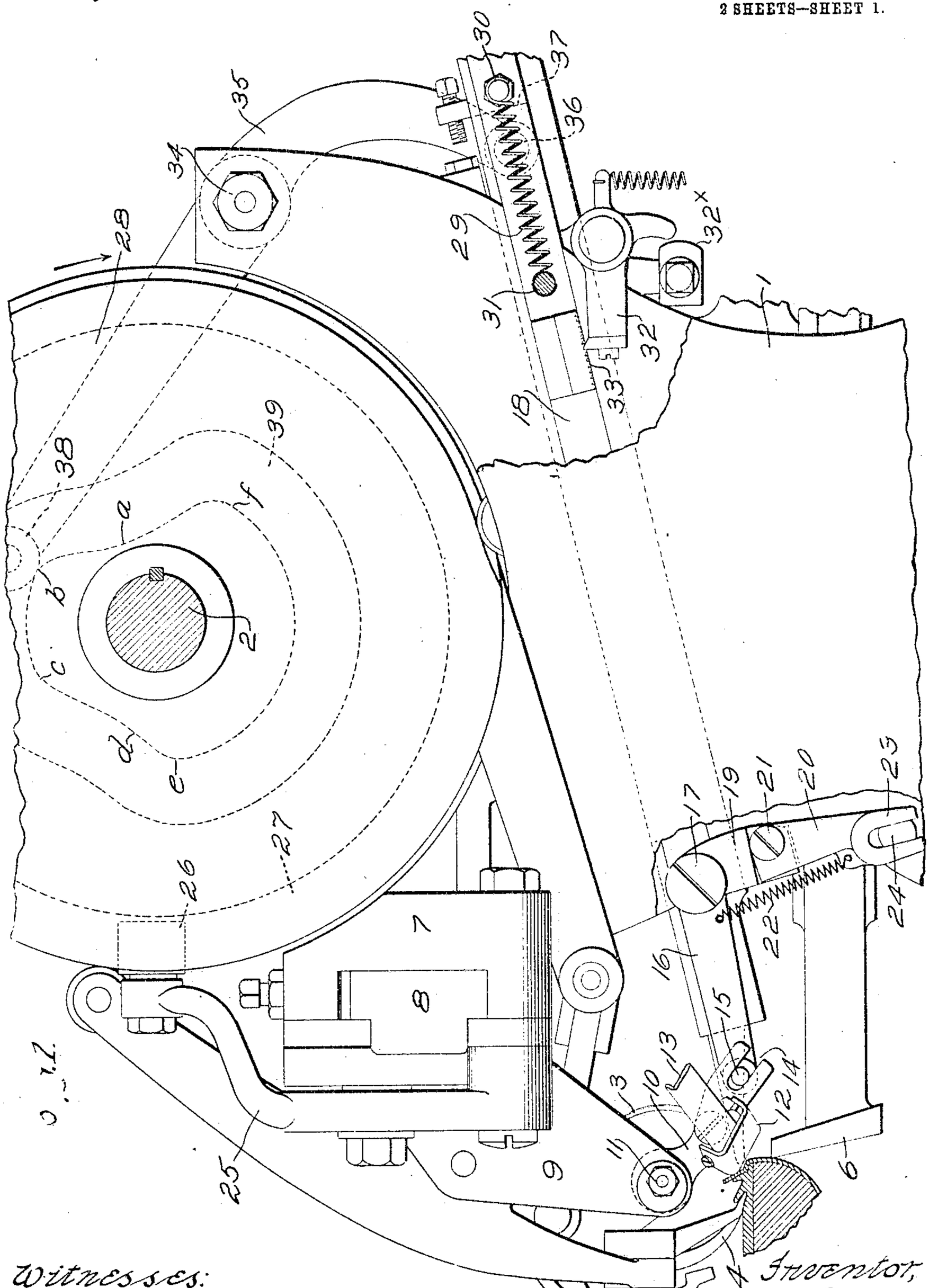
T. G. PLANT.

SHOE SEWING MACHINE.

APPLICATION FILED NOV. 4, 1908. RENEWED NOV. 22, 1909.

