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M. BLUMENKRANTZ
APPARATUS FOR ATTACHING SLIDE FASTENERS
TO FABRICS AND THE LIKE

2,776,635

Filed July 3, 1952

4 Sheets-Sheet 1

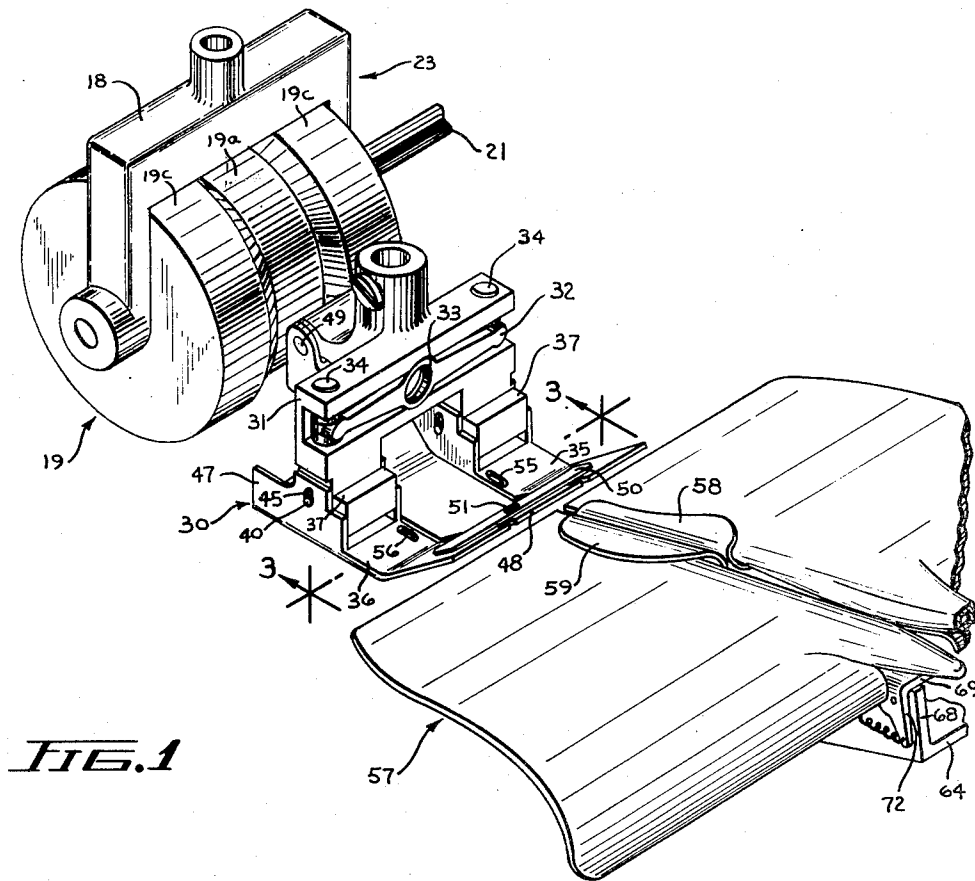


FIG. 1

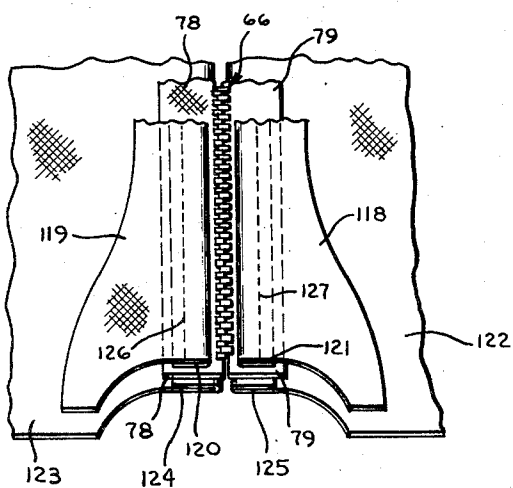


FIG. 1a

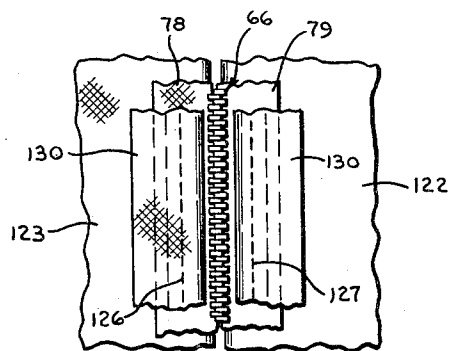


