Feb. 2, 1954 M. K. ROHRLICK ET AL 2,667,849

APPARATUS FOR FEEDING AND STITCHING SLIDE FASTENER STRINGERS TO GARMENT FLY PIECES

Filed Dec. 18, 1951 2 Sheets-Sheet 1

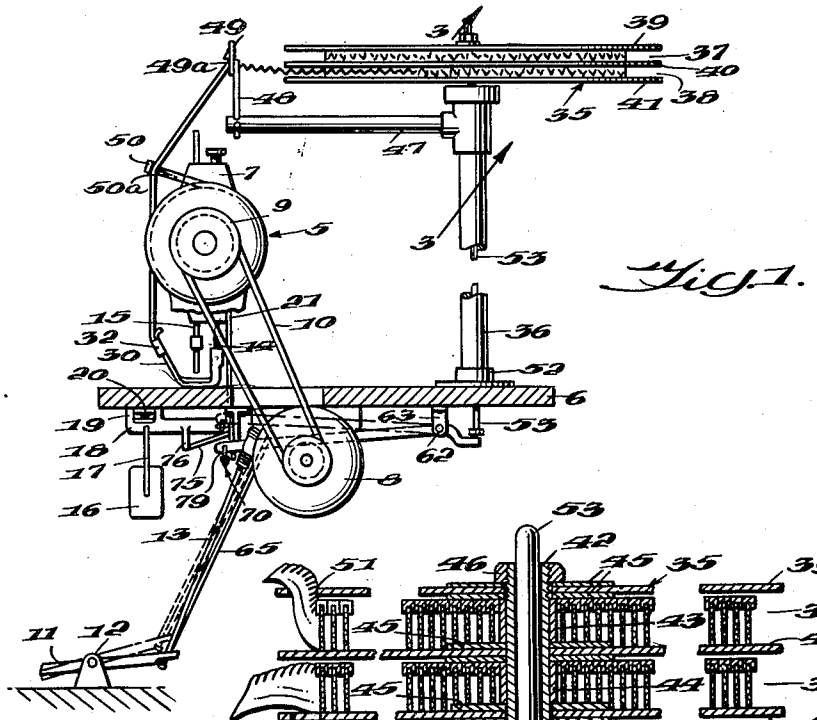


Fig. 1.

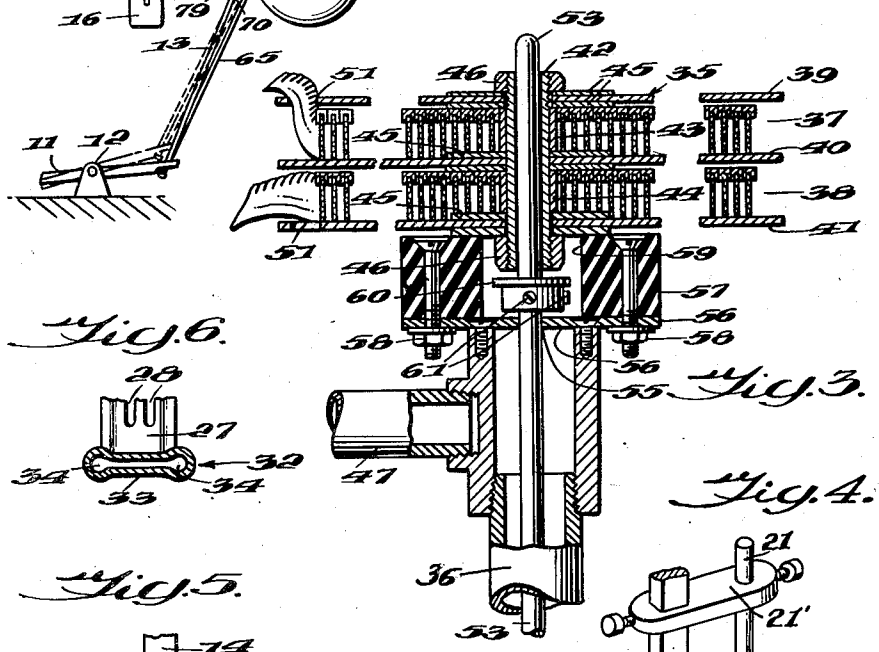


Fig. 3.

