

Description

This invention relates to slide fasteners and more particularly to a separable type slide fastener suitable for use in jackets and the like garment article to facilitate the removal thereof from the user. The invention is more specifically directed to a separable slide fastener of the type carrying coupling element rows in a meandering or zig-zag formation.

Various separable slide fasteners have been proposed, a typical example of which is provided with a separable bottom-end-stop assembly including a pin member attached to one of a pair of fastener stringers and a socket member to the other stringer, the pin being releasably engageable with the socket to join the respective lower ends of the stringers. Such known separable bottom-end-stop assemblies were successful when applied to slide fasteners carrying coupling elements of a helical coil structure, but were not very satisfactory when applied to slide fasteners having meander or zig-zag shaped continuous coupling elements mounted astride both sides of the fastener tapes. This is because more stresses would be required for the latter type of fastener to bend or flex along an axis vertical to the plane of the fastener with the results that the fastener stringers once coupled together are, when such stresses are exerted, apt to separate unintentionally starting with the first terminal or lowermost one of the coupling elements immediately adjacent the bottom-end-stop assembly. Such unintentional separation of the stringers is often referred to as "chain crack".

To cope with the above "chain crack" problem, there has been proposed a separable slide fastener, as disclosed in US-A-3,377,668, in which a separable bottom-end-stop assembly has a pin member on one stringer and a socket with pin on the other stringer, the pin member including a projection arranged to come under and engage the lower portion of a coupling head of the lowermost coupling element contiguous with the socket pin. This arrangement is effective in combatting lateral pull on the fastener but not quite for overcoming stresses tending to flex the fastener laterally across inasmuch as the projection merely rests underneath the coupling head of the coupling element. To further assure retention of the lowermost element with respect to the projection of the pin member, there is provided in the socket pin a groove configured to receive a corresponding rail-like portion of the pin member with a tight interlocking fit. This arrangement is not only so much costly but also would involve increased resistance to sliding coupling and uncoupling of the pin and socket members.

US-A-2 600 905 discloses a separable slide fastener with pin and box parts at one of its ends. The pin part comprises an offset projection with a V-shaped recess to receive part of the last coupling element of the opposed stringer. This slide fastener has V-shaped discret coupling elements and is not confronted to the same problem as slide fasteners having meander or zig-zag shaped continuous elements, namely a tight coupling of a spherical head of the lowermost coupling element in the pin recess.

FR-A-1 049 835 discloses a separable slide fastener formed also of discret coupling elements and comprising pin and box parts at one of its ends. The pin part comprises a cavity obtained by complicated machining operations. This cavity is designed to receive loosely the head of the lowermost coupling element in order to avoid the bump to which it is subjected when the pin is fully engaged into the box part when the two stringer are coupled together. Here again such a slide fastener is not confronted to the same problem as the present invention like the slide fastener of above mentioned patent.

The present invention seeks to provide a separable slide fastener with a separable bottom-end-stop assembly having a pin and a socket member which can be engaged and disengaged with utmost ease and which incorporates structural feature such that the lowermost fastener element can be steadily retained in place against sever lateral pull and bending stresses which would otherwise cause "chain crack".

The present invention further seeks to provide a separable bottom-end-stop assembly which is suitable for use with a slide fastener having a meander or zig-zag formation of fastener elements.

According to the present invention, there is provided a separable slide fastener comprising a pair of opposed stringers each including a tape and a row of coupling elements secured along one longitudinal edge of the tape, and each of the coupling elements having a coupling head with upper and lower hook portions, a slider movable reciprocally on and along the pair of stringers, and a separable bottom-end-stop assembly comprising a socket member fixedly connected to a lower end portion of one the stringer, a socket pin member integral with and projecting from the socket member and a guide pin member fixedly connected to a lower end portion of the other the stringer and releasably engageable with the socket member, said guide pin having a pocket for receiving the coupling head of a terminal element, said guide pin having a bulged upper end portion which is bevelled to provide a cross-sectionally semi-circular opening defining by a lower portion thereof said pocket for receiving the lower hook portion of the

lowermost terminal element in the row of elements on the stringer in tight engagement.

The above and other objects and features of the invention will become manifest from the following detailed description of certain preferred embodiments taken in conjunction with the accompanying drawings.

