March 9, 1954 F. P. TAMBURRO ET AL 2,671,422

PRESSER FOOT ORGANIZATION

Filed Jan. 17, 1952 3 Sheets-Sheet 1

Fig. 2

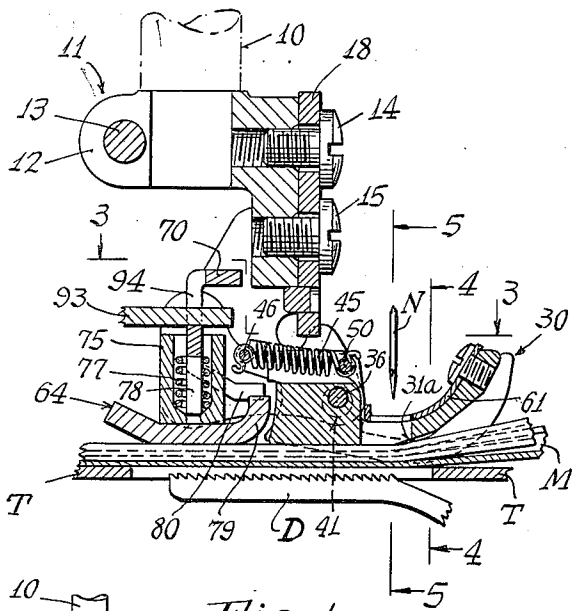


Fig. 5

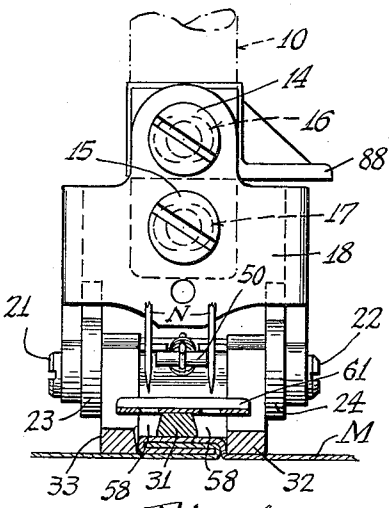


Fig. 1

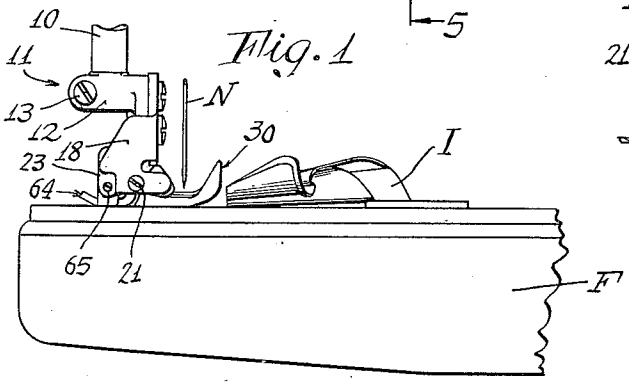


Fig. 4

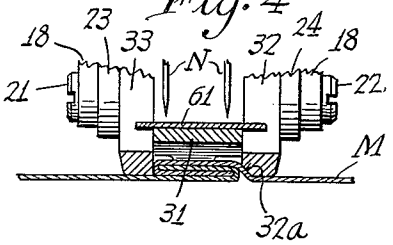
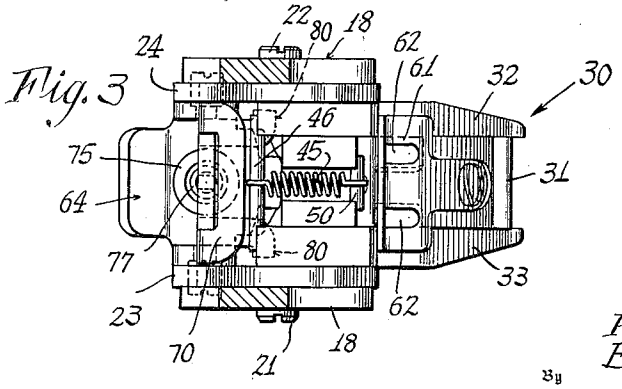


Fig. 3



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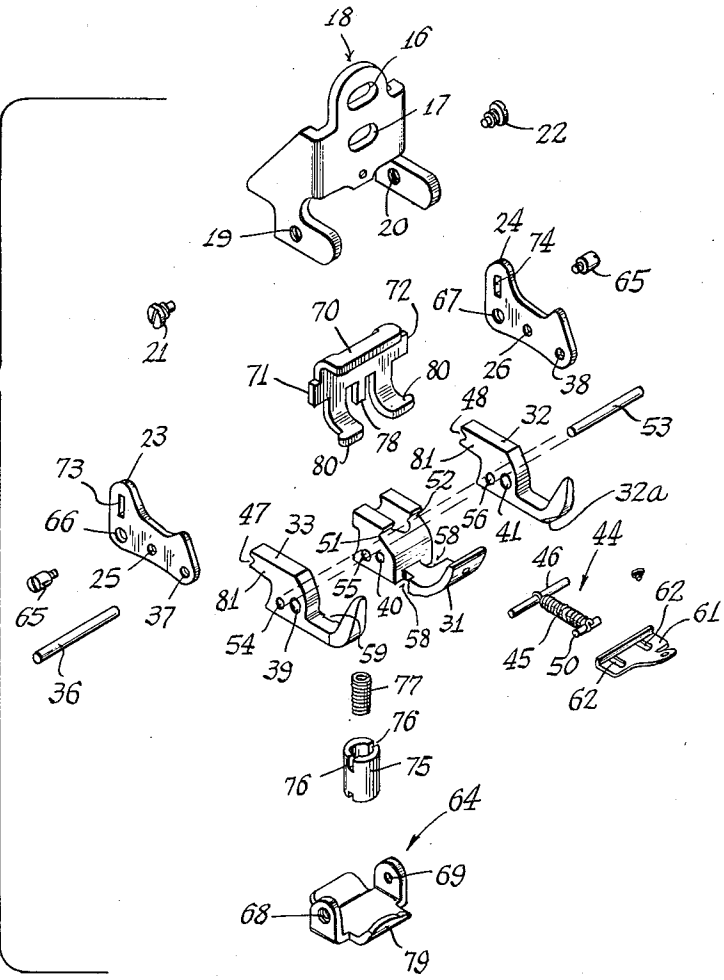
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March 9, 1954 F. P. TAMBURRO ET AL 2,671,422