Fig. 6.

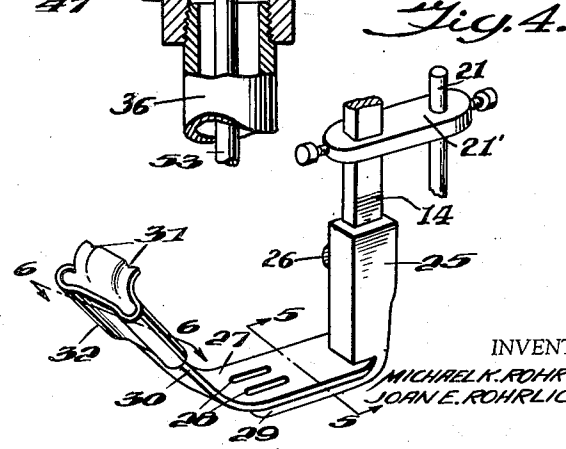


Fig. 4.

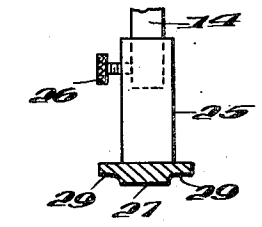


Fig. 5.

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Filed Dec. 18, 1951 2 Sheets-Sheet 2.

Fig. 7.

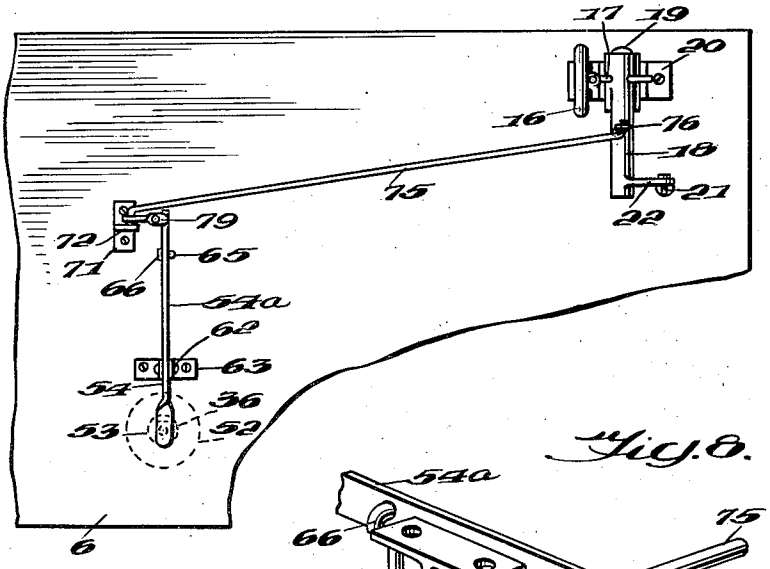


Fig. 8.

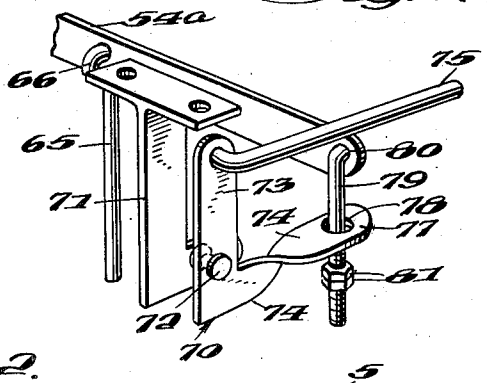
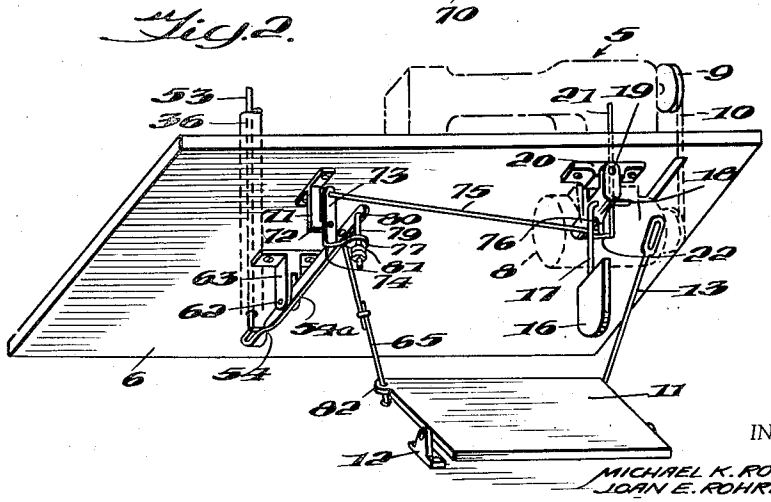


