(12) UK Patent Application (19) GB (11) 2 096 693 A

(21) Application No 8208424
(22) Date of filing 23 Mar 1982
(30) Priority data
(31) 56/051268
(32) 9 Apr 1981
(33) Japan (JP)
(43) Application published
20 Oct 1982
(51) INT CL³
A44B 19/36
(52) Domestic classification
E2S GG
(56) Documents cited
GB 1506839
(58) Field of search
E2S
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(54) **Slide fastener assembly**

(57) A slide fastener 100 comprises a top end stop or stops 107, 108 dimensioned to be receivable within the interior of a slider 106 having upper and lower shields (110) and (111) connected together by a neck or diamond portion 112. This portion of the slider is recessed to receive a protuberance 107*a*, 108*a* of the top end stop so as to reduce the resistance encountered upon starting movement of the slider in a direction to open the fastener.

FIG. 1

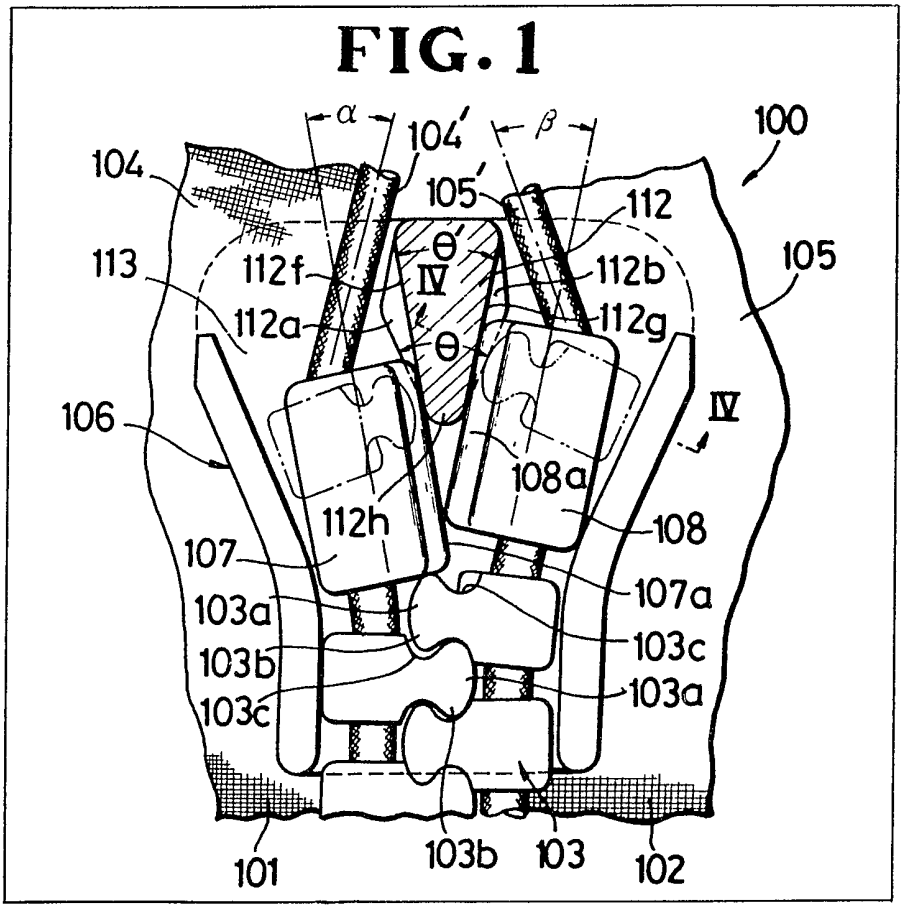

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FIG. 1

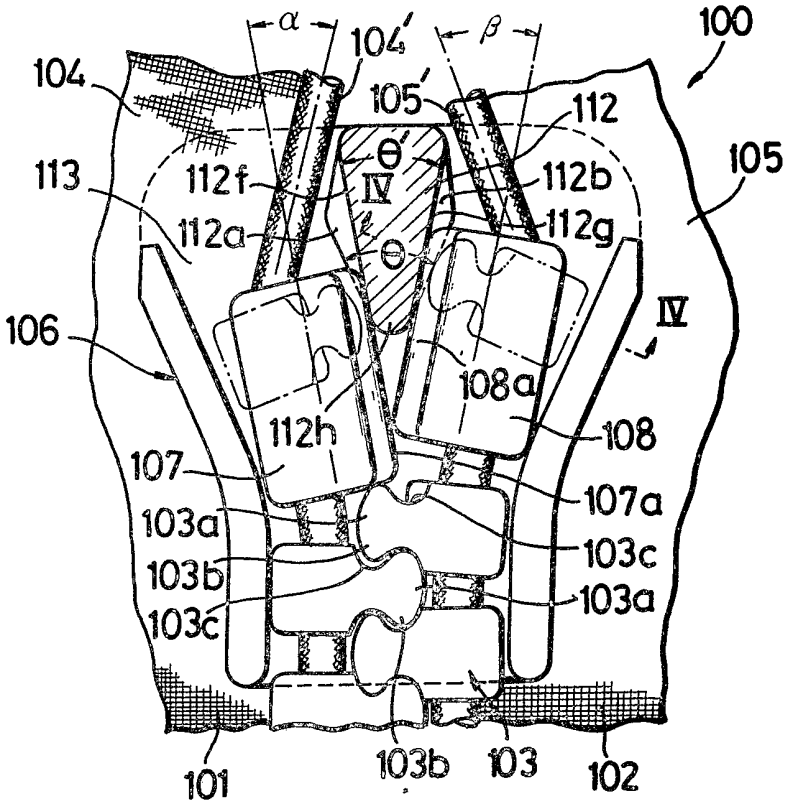
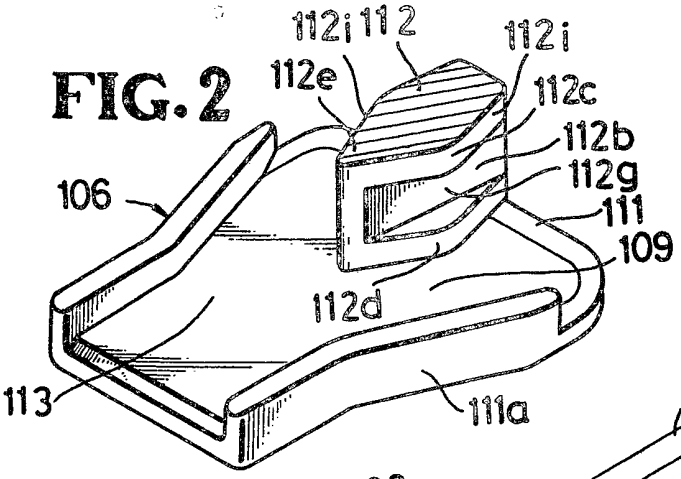