PRESSER FOOT ORGANIZATION

Filed Jan. 17, 1952 3 Sheets-Sheet 2

Fig. 6



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March 9, 1954 F. P. TAMBURRO ET AL 2,671,422

PRESSER FOOT ORGANIZATION

Filed Jan. 17, 1952 3 Sheets-Sheet 3

Fig. 7

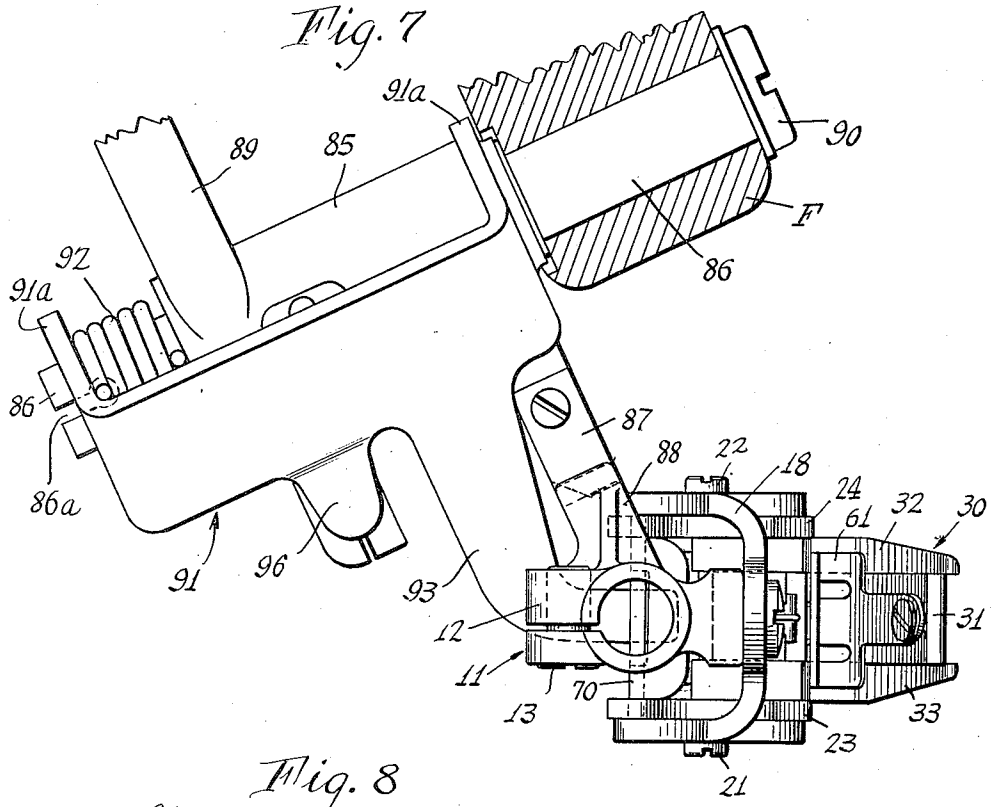
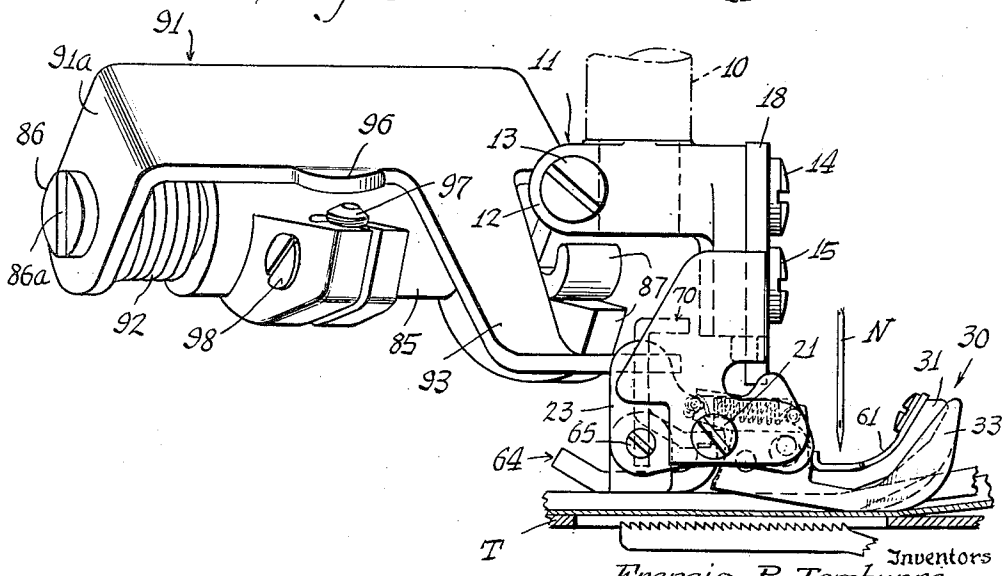


Fig. 8



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Patented Mar. 9, 1954 2,671,422

UNITED STATES PATENT OFFICE

2,671,422

PRESSER FOOT ORGANIZATION

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Application January 17, 1952, Serial No. 266,873

20 Claims. (Cl. 112—235)

1

This invention relates to a novel presser foot organization for sewing machines and more specifically to a presser foot having particular utility for pressing and holding together the plied edges of fabric sections during the formation of a flat felled seam or the like.