FIG. 1b

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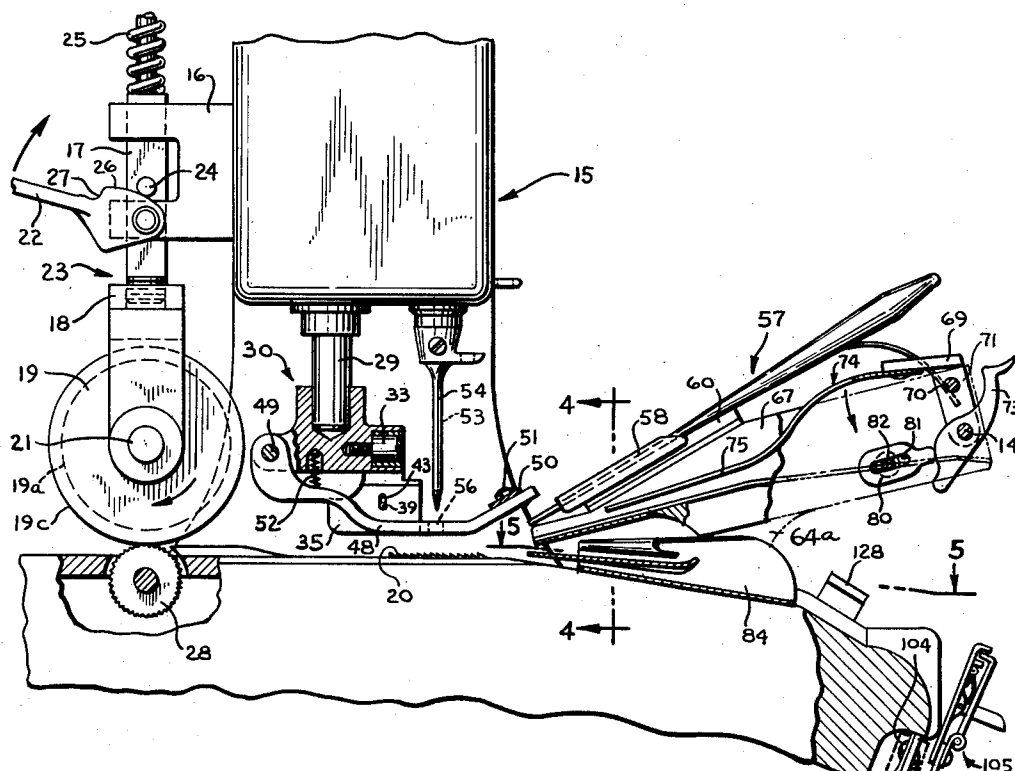


Fig. 2

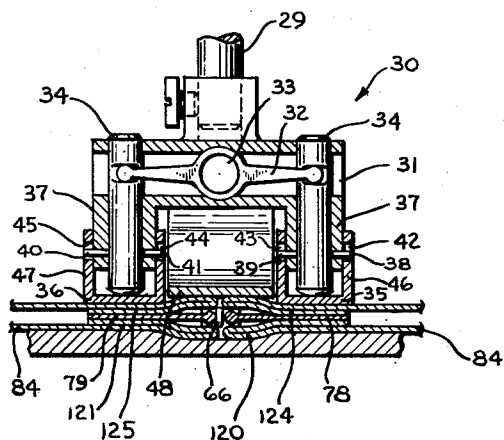


FIG. 3

84

104

105

102

88

96

7

103

98

92

99

97

95

85

86

87

89

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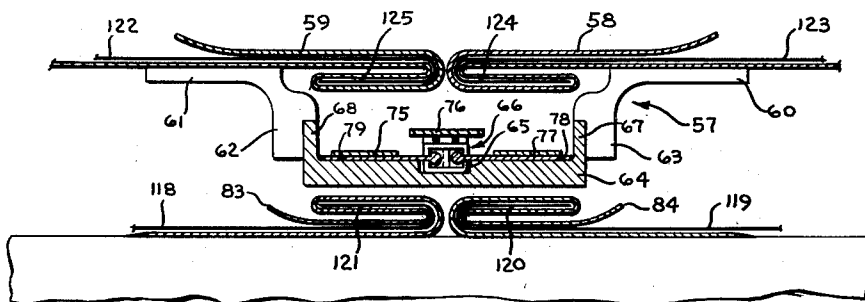