Fig. 2.



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APPARATUS FOR FEEDING AND STITCHING SLIDE FASTENER STRINGERS TO GARMENT FLY PIECES

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9 Claims. (Cl. 112—2)

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This invention relates to improvements in apparatus for automatically feeding and stitching slide fastener stringers to cooperating garment pieces adapted to be secured together by slide fasteners, and particularly garment fly pieces.

In particular the invention relates to improvements in the type of apparatus disclosed in our prior United States Patent No. 2,574,351, issued November 6, 1951, for feeding successive strips of garment fly pieces to a working bed in end-to-end relation and for continuously feeding a slide fastener stringer thereto so that the fly pieces and stringer may be continuously stitched together throughout the length of the stringer.

According to our prior patent, in the first stage a slide fastener stringer, known as a left hand stringer, is automatically fed from a single compartment reel, mounted for rotation on a reel stand, through a left hand stringer guide carried by a left hand presser foot to and beneath said presser foot with the attached coupling links along the left hand side edge of the stringer for uninterrupted stitching of the stringer to successive fly pieces known in the trade as "white" fly pieces. In order to accomplish continuous stitching, a "white" fly piece is fed underneath the presser foot bottom end first and the stringer is stitched along the length of a "white" fly piece from a predetermined point in from the bottom end to the top end of the "white" fly piece. The sewing operation is then suspended and braking action is applied to the reel. The presser foot is raised and the next "white" fly piece is inserted beneath the presser foot bottom end first with that portion from the bottom end up to the predetermined point where stitching commences underlying the adjacent stitched end of the preceding "white" fly piece. The presser foot is then lowered and then release of the reel brake and starting of the stitching operation is effected. In this manner successive "white" fly pieces are sewn to the stringer in end-to-end relation throughout the length of a left hand stringer as it is unwound and fed from a reel to and beneath the presser foot eliminating the waste portions of the stringer normally encountered in the usual conventional practice.

However, before the next operation stage can be effected, a new reel, carrying a right hand stringer for application to "black" fly pieces, must be mounted on the reel stand in place of the aforementioned reel and a right hand presser foot carrying a right hand stringer guide must be substituted for the left hand presser foot and

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stringer guide. The right hand stringer is then fed from the reel through the right hand stringer guide and to and beneath the newly substituted presser foot for stitching to successive lengths of "black" fly pieces. Each "black" fly piece is marked inwardly from the bottom end to indicate the point where stitching of the stringer along its length will be terminated. Each "black" fly piece is fed, upper end first, to and beneath the presser foot and the stringer is automatically fed and stitched thereto along its length to the predetermined point. The stitching is then suspended, the brake applied to the reel, and the presser foot is raised. That portion from the lower end to the point where the stitching terminates is then tucked under the adjacent previously stitched portion and the upper end of the next "black" fly piece is placed adjacent the previously stitched fly piece so as to afford continuous stitching of the stringer without waste in the length of the stringer.