Heretofore, in making felled seams, it was necessary to have a plurality of presser feet, each having a seam receiving groove or channel of a different depth in order to have a proper sewing of the seam for materials of different thicknesses or for different combinations of materials. This constant selection of the proper presser foot and the changing of the same produced considerable annoyance. Further if the feet were not changed for each change of material, improper sewing would occur because if the groove was not deep enough to receive the seam then the presser foot would ride on the top of the seam and the sides of the feet would not engage the fabric being sewn to apply any pressure thereto for feeding. On the other hand, if the groove was too deep the feet at the sides of the channel would engage the fabrics with undue pressure and cause tearing of the material.

Furthermore, even if a foot having a proper groove was used and the foot encountered a cross seam the groove would be such that the presser foot would be unable to accommodate the additional thickness set up by the cross seam and hence would tend to apply undue pressure to the top of the seam and cause distortion of the material.

Another disadvantage of the prior presser feet was that the throat at the forward end of the presser foot would engage the top fold of the seam a substantial distance in advance of the needle line and this would cause a distortion of the top ply of the seam.

Also, in the presser foot assemblies of the prior art wherein pressure is applied to the rear foot from the lifter mechanism, the pressure applying means has been rigidly connected with the lifting member so that back pressures were transmitted to the lifter member to cause bouncing action therein during operation of the machine.

It is an object of the present invention to provide a presser foot having a seam groove capable of automatically adjusting itself to various differences in fabric thicknesses.

It is a further object of the present invention to provide a presser foot capable of automatically adjusting itself to temporary and uneven changes caused by riding over cross-seams and the like and of automatically readjusting itself after crossing seams to quickly regain close control over the seam.

It is a still further object of the present invention to provide a presser foot capable of

2

holding a flat felled seam to prevent slipping or unfolding of the plies thereof and insure uniform feeding pressure thereon during the seaming operation and having a novel throat arrangement whereby the seam can be carried in to the needle line without drag applied to the top ply to distort the same.

A feature of the present invention is the provision on the foot of an accurate guide means for the seam and of a marginal adjustment for the presser foot whereby the stitching may be selectively positioned laterally of the seam to provide marginal widths as desired.

Another feature of the present invention is the provision of a presser foot having means for controlling the release of the stitched felled seam and holding the chain thereafter formed to prevent unraveling of the seam.

Still another feature of the present invention is the provision of means at the front of the presser foot to facilitate the folding of the fabric around the side of the seam and the movement of the foot in a curving path during the sewing operation.

A further object of the present invention is the provision as a part of the presser foot organization of lifter assembly for applying pressure to the rear shoe of the presser foot, and for raising the presser foot, and for properly positioning the raised presser foot.

In accomplishing the above objects, according to the preferred embodiment of the invention, a presser foot is provided comprising a front shoe and a rear shoe pivotally mounted on the lower end of a spring-urged presser bar carried in the sewing machine head.

The front shoe comprises a main member or center shoe and two side members or side shoes adjacent thereto. These side shoes are each independently relatively movable with respect to the center shoe and normally urged to a position alongside of and lower than the center shoe. In this way a seam groove is formed by the lower surface of the center shoe and the inner walls of the side shoes and, when a seam of a particular thickness is fed into this groove, the center shoe and the side shoes will automatically move relatively to one another until the depth of the groove is proper to receive the multiple plies of the seam.

The side shoes are urged to their normal position beside the center shoe and into engagement with the fabric on either side of the seam by means of a novel spring arrangement which may be easily assembled and which applies uniform pressure to each of the shoes.

Since the side shoes are normally urged with their bottom faces in engagement with the material on either side of the seam and have a side face which engages the edge of the seam they

may be used as guide means for guiding the work through the presser foot. Furthermore, since the center shoe applies a pressure to the seam and the side shoes apply a pressure to the material at either side of the seam, uniform feeding action of the material through the machine is produced by their cooperation with the usual feed dogs under the presser foot.

Whenever the presser foot rides over a cross-seam or the like in the fabric sections, the side shoes will resiliently and individually yield correspondingly whereby the presser foot automatically adjusts itself to any such temporary and uneven changes in fabric thickness. When the presser foot has passed the cross-seam or the like, the side shoes will automatically return to their original balanced position and quickly resume complete control of the seam being sewn.

In order that the marginal width of the seam stitching be regulated, the presser foot is mounted on the presser bar so as to be laterally adjustable with respect to the needles. This laterally adjustable mounting cooperates with an adjustable needle hole plate mounted on the center shoe whereby the needle penetrates the work at a selected lateral position thereon to locate the seam stitching as desired.

Movement of the material past the presser foot around the side of the seam in a curved path is provided for by a guiding cut-away portion on the leading edge of at least one of the side shoes which permits in turning the work in the desired direction.

The raising or lowering of the presser device is effected by a lifter assembly. A resiliently urged pivoted finger of this assembly is interlocked with and presses on the rear shoe of the presser foot and provides for the application of the proper pressure thereto additional to that applied by the presser bar. An adjustable abutment is so positioned on the lifter assembly with respect to the resiliently urged presser finger that it engages the finger and moves it to a predetermined position when the presser foot is raised by the lifter assembly to level the shoes of the presser foot or incline them, if so desired.

Other objects and features, as well as advantages of the present invention, will appear in the following specification and accompanying drawings wherein we have described and illustrated a preferred embodiment of our invention but it is to be understood that our inventive concept is not to be construed as limited to the construction disclosed therein except as determined by the scope of the appended claims.

With reference to the accompanying drawings:

Figure 1 is a side elevational view of the presser foot of the present invention showing its relationship to the feller.

Fig. 2 is a cross-sectional plan view in side elevation showing details of the presser foot.

