one of two similar segments of a concealed fastener embodying the invention;

FIGS. 5 - 7, inclusive, are transverse sectional views illustrating different modifications of the concealed fastener of the invention;

FIG. 8 is a transverse sectional view of a conventional coil-type concealed fastener; and

FIG. 9 is a transverse sectional view of a conventional meander-type concealed fastener.

Briefly stated, the concealed zip fastener according to the invention comprises a pair of opposed carrier tapes each having an inwardly folded reinforced edge and a series of spaced element-receiving openings aligned along said folded longitudinal edge and defin-

ing a line of fold along which the tape is folded, a row of interlocking fastener elements in a meandering form each of which elements having a coupling head portion, merging upper and lower leg portions, a first base portion associated with said upper leg portion and a second base portion associated with said lower leg portion and connecting between adjacent elements, said first base portions being inserted in said openings, a first line of stitchings securing both leg portions adjacent said coupling head to said folded edge and running substantially along said line of fold and a second line of stitchings securing said lower leg portion to said folded edge.

Referring now to the drawings and in particular FIGS. 1 through 3 inclusive which illustrate a most preferred form of the present invention, there is shown a concealed or masked zip fastener generally designated 10 which comprises a pair of opposed carrier tapes T, T' each having mounted thereon a row of interlocking fastener elements E of a meandering form. Each carrier tape T, as better seen in FIG. 3, is provided with a thickened or otherwise reinforced longitudinal edge 11 and a series of spaced element-receiving openings 12 aligned therealong, more specifically closely along a boarder line 13 between a web portion Ta and the reinforced edge 11.

Each individual interlocking fastener element Ea has a coupling head portion 14, merging upper and lower leg portions respectively designated 15 and 16 and base portions 17a and 17b extending respectively from the upper and lower leg portions 15 and 16 and connecting between adjacent elements Ea. The upper leg portion 15 contiguous to and extending from the coupling head portion 14 is shorter than the lower leg portion 16 and is bent upwardly at a point near its associated base portion 17a to make the latter rise as at 17' and project substantially vertically as shown in FIG. 3. The longer or lower leg portion 16 is bent upwardly about its center to provide an upstanding region 16' which is further bent centrally inwardly to provide an upper region 16'' flush with the upper leg portion 15 and parallel with the lower leg portion 16 thereby defining with the upper leg portion 15 a substantially oblong space 18 for receiving the reinforced thickened marginal edge 11 of the carrier tape T as better shown in FIG. 2.

As illustrated in FIG. 3 which is utilized to explain the manner in which the row of interlocking fastener elements E is mounted on the carrier tape T, the upwradly projecting base portions or lugs 17' of the successively interconnected elements Ea are inserted in the element-receiving openings 12 arranged longitudinally along the boarder line 13. In this manner, the elements E are secured to the carrier tape T by a first line of stitchings S₁ running substantially along the boarder line 13 or closely along the series of element-receiving openings 12 and spanning between the lower leg portions 16 close at the coupling heads 14 and the boarder line 13 of the tape T. The carrier tape T is now folded on itself along the first line of stitchings S₁ to reveal an external folded edge 19 which forms with corresponding edge 19' of the mating tape T' a junction simulating a garment seam, in which instance the internal folded edge 20 (20') is borne against and supported by the upwardly projecting base portion or lug 17' so that the carrier tape T resists thereat against lateral displacement when lateral stresses are exerted to pull the junction apart. The reinforced edge portion 11 is snugly fit-

ted in the oblong spaces 18 and anchored in place there by a second line of stitchings S_2 which extends there-through and spans between the lower leg portions 16 and merging upper regions 16'' at a point adjacent the upstanding region 16' as shown in FIGS. 1 and 2.

With this construction, the concealed zip fastener 10 of the invention can maintain its normal correct posture against severe stresses applied in a direction to pull the opposed tapes apart at their junction which would otherwise cause the tapes to shift laterally away from each other to expose the elements E to external view. Also advantageously, the fastener elements E of the unique construction described and illustrated as attached to the respective carrier tapes T, T' tend to absorb or cancel out lateral stresses by resilient compression between the upper and lower leg portions to tighten them harder without presenting any physical deformation. Thus, when it is closed by a slider 30 schematically shown in FIG. 1, the zip fastener 10 retains its concealing or masking function as desired of this type of fastener under severe stresses.

FIGS. 4 through 7, inclusive, provide different modifications of the above-described zip fastener of the invention which all incorporate the basic inventive principles.

The embodiment shown in FIG. 4 omits the provision of the upwardly projecting lug 17' but aims to retain the positional stability of the carrier tapes T, T' by the anchoring effect provided by the element-receiving openings 12 and the first line of stitchings S_1 securing the elements E closely at their base portions 17a contiguous to the coupling head portions 14.