FIG. 2



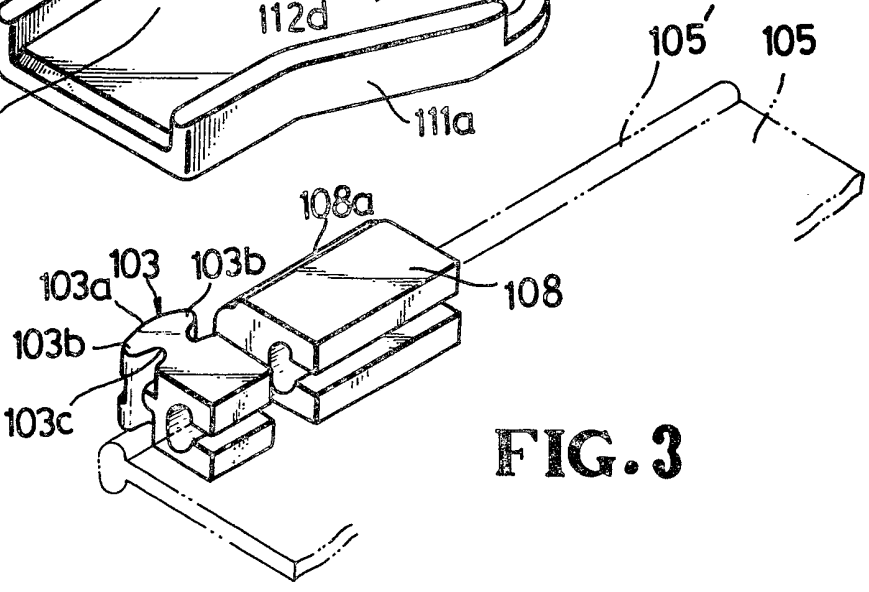


FIG. 3

FIG. 4

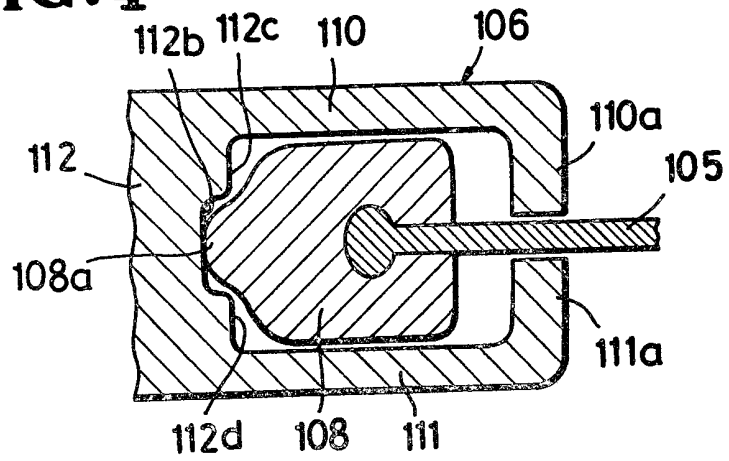


FIG. 5

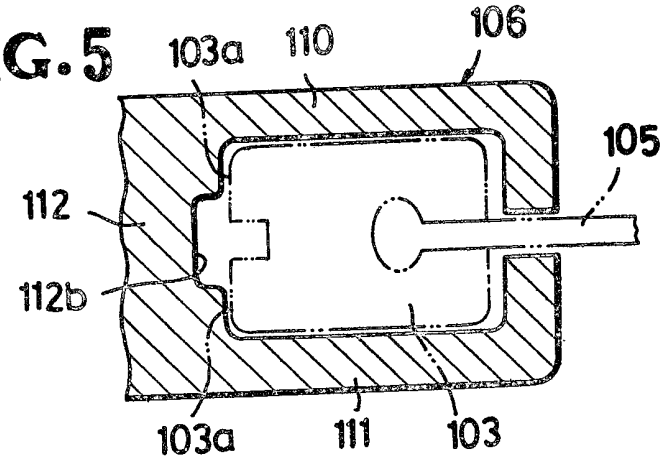


FIG. 6

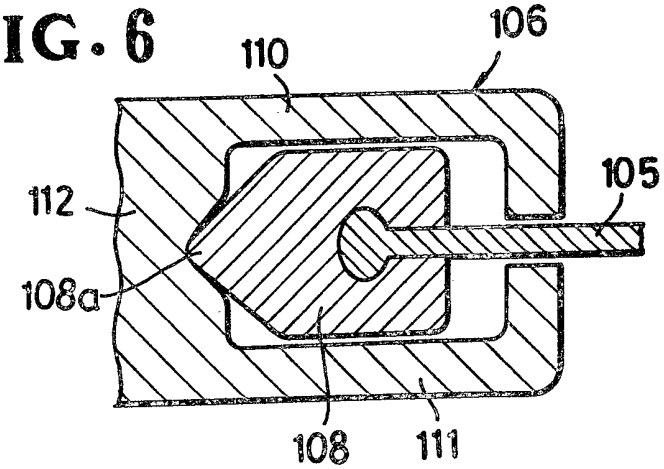


FIG. 7

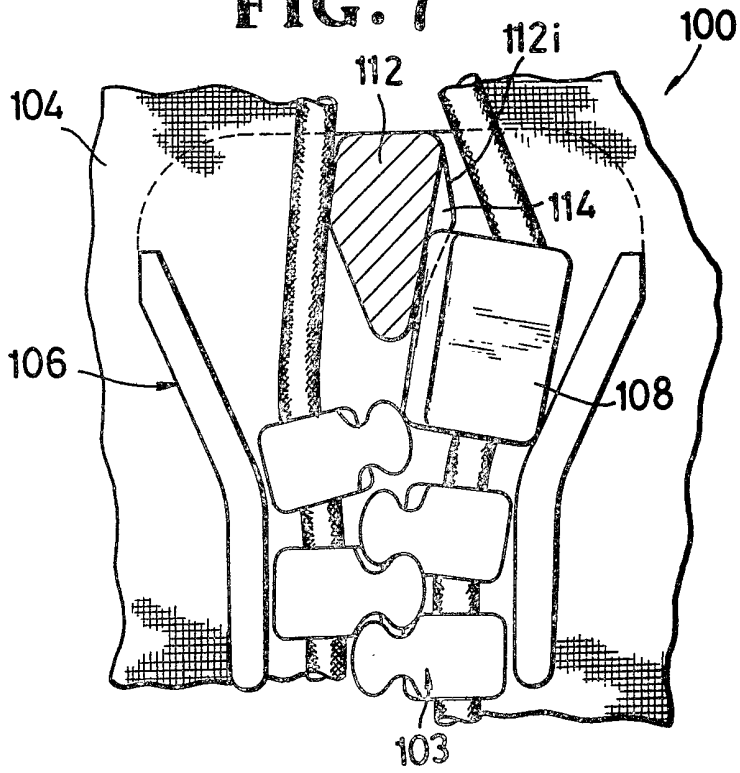
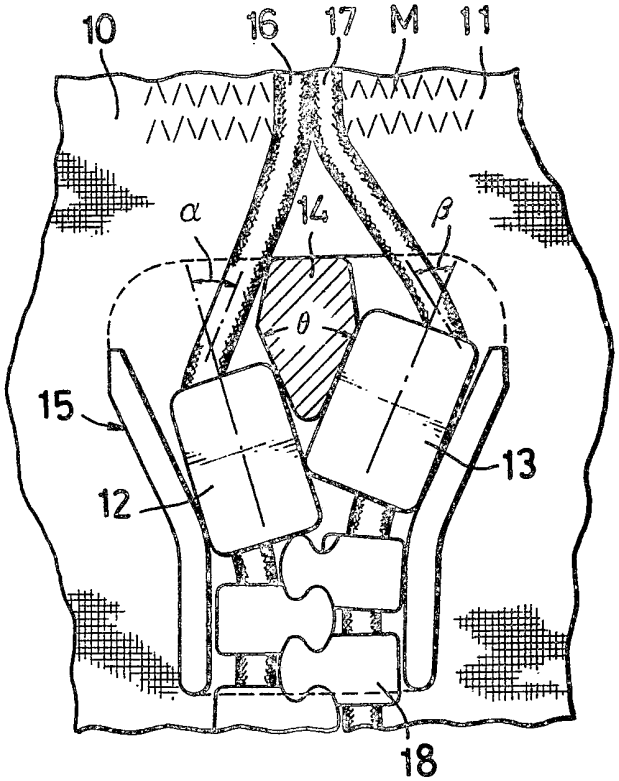


FIG. 8



SPECIFICATION

Slide fastener assembly

This invention relates to slide fasteners and more particularly to a slide fastener assembly of the type in which top end stops are allowed to enter the interior of a slider.

Numerous slide fasteners of the type described are known in the art. A typical example of such slide fasteners is illustrated in Figure 8 of the drawings accompanying this specification, wherein the slider fastener is shown in fully closed disposition with both stringer tapes 10, 11 brought together at one or upper end of the fastener and attached by a sewn seam M to a garment article not shown. In this disposition, top end stops 12, 13 are trapped and locked between a diamond 14 and respective side flanges of a slider 15, and beaded edges 16, 17 of the tapes 10, 11 (which beaded edges are devoid of fastener elements 18, are located between the respective end stops 12, 13 and are sewn to the upper ends of the tapes 10, 11) are spread apart to assume an inverted Y-shape. The angle at which the Y-shaped region of the beaded edges 16, 17 spreads or flares is determined by and dependent upon an angle θ of the diamond 14. This diamond angle θ is also an important factor bearing upon the resistance which is encountered during starting movement of the slider 15 in a direction to open or separate the fastener. This starting resistance is also variable with the coefficient of friction between the diamond 14 and the end stops 12, 13, such friction coefficient being in turn dependent upon the material used for these parts. The same resistance may further be variable with the angles α and β at which the beaded edges 16 and 17 respectively flex with respect to the longitudinal axis of the end stops 12, 13. The slider starting resistance is smaller the smaller the angles α and β. However, if these angles were desired to be reduced without changing the diamond angle θ, this could be done by locating the sewn seam M of the beaded edges 16, 17 remotely from the end stops 12, 13. This would however result in fastener stringers being left unclosed at the top terminal end of the fastener.