The foregoing arrangement has certain disadvantages which the present invention proposes to overcome. For example, the operator is required to remove and replace certain mechanical parts of the apparatus in order to effect a change-over from the first stage stitching operation between a left hand stringer and successive strips of "white" fly pieces to the second stage stitching operation between a right hand stringer and successive strips of "black" fly pieces.

One object of this invention is to provide a double compartment reel adapted to be mounted for rotation on a reel stand and about which left and right hand stringers, constituting the complementary stringer sections of a slide fastener, are separately wound for selective feeding to and beneath a presser foot to be stitched to the corresponding "white" and "black" fly pieces of a garment.

Another object is to provide a universal stringer guide and presser foot unit which is adapted to guide and feed either a left or right hand stringer to the working bed of the apparatus for continuously stitching the selected stringer to successive fly pieces as the latter are fed beneath the presser foot in end-to-end relation.

Another disadvantage of the apparatus according to our prior patent is that the motor is stopped and the brake is applied to the reel through mechanism controlled solely by a foot treadle so that brake release can only be effected simultaneously with motor starting and conse-

quent stitching operation. The operator, after raising the presser foot, requires a certain amount of slack play in the stringer for adjusting the adjacent portions of the fly pieces to the desired position beneath the presser foot so that uninterrupted stitching of the stringer to successive fly pieces can be effected. The operator must, therefore, draw off the required slack against the braking action applied to the reel. This means an increase in the operations required by the operator, which, being of a fatiguing nature, decrease the efficiency of the operator. Furthermore, the time consumed to draw off the required stringer slack is a lost motion which increases the operating time and costs of the apparatus.

It is, therefore, a further object of this invention to provide a novel brake release attachment which is controlled through the medium of the presser foot actuating mechanism for releasing the reel brake in co-ordination with the raising of the presser foot while the motor switch remains in the off position. With this arrangement the stringer is automatically slackened to permit the desired adjustment of the fly pieces beneath the presser foot without requiring any additional motions on the part of the operator.

The above and other objects and advantages of this invention will be understood more readily from the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is an end view of an apparatus embodying the invention;

Fig. 2 is a perspective view looking at the under side of the working bed of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged sectional view, partly broken, of a portion of the apparatus indicated between lines 3—3 of Fig. 1;

Fig. 4 is an enlarged detail view of the presser foot and attached portions;

Fig. 5 is a detail taken along the lines 5—5 of Fig. 4;

Fig. 6 is a further detail along the lines 6—6 of Fig. 4;

Fig. 7 is a bottom plan view, partly broken, of the working bed and showing details of the reel brake and the presser foot actuating mechanism; and

Fig. 8 is an enlarged detail of a portion of the brake actuating mechanism shown in Figs. 2 and 7.

Referring more particularly to the drawings, 5 generally designates a conventional sewing machine which includes a working bed 6, a sewing head 7 mounted over said working bed, a motor 8 mounted beneath the working bed and connected to a machine driven pulley 9 by belt 10, and a treadle 11 supported for rocking about a horizontal axis, as indicated at 12, said treadle being connected to one end of a switch actuating bar 13 which operates a conventional switch (not shown) of motor 8. The machine is provided with the standard mechanical driving apparatus and stitch forming mechanism, including a presser foot bar 14 and needle bar 15. The machine may be of the conventional single or double needle machine type, preference being given to the latter in order that a double row of stitching may be provided to adequately secure a stringer of a slide fastener to a garment fly piece.

The presser foot bar 14 has conventional mechanism (not shown) for lowering and raising a presser foot to operative and inoperative positions. This mechanism is operated by a knee pressure actuating device comprising a knee pressure pad 16 at the lower end of an arm 17 which is connected at its upper end to an actuating bar 18 for rotation of said bar about a horizontal axis, indicated at 19, and extending through a bracket 20 secured to the underside of working bed 6. A connecting rod 21 extends upwardly through working bed 6 and is connected at its upper end in any suitable manner to the conventional presser foot lowering and raising mechanism. For example, rod 21 may be rigidly connected by bar 21' to presser foot bar 14. The lower end of rod 21 is connected by link 22 to actuating bar 18 so that rotation of the actuating bar in a counter-clockwise direction will lift rod 21, thereby actuating the aforesaid presser foot mechanism through rod 21 to raise the presser foot. The knee pressure actuating device and its linkage to the presser foot mechanism is well known in the art. Therefore, the above description is intended to deal only with the motion of the actuating device and the resultant effect on the presser foot mechanism for the purpose of co-relating motion of certain other mechanical elements of this invention in a manner hereinafter more fully described.