958,299. Patented May 17, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

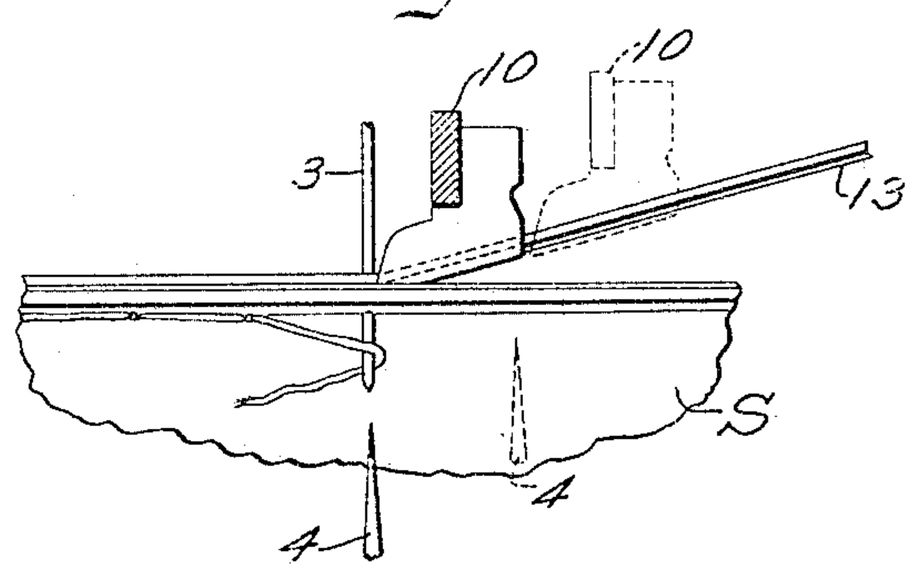


Fig. 3.

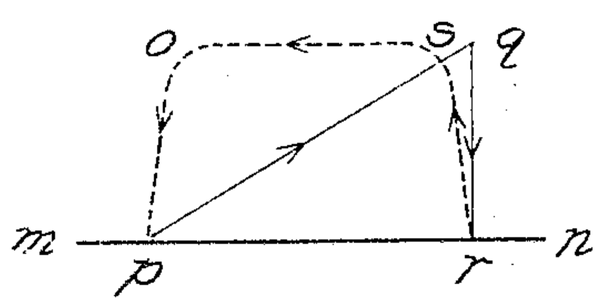


Fig. 5.

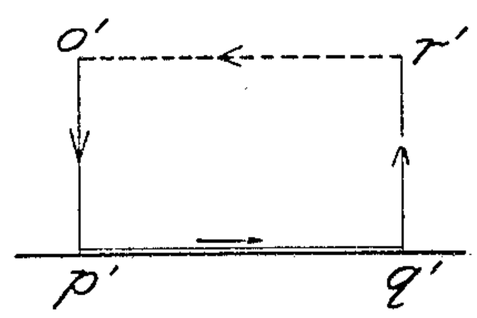
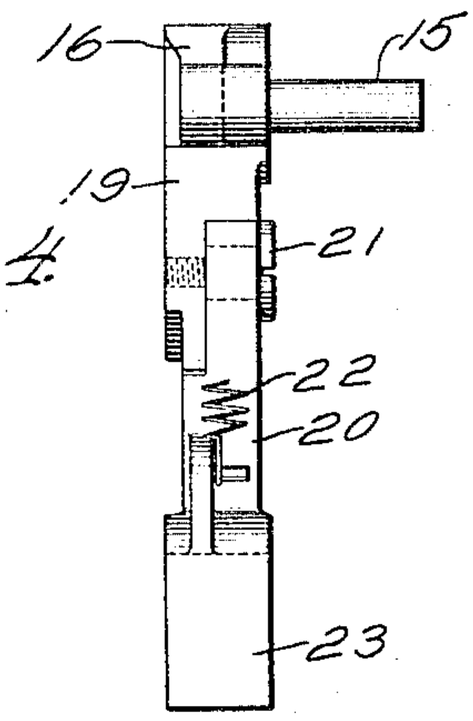


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS G. PLANT, OF BOSTON, MASSACHUSETTS.