FIG. 4

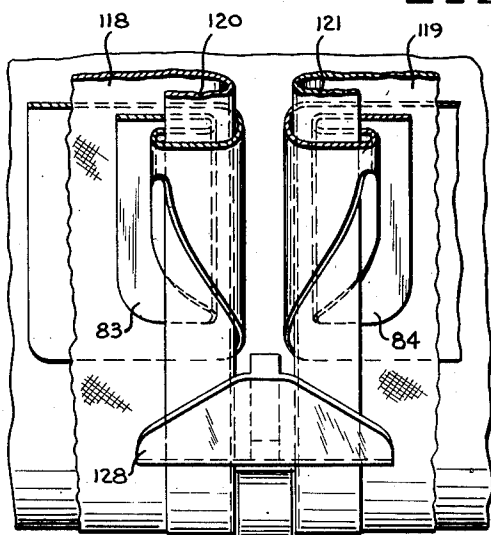


FIG. 5

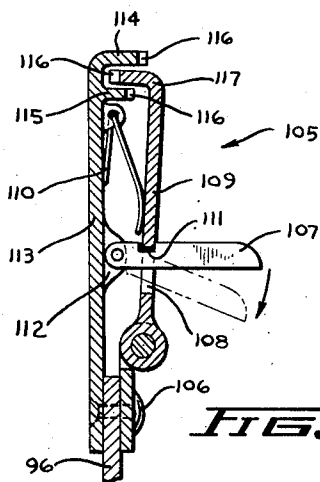


FIG. 2a

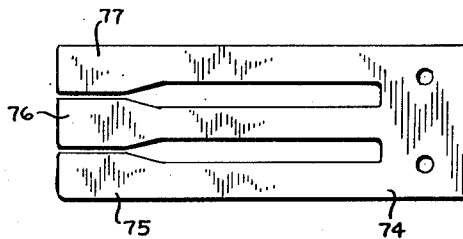


FIG. 6

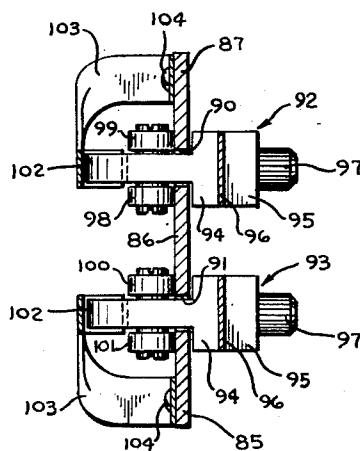


FIG. 7

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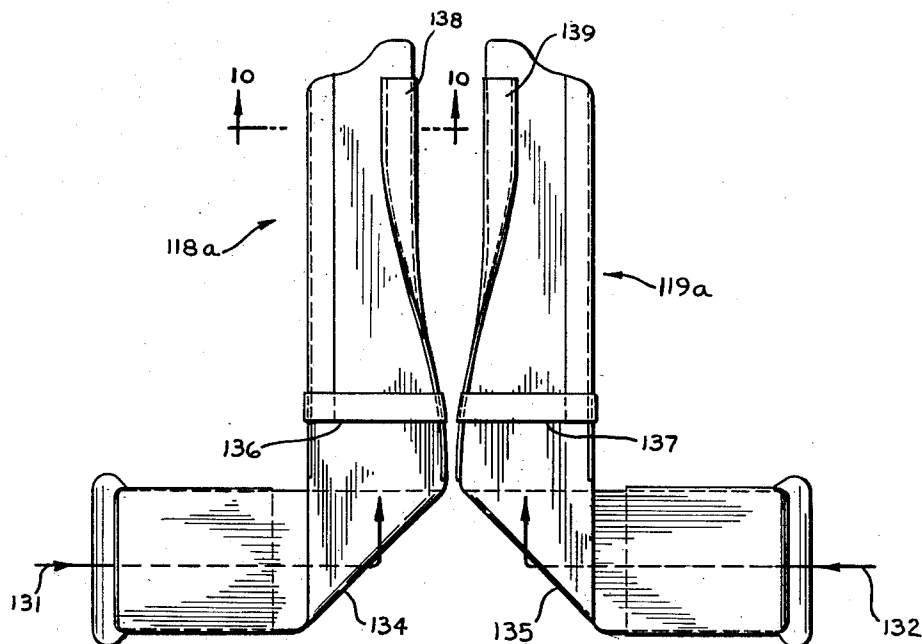