As shown in Figs. 4, 5 and 6, the presser foot employed in this invention comprises a block 25 having an opening to receive the presser foot bar 14, which is then secured by thumb screw 26, and a presser foot plate 27 extending forwardly of block 25. Plate 27 is provided with central needle openings 28 and is grooved along the under surface on opposite sides, as indicated at 29, to accommodate the attached coupling links of a slide fastener stringer as the stringer passes beneath the presser foot. The double grooving of the presser foot plate permits feeding of the stringers with the links either on the left or right hand side of the stringer as desired. In the use of a single needle machine, the plate 27 will be provided with a single central needle opening but will be otherwise constructed the same as above described.

The forward end of plate 27 is provided with an upwardly curved stringer guide plate 30 for feeding the stringer directly beneath the presser foot plate. Guide plate 30 is grooved, as indicated at 31, along its under surface on both sides and is provided with a tubular section 32 intermediate its length. Tubular section 32 is substantially flattened, as indicated at 33, throughout a substantial portion of its width for passage of the stringer therethrough and is outwardly expanded along the opposite sides to provide enlarged openings 34 for accommodation of the attached coupling links along either the left or right hand side of the stringer when said stringer is fed through the tubular section to the required position beneath the presser foot.

A slide fastener stringer is fed to the presser foot stringer guide 30 from a reel 35 mounted for rotation about a vertical axis on a hollow reel stand 36. Reel 35 is divided into upper and lower stringer compartments 37 and 38 defined by upper, intermediate and lower reel discs 39, 40 and 41 centrally arranged about a sleeve 42 and spaced apart by hub forming collars 43 and 44. The discs are stiffened adjacent their sleeve openings by washers 45 flatly engaging opposing surfaces of said discs. Nuts 46 screw-threaded on the ends of sleeve 42 serve to clamp the discs, washers and hubs together for rotation with the sleeve about its axis. The purpose of the double

reel is to separately accommodate the left and right hand stringers of a slide fastener to be separately stitched to garment fly pieces known in the trade as the "white fly" and the "black fly" pieces, respectively. The reel stand 36 is provided with an arm 47 which is directed toward the machine head 7. The arm supports a post 48 having upper and lower stringer guide loops 49 and 49a positioned opposite compartments 37 and 38 respectively.

An operator will select a stringer from one of the compartments 37 and 38 passing the end through one of the two guide loops 49 and 49a and then through a tension device 50 on a bracket 50a carried by the machine head 7. The stringer is then threaded through tubular section 32 of presser foot stringer guide 30 and thence beneath the presser foot plate 27. If the left hand stringer is selected it will have its coupling links disposed in the left hand groove 31 and enlarged opening 34 of the stringer guide 30 and beneath the left hand groove 29 of the presser foot plate for stitching to a "white fly" piece. If the right hand stringer is selected the arrangement will be reversed for stitching to a "black fly" piece. The remaining stringer will have its free end passed through a slot 51 in disc 39 or 41 to prevent unreeling of the remaining stringer while the selected stringer is being fed from the reel.