SHOE-SEWING MACHINE.

958,299. Specification of Letters Patent. Patented May 17, 1910.

Application filed November 4, 1908, Serial No. 460,995. Renewed November 22, 1909. Serial No. 529,307.

To all whom it may concern:

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Shoe-Sewing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to sewing machines and more particularly to the type of such machines employed in attaching the welt to the insole and upper of a shoe, and commonly known as "welters".

In the type of machine referred to it has been common, in positioning the welt with relation to the stitch forming mechanism and shoe, to employ a welt guide. It has been proposed, heretofore, to move this welt guide directly toward and against the work just prior to the advance movement of the needle in the stitch formation, and after the needle has pierced the work, received the loop of thread from the looper, and retreated, usually its full retracting stroke, to move the welt guide directly away from the work to allow the work to be fed, such movements of the welt guide being in a plane substantially parallel to the plane of the needle movement. As the shoe is fed, the welt guide being then in its retracted position, the welt is drawn through the welt guide or "measured" for the next stitch. This direct backward movement of the welt guide obviously tends to draw the welt outward from the shoe, puts a strain upon and tends to loosen the last stitch uniting the welt to the shoe. As the shoe is fed the welt must be drawn through the welt guide thus causing a drag opposed to the feed movement, to minimize which, it has been necessary to make the welt guide sufficiently large to permit the welt to have a loose fit therein. As will be apparent to those familiar with this type of machine, such loose fit of the welt in the welt guide permits the welt to have a latitude of movement such that the needle will sometimes not pierce the welt at the proper point. It has been heretofore proposed also to give to the welt guide another or additional movement in the line of feed and return, to thereby "measure" the welt for the next stitch while the needle is in the work. Such return movement of the welt guide after the shoe has been fed has been made, however, with the welt guide resting against the work, so that as the welt guide slid along the work in its return movement it would cause the upper of the shoe to be pushed into wrinkles or plaits ahead of the welt guide with obvious objectionable results.

With these general matters in view the present invention aims to provide means for giving to the welt guide the desired movements to properly position the welt for the stitch forming mechanism and to "measure" or cause welt to be drawn through the welt guide for the next stitch without the objections incident to the prior devices, all of which will best be understood from the following description in connection with the accompanying drawings which disclose one form or embodiment of the invention.

In the drawings:—Figure 1 is a partial side elevation of sufficient parts of a shoe sewing machine to show the features of the present invention, parts being broken away to show other parts beyond; Fig. 2 is an enlarged detail and detached view looking at the front of the machine typifying the needle, awl, welt guide, work and stitches; Fig. 3 is a diagrammatic view showing the path of welt guide movement; Fig. 4 is an edge or front view of the link connection between the welt guide and back gage; and Fig. 5 is a view similar to Fig. 3, showing the welt guide movement as heretofore proposed.

The main supporting frame 1, the driving shaft 2 mounted therein and suitably driven, the needle 3, the awl 4, the looper 5, the actuating means for said part whereby the desired stitch is formed, and the back rest 6 may be of usual and well understood construction and operate in a manner as heretofore in the stitch formation and familiar to those skilled in the art.

Mounted to slide in the guideway 7 substantially in the direction of work feed and return is the slide 8 from which projects the arm 9 carrying the awl 4, as usual, and the welt guide 10, pivotally mounted thereon at 11, and provided with a guiding part 12 for the welt 13. The welt guide has an extended portion provided with a slot 14 into which projects a pin 15 carried by an arm 16 of a bell-crank lever pivoted at 17 to the back gage 18. The other arm

of the bell-crank lever is preferably formed of two parts 19 and 20, having a knife joint connection at 21 so that they may have a limited amount of relative movement under the action of a spring 22 joining the arm 16 and part 20. The end of part 20 is bifurcated at 23 and engages a fixed pin or stop 24, the construction being such that as the back gage 18 moves toward and from the work it will carry the pivot 17 of the bell crank, while the pin or stop 24 will hold the part 20 of the bell-crank arm relatively fixed, thus the arm 16 will raise the end of the welt guide 10 and remove the welt guide from the work as the back gage moves rearwardly, and will cause the welt guide to approach the work with a yielding action, due to spring 22, when the back gage moves forwardly, as will be clear.

