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PRESSER FOOT MECHANISM

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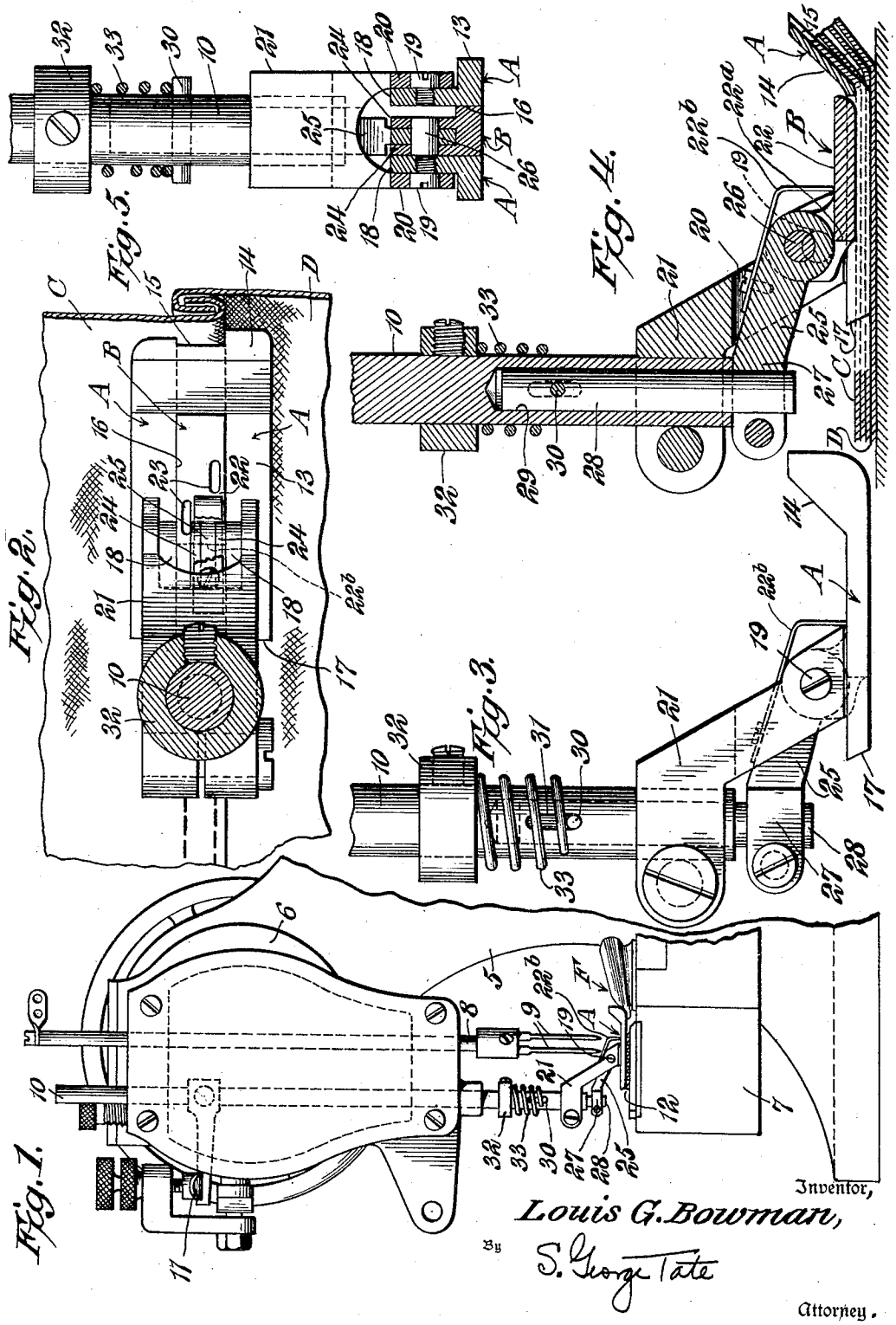


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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PRESSER FOOT MECHANISM

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This invention relates to new and useful improvements in presser foot mechanisms for high speed sewing machines generally, although my invention is particularly adapted for double lap seaming operations wherein the folded edge portions are joined by two lines of straight-away stitches.

One of the principal objects of my invention is to provide a presser foot which will "chain off" properly between garments without sacrificing the pressure necessary to feed the garment through the machine at high speed.