The hollow reel stand 36 is mounted on the upper surface of working bed 6, as indicated at 52 and has a spindle 53 arranged for vertical sliding movement therein. The lower end of spindle 53 extends through an opening in working bed 6 and is supported on one end of a lever arm 54 which is suspended beneath the working bed for pivotal movement about a horizontal axis. The upper end of spindle 53 extends through an opening 55 in a plate 56 secured to the upper end of reel stand 36. The plate 56 serves to centre the spindle on the hollow reel stand 36. A brake disc 57 is bolted or otherwise secured to the upper surface of plate 56, as indicated at 58, said brake disc being provided with a central opening 59 within which a collar 60 on spindle 53 is arranged for vertical movement with the spindle. Collar 60 is provided with set screws 61 for vertical adjustment of the collar on the spindle. The sleeve 42 of reel 35 is slidably fitted on the free upper end of spindle 53 for rotation of the reel about the spindle. The reel normally frictionally engaging brake disc 57 is removable from friction contact therewith by lifting action of collar 60 against the bottom of sleeve 42 when spindle 53 is raised through the medium of lever arm 54.

The lever arm 54 is suspended intermediate its length to rotate about a horizontal axis 62 of a bracket 63 secured to the under side of working bed 6. The extension 54a of arm 54 on the side of axis 62 remote from the spindle is connected to treadle 11 by a link 65, said link being connected to said arm extension 54a at 66 intermediate the axis 62 and the free end of said lever arm extension.

When the offside of treadle 11 is depressed, the switch actuating bar 13 is pulled downwardly to thereby actuate the motor switch for starting the motor 8. At the same time lever arm 54, through link 65, is rotated about its axis 62 to lift the spindle 53. This releases the reel 35 from frictional contact with brake disc 57 through the medium of collar 60 to permit free rotation of the reel for feeding the stringer to and beneath the presser foot during stitching operation of the stringer to a fly piece. When the offside of treadle 11 is raised, as shown in dotted line in Fig. 1, switch actuating bar 13 shuts off the motor 8. At the same time, tension of the treadle having been released by the raising of the rear of the treadle, the lever arm 54 will be rotated by the weight of the spindle and the reel thereon to permit lowering of the reel into frictional engagement with the brake disc to prevent further unreeling of the stringer.

The operator shuts off the motor in the manner above described when stitching of the stringer to the fly piece has reached a predetermined point along the length of the fly piece. The operator then raises the presser foot by applying knee pressure against the aforementioned knee pressure actuating device in order to insert a new fly piece beneath the pressure foot for continuous stitching along the length of the stringer from one fly piece to another. A slight amount of play must be given to the stringer for manipulation of the adjacent ends of the fly pieces into position beneath the presser foot. To provide this play the operator must draw off sufficient slack from the reel. Repeated operations of this nature are fatiguing to the operator when the brake is applied to the reel.

This is overcome by providing a separate mechanism co-operable with the knee pressure actuating device for releasing frictional contact between brake disc 57 and reel 35 simultaneously with the raising of the pressure foot. The mechanism comprises a crank lever 70, pivotally connected to a bracket 71 secured to the underside of working bed 6. Lever 70 is pivoted to bracket 71 for rotation about a horizontal axis indicated at 72 and has one arm 73 normally projecting upwardly and the other arm 74 projecting at right angles thereto. Arm 73 is pivotally connected adjacent its free end to one end of a link 75 having its other end connected to an arm 76 extending downwardly from the presser foot actuating bar 18. The other arm 74 is shaped to provide a horizontally disposed flat surface, indicated at 77, provided with an opening 78 therethrough to receive a depending rod 79 which is pivotally connected at 80 to the free end of the brake actuating arm extension 54a. The lower end of rod 79 is threaded to receive adjusting nuts 81 which are suitably adjusted on the rod and below the arm 74. Rotation of the knee pressure actuating device in a counter-clockwise direction provides rotation of crank lever 70 through link 75. This action causes crank arm 74 to exert a downward pressure against nuts 81 on depending rod 79 to thereby rotate spindle lever arm 54 about its horizontal axis 62 for lifting spindle 54 to free the reel 35 from frictional engagement with the brake disc 57 simultaneously with the raising of the presser foot. As the treadle 11 is still in the "stop" position, that is, with the offside of the treadle raised, the link 65 between lever arm 54 and treadle 11 will slide relative to the treadle through a suitable opening 82 provided therefor.