FIG. 8

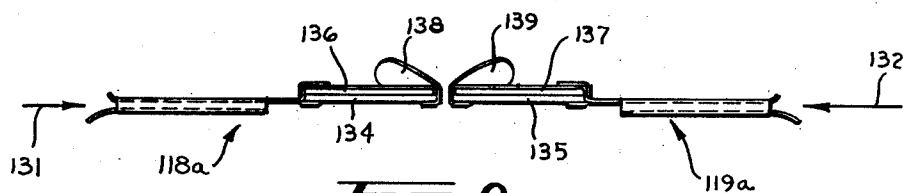


FIG. 9

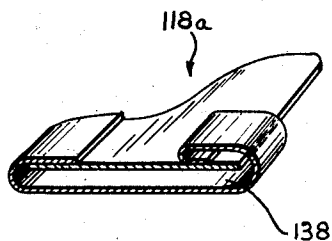


FIG. 10

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APPARATUS FOR ATTACHING SLIDE FASTENERS TO FABRICS AND THE LIKE

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Application July 3, 1952, Serial No. 297,032

9 Claims. (Cl. 112—2)

This invention relates to a method and apparatus for attaching slide fasteners to cloth, the slide fasteners being of any known type, such as the well-known "zipper" and are hereinafter sometimes referred to as such for brevity.

The object of the invention is to provide a method and apparatus for attaching zippers to cloth underlying and overlying the fabric strips forming part of the zipper, said cloth having reinforcing hems lying above and below said fabric strips, whereby the cloth is reinforced where stitched to the zipper.

Another object is to provide a method and apparatus for practicing same that requires a minimum of operations on the part of the machine operator and which is completely automatic once the machine is in operation.

A further object is to provide a method of attaching a cover cloth, the zipper, and a liner simultaneously in one operation.

By way of illustration, a preferred form of apparatus is disclosed for practicing the method or process, but other apparatus can be employed and various changes can be made in the apparatus herein disclosed without departing from the spirit of the invention as hereinafter set forth and claimed.

In the accompanying drawings:

Figure 1 is a perspective of attachments, puller-roll, presser-foot, and guide plate for a standard multiple needle sewing machine;

Figure 1a is a partial bottom view of the machine, Figure 1, with facing cloth, zipper and upper cloth in correct relative position but separated for clarity;

Figure 1b is a partial bottom view of another type of facing or binding used;

Figure 2 is a side elevation of the sewing machine, Figure 1, with attachments in place and guide element partly in section, also showing facing clips in neutral position, held in their highest position by leaf springs;

Figure 2a is an enlarged detailed view of facing clip 105;

Figure 3 is a sectional view taken on line 3—3 of Figure 1, showing main elements of a compensating presser-foot;

Figure 4 is a section taken on line 4—4 of Figure 2, through guiding elements, showing relationship of upper cloth, zipper, lower cloth of facing and means for holding and guiding all pieces in place while being sewn together;

Figure 5 is a section taken on line 5—5 of Figure 2, showing lower hem forming plates with facing cloth in place and top of tripping member for facing clips;

Figure 6 is a plan view of the three-legged leaf spring showing general shape;

Figure 7 is a section taken on line 7—7 of Figure 2, showing top view of facing clip guides;

Figure 8 is a modified form of lower hem guiding plates for facing or binding cloth of the type shown in Figure 1b. When this type of facing or binding material is used, the lower hem forming plate is removed and re-

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placed by said modified form. The facing clips for holding ends of cloth are not used in connection with same. Instead, cloth comes directly from rolls mounted under machine;

Figure 9 is a front elevation of Figure 8; and

Figure 10 is a section in perspective taken on line 10—10 of Figure 8.

Description of attachments when mounted in operating positions on a standard multiple needle sewing machine

Referring to Figures 1 and 2, a standard sewing machine head 15 is shown, to which is attached a guide member 16, in which the square shaft 17 is mounted and carries a fixed yoke 18, supporting the rubber puller rollers 19. Said rollers are driven intermittently and in direct synchronism with the feeder 20.

The shaft 21, which drives the puller rollers, is connected to a standard one-way clutch (not shown) to produce the desired rotation in one direction only.