With this and other objects in view which will more fully appear, the nature of the invention will be more clearly understood by following the description, the appended claims, and the several views illustrated in the accompanying drawing.

In the accompanying drawing:—

Figure 1 is a fragmentary side elevation of a feed-off-the-arm type of sewing machine showing the application of my invention,

Figure 2 is a horizontal sectional view of the presser foot showing its relation to the double lap seam of the garment,

Figure 3 is a side elevation of the foot,

Figure 4 is a vertical longitudinal sectional view of the foot showing the auxiliary foot section raised, and

Figure 5 is a vertical sectional view taken through the pivots of the foot sections.

Like reference numerals designate corresponding parts throughout the several figures of the drawing.

Referring to the drawing, I have shown my invention applied to a feed-off-the-arm type of machine which includes a standard 5, an overhanging arm 6, and a work arm 7 which has its free end disposed under the overhanging arm. Supported in the overhanging arm is a vertically reciprocatory needle bar 8 carrying needles 9, 9 which cooperate with a complemental stitch forming mechanism (not shown) located in the work arm for making two lines of straight-away stitches. Also mounted in the overhanging arm is a presser bar 10 which is pressed downwardly by a spring 11.

Mounted on the lower end of the bar is a main presser foot A and an auxiliary presser foot B which cooperate with a feed dog 12 to feed the body fabrics C and D past the stitch forming mechanism.

The auxiliary foot B is pivoted and is bodily movable vertically independently of the main foot A for accommodating a double lap seam formed in the body fabrics, and for engaging the chains between articles in a manner to insure the chains being properly formed and fed rearwardly, especially when the machine is being operated at high speed.

The main presser foot A comprises a flat body portion 13 which terminates at its front end in an upwardly extending toe 14 having a downwardly extending groove 15 in its front face. The body portion 13 is provided with a centrally located opening 16 which extends forwardly from the rear edge 17 of the body portion and merges with the groove 15 at the base of the toe 14, the width of the opening corresponding to the width of the groove 15 and being located in alinement therewith. Rigid with the rear part of the body portion are spaced upstanding ears 18, 18 which are pivotally connected by pivot screws 19, 19 to the arms 20, 20 which are rigidly connected to a clamp 21 fixedly secured to the lower end of the main presser bar 10.

The auxiliary presser foot B is disposed within the opening 16 and corresponds in area thereto. This auxiliary presser foot B includes a body portion 22 which is provided with needle openings 23, 23. Rigidly connected to the rear part of the body portion 22 is a pair of upstanding ears 24, 24 to which the forward end of an arm 25 is pivotally connected by a pivot pin 26. The rear end of the arm 25 is formed into a clamp 27 which is fixedly secured to the lower end portion of an auxiliary presser bar 28 which is mounted within a bore 29 formed in the lower end of the presser bar 10 and is capable of longitudinal movements relative thereto. The longitudinal movements of the auxiliary presser bar 28 relative to the main presser bar 10 are limited by a cross pin 30 which projects out-

wardly through longitudinal openings 31, 31 formed in the main presser bar 10 and communicating with the bore 29 thereof. Secured to the main presser bar 10 above the bore 29 is a collar 32 and disposed around the main presser bar 10 between the collar and the cross pin 30 is a coil spring 33 which yieldably urges the auxiliary presser bar 28 downwardly together with the auxiliary foot B. It will be noted that the arm 25 projects forwardly between the arms 20, 20 to which the main presser foot A is pivotally connected.

This machine is especially adapted for double lap seaming operations and the adjacent edges of the body fabrics C and D are turned into the folder F whereby four thicknesses of material are fed into the groove 15 of the main presser foot A and thence rearwardly under the auxiliary presser foot B where they are united by two lines of straight-away stitches. When the body fabrics are in said position under the presser feet A and B, the main foot A bears on the respective body fabrics on opposite sides of the same and the auxiliary foot B is raised against the tension of the spring 33 by the three thicknesses of fabric. The spring 33 is weaker than the spring 11 and consequently the main foot A is yieldably held against upward movement while permitting the auxiliary foot B to be raised. When the lap seam is disposed under the auxiliary foot B, the latter is raised until the clamp 27 engages the lower end of the main presser bar 10 and in this position of the parts equal pressure is exerted on both presser feet. As the garments are fed rearwardly from the presser feet the auxiliary presser foot B will be lowered by the spring 33 onto the chain of stitches being formed and by reason of the spring 33 being lighter than the spring 11, these stitches will be properly formed. When the next garment is inserted under the toe 14 of the main foot A, the lap seam will raise the front end of the auxilary foot B and thereby cause the heel of said auxiliary foot to maintain its engagement with the connected chain and continue to cooperate therewith to properly form the chain until said garment reaches the needles.