With this brake releasing mechanism, the operator can readily draw off the slack stringer from the reel which is required in order to manipulate the adjacent ends of the fly pieces beneath the presser foot as previously set forth. It will be appreciated that this brake releasing mechanism requires no additional manipulation by the operator but is linked for simultaneous co-ordination with the conventional presser foot

actuating device the control of which the operator is already completely familiar with.

Having now described what is deemed to be the preferred embodiment of this invention it will be understood that changes and modifications may be resorted to within the scope and spirit of our invention as defined by the appended claims.

We claim:

1. In combination with a sewing machine having a working bed and mechanism operable for stitching and feeding work together along the working bed, a reel supporting spindle mounted for vertical movement, a multi-compartment reel rotatably mounted on said spindle, each of said compartments containing a slide fastener stringer arranged for selective feeding of one of said stringers to the working bed, said mechanism including a presser foot, means carried by said presser foot for selectively guiding a stringer from said reel to and beneath the presser foot with the attached coupling links arranged either along the left or right hand side of the stringer, means to brake said reel, means to raise and lower said presser foot, and means operatively connected to said last means and to said braking means to render said braking means inoperative when said presser foot is raised.

2. A machine as set forth in claim 1, in which said stringer guide means comprises a plate member secured to the forward end of the presser foot to project upwardly and outwardly therefrom, said plate being provided with a lengthwise groove in the under surface on both sides and being provided with a tubular section intermediate its length, said tubular section being substantially flattened throughout a substantial portion of its width for passage of the tape portion of a stringer therethrough, and being outwardly expanded throughout its length along opposite sides to provide enlarged openings for accommodation of said coupling links whether on the left or right hand side of the stringer.

3. A machine as set forth in claim 2 in which said enlarged openings of the tubular section are aligned with the grooves along the under side of the guide plate.

4. A machine as set forth in claim 1, in which said stringer guide means comprises a plate member projecting upwardly from the forward end of the presser foot, said plate member being provided with a tubular section through which a stringer is guided downwardly toward and beneath the presser foot, said tubular section being substantially flattened throughout a substantial portion of its width for passage of the tape portion of a stringer therethrough, and being outwardly expanded throughout its length along opposite sides to provide enlarged openings for accommodation of said coupling links whether on the left or right hand side of the stringer.

5. A machine as set forth in claim 4, in which said presser foot is provided with a groove along the under surface at each side which is positioned with respect to the enlarged opening on the same side in the tubular section so that the attached coupling links of a stringer will lie within the groove of the presser foot when said stringer is fed for stitching beneath said presser foot.

6. In combination with a sewing machine having a working bed and mechanism operable for stitching and feeding work together along the working bed, a reel supporting spindle mounted for vertical movement, a reel rotatably mounted on said spindle and movable vertically therewith, said reel carrying a slide fastener stringer for feeding to said working bed and beneath a presser foot, a presser foot mounted over said working bed, means operable for raising and lowering said presser foot, a brake mounted for frictionally engaging said reel, means operable for moving said spindle vertically to thereby move said reel into and out of frictional engagement with said brake, and means operatively connecting said presser foot operating means to said spindle operating means to lift said spindle so as to move said reel out of frictional engagement with said brake during movement of said presser foot to its raised position by said presser foot operating means.

7. A stringer guiding presser foot having a plate member secured to the forward end of the presser foot to project upwardly and outwardly therefrom, said plate being provided with a lengthwise groove in the under surface on both sides and being provided with a tubular section intermediate its length, said tubular section being substantially flattened throughout a substantial portion of its width for passage of the tape portion of a stringer therethrough, and being outwardly expanded throughout its length along opposite sides to provide enlarged openings for accommodation of said coupling links whether on the left or right hand side of the stringer.

8. A machine as set forth in claim 7 in which said enlarged openings of the tubular section are aligned with the grooves along the under side of the guide plate.

9. In combination, a sewing machine having a presser foot, means to raise and lower the presser foot, a reel, means rotatably mounting the reel on the machine, means to brake the reel, and means operatively connected to said raising and lowering means and to said braking means to render said braking means inoperative when the presser foot is raised.

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