On the other hand, the diamond angle θ is required to be about 50 degrees in order to maintain the normal satisfactory operation of opening and closing the fastener (i.e. to disengage and engage the rows of fastener elements 18), and hence cannot be reduced too greatly.

According to one aspect of the invention there is provided a slide fastener comprising a pair of stringers, a slider to engage and disengage the stringers, and a top end stop engageable with the slider, the slider having a neck or diamond recessed to receive a complementary part of the end stop.

The present invention seeks to provide a slide fastener which will eliminate the aforementioned drawbacks of the prior art fasteners.

The invention further seeks to provide a slide fastener of the type herein described incorporating structural features to enable the slider to start movement in a fastener opening direction with a minimum of resistance.

According to another aspect of the invention, there is provided a slide fastener assembly which comprises a pair of stringers having oppositely disposed rows of fastener elements secured to respective support tapes, a slider having upper and lower shields and a diamond portion connecting said shields in spaced opposed relation to provide a substantially Y-shaped guide channel, said slider being movable to take said rows of fastener elements into and out of engagement, and a top end stop dimensioned to be receivable within the guide channel of said slider and having a protuberance, said diamond having formed in at least one side wall thereof an elongated longitudinal recess for receiving said protuberance of said top end stop, the remaining portions of said side wall being disposed for guided engagement with said rows of fastener element.

Other objects and features will appear or be pointed out as the description proceeds with reference to the accompanying drawings which illustrate by way of example some preferred embodiments.

Figure 1 is a plan view to an enlarged scale of a portion of a slide fastener assembly embodying the invention, with an upper shield of a slider removed to reveal the relative positions of the fastener parts;

Figure 2 is a perspective view on enlarged scale of a slider with its upper shield removed;

Figure 3 is a perspective view on enlarged scale of a portion of a fastener stringer;

Figure 4 is a cross-sectional view on enlarged scale taken on the line IV—IV of Figure 1;

Figure 5 is a transverse cross-sectional view to enlarged scale of the fastener stringer showing the positional relation between the fastener element and the slider;

Figure 6 is a cross-sectional view similar to Figure 4 but illustrating a modified form of the invention;

Figure 7 is a plan view similar to Figure 1 but illustrating a modification of the fastener; and

Figure 8 is a plan view to enlarged scale of a prior art fastener with an upper slider shield removed to show the positional relations of its parts.

Referring now to the drawings and Figure 1 in particular, there is shown a portion of a slide fastener assembly 100 embodying the invention, which assembly comprises a pair of stringers 101 and 102 having oppositely disposed rows of fastener elements 103 secured to respective support tapes 104 and 105, a slider 106 movable to take the rows of elements 103 into and out of engagement, and a pair of top end stops 107 and 108 each dimensioned to be receivable within the interior of the slider 106. Each of the support tapes 104, 105 has a beaded edge 104' (105') extending along one of its longitudinal edges and utilized for mounting thereon the respective row of

fastener elements 103 which is shown in the illustrated embodiment to be of a discrete formation as contrasted to a continuous formation. Each individual fastener element 103 has a coupling head portion 103*a* with side projections 103*b* and corresponding recesses 103*c* for receiving side projections of a complementary fastener element on the other or mating stringer.

The slider 106 comprises a slider body 109 having an upper shield 110 and a lower shield 111 connected together at their respective front ends and in spaced opposed relation by a neck portion or diamond 112 to provide a substantially Y-shaped guide channel 113 for the passage therethrough of the fastener elements 103. The upper and lower shields 110 and 111 have side flanges 110*a* and 111*a*, respectively which serve to retain the fastener elements 103 in the guide channel 113 during movement of the slider 106 along the rows of elements 103 to open or close the slide fastener 100 in the well known manner. The slider 106 is manipulated usually by a pull tab which is omitted from the present illustration as it constitutes no important aspect of the invention.