Fig. 3 is a cross-sectional plan view taken on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary cross-sectional view in front elevation taken on the line 4—4 of Fig. 2.

Fig. 5 is a cross-sectional view in front elevation taken on the line 5—5 of Fig. 2.

Fig. 6 is an exploded view of the presser foot of the present invention.

Fig. 7 is a plan view of the lifter assembly.

Fig. 8 is a view in elevation of the lifter assembly.

As shown in Figs. 1–6, the presser foot of the present invention is associated with a sewing machine having the usual frame F, cloth plate T, feed dogs D and needles N. A feller or interfolder I may be positioned adjacent the presser foot to form the plies or folds of the desired seam or the like.

A presser bar 10 extends downwardly from the sewing head of the machine and carries at its lower end a bracket 11 secured thereon by a split collar 12 or the like. The presser foot comprises a supporting shank or bracket 18 which may be mounted on the front end of the presser bar bracket 11 by any suitable means such as draft bolts 14 and 15 passing through openings 16, 17. Preferably the openings 16 and 17 are elongated to permit the presser foot to be adjusted laterally of the presser bar 10 to effect the lateral relationship of the needles N with respect to the presser foot whereby the point of penetration of the needle into the material may be selectively determined, as desired, according to the marginal width required for the particular grade of work, as will be described.

The lower portion of the support shank 18 is provided with a pair of aligned tapped holes 19 and 20 for the reception of pivot bearing screws 21 and 22. A pair of rocker arms or shoe supports 23 and 24 are pivotally mounted on the pivot bearing screws 21 and 22 which pass through aligned openings 25 and 26 in the shoe supports whereby they are free to rock in limited fashion thereon.

A front shoe assembly 30 comprising a center shoe 31 and right and left side shoes 32 and 33 is positioned between the shoe supports 23 and 24 and pivots on a shoe support pivot pin 36 which passes through aligned openings 37 and 38 in the shoe supports 23 and 24 and through aligned openings 39, 40 and 41 in the shoes.

The three shoes are individually and independently pivotally mounted on the shoe support pivot pin 36 whereby they may assume any desired relation with respect to each other.

This independent relative movement of the center and side shoes is provided by pivoting the shoes on a hinge pin 53 which passes through aligned openings 54, 55, 56 in the rear portions of the shoe members. Relative movement of the shoes is permitted by making the openings 39 and 41 in the side shoes 33 and 32 arcuately elongated whereby each side shoe may pivot on the hinge pin 53 and be limited in such pivotal movement by the amount of play of the shoe support pivot pin 36 in the elongated openings 39 and 41. These openings 39 and 41 may be so designed that the side shoes may move from a position level with the center shoe to any desired maximum distance below the same.

The right and left side shoes 32 and 33 are normally urged to a balanced symmetrical position below the center shoe 31, by an equalizing shoe spring-and-pin assembly 44. This assembly includes a tension spring 45 which is attached to a long rear spring pin 46 which is anchored within V-shaped grooves or notches 47 and 48 formed in the rear portions of the side shoes 32 and 33. The other end of the tension spring 45 is attached to a short front spring pin 50 which in anchored within forwardly facing V-shaped grooves or notches 51 and 52 of the center shoe 31. Because the pins are held resiliently within the open grooves by the spring the assembly may be readily inserted therein or removed therefrom without involving the removal of any other part of the presser foot. With this construction, the side shoes 32 and 33

are spring-urged by assembly 44 forwardly and downwardly whereas the center shoe 31 is spring-urged rearwardly and upwardly to form a groove defined by the lower surface of the center shoe 31 and the inner walls of the side shoes 32 and 33.

Since the side shoes move relative to the center shoe, it will be seen that the groove defined by said surfaces will automatically adjust itself to any thickness of seam which is fed thereunder as may be caused by differences in materials or combinations of materials, with the lower surface of the center shoe 31 engaging the upper surface of the seam and the inner walls of the side shoes 32, 33 engaging the edges of the seam with the bottom surfaces of the shoes 32, 33 pressed against the fabric on either side of the seam. Also the side shoes will automatically adjust themselves when the foot passes a cross seam to maintain substantial control of the seam and will quickly return to their original positions when the cross seam has passed. Further, inasmuch as the center shoe tends to be rocked upwardly about its pivot by spring 45, the rear or trailing edge will be pressed with a maximum pressure into firm holding relation with the seam to provide for a complete control of the sewn seam as it leaves the front foot without distortion thereof.

This therefore provides a groove or channel in the presser foot which is a maximum at the toe and decreases in depth to a predetermined value at the needles as automatically and adjustably determined by the thickness of the materials being used and as permitted by the three independently mounted shoes. The groove then tapers off beyond the needles to the extreme rear edge until it has substantially no depth at all. This structure provides a clamping means for the chain at the rear of the foot in the form of a flat presser surface which enables the feeding means to grip and advance the chain.

Thus is created ideal operating conditions for not only do these three shoes provide an automatically adjustable groove for the seam but they establish accurate guiding of the folded seam from the folder with even margins in the top and bottom plies of the material, apply a uniform downward pressure on the material being fed so that in cooperation with the usual feed dogs of the machine they will produce a uniform feeding of the material through the machine and cooperate in the forming and feeding of the chain.

The inner side of the left shoe engages the side of the seam as is clearly shown in Fig. 4, and can be utilized to guide the work during a sewing operation. However, since there are substantially no side walls at the back edge this enables the foot to be more easily fed around curved seams.

The right shoe at its forward inner edge is provided with a sloping or tapering chamfered surface 32*a* which cooperates with the fabric to turn it or bend it around the edge of the seam and into tight relation therewith, with the adjacent fabric in engagement with the cloth plate as shown in Figs. 4 and 5. This cut-away portion 32*a* serves an additional function of permitting the presser foot to more easily move around a curved seam as the same is being fed through the machine since it provides a relief portion for the incoming seam.