A cam lever 22 mounted on member 16 actuates the puller roller assembly 23. A pin 24 fixed to square shaft 17 which is under compression by spring 25, bears against cam face 26 and rests in cam detent 27 when lever is rotated in a clockwise direction as viewed in Figure 2. Moving lever in said direction will lift puller roller assembly 23 away from serrated roller 28. The cloth passes between and is pulled by friction by the puller rollers 19.

Mounted on the standard presser foot shaft 29 is the compensating presser foot attachment 30 (see Figures 1, 2 and 3) which consists of a body 31, a lever 32 pivotally mounted at 33, on the body 31, two vertical pins 34 that transfer motion from one shoe 35 through lever 32 to shoe 36.

The shoe 35 is mounted on the lower portion 37 of the body 31 by a pin and slot arrangement which permits the shoe 35 to either oscillate or move in a vertical direction as may be required. The lower portion 37 has pins 38 and 39 thereon which ride in slots 42 and 43 formed in upwardly extending ears 46 of shoe 35. The shoe 36 works in exactly the same manner as shoe 35 with pins 40, 41 riding in slots 44 and 45 in extending ears 47 of shoe 36.

The presser foot attachment 30 also has a third and center shoe 48 (Figure 2) which pivots at 49. This shoe is not part of the compensating mechanism. Its only purpose is to hold the top of the zipper (slide fastener) down and apply a drag to prevent same from wrinkling and bunching up. This is accomplished by coil spring 52, which presses against the top of foot 48. The leaf spring 50 is secured to foot 48 by screw 51 preventing same from being pivoted to a position lower than shoes 35 and 36.

The threaded needles 53, 54 pass through slots 55, 56 of shoes 35 and 36 to transfer the thread in the conventional manner for stitching.

Directly in line with, and in front of, presser foot 30 is mounted a combination cloth guide and tensioning device 57 (see Figure 4) which consists of hem forming plates 58, 59 which are mounted on members 60, 61 which have legs at right angles 62, 63 which are attached to a center portion 64 in which there is a center groove 65 to guide a zipper fastener element 66. Mounted to the rear legs 67, 68 of member 64 is an inverted channel 69 which straddles legs 67, 68 of member 64. This member 69 is pivotally mounted at 70 by its extending legs 71, 72. The lower portion of leg 71 has a lever 73 which pivots at 14. The purpose of lever 73 is to provide a means by which the spring 74 may be readily moved out of path of zipper fastener 66 when same is loaded in channel member 64, adjustably supported on bracket 64a secured to the machine.

The spring 74 is mounted on the lower portion (as shown in Figure 2) of member 69, and the general shape of spring 74 is shown in Figure 6, which shows extending legs 75, 76 and 77. Legs 75 and 77 serve to hold down tape portions 78, 79 of zipper 66 as shown in Figure 4. The exact amount of drag from spring 74 can be adjusted by a member 80, which has a slot 81; and a screw 82 which is tapped into leg 67 of member 64 guides this member 80 against this cam portion of lever 73 limiting its travel. When the proper drag has been applied to the zipper 66 and its tape 78, 79, the member 80 is locked in place thereby holding the proper adjustment for all zippers of same size.

Lower guiding plates 83, 84, which are used to form a hem for the lower cloth or facing, are mounted directly below and in line with upper plates 58, 59, as shown in Figure 4.

Mounted directly in line with and in front of unit 57, as shown in Figures 2 and 7, there are three guide bars 85, 86, 87, which are attached to the sewing machine by screws at the top portion 88. The lower extreme ends are secured to each other and kept spaced apart by cross-member 89. The spaces 90 and 91 between the bars 85, 86 and 87 provide an entrance for assembling the facing clip holders 92, 93. Said holders consist of two parts: 94 which is in the form of a T-section, and part 95 which serves to hold or clamp the spring 96 when bolted together by serrated head pocket screw 97. Said screw serves another purpose which will be described in the operating cycle of said attachments.

Screwed to the longer leg of the T-section 94 are four rollers 98, 99, 100, 101, to each assembly 92 and 93, which enable the clip holders 92 and 93 to be lowered or raised vertically when desired, with the least amount of effort.

The T-section 94 also has a cam shaped portion 102 (see Figure 2) that goes past leaf spring 103, which is secured at top by screws 104 when said holders 92 and 93 move to that high point at end of cycle, thereby restricting same from sliding down on bars 85, 86 and 87.