Figure 1 is a perspective view of a segmentary bottom end portion of a separable slide fastener, showing a separable bottom-end-stop assembly; Figure 2 is a modified form of a portion of a guide pin member constituting part of the stop assembly;

Figure 3 is a transverse cross-sectional view of the guide pin member;

Figure 4 is a plan, partly sectional, view of a bottom end portion of the fastener of Figure 1 shown in closed disposition;

Figure 5 is a transverse cross-sectional view of the fastener with a slider mounted thereover;

Figure 6 is a plan view similar to Figure 4 but showing the manner of inserting the guide pin member through a slider; and

Figure 7 is a plan view similar to Figure 6 but showing the guide pin fully engaged with the socket member.

Referring now to the drawing and Figure 1 in particular, there is shown a separable slide fastener 10 embodying the invention. The fastener 10 comprises a pair of stringers 11, 12 each including a row of meandering coupling elements E mounted (secured as by two-thread chain stitches) astride an inner longitudinal edge of a support tape 13 (14). Each individual element E in a continuous row extending in a ladder-like fashion longitudinally of the tape 13 (14) consists of a pair of leg portions Ea, Ea superposed across the tape edge portion, a coupling head portion Eb and a shank portion Ec merging with leg portions Ea, Ea of adjacent elements E. The coupling head Eb on one tape 13 is flattened out or otherwise deformed to provide upper and lower hook portions Ed and Eb projecting beyond the inner tape edge and releasably interengageable with corresponding portions of the coupling head Eb in confronting relation on the other tape 14.

A bottom-end-stop assembly generally designated at 15 and fabricated from suitable thermoplastic material comprises a socket member 16 fixedly connected to the inner edge of the lower or bottom end portion Ta of one stringer 11, a socket pin member 17 integral with the socket member 16 and projecting therefrom parallel to the plane of the tape 13 and a guide pin member 18 fixedly connected to the inner edge of the bottom end portion Ta of the other stringer 12. The guide pin 18 is somewhat longer and extends at both of its ends beyond the ends of the socket pin 17.

The socket member 16 has a pair of opposed flanges 16a, 16a respectively clamped on opposite surfaces of the bottom end portion of the tape 13 and defining therebetween a cavity 16b for receiving the guide pin 18.

The guide pin member 18 on the left-hand stringer 14 has a bulged or thickened upper end portion 18a which is bevelled as at 19 to provide a cross-sectionally semi-circular opening 18b defined by an inner peripheral wall 18c and revealing a portion of an inner tape edge Tb. The opening 18b is adapted to receive the coupling head Eb of the lowermost terminal element E' extending integrally from the socket pin 17 on the right-hand stringer 13. More specifically, there is formed a pocket 20 in the bevelled bulged upper end portion 18a of the guide pin 18, which pocket 20 is defined by a lower bevelled peripheral edge 19a and the portion of the inner tape edge Tb which is disposed in the opening 18b. The pocket 20 is dimensioned to fully receive the lower hook portion Ef of the coupling element E with a tight fit, whilst the upper hook portion Ed engages the next adjoining element E as in normal coupling operation. The bevelled marginal edge 19 of the pocket 20 is formed somewhat arcuately as shown in Figure 1, but can be straight as shown in Figure 2. In either case, however, it is preferable to round off the lower portion 19a of the bevelled edge 19 so as to ensure friction-free reception of the coupling head Eb of the lowermost element E' in the pocket 20.

As shown in Figure 1 and better in Figure 3, the guide pin member 18 is tapered laterally inward from both of its sides as at 21 to provide an abutment wall 22 of reduced thickness. The socket pin 17 is likewise tapered to provide a similar abutment wall 23 for abutting engagement with the wall 22 of the guide pin 18. This arrangement ensures smooth and easy insertion and removal of the guide pin 18 into and out of the cavity 16b of the socket member 16.

With this construction, when coupling together the two confronting stringers 11 and 12 coupled together by a slider S is first brought over the socket pin 17 of the socket member 16 and then the guide pin 18 is threaded into the guide channel of the slider S in a well known manner. The guide pin 18 is inserted into the slider S at an oblique angle to the longitudinal axis of the fastener 10 such that there occurs no interference between the opposed coupling elements E and further into the cavity 16b of the socket member 16, in which instance the lower hook portion Ef of the lowermost element E' partly overlies the lower bevelled edge 19a of the pocket 20 as shown in Figure 6.