The rear end 22*a* of the auxiliary foot B terminates under the pivot 26 of the foot immediately in rear of the right hand needle hole 23, and in advance of the rear end 17 of the main foot A. This insures the heel of the auxiliary foot to quickly step down onto the chain or chains, and in order to force the front end of this auxiliary foot to quickly step down and thereby engage and hold the chain or chains on the throat plate to prevent the loopers from entering the thread loops for the second time, I have attached a spring 22*b* to the arm 25 in a manner to cause the front end of the spring to bear downwardly against the auxiliary foot at a point in advance of the pivot thereof.

It is a well known fact to those skilled in the art of high speed sewing machines that the pressure of the main presser foot must be increased in proportion to the speed of the machine in order for the usual 4-motion feed dog to properly cooperate with the foot and feed the fabric at uniform stitch length distances. It is also a well known fact that when chaining off between garments, especially with a high speed double lock stitch machine, too much pressure on the presser foot will result in a failure to chain off due to the fact that the feed dog teeth which clamp the chain against the foot during every cycle of operation tend to cut the threads and thereby prevent the chain from being formed because the chain will not be fed a stitch length distance and thereby open the looper thread triangle for the reception of the needle thread loop. My invention is particularly adapted for double lap seaming operations and for chaining off between garments. The auxiliary pressure foot section is bodily movable vertically independently of the main presser foot section and is normally held against upward movement by the spring 33 which is lighter than the main presser foot spring 11. By reason of the auxiliary foot section being movable vertically independently of the main foot section, the double lap fell of the seam may be readily accommodated by the presser foot regardless of the thickness of the material being seamed. The auxiliary presser foot section is pivotally mounted on the auxiliary presser foot bar and the rear end of said auxiliary section is located directly below the pivot of said section and in front of the rear end of the main foot section. Consequently when the last end of a seam passes rearwardly beyond the auxiliary section, the rear end of said section will engage the chain prior to the garment leaving the main section, and when a new garment is inserted under the front end of the presser foot, the auxiliary section will swing about its pivot and the rear end of said auxiliary section will engage the chain and remain in engagement therewith until the garment substantially reaches said chain.

Thus it will be seen that I have provided a presser foot mechanism which will function to "chain off" between garments without sacrificing the pressure necessary to feed the garments through the machine at high speed.

It is of course to be understood that the details of structure and arrangements of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim:—

1. In a presser foot mechanism for sewing machines, the combination with a main presser bar, of a presser foot including a main section provided with an opening and an auxiliary section located in the opening, the

lower end of the main presser bar being provided with an upwardly extending bore and with diametrically opposite openings communicating with the bore, a forwardly extending arm clamped to the bar, a pivotal connection between the arm and the main foot section, an auxiliary presser bar slidably mounted in the bore of the main presser bar and having its lower end projecting therebelow, a forwardly extending arm clamped to the projecting end of the auxiliary presser bar below the main presser bar, a pivotal connection between the last mentioned arm and the auxiliary foot section, the pivotal connections between the arms and the foot sections being normally in axial alinement, a collar fixed to the main presser bar, a pin fixed to the auxiliary presser bar and projecting outwardly through the openings in the main bar, and a spring weaker than the main presser bar spring surrounding the main bar between the collar and the pins.

2. In a presser foot mechanism for sewing machines, the combination with a main presser bar, of a presser foot including a main section provided with an opening and an auxiliary section located in the opening, the lower end of the main presser bar being provided with an upwardly extending bore and with diametrically opposite openings communicating with the bore, a forwarding extending arm clamped to the bar and having forked arms at its front end, pivotal connections between the forked arms and the main foot section, an auxiliary presser bar slidably mounted in the bore of the main presser bar and having its lower end projecting therebelow, a forwardly extending arm clamped to the projecting end of the auxiliary presser bar below the main presser bar, a pivotal connection between the last mentioned arm and the auxiliary foot section, the pivotal connections between the arms and the foot sections being normally in axial alinement, a collar fixed to the main presser bar, a pin fixed to the auxiliary presser bar and projecting outwardly through the openings in the main bar, and a spring weaker than the main presser bar spring surrounding the main bar between the collar and the pins.