At one extreme end of spring 96 the facing clip 105 is secured by rivet 106. The facing clip 105 is shown in section in Figure 2a. When the clip is squeezed it remains closed due to the light wire spring 110, which urges the lever 107 forward, thereby causing engagement between notch 111 in lever 107 and hinge portion 109 of clip 105. As noted the lever 107 protrudes through slot 108 in hinge portions 109 of clip 105. The lever 107 pivots at 112 on stationary portion 113 of clip 105, the end portion of facing cloth is held in place by placing same over walls 114 and 115, which may have teeth 116 as shown. When the hinge portion is locked by squeezing 109 and 113 together, the cloth is wedged between walls 114, 117 and 115, as shown in Figure 2a (enlarged detail).

Operation

A sewing machine is equipped with the puller-roller assembly 23, presser foot attachment 30, guide and tensioning device 57, and all elements described to support facing clips 105. The cycle of operation begins as follows:

(1) Two strips of facing material 118 and 119 are fed by hand into guide-forming plates 83 and 84. As materials 118, 119 are fed forward, they are guided and forced to conform to the shape of the forming plates 83 and 84, as shown in Figures 4 and 5, thereby producing hems 120 and 121, until they reach a position over the feeder 20. The facing materials or strips 118 and 119 are elongated, and the free or trailing ends thereof extend forwardly toward an operator's position and hang downwardly in front of the machine and these free ends are engaged with the facing clips 105.

(2) The operator then makes sure that the lever 73 is in its highest position, thereby lifting spring 74 and leaving the path clear for the insertion of a standard zipper fastener 66 into channel or groove 65 of member 64

in assembly 57. The zipper is then fed forward, and the binding 78, 79 is then directly over the two hems 120 and 121 of facing 118 and 119 until it lies over feeder 20, which is directly under presser foot 30.

(3) The upper cloth strips 122 and 123 are fed into forming guide plates 58 and 59. The shapes of these plates are the same as 83 and 84 in that they form identical hems, only turned downward (as shown in Figures 4 and 1a), 124 and 125, which are in direct line over hems 120 and 121 (shown in Figures 4 and 1a). The cloth is fed forward past the zipper fastener 66 and cloth 118 and 119, until it lies over feeder 20.

(4) The operator now pushes down on assemblies 92 and 93 (see Figure 7) thereby releasing them from the retaining springs 103. The weight of these assemblies, which are guided down by guide rods 85, 86 and 87 is now holding the facing cloth 118 and 119 taut.

(5) The power is then turned on by the operator. The upper cloth 122, 123 and lower cloth 118 and 119 are pulled forward by the puller roller 19, which is driven in synchronism with the feeder 20, as previously explained, because they are in line with and behind the feeder 20, which is normally used for this purpose. The feeder 20 however, does feed the zipper fastener 66 in the conventional manner. The rows of stitches 126 and 127 (Figure 1a) attach the zipper fastener between upper and lower cloth.

It is also noted that the apparatus is completely automatic and once the machine is turned on the operator merely watches until the zipper is sewn in place; then he takes his foot off the power, thereby stopping the machine to complete the cycle.

It is also noted that the facing clip automatically releases the opposite end of cloth being held by same. When facing clip 105 passes under member 128, the lever 107 is tripped thereby releasing lower cloth or facings 118 and 119. The springs 103 cam under portion 102 of holders 92, 93 and restrict same from falling.

Another object not previously mentioned is that the puller roller (as noted in Figures 1 and 2) has a reduced diameter 19a, which allows the zipper fastener 66 to pass under without obstruction. The pulling is only accomplished by outer diameter 19c of roller 19.

In Figure 1b is shown another method of attaching zipper fasteners. This is accomplished by using facing strips 130 of equal width. This cloth can be fed from a roll of material that is mounted under the machine, doing away with the clip-holders 92, 93 and guide plates 85, 86 and 87. The modified guide plates are shown in Figures 8, 9 and 10. Cloth 130 coming from roll, not shown, enters these guide plates as indicated by arrows 131, 132. The cloth is turned around corners 133, 134 at a 45° angle and enters openings 136, 137. The forward ends 138, 139 are formed to make hems 120, 121 in the binding 130 in the exact manner as previously described.

