

SPECIFICATION

Separable Sliding Clasp Fastener

This invention relates to zippers or sliding clasp fasteners and more particularly to a separable type of sliding clasp fastener having a separable terminal assembly.

There have been proposed many separable sliding clasp fasteners equipped with a separable terminal assembly which comprises a separable pin fixed to the bottom end of one of companion stringer tapes, a retainer pin fixed to the bottom end of the other stringer tape and a retainer formed integrally with the retainer pin for receiving the separable pin to couple the two stringer tapes. It is a common practice in such sliding clasp fasteners to anchor the opposed endmost coupling elements to the separable terminal assembly with a view to preventing the coupling elements from falling off from the stringer tapes.

However, an inevitable disadvantage of such fastener is that the pins of separable terminal assembly respectively fixed to the tapes adjacent to or substantially integral with the endmost coupling elements tend to hinder the smooth engagement or disengagement of the endmost coupling elements, when a slider moves toward and away from the separable terminal assembly to open and close the fastener. In some instances, the slider is blocked at a position just before the separable terminal assembly. The starting movement of the slider in the fastener closing direction is also liable to become sluggish, sometimes even impossible. This problem is aggravated where the separable terminal assembly and the coupling elements are both made of a plastic material, the endmost coupling elements are susceptible to deformation under heat and pressure applied during fusion of the separable terminal assembly with the endmost coupling elements.

U.S. Patent 3,162,918 discloses a somewhat successful improvement of a separable sliding clasp fastener having a row of coupling loops or a coil element which includes a flexible plastic finger integrally molded with a body portion of a separable terminal assembly and extending along the edge of the stringer tape through the coil, the resulting terminal assembly providing secure but relatively flexible connection with the lower portion of the coupling elements. Such arrangement however requires the use of molds precisely finished to fit tightly over the loops of coupling elements and the maintenance of finely controlled molding temperature and pressure conditions, resulting in complicated and costly process and increased consumption of material.

According to the invention, there is provided a separable sliding clasp fastener having a slider adapted to open and close the fastener comprising a pair of stringer tapes each carrying a row of coupling elements along one longitudinal edge, each of said coupling elements including a pair of spaced legs supported on one of said tapes

and a coupling head extending between said legs, said coupling head having a pair of lateral projections extending longitudinally of the row of coupling elements beyond the width of the legs so that the rows of coupling elements can be interlocked, and a separable terminal assembly comprising a separable pin fixed to the bottom end of one of said stringer tapes, a retainer pin fixed to the bottom end of the other stringer tape and a retainer formed integrally with said retainer pin for receiving therein said separable pin, said lateral projections of the endmost coupling elements located adjacent to said pins being cut off, removed or missing to permit said endmost coupling elements to be non-interlocked when the sliding clasp fastener is in fully closed condition.

The invention will now be described by way of example, with reference to the accompanying drawing:

The drawing is an enlarged fragmentary plan view of a separable sliding clasp fastener provided in accordance with the invention.

There is shown an enlarged fragment of a separable sliding clasp fastener generally designated 10 which comprises a pair of stringer tapes 11, 12 each carrying on and along its inner longitudinal edge a row of coupling elements 13, 14 formed from a continuous plastic filament into a helical coil structure including a plurality of turns spaced longitudinally of the tape. Each of the turns includes a pair of spaced legs 15 and a coupling head 16 extending between the legs 15, the coupling head 16 having a pair of lateral projections 17 extending longitudinally of the row of coupling elements 13, 14 beyond the width of the legs 15 so that the rows of coupling elements can be interlocked as the lateral projections of opposed coupling heads are interengaged. Each coupling element 13, 14 further has a plurality of connecting portions 18 each extending between adjacent legs 15.

The opposed rows of coupling elements 13, 14 are taken into and out of mutual engagement by a slider (not shown) to open and close the fastener in the well known manner.

A separable terminal assembly 20 comprises a separable pin 21 fixed to the bottom end of one of the stringer tapes 11, a retainer pin 22 fixed to the bottom end of the other stringer tape 12 and a retainer 23 formed integrally with the retainer pin 22 for receiving therein the separable pin 21. The separable pin 21 has a projection 24 along its inner longitudinal edge, the projection 24 extending transversely of the rows of coupling elements 13, 14. The retainer pin 22 has a recess 25 receptive of the projection 24.