3. In a presser foot mechanism for sewing machines, the combination with a spring presser bar, of a presser foot including a main section connected to said bar and having an opening centrally formed therein, an auxiliary foot section located in said opening, said auxiliary foot section being formed with needle openings, and a connection between the presser bar and the auxiliary foot section including an arm slidably mounted on the presser bar and connected to the auxiliary foot section whereby the latter may move bodily upward and independently of the main foot section, and a spring for urging said auxiliary foot section downwardly.

4. In a presser foot mechanism for sewing machines, the combination with a spring pressed presser bar, of a presser foot including a main section connected to said bar and having an opening centrally formed therein, an auxiliary foot section located in said opening, said auxiliary foot section being formed with needle openings, and a connection between the presser bar and the auxiliary foot section including an arm slidably mounted on the presser bar and connected to the auxiliary foot section whereby the latter may move bodily upward and independently of the main foot section, a spring for urging said auxiliary foot section downwardly, a stop on the presser bar for limiting the upward bodily movement of the auxiliary foot section, and a spring interposed between the presser bar and the auxiliary foot section for yieldably retaining the latter against upward bodily movement.

5. In a presser foot mechanism for sewing machines, the combination with a spring pressed presser bar, of a presser foot including a main section connected to said bar and having an opening centrally formed therein, an auxiliary foot section located in said opening, said auxiliary foot section being formed with needle openings, and a connection between the presser bar and the auxiliary foot section including an arm slidably mounted on the presser bar and connected to the auxiliary foot section whereby the latter may move bodily upward and independently of the main foot section, and a spring for urging said auxiliary foot section downwardly, the arm and the auxiliary foot section being connected by a pivot located in front of the rear end of the main section and directly above the rear end of the auxiliary section.

6. In a presser foot mechanism for sewing machines, the combination with a spring pressed presser bar, of a presser foot including a main section connected to said bar and having an opening centrally formed therein, an auxiliary foot section located in said opening, said auxiliary foot section being formed with needle openings, and a connection between the presser bar and the auxiliary foot section including an arm slidably mounted on the presser bar and connected to the auxiliary foot section whereby the latter may move bodily upward and independently of the main foot section, a spring for urging said auxiliary foot section downwardly, the arm and the auxiliary foot section being connected by a pivot located in front of the rear end of the main section and directly above the rear end of the auxiliary section, a stop on the presser bar for limiting the upward bodily movement of the auxiliary foot section, and a spring interposed between the presser bar and the auxiliary foot section for yieldably retaining the latter against upward bodily movement.

7. In a presser foot mechanism for sewing machines, the combination with a main presser bar, of a spring for urging the main presser bar downwardly, a presser foot including a main section provided with an opening and an auxiliary section located in the opening, the lower end of the main presser bar being provided with an upwardly extending bore, a forwardly extending arm clamped to the bar and connected to the main foot section, an auxiliary presser bar slidably mounted in the bore of the main presser bar and having its lower end projecting therebelow, a forwardly extending arm clamped to the projecting end of the auxiliary presser bar below the main presser bar, a connection between the last mentioned arm and the auxiliary foot section, and a spring interposed between the presser bars for yieldably retaining the auxiliary foot section against upward bodily movement.

8. In a presser foot mechanism for sewing machines, the combination with a main presser bar, of a spring urging the main presser bar downwardly, a presser foot including a main section provided with an opening and an auxiliary section located in the opening, the lower end of the main presser bar being provided with an upwardly extending bore, a forwardly extending arm clamped to the bar and connected to the main foot section, an auxiliary presser bar slidably mounted in the bore of the main presser bar and having its lower end projecting therebelow, a forwardly extending arm clamped to the projecting end of the auxiliary presser bar below the main presser bar, a pivotal connection between the last mentioned arm and the auxiliary foot section, the pivot being located in front of the rear end of the main foot section and directly above the rear end of the auxiliary foot section, a spring bearing downwardly against the auxiliary foot section at a point in front of the pivot thereof, and a spring interposed between the presser bars for yieldably retaining the auxiliary foot section against upward bodily movement.

In testimony whereof I affix my signature.

LOUIS G. BOWMAN.