FIG. 5 shows another modification wherein the lower leg portion 16 is folded inwardly towards the coupling head portion 14 in a manner similar to a hair pin, forming a clearance 31 at the fold for receiving a filling core or stiffening cord 32, and the reinforced edge portion 11 of the tape T is rested on the folded upper region 16'' of the lower leg 16.

FIG. 6 shows a further modification which differs from the fastener of FIG. 5 only in that the lower leg portion 16 is folded completely flat without forming the cord or core-receiving clearance 31.

FIG. 7 shows still another modification which is identical with the most preferred embodiment shown in FIGS. 1-3 only with the exception that the upstanding region 16' contiguous to the lower leg portion 16 is reduced in its length so that the base portion 17b associated therewith lies flush with the upper leg portion 15 without being inwardly bent, and hence the second line of stitchings S_2 spans between the lower leg portion 16 and the upper surface of the reinforced edge 11.

Having thus described the invention, it is to be understood that further modifications and changes may be made in the details of form and construction herein above advanced, without departing from the scope of the appended claims. As for an example, the element-receiving openings 12 may be substituted by a coarsely woven web formed solely by weft yarns to permit of the insertion of the upper leg portion 15 of the element E.

What is claimed is:

1. A concealed slide fastener comprising, a pair of carrier tapes each having an inwardly folded reinforced longitudinal edge and a series of apertures aligned along said folded longitudinal edge and defining a line of fold along which the tape is folded, a row of coupling

elements each having a coupling head, upper and lower leg portions extending from said coupling head in a transverse common direction of said row of coupling elements wherein said lower leg portion extends a greater distance than said upper leg portion, said upper leg portion being provided with a bent portion at an end remote from said coupling head and extending in a direction transverse to said row of coupling elements and away from said lower leg portion, an upstanding portion extending from an end of said lower leg portion opposite said coupling head in a direction essentially parallel thereto, an upper portion extending from an end of said upstanding portion opposite said lower leg portion in a direction toward said coupling head and essentially parallel to said lower leg portion, a lower base portion extending from an end of said upper portion opposite said upstanding portion in a lateral direction of said row of coupling elements and connecting to a lower base portion of a next adjacent coupling element, an upper base portion extending from said bent portion of said upper leg in a lateral direction of said row of coupling elements opposite the direction of said lower base portion and connecting to an upper base portion of a next adjacent coupling element, said carrier tapes being disposed with said reinforced longitudinal edge between said upper and lower leg portions and said upper base portions and said bent portions of said upper legs extending through corresponding ones of said apertures, a first line of stitches securing said upper and lower leg portions adjacent said coupling head to said folded edge and disposed substantially adjacent said apertures, and a second line of stitches securing said lower leg portion to said folded edge.

2. In a concealed slide fastener according to claim 1, wherein said upstanding portion extends a distance from said lower leg portion substantially equal to a height of said coupling head so that said upper portion is substantially the same distance from said lower leg portion as said upper leg portion.

3. In a concealed slide fastener according to claim 1, wherein said upstanding portion extends a distance from said lower leg portion substantially less than a height of said coupling head.

4. A concealed slide fastener comprising, a pair of carrier tapes each having an inwardly folded reinforced longitudinal edge and a series of apertures aligned along said folded longitudinal edge and defining a line of fold along which the tape is folded, a row of coupling elements each having a coupling head, upper and lower leg portions extending from said coupling head in a transverse common direction of said row of coupling elements wherein said lower leg portion extends a greater distance than said upper leg portion, said upper leg portion being provided with a bent portion at an end remote from said coupling head and extending in a direction transverse to said row of coupling elements and away from said lower leg portion, an upper portion extending from an end of said lower leg portion remote from said coupling head and reversely bent toward said coupling head and curved toward said lower leg portion so as to contact said lower leg portion, a lower base portion extending from an end of said upper portion near said coupling head in a lateral direction of said row of coupling elements and connecting to a lower base portion of a next adjacent coupling element, an upper base portion extending from said bent portion of said upper leg in a lateral direction of said row of cou-

pling elements opposite the direction of said lower base portion and connecting to an upper base portion of a next adjacent coupling element, said carrier tapes being disposed with said reinforced longitudinal edge overlying said upper portions and said bent portions of said upper legs extending through corresponding ones of said apertures, a first line of stitches securing said carrier tapes to said upper leg portions, and a second line of stitches securing said reinforced longitudinal edges to said upper portions.

5. A concealed slide fastener according to claim 4, wherein, in each said coupling element said upper por-

tion is curved toward said lower leg portion and contacting said lower leg portion at a point remote from the end of said lower leg portion remote from said coupling head to define a space therebetween, and said concealed slide fastener further comprises a stiffening cord disposed in said spaces between said upper portions and said lower leg portions.

6. A concealed slide fastener according to claim 4, wherein, in each said coupling element said upper portion is in contact with said lower leg portion for substantially an entire length of said upper portion.

* * * * *

15

20

25

30

35

40

45

50

55

60

65