A pair of endmost coupling elements E_1 , E_2 are fused integrally with the separable terminal assembly 20 in such a manner that the first endmost coupling element E_1 is joined at its connecting portion 18 to the upper edge of the retainer pin 22 and the second endmost coupling element E_2 is joined at its legs 15 to the upper edge of the separable pin 21. The interengaged

lateral projections 17 of the coupling heads 16 of the opposed endmost coupling elements E_1 , E_2 located adjacent to the pins 21, 22 are cut off, removed or missing to form flattened coupling surfaces 26, thereby permitting the endmost coupling elements E_1 , E_2 to be non-interlocked when the separable sliding clasp fastener 10 is in fully closed condition. The legs 15 and the coupling head 16 of the endmost coupling element E_2 are partly cut off to form a cut-off flattened surface 27, thereby defining a slot 30 extending transversely of the rows of coupling elements 13, 14. The slot 30 preferably has a length greater than the distance between the interengaged coupling heads.

The formation of the separable terminal assembly 20 and the slotted endmost coupling elements E_1 , E_2 just described is accomplished by first placing a strip 28 of thermoplastic material on one surface of the tapes 11, 12, the strip 28 overlying a group of the coupling elements 13, 14. Then, heat and pressure is applied by a suitable ultrasonic welding or high-frequency heating means (not shown) to the strip 28 for simultaneously fusing the strip 28 with the stringer tapes 11, 12 and the group of coupling elements 13, 14 and shaping the separable pin 21 and the retainer pin 22 into desired form. Simultaneously with the formation of the pins 21, 22, the slot 30 is also formed in the endmost coupling elements E_1 , E_2 . The projection 24, recess 25 and slot 30 are formed all simultaneously by a suitable punch (not shown), such that the slot 30 communicates with the recess 25 receiving the projection 24. The box-like retainer 23 is finally joined with the retainer pin 22 by welding or adhesive bonding.

With the separable sliding clasp fastener 10 thus constructed, a slider (not shown) is brought against the retainer 23, and the separable pin 21 is inserted through a guide channel in the slider into the retainer 23. When the slider starts in the fastener closing direction from the separable terminal assembly 20, the pair of endmost coupling elements E_1 , E_2 begin to move into mutual engagement with each other. In this instance, the flattened coupling surface 26 of the first endmost coupling element E_1 moves clear out of the way of the cut-off flattened surface 27 of the second endmost coupling element E_2 , so that the slider can continue smooth movement in the fastener closing direction. The slider movement is reversed to effect the opening of the fastener. As the slider moves toward the

separable terminal assembly 20, the slot 30 permits the endmost coupling elements E_1 , E_2 to start moving without mutual interference.

Claims

1. A separable sliding clasp fastener having a slider adapted to open and close the fastener comprising a pair of stringer tapes each carrying a row of coupling elements along one longitudinal edge, each of said coupling elements including a pair of spaced legs supported on one of said tapes and a coupling head extending between said legs, said coupling head having a pair of lateral projections extending longitudinally of the row of coupling elements beyond the width of the legs so that the rows of coupling elements can be interlocked, and a separable terminal assembly comprising a separable pin fixed to the bottom end of one of said stringer tapes, a retainer pin fixed to the bottom end of the other stringer tape and a retainer formed integrally with said retainer pin for receiving therein said separable pin, said lateral projections of the endmost coupling elements located adjacent to said pins being cut off, removed or missing to permit said endmost coupling elements to be non-interlocked when the sliding clasp fastener is in fully closed condition.

2. A separable sliding clasp fastener according to claim 1, the legs and the coupling head of at least one of said endmost coupling elements being partly cut off to define a slot extending transversely of the rows of coupling elements.

3. A separable sliding clasp fastener according to claim 2, said slot having a length larger than the distance between the interengaged coupling heads.

4. A separable sliding clasp fastener according to claim 2, said separable pin having a projection along its inner longitudinal edge, said retainer pin having a recess receptive of said projection, said projection extending transversely of the rows of coupling elements, and said slot communicating with said recess.