As will be seen in Fig. 2, the center foot at its forward end is provided with an upwardly extending undersurface 31*a* which extends substantially into the needle line. This surface forms a throat which permits the upper fold to move into the presser foot to a point substantially in line with the needle line before engagement by the center shoe so that the folded superposed material may be moved into sewing relation without undue drag being placed on the top surface of the fold which will cause disarrangement and distortion of the fold and produce an unattractive seam.

Center shoe 31 is provided with enlarged openings 58, 58 to permit the needles N to pass therethrough during the stitching of the seam. These needle openings 58, 58 should be of sufficient width so as to provide passage to the needles in all laterally adjusted positions of the presser foot. The inner walls of the side shoes 32 and 33 may be cut away or inclined as at 59, shown on the left side shoe in Figure 6, to provide clearance for a needle descending very close to the inner wall of the left shoe when a narrow margin is desired. Additionally, if a needle ever should descend too far outwardly, it will be deflected inwardly by the inclined surface. Such a cut-away portion is placed on the left shoe for making the illustrated seam inasmuch as the abrupt edge of the seam fits thereagainst and is guided thereby while being fed under the presser foot. To prevent the thread from jamming between the side shoes and center shoe a needle hole plate 61 having needle openings 62, 62 is provided. This is secured to the top surface of the center foot 31 so that the openings guide the needle and thread through the shoe assembly into the work material.

A rear presser foot 64 is pivotally mounted between the rear inner portions of the shoe supports 23 and 24 by means of rear pivot screws 65, 65 which pass through aligned openings 66, 67 in the shoe supports and are threaded into aligned tapped openings 68, 69 in upturned ears of the rear presser foot. In this way the rear presser foot 64 is capable of a rocking motion from a level to an inclined position.

A rear shoe bridging member 70 extends between the shoe supports 23 and 24 and has a pair of rectangular lugs 71, 72 thereon extending into corresponding rectangular openings 73, 74 in the shoe supports whereby the bridging member is relatively fixed therebetween. The bridging member 70 forms a support and guide for a cup shaped rear stop member 75 having grooves 76, 76 slidably fitting into the frame of the bridging member to permit relative movement therebetween. A downwardly extending lug 78 on the bridging member 70 fits within the cup shaped rear stop 75 and serves as a rod or guide for a compression spring 77 which is positioned within the rear stop 75. The force of the spring 77 abutting up against the relatively fixed abridging member 70 is exerted downwardly against the rear stop member 75 seated on the rear presser foot and causes the rear stop member 75 to press substantially perpendicularly against the central area of the rear presser foot 64. It will be apparent that the spring action exerted thereby will tend to maintain the rear presser foot in a level position and will resiliently resist any efforts to tilt or incline the rear presser foot and will apply a restoring force immediately to return the rear presser foot to that level position.

In order that the rear shoe and the front shoe never reach such an angularity with respect to each other as to prevent smooth passage of the

material beneath its lower surfaces, means may be provided whereby these shoes, although permitted individual pivotal movement, are restrained so as to keep within predetermined limits of relative angularity. In the preferred form of the invention stops or limits may be provided on the rear shoe assembly to cooperate with the front shoe to limit the relative angular pivotal movement of the front shoe assembly. To accomplish this the forward end 79 of the rear presser foot is inclined upwardly and is so positioned relatively to the rear of the front presser foot assembly 30 as to limit the rotational movement thereof on pivot pin 33 in a clockwise direction, as viewed in Fig. 2. Similarly, downwardly and inwardly extending fingers or stops 80 are formed on the fixed rear shoe bridging member 70 and extend under rearwardly projecting portions 81 of the side shoes 32 and 33 so as to limit the rotational movement thereof on pivot pin 36 in a counterclockwise direction, as viewed in Fig. 2.

For the purpose of raising the presser bar 10 and the presser foot carried thereby, a lifter assembly is provided and comprises a rotatable collar 85 positioned upon a shaft or stud 86 mounted in the frame F of the sewing machine by means of a clamping screw 90. A lifter finger 87 extends outwardly from the collar 85 and is located under a projecting abutment 88 of the bracket 11. An operating lever 89 extends outwardly from the collar 85 in the direction opposite from that of the lifter finger and provides the means whereby the collar 85 may be manually rotated to cause the lifter finger 87 to be moved upwardly to lift the presser bar 10 and the presser foot. Return movement of the presser bar 10 and the presser foot is made possible by manipulating the operating lever 89 to depress the lifter finger 87 whereby the presser bar 10 is urged downwardly by spring means (not shown) in the sewing machine head.

In order that the proper pressure be applied to the rear shoe 64 during the feeding of the material M therepast a pressure applying device is provided in the form of a separate pressure applying bracket 91 having side ears 91*a*, which are mounted for rotation on the stud 86 so as to straddle the collar 85 and has a pressure applying finger 93 positioned within an opening 94 of the bridging member 70 (see Fig. 2). A helical spring 92 coiled around the stud 86 and having one end fixed in relation thereto as by being inserted in slot 86*a* and the other end engaging the bracket urges the bracket 91 in a direction to press the bridging member downwardly, whereby the rear shoe 64 applies the proper pressure to the material M in addition to the pressure applied by the presser bar 10.

In order to adjust the pressure applied to the rear foot by the helical spring, the stud 86 is made adjustable and is held in adjusted relation by means of a set screw (not shown) and by the clamping screw 90 at the end thereof. By releasing the set screw and the clamping screw and inserting a screw driver or the like in the slotted end 86*a* of stud 86 the stud is rotated in the frame in the proper direction to increase or decrease the tension in the spring and the pressure applied to the foot by the pressure applying finger.

It is to be noted that the positioning and adjustment of the pressure applying finger 93 is independent of the lifter and may be performed separately and is a decided improvement over presently used arrangements wherein the fingers cannot be adjusted individually or independently.