Now, according to an important feature of the invention, the diamond 112 of the slider 106 has a pair of symmetric elongated longitudinal recesses 112*a* and 112*b* formed, respectively, in and extending centrally opposite side walls 112*i* of the diamond 112 for receiving protuberances 107*a* and 108*a* which extend from the inner longitudinal edges of the respective top end stops 107 and 108 as better shown in Figure 4. The provision of the recesses 112*a* and 112*b* results in the formation of an upper peripheral guide surface 112*c* and a lower peripheral guide surface 112*d* at opposite sides of the diamond 112 converging toward the rear end of the slider 106 to form an un-offset triangular head 112*e* and offset longitudinal side wall portions 112*f* and 112*g* as better shown in Figure 2. The peripheral guide surfaces 112*c*, 112*d* are disposed for guided engagement with the coupling head portions 103*a* of respective rows of fastener elements 103 during operative movement of the slider 106 as better shown in Figure 5. The un-offset triangular head 112*e* has an angle θ of about 50 degrees sufficient to effect separation of the rows of fastener elements 103 during movement of the slider 106 in a direction to open the fastener 100.

The offset side wall portions 112*f*, 112*g* extend divergently toward the front end of the slider 106 at a relatively small angle, or state otherwise extend convergently toward the rear end of the slider 106 and form an offset triangular head 112*h* which has an angle θ' substantially smaller than the angle θ of the un-offset triangular head 112*e*. The angle θ' of the offset triangular head 112*h* may be held at as small as about 25 degrees, so that the two top end stops 107, 108 are brought closer toward each other across the offset triangular head 112*h* when the slider 106 has moved up to its uppermost position effecting full closure of the slider fastener 100. When the tapes 104, 105 are sewn at their upper terminal ends to a garment or the like, the beaded edges 104′ and 105′ flex inwardly at considerably reduced angles α and β with respect to the longitudinal axis of the top stops 107 and 108, respectively. This will in turn help greatly reduce the resistance encountered upon starting movement of the slider 106.

Figure 6 illustrates a modification wherein the recess 112*a* (112*b*) in the diamond 112 has a cross-sectionally triangular shape and the top end stop 107 (108) has a complementarily pointed protuberance 108*a*′ receptive in the recess 112*a* (112*b*).

Figure 7 shows another modification characterized by the provision of a recess 114 only at one side of the diamond 112.

CLAIMS

1. A slide fastener assembly (100) which comprises a pair of stringers (101, 102) having oppositely disposed rows of fastener elements (103) secured to respective support tapes (104, 105), a slider (106) having upper and lower shields (110) and (111) and a diamond portion (112) connecting said shields in spaced opposed relation to provide a substantially Y-shaped guide channel (113), said slider being movable to take said rows of fastener elements (103) into and out of engagement, and a top end stop (107, 108) dimensioned to be receivable within the guide channel of said slider (106) and having a protuberance (107*a*, 108*a*), said diamond (112) having formed in at least one side wall (112*i*) thereof an elongated longitudinal recess (112*a*, 112*b*) for receiving said protuberance (108*a*) of said top end stop (107, 108), the remaining portions of said side wall being disposed for guided engagement with said rows of fastener element (103).

2. A slide fastener assembly as defined in claim 1 wherein said diamond (112) is provided in opposite side walls thereof with a pair of symmetric elongated recesses (112*a*) and (112*b*) extending divergently at a relatively small angle, said remaining portions of each of said opposite side walls comprising a pair of upper and lower guide surfaces (112*c*) and (112*d*) across said recesses.

3. A slide fastener assembly as defined in claim 2 wherein said angle is in the neighborhood of 25 degrees.

4. A slide fastener assembly as defined in claim 2 wherein said upper and lower peripheral guide surfaces (112*c*) and (112*d*) converge

toward the rear end of said slider (106) to form an un-offset triangular head (112*e*) of a relatively large angle, and said elongated recesses (112*a*) and (112*b*) define an offset triangular head (112*h*) having an angle smaller than the angle of said un-offset triangular head (112*e*).

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1982. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained