

April 11, 1961

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2,979,003

METHOD FOR SEWING CONCEALED SLIDE FASTENERS

Filed Jan. 16, 1958

3 Sheets-Sheet 1

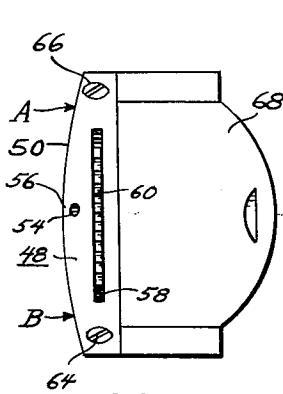


Fig. 2.

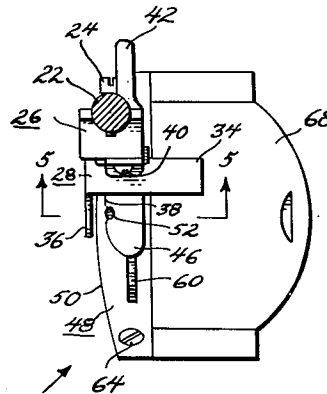


Fig. 1.

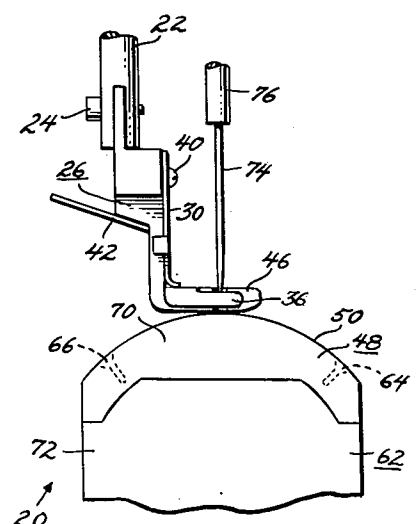


Fig. 3.

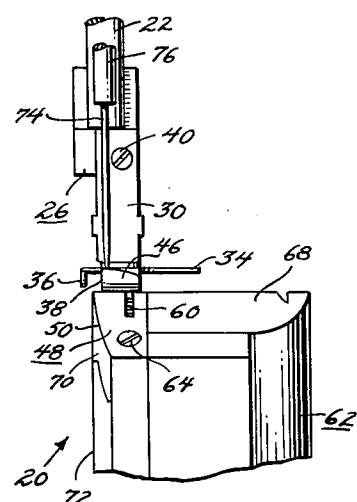


Fig. 4.

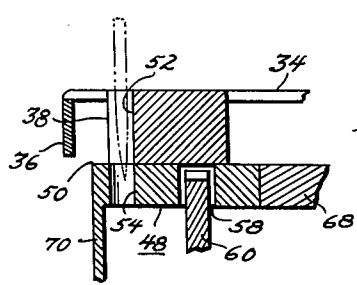


Fig. 5.

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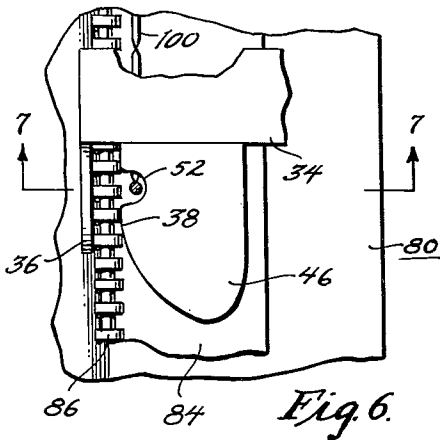


Fig. 6.

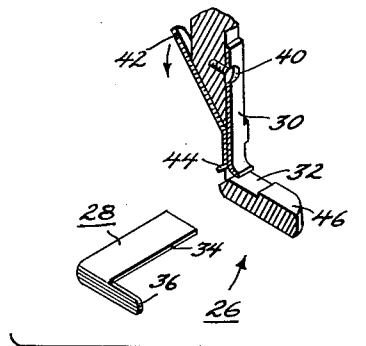


Fig. 8.

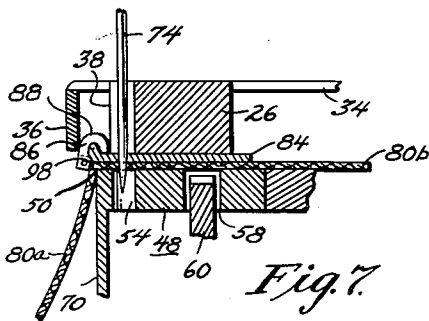


Fig. 7.

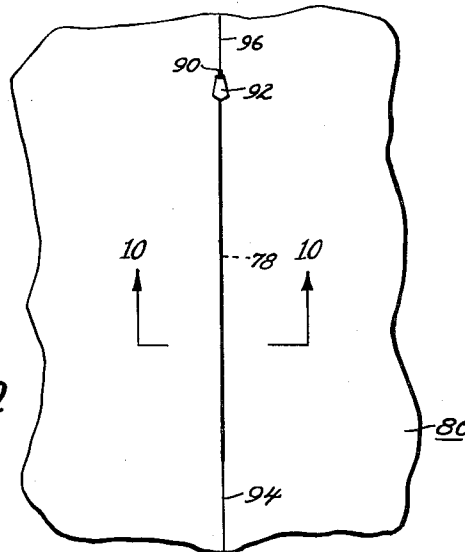


Fig. 9.

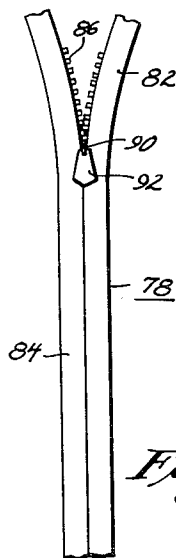


Fig. 11.

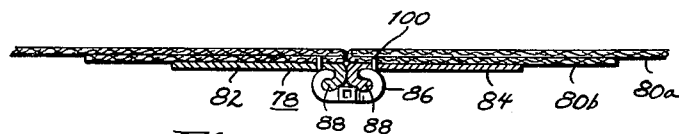


Fig. 10.

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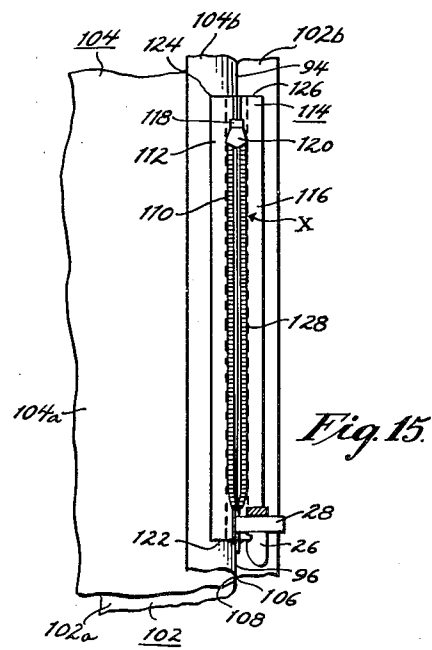
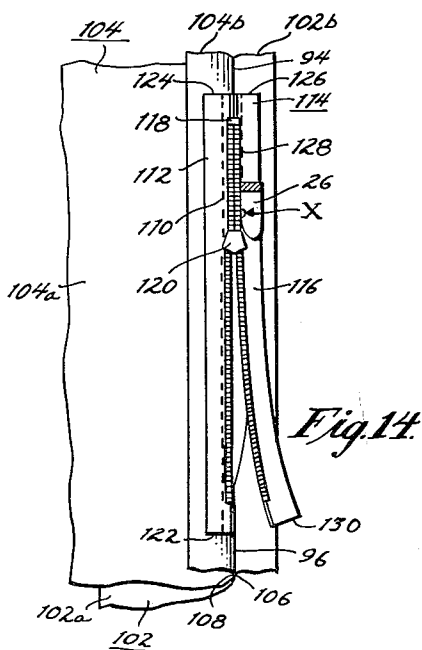
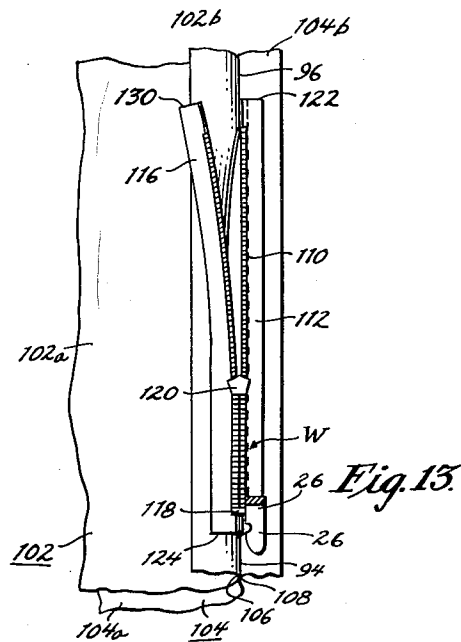
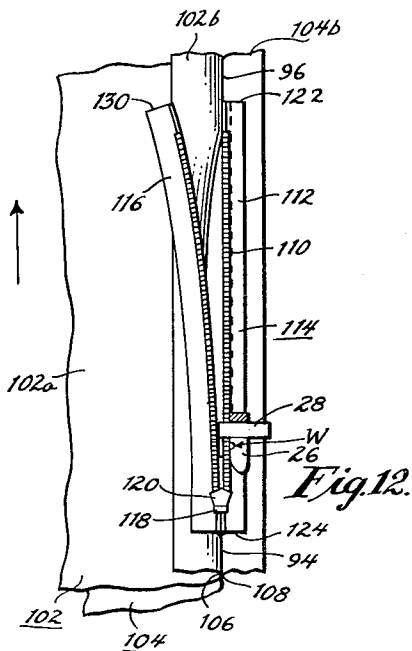
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3 Sheets-Sheet 3



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2,979,003

## METHOD FOR SEWING CONCEALED SLIDE FASTENERS

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4 Claims. (Cl. 112—265)

The present invention relates to a machine and method for sewing concealed slide fasteners, and more particularly to a machine and method for sewing concealed slide fasteners wherein the sewn-in slide fastener closely resembles a seam when the slide fastener is closed, and wherein the stitching joining the slide fastener to the cloth of the garment to which it is attached extends for the full length of the slide fastener and is concealed.

The Duchan method for inserting concealed slide fasteners, which method is described in United States patent application Serial No. 692,772 filed October 28, 1957 for: "Machine and Process for Sewing Concealed Slide Fasteners" is the finest method heretofore developed for inserting concealed slide fasteners upon a garment. In this method and apparatus the concealed slide fastener is manipulated by the hands of the user, although such manipulations are maintained at a minimum level, the user aligning the slide fastener elements manually during the operation of the process, so that proper attachment of such slide fastener elements to the garment may be had.

I have now discovered a method in which alignment by mechanical means of the slide fastener elements during a major portion of the sewing-in operation is possible. In my method, the tapes bearing the slide fastener elements may be sewn to the garments carrying such tapes along the full length of such tapes.

I have also discovered a machine for sewing in concealed slide fasteners in which mechanical alignment of the slide fastener elements during the sewing-in operation is effected for at least a portion of the sewing-in operation.

This invention has as an object the provision of a novel machine for sewing concealed slide fasteners onto a juxtaposed cloth.

This invention has as another object the provision of a machine which can sew concealed slide fasteners onto juxtaposed cloth at a rapid rate with a minimum of manual operation and in which alignment of the slide fastener elements by mechanical means during at least a portion of the sewing-in operation is achieved.

This invention has as yet another object the provision of a machine for sewing concealed slide fasteners onto a cloth so that the line of stitching joining the concealed slide fastener to the cloth is concealed.

This invention has as a further object the provision of a machine for sewing concealed slide fasteners onto cloth in such manner that when the concealed slide fasteners are in their closed disposition the appearance of a genuine seam is closely simulated.

This invention has as still a further object the provision of a method for sewing concealed slide fasteners onto juxtaposed cloth in such manner that when the concealed slide fasteners are in their closed disposition the appearance of a genuine seam is closely simulated.

This invention has as yet a further object the provision of a method for sewing concealed slide fasteners onto juxtaposed cloth in which alignment of the slide fastener

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elements by mechanical means during at least a portion of the sewing-in operation is achieved.

Other objects will appear hereinafter.

For the purpose of illustrating the invention there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

Referring to the drawings wherein like reference characters refer to like parts:

Figure 1 is a plan fragmentary view, viewed from above, of the presser foot and needle plate portion of the sewing machine of the present invention.

Figure 2 is a plan view similar to that of Figure 1, except that the presser foot is removed in order that clarity of underlying parts may be had.

Figure 3 is a side elevational view of the portion of the machine shown in Figure 1.

Figure 4 is a front elevational view of the portion of the machine shown in Figure 1.

Figure 5 is a fragmentary sectional view taken through the presser foot and needle plate on the line 5—5 of Figure 1.

Figure 6 is a plan view revealing the manner in which a tape bearing slide fastener elements is stitched to cloth by the machine of the present invention in accordance with the process of the present invention.

Figure 7 is a sectional view taken on line 7—7 of Figure 6.

Figure 8 is an exploded view, partially in section, of the presser foot used in the sewing machine of the present invention.

Figure 9 is a view demonstrating the appearance of a concealed slide fastener when the same is in its closed disposition attached to cloth by the process of the present invention, said view demonstrating the seam-like appearance of the slide fastener.

Figure 10 is a section taken on line 10—10 of Figure 9.

Figure 11 is a view revealing a concealed slide fastener which may be attached to cloth by the machine of the present invention.

Figure 12 is a diagrammatic view revealing the first stage of the process of the present invention.

Figure 13 is a diagrammatic view revealing a later stage of the process than is revealed in Figure 12.

Figure 14 is a diagrammatic view of a still later stage of the process than is revealed in Figure 13.

Figure 15 is a diagrammatic view of the final stage in the process of the present invention.

Referring to the drawings, and initially to Figures 1 through 5 inclusive, the machine of the present invention is designated generally as 20. Such machine 20 may comprise a single needle lock-stitch sewing machine. For the sake of simplicity and clarity of presentation, only those portions of the machine 20 needed to comprehend the present invention will be described herein, it being understood that the remainder of the machine 20 is of conventional construction.

The machine 20 includes a presser bar 22 in which is held by means of set screw 24 the presser foot 26.

The presser foot 26 (see in particular Figure 8) is of the type of presser foot known as a gauge foot and includes the gauge bar 28 which is retained by closure member 30 on the uppermost surface of the presser foot 26, and in particular within a notch 32 provided on the instep of the presser foot 26. The gauge bar 28 includes a flat reciprocally movable member 34 which is received within notch 32, and an offset projection 36 which is carried on the free end of member 34, such offset projection 36 being juxtaposed to and parallel to the straight outside edge 38 of presser foot 26.

The closure member 30 of presser foot 26 is secured

to presser foot 26 by means of retention screw 40, closure member 30 being resilient so that it spring-urges the member 34 of gauge bar 28 into the notch 32.

Release lever 42 projects through presser foot 26, its lowermost end 44 being cross-shaped and received within a notched groove in presser foot 26 behind closure member 30. Downward movement of release lever 42 (in the direction indicated by the arrow in Figure 8) urges closure member 30 upwardly whereby the lowermost portion of closure member 30 is disengaged from the uppermost surface of member 34, permitting the member 34 to be reciprocally moved within the notch 32 in presser foot 26.

The uppermost surface of member 34 may be provided with spaced indicia in order that the inside face of offset projection 36 may be spaced from the outside edge 38 of presser foot 26.

The toe 46 of presser foot 26 is gently curved inwardly, as seen particularly in Figures 1 and 6.

Beneath the presser foot 26 is the plate 48, sometimes referred to as the throat plate, sometimes as the face plate, and referred to herein as the needle plate 48. The outer edge 50 of needle plate 48 is arcuately curved, as shown particularly in Figure 2.

The outside edge 38 of presser foot 26 extends on both sides of the needle guide hole 52 which is disposed on such outside edge 38. As seen from Figure 1 the presser foot 26 is superposed above the needle plate 48, with the entire presser foot 26 being disposed above the needle plate 48 and within the border formed by the arcuate outer edge 50 of needle plate 48.

The arcuate outer edge 50 of needle plate 48 extends outwardly its maximum distance in the portion of the needle plate 48 which includes the needle hole 54, such needle hole 54 being spaced from the arcuately curved outer edge 50 by the land 56. In the illustrated embodiment, the needle hole 54 is generally elliptical with its major axis running parallel to the major axis of the presser foot 26 (extending from the presser foot's toe to its heel) and also the major axis of the feed slot 53 through which the feed dog 60 projects upwardly.

The degree of curvature of the outer edge 50 of needle plate 48 is such that a projection of the major axis of the elliptical needle hole 54 intersects the curved outer edge 50 both before the needle hole 54 and after the needle hole 54 (see points respectively designated A and B in Figure 2).

As seen in Figure 3 the needle plate 48 is arcuately curved, with the needle hole 54 being disposed at the highest point of such arcuate curvature. The needle plate 48 is secured to the post 62 by front and rear retention screws 64 and 66.

A work plate or end plate 68 of conventional construction is provided at the top of the post 62 for permitting access to the contents of the post 62, such as the bobbin.

The needle plate 48 includes a dependent wall 70 beneath its curved outer edge 50, which dependent wall 70 is integral with the remainder of the needle plate 48 and is arcuately curved to the same extent as the outer edge 50 of needle plate 48. Preferably the outer wall 72 of post 62 is similarly arcuately curved so that a curved wall extends vertically beneath the curved outer edge 50 which conforms to the degree of curvature of the curved outer edge 50. As seen particularly in Figure 7 the vertical height of the curved outer wall 70 (which, as heretofore indicated, extends continuously with curved outer wall 72 of post 62) is appreciably greater than the maximum width of the slide fastener elements which are to be stitched to the cloth by the machine 20 of the present invention.

A needle 74 of conventional construction is carried by the needle bar 76 and is reciprocally movable through the needle guide hole 52 of presser foot 26 and the needle hole 54 of needle plate 48.

A form of concealed slide fastener 78 which may be utilized in accordance with the present invention is shown in Figure 11. The precise construction of the concealed slide fastener 78 forms no part of the present invention, a wide variety of such concealed slide fasteners being described in the art. A suitable example of a concealed slide fastener which may be utilized in the present invention is that shown in United States Letters Patent 2,738,560 issued March 20, 1956 to Jacques Hug entitled "Concealed Slide-Fasteners." The finished sewn article is shown in Figures 9 and 10, and by reference to Figures 10 and 11, a sufficient understanding of the concealed slide fastener's structure may be had to follow the manner in which such concealed slide fastener 78 is sewn to the cloth 80.

The slide fastener 78 includes a pair of element supporting tapes 82 and 84 on which the elements 86 of the concealed slide fastener 78 are carried.

As seen particularly in Figure 10, the elements 86 are carried on folded-in inner edges of the tapes 82 and 84, the inner edges of the tapes 82 and 84 being welted at 88 to provide means for anchoring the elements 86. Since the elements 86 are disposed behind the inner edges of the tapes 82 and 84 and since the slider 90 rides on the inside and outside of the elements 86, when the concealed slide fastener 78 is closed (Figure 9) substantially only the tab 92 of slider 90 is visible.

As shown in Figures 6 and 7, a tape 84 of the concealed slide fastener 78 is joined to cloth 80. The cloth 80 includes a sewn seam 94 below the concealed slide fastener 78 and a sewn seam 96 above the concealed slide fastener 78 (see Figure 9), such seams joining the cloth 80 together except for the gap intermediate the seams 94 and 96 which is occupied by the concealed slide fastener 78.

The cloth 80 is folded back along fold line 98 (see Figure 7) to form the exposed major portion of the cloth designated 80a and the folded-under portion of the cloth designated 80b, such folded-under portion 80b being juxtaposed to the tape 84.

As seen particularly in Figure 7 the distance between the outer edge 50 of needle plate 48 and the outer edge 38 of presser foot 26 in the region of the needle guide hole 52 of presser foot 26 is approximately equal to the lateral dimension of the elements 86 of slide fastener 78. It is noted that such elements 86 are closely adjacent the outer edge 38 of presser foot 26 and the inner face of offset projection 36 of gauge bar 28. Similarly, the maximum width of the land 56 between the needle hole 54 and the outer edge 50 of needle plate 48 is also approximately equal to the lateral dimension of the elements 86 of slide fastener 78, and in any event is sufficiently large so that said land 56 forms a supporting surface upon which the elements 86 may be rested, with a portion of such elements 86 overhanging the vertical wall 70 which depends from the outer edge 50 of needle plate 48. The line of stitching 100 is secured adjacent the elements 86 since the needle guide hole 52 of presser foot 26 is adjacent the outer edge 38 (actually being on the outer edge 38) of presser foot 26.

Folding back of the major portion 80a over the folded-under portion 80b will conceal the line of stitching 100 so that such line of stitching 100 may not be seen when the outside of the cloth 80 is viewed (see Figures 9 and 10).

The process for sewing a concealed slide fastener 78 to cloth 80 of my invention is as follows:

Cloth 80 (see Figures 9 and 12) is provided with a gap intermediate the collinear seams 94 and 96, which gap is to be occupied by the slide fastener 78.

The cloth 80 includes the two adjacent panels designated 102 and 104. The panel 102 is folded along fold line 106 so that the panel 102 includes the major portion 102a which is seen by the viewer when the garment

comprising the panels 102 and 104 is worn and the folded-under portion 102b which is hidden from view when the garment is worn by the major portion 102a. Similarly, panel 104 is folded along fold line 108 to provide the major portion 104a and the folded-under portion 104b, the major portion 104a of panel 104 being seen by the viewer when the garment comprising panel 104 is worn.

The first step in the process of my invention is the joinder of tape 112 of slide fastener 114 to folded-under portion 104b of panel 104 (see Figure 12). It is, of course, to be understood that the slide fastener 114 is identical to the slide fastener 78, and that the sewing machine used to effect the process of my invention is machine 20.

In the first step of my process, the concealed slide fastener 114 is juxtaposed to the folded-under portions 102b and 104b with its tape 116 being juxtaposed to the folded-under portion 102b and its tape 112 being juxtaposed to the folded-under portion 104b, as shown in Figure 12. The concealed slide fastener 114 is linearly aligned so that its elements cover the gap portion between seams 94 and 96. The clip 118 of concealed slide fastener 114 is positioned adjacent the seam 94.

In the first step of the process of the present invention shown in Figure 12 the slider 120 is moved adjacent the clip 118, namely near the bottom of the concealed slide fastener 114. Then with the elements of the tape 112 disposed in the manner in which the elements of the slide fastener tape are disposed in Figures 6 and 7 the line of stitching 110 is sewn adjacent the elements of the tape 112 down to the point designated W in Figure 12. Thus, the line of stitching 110 is effected with the presser foot 26 retaining the elements of the tape 112 intermediate the offset projection 36 of gauge bar 28 and the outside edge 38 of presser foot 26, and the feed dog 60 advancing the panel 104 in the direction indicated by the arrow to the left of Figure 12.

The location of point W is not critical as long as the same is at an appreciable distance from the ends of the concealed slide fastener 114, and in particular a sufficient distance from clip 118 so as to permit slider 120 to be received intermediate the clip 118 and point W. Preferably, as shown in Figure 12, such point W should be about three-quarters or seven-eighths of the distance towards the clip 118 from the uppermost end 122 of the tape 112 where the line of stitching 110 was commenced.

When point W is reached, the gauge bar 28 is removed from presser foot 26, which can be rapidly accomplished by moving release lever 42 of presser foot 26 in the direction of the arrow shown in Figure 8 thereby raising the closure member 30 from the uppermost surface of the gauge bar 28 permitting the gauge bar 28 to be rapidly withdrawn from the notch 32.

The slider 120 of slide fastener 114 is then moved upwardly away from clip 118 past point W (see Figure 13) and the line of stitching 110 is continued from the point W to the lowermost end 124 of tape 112. The portion of the line of stitching 110 intermediate the point W and the lowermost end 124 of tape 112 is effected by the presser foot 26 with the gauge bar 28 removed. The control and retention of the slide fastener 114 in respect to the panels 102 and 104 during the portion of the line of stitching 110 intermediate the point W and the lowermost end 124 is by hand.

When the line of stitching 110 reaches the lowermost end 124, the presser bar 22 is raised thereby raising the presser foot 26 from tape 112. The panels 102 and 104 are then reversed in respect to the machine 20, with the tape 116 being placed over the needle plate 48 of machine 20. Specifically, the end 126 of tape 116, namely the end of tape 116 which is adjacent the end 124 of tape 112 and seam 94 is placed upon needle plate 48 of machine 20. The line of stitching 128 is then commenced. As noted in Figure 14, the line of stitching 128

is commenced with the slider 120 being disposed at point X. The line of stitching 128 intermediate end 126 of tape 116 and point X is effected with the elements intermediate the clip 118 and the slider 120 being engaged.

It is effected with the gauge bar 28 removed, the juxtaposition of the tape 116 in respect to folded-under portion 102b being manually controlled. The point X is positioned intermediate the clip 118 and the opposite end of the elements of the slide fastener 114 a distance sufficient to enable the slider 120 to be drawn away from the clip 118 and permit a sufficient length of stitching of line of stitching 128 so that on the return of the slider 120 to the clip 118 the line of stitching 128 will extend well beyond the slider 120. Preferably, point X should be closer to clip 118 than to the opposite end of the elements forming the slide fastener 114. If desired, point X may coincide with point W, although the same is not necessary.