5. A separable sliding clasp fastener according to claim 1, said separable terminal assembly and said coupling elements being made of a plastic material, and said separable pin and said retainer pin being integral with said endmost coupling elements.

6. A separable sliding clasp fastener substantially as herein described with reference to and as illustrated in the accompanying drawing.



lateral projections 17 of the coupling heads 16 of the opposed endmost coupling elements E_1 , E_2 located adjacent to the pins 21, 22 are cut off, removed or missing to form flattened coupling surfaces 26, thereby permitting the endmost coupling elements E_1 , E_2 to be non-interlocked when the separable sliding clasp fastener 10 is in fully closed condition. The legs 15 and the coupling head 16 of the endmost coupling element E_2 are partly cut off to form a cut-off flattened surface 27, thereby defining a slot 30 extending transversely of the rows of coupling elements 13, 14. The slot 30 preferably has a length greater than the distance between the interengaged coupling heads.

The formation of the separable terminal assembly 20 and the slotted endmost coupling elements E_1 , E_2 just described is accomplished by first placing a strip 28 of thermoplastic material on one surface of the tapes 11, 12, the strip 28 overlying a group of the coupling elements 13, 14. Then, heat and pressure is applied by a suitable ultrasonic welding or high-frequency heating means (not shown) to the strip 28 for simultaneously fusing the strip 28 with the stringer tapes 11, 12 and the group of coupling elements 13, 14 and shaping the separable pin 21 and the retainer pin 22 into desired form. Simultaneously with the formation of the pins 21, 22, the slot 30 is also formed in the endmost coupling elements E_1 , E_2 . The projection 24, recess 25 and slot 30 are formed all simultaneously by a suitable punch (not shown), such that the slot 30 communicates with the recess 25 receiving the projection 24. The box-like retainer 23 is finally joined with the retainer pin 22 by welding or adhesive bonding.

With the separable sliding clasp fastener 10 thus constructed, a slider (not shown) is brought against the retainer 23, and the separable pin 21 is inserted through a guide channel in the slider into the retainer 23. When the slider starts in the fastener closing direction from the separable terminal assembly 20, the pair of endmost coupling elements E_1 , E_2 begin to move into mutual engagement with each other. In this instance, the flattened coupling surface 26 of the first endmost coupling element E_1 moves clear out of the way of the cut-off flattened surface 27 of the second endmost coupling element E_2 , so that the slider can continue smooth movement in the fastener closing direction. The slider movement is reversed to effect the opening of the fastener. As the slider moves toward the

separable terminal assembly 20, the slot 30 permits the endmost coupling elements E_1 , E_2 to start moving without mutual interference.

Claims

1. A separable sliding clasp fastener having a slider adapted to open and close the fastener comprising a pair of stringer tapes each carrying a row of coupling elements along one longitudinal edge, each of said coupling elements including a pair of spaced legs supported on one of said tapes and a coupling head extending between said legs, said coupling head having a pair of lateral projections extending longitudinally of the row of coupling elements beyond the width of the legs so that the rows of coupling elements can be interlocked, and a separable terminal assembly comprising a separable pin fixed to the bottom end of one of said stringer tapes, a retainer pin fixed to the bottom end of the other stringer tape and a retainer formed integrally with said retainer pin for receiving therein said separable pin, said lateral projections of the endmost coupling elements located adjacent to said pins being cut off, removed or missing to permit said endmost coupling elements to be non-interlocked when the sliding clasp fastener is in fully closed condition.

2. A separable sliding clasp fastener according to claim 1, the legs and the coupling head of at least one of said endmost coupling elements being partly cut off to define a slot extending transversely of the rows of coupling elements.

3. A separable sliding clasp fastener according to claim 2, said slot having a length larger than the distance between the interengaged coupling heads.

4. A separable sliding clasp fastener according to claim 2, said separable pin having a projection along its inner longitudinal edge, said retainer pin having a recess receptive of said projection, said projection extending transversely of the rows of coupling elements, and said slot communicating with said recess.

5. A separable sliding clasp fastener according to claim 1, said separable terminal assembly and said coupling elements being made of a plastic material, and said separable pin and said retainer pin being integral with said endmost coupling elements.

6. A separable sliding clasp fastener substantially as herein described with reference to and as illustrated in the accompanying drawing.