In addition to performing the pressure applying function, the finger 93 cooperates with the lifter mechanism to properly position the shoes when the lifter mechanism is operated to raise the presser bar. This is accomplished by providing on the bracket member 91 an ear or tab 96 which overlies an adjustable stop member 97 on the collar, which stop member is locked in adjusted position by a set screw or the like clamping screw 98. The adjustable stop is so positioned that as the lifter assembly and sleeve is rotated on the stud 86 to cause the lifter finger 87 to raise the presser foot it will engage the tab 96 at a predetermined time to cause a controlled lifting action of the back foot through the cooperation of the finger 93 and the opening 94 and hence will control the pivotal action of the presser foot on its mounting means so that the foot will be held in a level position or with its forward end inclined upwardly as may be required by the operator.

In the operation of the present invention the presser foot is attached to the presser bar so as to have a proper position with respect to the needles to produce the required margin and in alignment with the interfolder I. The pressure on the bracket 91 for applying pressure to the rear foot is adjusted by releasing the clamping screw 90 and set screw and adjusting the stud 86 to vary the tension in spring 92. After the adjustment is made the stud is clamped in position. The fabric sections which are to be joined together are guided into the interfolder which brings them into proper overlapped relation as shown in Figs. 4 and 5. The leading end of the interfolded seam is inserted under the presser foot and the lift lever is released, permitting the presser foot to move down and grip the inner end of the seam. It will be noted that the center shoe will rest on the top of the seam with the rear edge having maximum pressure thereon to control the feeding of the seam and the side shoes will extend on either side of the seam to engage the fabric and automatically provide the proper groove in the foot for the same.

The sewing operation proceeds with the fabric being guided through the machine through the use of the left front shoe whose innerface rides against the edge of the seam. As the seam is sewn, should any cross seams be encountered the articulated presser foot will ride over the seams and the side shoes of the front foot will adjust themselves to substantially control the seam as it passes over the additional thickness and immediately after passing over the cross seam will resume complete control of the seam.

It will be noted that the center shoe has a thread plate 61 which prevents jamming of the thread between the side and center shoes and has a seam-receiving throat at its forward end which enables the seam to be fed into substantially the needle line before a drag is applied to the top surface thereof which may tend to distort the fabric in the fold. This is of particular advantage where the two needles are in side-by-side relation and stitch the fabric simultaneously.

As the seam is being sewn, the cut-away portion 32*a* on the right shoe will fold the fabric around the right edge of the seam and produce a tight seam structure. The cut-away portion also will permit the sewing of curved seams since

it provides the necessary relief of the presser foot at that area to prevent binding or bunching.

After the seam is completed, the lifter mechanism is operated which first lifts the presser bar and presser foot connected thereto and subsequently picks up the pressure finger 91 for the back shoe in predetermined relation to the lifting action which pressure member, cooperating with the back shoe, will provide the required tilting of the presser foot as it is lifted.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

We claim:

1. A presser foot for attachment to the presser bar of a sewing machine head for sewing material having a lengthwise section of greater thickness than the fabric adjacent thereto including a presser foot shoe unit comprising a central shoe having needle openings therein adapted to engage the lengthwise section and side shoes extending forwardly of the needle openings and adapted to engage the adjacent fabric, said shoe unit being mounted for pivotal movement about a predetermined transverse axis and said side shoes being pivotally connected to the central shoe and mounted for independent movement relatively to said central shoe about a second transverse axis spaced from said first transverse axis, and spring means acting on said central shoe and said side shoes normally urging the central shoe and side shoes in opposite directions about the second transverse axis whereby the said central shoe will press the lengthwise section in the rear of the needle openings and said side shoes will press the adjacent fabric ahead of the needle openings in said central shoe.

2. A presser foot unit for attachment to the presser bar of a sewing machine head for sewing material having a lengthwise section of greater thickness than the fabric adjacent thereto comprising a central shoe having needle openings therein adapted to engage the lengthwise section and separate, independent side shoes adapted to engage the adjacent fabric, said presser foot shoe unit being pivotally mounted on the presser foot to the rear of the needle openings and said side shoes being pivotally carried by the central shoe to turn about an axis to the rear of the pivotal mounting for the shoe unit to position the same at variable levels in response to the difference in thickness between the lengthwise section and the adjacent fabric, whereby the lengthwise section may be pressed by said central shoe and the adjacent fabric may be pressed by said side shoes; and means resiliently retaining each of said side shoes in a predetermined relationship with respect to said central shoe.

3. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing felled seams, a compensating presser foot comprising a mounting bracket and a central shoe mounted thereon to engage the top of the seam and having transversely elongate needle passages therethrough; side shoes extending adjacent each side of the central shoe to engage the fabric adjacent each side of the seam; and means yieldably mounting said side shoes to said bracket for independent movement relatively with respect to each other and to said central shoe to automatically form a groove of the required depth for said seam, said bracket being laterally adjustable with respect to the presser bar to position the needles in predetermined relation with respect to the edge of the seam groove to form the required margin on the seam.

4. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing felled seams, a compensating presser foot comprising a mounting bracket and a central shoe mounted thereon to engage the top of the seam and having transversely elongate needle passages therethrough; side shoes extending adjacent each side of the central shoe to engage the fabric adjacent each side of the seam; means yieldably mounting said side shoes to said bracket for independent movement relatively with respect to each other and to said central shoe to automatically form a groove of the required depth for said seam, said bracket being laterally adjustable with respect to the presser bar to position the needles in predetermined relation with respect to the edge of the seam groove to form the required margin on the seam; and a plate secured to the central shoe and having thread guiding openings therein for preventing thread from the needle from jamming between the side and central shoes.

5. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing felled seams, a compensating presser foot comprising a mounting bracket; a central shoe; side shoes adjacent each side of the central shoe and pivotally mounted thereon for independent movement with respect thereto, said central shoe and side shoes being pivotally mounted on the mounting bracket for solely pivotal movement about a single axis with the central shoe engaging the top of the seam and having needle passages therethrough and said side shoes engaging the fabric adjacent each side of the seam; and spring means urging said side shoes about the pivotal mounting therefor to apply pressure to the fabric in advance of the sewing needles.

6. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing felled seams, a compensating presser foot comprising a mounting bracket; a central shoe; side shoes adjacent each side of the central shoe, said central shoe and side shoes being pivotally mounted on the mounting bracket for solely pivotal movement about a single axis with the central shoe engaging the top of the seam and having needle passages therethrough and said side shoes engaging the fabric adjacent each side of the seam; and spring means urging the forward end of said central shoe upwardly about said pivotal mounting to apply a maximum pressure thereby on the seam to the rear of the needles and urging the forward ends of the side shoes downwardly to apply maximum pressure to the fabric in advance of the sewing needles.

7. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing seams, a compensating presser foot comprising a mounting bracket; a central shoe; side shoes adjacent each side of the central shoe and pivotally mounted thereon for independent movement with respect thereto, said central shoe and side shoes being pivotally mounted on the mounting bracket for solely pivotal movement about a single axis with the central shoe engaging the top of the seam and having needle passages therethrough forwardly of said axis and said side shoes engaging the fabric adjacent each side of the seam; and spring means urging the forward portion of said central shoe upwardly to form

a wide seam receiving mouth in advance of the sewing needles.

8. A presser foot for attachment to the presser bar of a sewing machine head for sewing felled seams comprising a central shoe adapted to engage the top of the seam; side shoes extending along the sides of said central shoe, said central shoe and side shoes being pivoted about a common axis and being independently relatively movable with respect to each other so as to be positioned at variable levels in response to the differences in thickness of the fabric to automatically form a seam-receiving groove of the required depth for said fabric; and means resiliently connecting said side shoes and central shoe to apply a pressure thereto and cause said shoes to move to a predetermined relation to form a groove for receiving the seam, said means comprising a pin carried by said central shoe, a second pin carried by said side shoes, and resilient means secured to said pins urging them together to cause the side shoes to be rotated in a downward direction and said central shoe to be rotated in an upward direction about said axis and maintain said groove and apply a predetermined pressure to the seam and fabric.

9. A compensating presser foot unit for attachment to the presser bar of a sewing machine head for sewing felled seams comprising a central shoe having needle openings therein and a lower surface to engage the top of the seam to the rear of said needle openings and side shoes extending adjacent each side of the central shoe and ahead of the needle openings and having inner walls to contact the sides of the seam to form the seam groove with the lower surfaces of the side shoes engaging the fabric adjacent the seam, said side shoes being pivotally mounted on the central shoe and carried thereby to be a part thereof and relatively movable with respect to said central shoe so as to position the lower surfaces thereof at variable levels below the seam-engaging surface of the center shoe to automatically form the seam groove of the required depth for the material being sewn, the forward edge of the inner wall adjacent the lower surface of one of said side shoes being cut away to form a tapering chamfer to press out the excess fabric and bring the seam gradually into position before stitching to form a tightly folded felled seam to facilitate the sewing thereof.

10. A presser foot unit for attachment to the presser bar of a sewing machine head for sewing felled seams comprising a central shoe adapted to engage the top of the seam and side shoes extending adjacent each side of the central shoe and having inner walls adapted to contact the sides of the seam and form a seam groove with the lower surfaces of said side shoes adapted to engage the fabric adjacent said seam, said unit, including said central shoe and side shoes, being pivotally mounted for movement about a single axis and said side shoes being pivotally mounted on said central shoe to move about an axis to the rear of said first-named axis and means resiliently urging said side shoes to a position with respect to the central shoe wherein the lower surfaces of the side shoes are at variable levels to the lower surface of the central shoe to automatically form said seam groove with the required depth for said seam, and with one of said side shoes having a tapering chamfer on its forward lower inner edge to engage the fabric immediately adjacent said seam to press the fabric gradually into position to form a tightly folded felled seam, said tapering chamfer providing a relieved surface at the entrance of said groove to enable a curved felled seam to be sewn without binding.

11. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing felled seams, a compensating presser foot comprising a mounting bracket; a central shoe; side shoes adjacent each side of the central shoe, said central shoe and side shoes being pivotally mounted adjacent the back end thereof to the mounting bracket for solely pivotal movement about a single axis with the central shoe engaging the top of the seam and having needle passages therethrough and said side shoes engaging the fabric adjacent each side of the seam and having inner walls engaging the sides of the seam to form a groove for the seam; and spring means urging the forward end of said side shoes downwardly relatively to said central shoe so that said inner walls have a maximum depth in advance of the needles and a minimum depth at the rear of the shoes whereby the foot can be turned readily on curved seams.

12. In combination with a presser bar of a sewing machine head having sewing needles therein for sewing seams, a compensating presser foot comprising a mounting bracket; a central shoe having a seam contacting surface curving forwardly and upwardly from a point immediately in front of the needles to provide a wide seam receiving mouth; side shoes adjacent each side of the central shoe and pivotally mounted thereon for independent movement with respect thereto, said central shoe and side shoes being pivotally mounted on the mounting bracket for solely pivotal movement about a single axis rearwardly of the needles with the central shoe engaging the top of the seam and having needle passages therethrough and said side shoes engaging the fabric adjacent each side of the seam; and spring means urging the forward portion of said central shoe upwardly to apply a maximum pressure on the seam at the rear of the needles and a minimum pressure in advance of the sewing needles.