As the slider S is moved upwardly from this position, the lower hook portion Ef of the element E' slides over the edge 19a into the pocket 20, at

which time point the guide pin member 18 is fully inserted into and lies parallel with the socket member 16, with the abutment walls 22, 23 of the respective members held in abutting engagement with each other. In this disposition of the slide fastener 10. The coupling head Ea, its lower hook portion Ef in particular of the lowermost or terminal element E' is fully anchored in the pocket 20 inter alia and partly supportedly embedded by the inner peripheral wall 18c of the opening 18b so that the terminal element E' is firmly retained in place relative to an adjacent element E immediately above the guide pin 18 thereby ensuring smooth, effective interengagement of the rest of the elements upon movement of the slider upwardly along the tape edge.

To ensure proper alignment of the opposed coupling elements E during the coupling operation of the slider S, there is provided an inwardly directed projection Sa which is formed centrally of each of the upper and lower wings S1 and S2 of the slider S and which serves to guide and hold the coupling heads Eb of the elements E against vertical displacement. The provision of such projections Sa is made possible by virtue of tapering both guide pin 18 and socket pin 17 as illustrated, which tapering is also effective in eliminating cracks or damage which would otherwise often take place when clamping the conventional flat surfaced pin members.

Designated at 24 is a reinforcement strip made of plastics film, adhesive tuft or the like which is secured to the bottom end regions of the tapes 13, 14 at which the bottom-end-stop assembly 15 is attached.

Claims

1. A separable slide fastener (10) of the type having meandering or zig zag shaped coupling elements comprising a pair of opposed stringers (11, 12) each including a tape (13, 14) and a row of coupling elements (E) secured along one longitudinal edge of said tape (13, 14), and each of said coupling elements (E) having a coupling head (Eb) with upper and lower hook portions (Ed, Ef), a slider (S) movable reciprocally on and along said pair of stringers (11, 12), and a separable bottom-end-stop assembly (15) comprising a socket member (16) fixedly connected to a lower end portion (Ta) of one said stringer (11), a socket pin member (17) integral with and projecting from said socket member (16) and a guide pin member (18) fixedly connected to a lower end portion (Ta) of the other said stringer (12) and releasably engageable with said socket member (16), said guide pin (18) having a pocket (20)

for receiving the coupling head (Eb) of a terminal element (E'), said guide pin (18) having a bulged upper end portion (18a) which is bevelled to provide a cross-sectionally semi-circular opening (18b) defining by a lower portion (19a) thereof said pocket (20) for receiving the lower hook portion (Ef) of the lowermost terminal element (E') in said row of elements (E) on said stringer (11) in tight engagement.

2. A separable slide fastener (10) according to claim 1 characterized in that said bulged portion (18a) of the guide pin (18) includes an arcuately bevelled peripheral edge (19).
3. A separable slide fastener (10) according to claim 1 characterized in that said pocket (20) is defined by said lower portion (19a) of said bevelled edge (19) and an inner edge portion (Tb) of said tape (14).
4. A separable slide fastener (10) according to claim 1 characterized in that said socket pin member (17) and said guide pin member (18) are tapered laterally inward to respectively provide abutment walls (22, 23) of reduced thickness.
5. A separable slide fastener (10) according to claim 3 characterized in that said lower portion (19a) of said bevelled edge (19) is rounded off.

Patentansprüche

1. Teilbarer Reißverschluß (10) einer Bauart mit mäander- oder zickzackförmigen Kuppelgliedern, umfassend zwei gegenüberliegende Reißverschlußbänder (11, 12), die jeweils ein Tragband (13, 14) und eine entlang einem Längsrand des Tragbandes (13, 14) befestigte Reihe von Kuppelgliedern (E) aufweisen, wobei jedes dieser Kuppelglieder (E) einen Kuppelungskopf (Eb) mit oberen und unteren Hakenbereichen (Ed, Ef) hat, einen auf und entlang den beiden Reißverschlußbändern (11, 12) hin- und herbewegbaren Schieber (S) und ein Teilbarkeitsselement (15), umfassend ein Kastenteil (16), das mit einem unteren Endbereich (Ta) des einen Reißverschlußbandes (11) fest verbunden ist, einen Kastenstift (17), der mit dem Kastenteil (16) einstückig ist und von diesem vorspringt, und einen Führungsstift (18), der mit einem unteren Endbereich (Ta) des anderen Reißverschlußbandes (12) fest verbunden und mit dem Kastenteil (16) lösbar in Eingriff bringbar ist, wobei der Führungsstift (18) eine Tasche (20) zur Aufnahme des Kuppelungskopfes (Eb) eines endseitigen Kuppelglieds (E')