What is claimed is:

1. In combination with a machine supported on a surface and having a plurality of spaced apart needles and a presser-foot shaft; a compensating presser-foot attachment secured to said shaft and including two spring-pressed shoes adapted to contact material passing through said machine; said shoes having apertures therein to permit said needles to extend therethrough; means including a cloth guide including hem-forming guides adapted to receive material to be sewed and to form hems thereon said material including a pair of strips of facing material, positioned in front of said needles; and guide means for positioning a slide fastener having fabric webs, whereby the latter will overlie said seams to be secured thereto and to said material by stitching formed by said needles, guide means depending from said surface, facing clips adapted to move on said guide means along a vertical path under the urge of gravity and each carrying gripping means to be engaged with

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the ends of said facing strips, and tripping means adjacent to the path of movement of said clips for releasing said gripping means when the latter encounters said tripping means.

2. The invention according to claim 1 in which said clips have cam means movable therewith, and spring means adjacent to the upper portion of said depending guide means for engaging said cam means and arresting said facing clips in positions to be engaged with said strips of facing material.

3. The combination as claimed in claim 2, wherein said cloth guide includes a center portion; an inverted channel member adjustably mounted on the outer end of said center portion; a spring secured to said channel member and extending inwardly therefrom; and a lever pivoted adjacent said channel for moving said spring and secured thereto to move same out of the path of the slide fastener when same is fed to said cloth guide.

4. In a sewing machine for stitching a plurality of plies of fabric together, said plies including slide fastener webs and strips of facing material, said machine having a plurality of spaced apart needles and a presser foot shaft; a compensating presser foot attachment secured on said shaft and including at least two spring loaded shoes adapted to contact material passing through said machine, said shoes having apertures therein to clear said needles, cloth guide means including hem forming guides adapted to receive said plies and to form hems thereon and to guide said slide fastener webs between said hems, other guide means depending from said surface, facing clips adapted to move on said guide means on a vertical path under the urge of gravity and each carrying gripping means adapted to be engaged by the ends of said facing strips, and tripping means adjacent to the path of movement of said clips for releasing said clips and thereby freeing said strips during a certain portion of a sewing operation.

5. In combination, a sewing machine, a support therefor, said machine having stitching and feeding mechanism, guide means extending downwardly from said support in a plane approaching the vertical, clip means movably carried on said guide means and urged downwardly by the force of gravity, gripping means on said clip means adapted to be engaged with the ends of strips of fabric being stitched on said machine, whereby the force of gravity on said clips exert a degree of tension which makes it unnecessary for an operator to hold said strip during a sewing operation.

6. In combination, a sewing machine, a support therefor, said machine having stitching and feeding mechanism, guide means extending in a direction away from said stitching and feeding mechanism, clip means movably carried on said guide means, means urging said clip means in a direction away from said stitching and feeding mechanism, gripping means on said clip means adapted to be engaged with the end of a strip of fabric to be stitched on said machine, whereby said urging means acting against said clip means causes it

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to exert a degree of tension on said strip which makes it unnecessary for an operator to hold said strip during a sewing operation.

7. In a sewing machine for stitching a plurality of plies of fabric together, said plies including slide fastener carrying webs, said machine having a plurality of spaced apart needles and a presser foot shaft, a presser foot arranged on said shaft and comprising a spring loaded drag shoe, and a pair of shoes, one on each side of said drag shoe adapted to contact material passing through said machine, said pair of shoes having apertures therein clearing said needles, oppositely disposed hem forming guides adapted to receive said plies and to form hems thereon, said guides being arranged in front of said presser foot, a slide fastener channel guide centrally disposed with respect to said hem forming guides and also disposed in front of the presser foot, the lower wall of said channel having a central longitudinal depression therein with guide surfaces on each side thereof for guiding the slide fastener therethrough, latchable spring means projecting downwardly into said channel and having a central member disposed to impose pressure on the elements of said slide fastener and having members on each side of said central member adapted to bear on the slide fastener webs, and means for releasing said latchable spring means.

8. The invention according to claim 7 in which said latchable means comprises: lever means on said fastener channel guide operatively connected to said spring means and adapted when in one position to bring said spring means into engagement with said slide fastener, and adapted when in another position to raise said spring means to a position clearing said lower wall of said channel.

9. The invention according to claim 7 wherein an adjustable cam supported on said channel member co-operates with said lever and is adjustable for varying the tension exerted by said spring means upon material passing through said channel member.

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