When point X is reached, the presser bar 22 is again raised, and the slider 120 is moved adjacent the clip 118. The gauge bar 28 is inserted in the presser foot 26 and the line of stitching 128 is continued with the elements of tape 116 being retained between the inner face of offset projection 36 of gauge bar 28 and the outside edge 38 of presser foot 26 (see Figure 15). The line of stitching 128 is continued to the end 130 of tape 116.

It will be seen that when the major portions 104a and 102a of panels 104 and 102 are folded over their respective fold lines 108 and 106, the lines of stitching 110 and 128 are entirely hidden from view, being beneath the major portions 104a and 102a of panels 104 and 102. The fold lines 108 and 106 are preserved by the lines of stitching 110 and 128.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. The process of sewing a concealed slide fastener comprising a pair of tapes carrying fastener elements at their inner edges and a slider which engages the fastener elements and which is substantially concealed when the slide fastener is in its closed disposition by one face of each of the tapes which is opposite to the face juxtaposed to the slider to a pair of cloth members in such manner as to closely simulate a sewn seam when the slide fastener is in its closed disposition which comprises folding each of the cloth members along a straight fold line to form two plies, arranging said folded cloth members side by side with their fold lines being adjacent, joining one of the tapes which carries the fastener's elements to a folded ply of one of the cloth members by juxtaposing the face of said tape which conceals the slider to said ply, stitching a first portion of said one tape to said ply with the slider being disposed away from said first portion of stitching and with the fastener elements of said slide fastener adjacent said first portion of stitching being disengaged, guiding said first portion of stitching by means which straddle the fastener elements of said one tape to produce a line of stitching which is adjacent to and parallel to the fastener elements carried by said one tape with said fastener elements being disposed intermediate the fold line of the cloth member and the line of stitching, continuing said line of stitching of said one tape to a point appreciably less than the requisite full line of stitching, stopping said first portion of stitching, removing the means which straddle the fastener elements of said one tape, moving the slider to a point adjacent said first portion of stitching, and completing said line of stitching with a second portion of stitching, said second portion of stitching being effected while the fastener elements of the one tape adjacent to said second portion of stitching are engaged with the fastener elements of the other tape, said second portion of stitching being

collinear with said first portion of stitching and closely adjacent to and parallel to the fastener elements carried by said one tape so that said fastener elements are disposed intermediate the fold line of the cloth member and said second portion of stitching, reversing the cloth members, joining the other of the tapes which carries the fastener's elements to a folded ply of the other of the cloth members by juxtaposing the face of said tape which conceals the slider to said ply, stitching a first portion of said other tape to said ply with the slider being disposed away from said first portion of stitching and with the fastener elements of the tapes of the slide fastener being engaged with each other adjacent said first portion of stitching of said other tape to its juxtaposed ply of said other folded cloth member, continuing the stitching of said other tape to a point appreciably less than the requisite full line of stitching, said first portion of stitching of said other tape being a line of stitching which is adjacent to and parallel to the fastener elements carried by said tape so that said fastener elements are disposed intermediate the fold line of the other cloth member and the line of stitching, stopping said first portion of stitching of said other tape, moving the slider to a point adjacent said first portion of stitching of said other tape, straddling the fastener elements of said other tape with guide means, completing said line of stitching of said other tape with a second portion of stitching, said second portion of stitching being guided by the guide means which straddle the fastener elements of said other tape and said second portion of stitching being effected while the fastener elements of said other tape adjacent to said second portion of stitching are disengaged from the fastener elements of said one tape, said second portion of stitching being collinear with said first portion of stitching

ing of said other tape and being adjacent to and parallel to the fastener elements carried by said other tape so that said fastener elements are disposed intermediate the fold line of the other cloth member and said second portion of stitching, removing the guide means from engagement with said slide fastener, and superposing the remaining ply of each of said cloth members over said lines of stitching by bending such remaining plies along the fold lines.

2. A process in accordance with claim 1 in which the lines of stitching for both of the tapes of the slide fastener run the entire length of the tapes.

3. A process in accordance with claim 1 in which the lines of stitching of each of the tapes are parallel to each other.

4. A process in accordance with claim 1 for sewing a concealed slide fastener to a pair of cloth members which are joined together by collinear seams which are above and below a gap between the cloth members in which the slide fastener is inserted in the gap between the cloth members.

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