which time point the guide pin member 18 is fully inserted into and lies parallel with the socket member 16, with the abutment walls 22, 23 of the respective members held in abutting engagement with each other. In this disposition of the slide fastener 10. The coupling head Ea, its lower hook element Ef in particular of the lowermost or terminal element E' is fully anchored in the pocket 20 inter alia and partly supportedly embedded by the inner peripheral wall 18c of the opening 18b so that the terminal element E' is firmly retained in place relative to an adjacent element E immediately above the guide pin 18 thereby ensuring smooth, effective interengagement of the rest of the elements upon movement of the slider upwardly along the tape edge.

To ensure proper alignment of the opposed coupling elements E during the coupling operation of the slider S, there is provided an inwardly directed projection Sa which is formed centrally of each of the upper and lower wings S1 and S2 of the slider S and which serves to guide and hold the coupling heads Eb of the elements E against vertical displacement. The provision of such projections Sa is made possible by virtue of tapering both guide pin 18 and socket pin 17 as illustrated, which tapering is also effective in eliminating cracks or damage which would otherwise often take place when clamping the conventional flat surfaced pin members.

Designated at 24 is a reinforcement strip made of plastics film, adhesive tuft or the like which is secured to the bottom end regions of the tapes 13, 14 at which the bottom-end-stop assembly 15 is attached.

Claims

1. A separable slide fastener (10) of the type having meandering or zig zag shaped coupling elements comprising a pair of opposed stringers (11, 12) each including a tape (13, 14) and a row of coupling elements (E) secured along one longitudinal edge of said tape (13, 14), and each of said coupling elements (E) having a coupling head (Eb) with upper and lower hook portions (Ed, Ef), a slider (S) movable reciprocally on and along said pair of stringers (11, 12), and a separable bottom-end-stop assembly (15) comprising a socket member (16) fixedly connected to a lower end portion (Ta) of one said stringer (11), a socket pin member (17) integral with and projecting from said socket member (16) and a guide pin member (18) fixedly connected to a lower end portion (Ta) of the other said stringer (12) and releasably engageable with said socket member (16), said guide pin (18) having a pocket (20)

for receiving the coupling head (Eb) of a terminal element (E'), said guide pin (18) having a bulged upper end portion (18a) which is bevelled to provide a cross-sectionally semi-circular opening (18b) defining by a lower portion (19a) thereof said pocket (20) for receiving the lower hook portion (Ef) of the lowermost terminal element (E') in said row of elements (E) on said stringer (11) in tight engagement.

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3. A separable slide fastener (10) according to claim 1 characterized in that said pocket (20) is defined by said lower portion (19a) of said bevelled edge (19) and an inner edge portion (Tb) of said tape (14).
4. A separable slide fastener (10) according to claim 1 characterized in that said socket pin member (17) and said guide pin member (18) are tapered laterally inward to respectively provide abutment walls (22, 23) of reduced thickness.
5. A separable slide fastener (10) according to claim 3 characterized in that said lower portion (19a) of said bevelled edge (19) is rounded off.

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1. Teilbarer Reißverschluß (10) einer Bauart mit mäander- oder zickzackförmigen Kuppelgliedern, umfassend zwei gegenüberliegende Reißverschlußbänder (11, 12), die jeweils ein Tragband (13, 14) und eine entlang einem Längsrand des Tragbandes (13, 14) befestigte Reihe von Kuppelgliedern (E) aufweisen, wobei jedes dieser Kuppelglieder (E) einen Kuppelungskopf (Eb) mit oberen und unteren Hakenbereichen (Ed, Ef) hat, einen auf und entlang den beiden Reißverschlußbändern (11, 12) hin- und herbewegbaren Schieber (S) und ein Teilbarkeitsselement (15), umfassend ein Kastenteil (16), das mit einem unteren Endbereich (Ta) des einen Reißverschlußbandes (11) fest verbunden ist, einen Kastenstift (17), der mit dem Kastenteil (16) einstückig ist und von diesem vorspringt, und einen Führungsstift (18), der mit einem unteren Endbereich (Ta) des anderen Reißverschlußbandes (12) fest verbunden und mit dem Kastenteil (16) lösbar in Eingriff bringbar ist, wobei der Führungsstift (18) eine Tasche (20) zur Aufnahme des Kuppelungskopfes (Eb) eines endseitigen Kuppelglieds (E')