13. A presser foot for attachment to the presser bar of a sewing machine head for pressing a seam having a lengthwise section of greater thickness than the fabric adjacent thereto comprising a pivoted carrier; a pivotally mounted front shoe assembly mounted on the carrier and having a central shoe adapted to engage the lengthwise section and side shoes pivotally connected thereto adapted to engage the adjacent fabric, said central shoe and said side shoes having limited relative movement to position the same at variable levels in response to the difference in thickness between the lengthwise section and the adjacent fabric; and a rear shoe pivotally mounted on the carrier, said carrier having thereon rear shoe bridging means engaging the back of the front shoe assembly to limit upward pivotal movement thereof and to cause pivotal movement of the carrier to raise the front shoe assembly as a unit in feeding onto a seam.

14. A compensating presser foot for attachment to the presser bar of a sewing machine head for sewing felled seams comprising a pivoted central shoe to engage the top of the seam; and side shoes extending adjacent each side of said central shoe to engage the fabric adjacent the seam, said side shoes being relatively movable with respect to said central shoe so as to be positioned at variable lower levels than said central shoe in response to the difference in thickness between

the seam and the adjacent fabric to automatically form a groove of the required depth for the seam, said central shoe being urged rearwardly about the pivot therefor and applying a greater pressure at the trailing edge for more rigid control of the sewn seam.

15. A compensating presser foot for attachment to the presser bar of a sewing machine head for sewing a felled seam comprising a pivoted front shoe unit for engaging the seam during the sewing thereof; and a rear shoe unit adapted to engage the sewn seam subsequently to said front shoe unit, said rear shoe unit comprising a pivoted rear shoe, means on the rear shoe unit engaging and cooperating with the front shoe unit to limit the pivotal movement of said rear shoe within a predetermined range with respect to said front shoe unit and means including a flat rigid surface and resilient means pressing said flat surface on the top surface of the rear shoe to resiliently urge said rear shoe into, and to maintain, a predetermined normal level relation with respect to said rear shoe unit to facilitate the feeding of the sewn seam therepast.

16. A presser foot for attachment to the presser bar of a sewing machine head for sewing material having a lengthwise seam of greater thickness than the fabric sections adjacent each side thereof comprising a front shoe assembly having a pivotally mounted central shoe adapted to engage the seam and pivotally mounted side shoes adapted to engage the fabric sections, said side shoes being independently relatively movable with respect to each other and to said central shoe so as to be positioned at variable levels in response to the differences in thickness between the seam and each individual fabric section to provide a proper seam groove; and a rear shoe assembly adapted to engage the seam subsequently to the front shoe assembly and having a pivotally mounted rear shoe, and limiting means interposed between the rear shoe and central and side shoes to control the pivotal movement of said central shoe and said side shoes with respect to said rear shoe to limit the angularity of said shoe assemblies during a sewing operation.

17. In a sewing machine, a presser foot for attachment to the presser bar of the sewing machine head to be urged downwardly thereby for sewing material having a lengthwise seam of greater thickness than the fabric sections adjacent each side thereof comprising a front shoe assembly having a pivotally mounted central shoe adapted to engage the seam and pivotally mounted side shoes adapted to engage the fabric sections, said side shoes being independently relatively movable with respect to each other and to said central shoe so as to be positioned at variable levels in response to the differences in thickness of the seam, whereby the seam may be pressed by said central shoe and the fabric sections may be pressed by said side shoes; and a rear shoe assembly adapted to engage the seam subsequently to the front shoe assembly and having a pivotally mounted rear shoe, means interposed between the rear shoe and front shoe assemblies to limit the pivotal movement of the central shoe and side shoes with respect to said rear shoe and control the angularity of said shoe assemblies in engaging the seam being pressed, means to lift said assemblies from seam-engaging position, means to apply pressure to said rear shoe assembly in addition to that supplied by said presser bar, and means actuated in response to the operation of the lifting means to control the last-named means to act on the rear foot assembly to locate the raised assemblies in a predetermined angular position out of seam-engaging position.

18. In a sewing machine, a presser foot for attachment to the presser bar of the sewing machine head comprising a front shoe and a rear shoe urged downwardly toward work-engaging position by pressure applied by the presser bar; and means operable independently of said presser bar to apply pressure to said rear shoe in addition to that supplied by said presser bar, said means comprising a pressure member pivotally mounted on a stud carried by the machine for rotary adjustment, means clamping said stud in adjusted position, and a helical spring surrounding the stud and having one end connected to the stud and the other end engaging the pressure member, the pressure on said pressure member being varied in accordance with the angular adjustment of said stud.

19. In a sewing machine, a presser foot for attachment to the presser bar of the sewing machine head comprising a front shoe and a rear shoe urged downwardly toward work-engaging position by pressure applied by the presser bar; means movable from a retracted position to lift said front shoe and said rear shoe from work-engaging position to work-receiving position; and means operable independently of said lifting means to apply pressure to said rear shoe in addition to that supplied by said presser bar, said pressure applying means being engaged by the lifting means at a predetermined point in the movement thereof to position the raised front shoe and rear shoe in a desired angular position in the work-receiving position.

20. In a sewing machine, a presser foot for attachment to the presser bar of the sewing machine head comprising a front shoe and a rear shoe urged downwardly toward work-engaging position by pressure applied by the presser bar; lifter means pivotally mounted on a stud carried by said machine to lift said front shoe and said rear shoe from work-engaging position to work-receiving position; pressure means pivotally mounted on said stud to overlie said lifter means and operable independently of said lifting means to apply pressure to said rear shoe in addition to that supplied by said presser bar, said stud being rotatably adjustable on said machine; a helical spring mounted on said stud and having one end connected to the stud and the other end acting on the presser means and operable in response to angular adjustment of said stud to vary the pressure applied to said rear shoe; and means on the lifting means cooperating with said pressure applying means at a predetermined time in the operation of the lifter means for positioning the raised front shoe and rear shoe in a desired angular position on the presser foot.

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