hat, wobei der Führungsstift (18) einen verbreiterten oberen Endbereich (18a) hat, der abgeschrägt ist, um eine im Querschnitt halbkreisförmige Öffnung (18b) zu schaffen, die mit einem unteren Bereich (19a) desselben die besagte Tasche (20) bildet, um den unteren Hakenbereichs (Ef) des untersten endseitigen Kuppelglieds (E') der Reihe von Kuppelgliedern (E) an dem Tragband (11) in engem Eingriff aufzunehmen.

2. Teilbarer Reißverschluß (10) nach Anspruch 1, dadurch **gekennzeichnet**, daß der verbreiterte Bereich (18a) des Führungsstiftes (18) einen bogenförmig abgeschrägten Umfangsrand (19) hat.

3. Teilbarer Reißverschluß (10) nach Anspruch 1, dadurch **gekennzeichnet**, daß die Tasche (20) durch den besagten unteren Bereich (19a) des abgeschrägten Randes (19) und durch einen inneren Randbereich (Tb) des Tragbandes (14) begrenzt ist.

4. Teilbarer Reißverschluß (10) nach Anspruch 1, dadurch **gekennzeichnet**, daß der Kastenstift (17) und der Führungsstift (18) seitlich nach innen verjüngt sind, um Anlagewände (22, 23) mit verringerter Dicke zu bilden.

5. Teilbarer Reißverschluß (10) nach Anspruch 3, dadurch **gekennzeichnet**, daß der besagte untere Bereich (19a) des abgeschrägten Randes (19) abgerundet ist.

Revendications

1. Fermeture à glissière séparable (10) du type comportant des éléments d'accouplement de forme sinueuse ou en zigzag comprenant une paire de bandes d'accrochage opposées (11, 12) comprenant chacune un ruban (13, 14) et une rangée d'éléments d'accouplement (E) fixés le long d'un bord longitudinal du ruban (13, 14) et chacun des éléments d'accouplement (E) comportant une tête d'accouplement (Eb) munie de parties d'accrochage supérieure et inférieure (Ed, Ef), un curseur (S) pouvant effectuer un mouvement de va-et-vient sur et le long de ladite paire de bandes d'accrochage (11, 12), et un ensemble séparable formant butée d'extrémité inférieure (15) comprenant un élément femelle (16) monté de façon fixe sur une partie d'extrémité inférieure (Ta) d'une (11) des bandes d'accrochage, un doigt (17) d'élément femelle faisant corps avec l'élément femelle (16) et en faisant saillie et un doigt de guidage (18) monté de façon fixe sur une

partie d'extrémité inférieure (Ta) de l'autre bande d'accrochage (12) et pouvant venir en prise de façon libérable avec l'élément femelle (16), ledit doigt de guidage (18) comportant une cavité (20) destinée à recevoir la tête d'accouplement (Eb) d'un élément d'accouplement terminal (E'), ledit doigt de guidage (18) comportant une partie d'extrémité supérieure saillante (18a) qui est biseautée de manière à former, vue en coupe transversale, une ouverture semi-circulaire (18b) délimitant, par sa partie inférieure (19a), la cavité (20) destinée à recevoir, de façon serrée, la partie de crochet inférieure (Ef) de l'élément terminal inférieur extrême (E') de la rangée d'éléments (E) se trouvant sur la bande d'accrochage (11).

2. Fermeture à glissière séparable (10) selon la revendication 1, caractérisée en ce que la partie saillante (18a) du doigt de guidage (18) comprend un bord périphérique biseauté de façon curviligne (19).

3. Fermeture à glissière séparable (10) selon la revendication 1, caractérisée en ce que la cavité (20) est délimitée par la partie inférieure (19a) du bord biseauté (19) et par une partie de bord intérieur (Tb) du ruban (14).

4. Fermeture à glissière séparable (10) selon la revendication 1, caractérisée en ce que le doigt (17) d'élément femelle et le doigt de guidage (18) sont amincis latéralement vers l'intérieur de manière à former respectivement des parois de butée (22, 23) d'épaisseur réduite.

5. Fermeture à glissière séparable (10) selon la revendication 3, caractérisée en ce que la partie inférieure (19a) du bord biseauté (19) est arrondie.