Since the welt guide is pivotally mounted on the arm 9 carried by the feed slide 8, the pin 15 on the arm 16 is made sufficiently long, see Fig. 4, to maintain it in engagement with the end of the welt guide as the latter partakes of the slide movement.

The slide 8 is actuated by an arm 25, as usual, said arm being provided with a roller 26 traveling in a cam groove 27 formed in or on a cam carrying element or wheel 28 which is itself mounted to rotate with the main shaft 2, the cam groove being formed to move the slide 8, and consequently the awl, and the welt guide carried thereby in the direction of work feed and return, as will be fully understood by those skilled in the art.

The back gage 18 has connected thereto at 30 a spring 29, the opposite end of which is attached to a pin 31 on the head frame 1, the tendency of said spring being to move the back gage toward the work, and when in such position a catch 32, by engagement with the teeth 33, holds the back gage in position, as usual in this class of machine, being tripped at desired times by the trip arm $32^{\times}$ to permit the back gage to move backward.

Pivotally mounted at 34 is a back gage actuator 35, having an end 36 adapted to contact with a block or stop 37 on the back gage 18 to withdraw or move the back gage to the rear against the action of the spring 29. The other end of the actuator 35 has a roll 38 which travels in a cam path 39 rotating with the main shaft 2 and preferably formed in the side of the cam carrying element or wheel 28, said wheel being rotatable in the direction of the arrow, Fig. 1. The cam 39 is formed, as indicated, and related to the cam 27 for actuating the feed slide 8, so that just prior to the advance movement of the needle in the stitch forming operation, the cam 39 acts upon the roll 38, from *a* to *b*, causing the welt guide to move into contact with the work, where it remains while the part *b*—*c* of cam 39 travels past the roll 38. During this interval the needle advances and penetrates the work, as indicated in Fig. 2, and as the needle is receiving the loop of thread for the stitch formation, the part *c* to *d* of cam 39 passes under the roll 38, and simultaneously therewith the feed slide 8 is moved to carry the awl and welt guide in a direction reverse to the feed movement, the result of such component movements being that the welt guide travels in an inclined or diagonal direction as indicated by dotted lines in Fig. 2, and "measures" the welt for the next stitch without sliding along the upper. At the end of this diagonal measuring movement of the welt guide the awl and welt guide are located substantially as indicated by dotted lines in Fig. 2, whereupon the part *d*—*e* of cam 39 passes under the roll 38, causing the welt guide to move into contact with the work. The part *e*—*f* of the cam then moves under the roll 38, causing the welt guide to remain in contact with the work as the needle withdraws therefrom prior to the feed movement, whereupon the part *f*—*a* of the cam passes under the roll retracting the welt guide, which then assumes its initial or starting position, as will be readily understood by those skilled in the art.

The characteristic movement of the welt guide is well illustrated by the graphic representation thereof in Fig. 3, wherein, assume the line *m*—*n* to represent the stitch line, the needle being out of the work and the welt guide back from the work. The welt guide first moves from *o* to *p* in advance of the needle and contacts with the work where it remains until the needle has passed through the work. As the looper is placing the loop of thread about the needle, the welt guide moves in a direction diagonal to the work from *p* to *q*, Fig. 3, at which time it "measures" the amount of welt for the next stitch. This diagonal movement of the welt guide at such time does not disturb the last stitch, and while measuring the welt for the next stitch obviates the formation of any wrinkles in the shoe upper. The welt guide then moves from *q* to *r* and serves to resist the pull of the needle as it draws out of the work to its full retracted stroke. Prior to the feed movement, the welt guide moves from *r* to *s*, and during feed movement from *s* to *o* where it reaches its assumed starting position.

An important feature of the present invention, regardless of details or the different mechanisms by which it may be carried into effect, is that, as the welt guide moves away from the needle or stitch making point, it travels in a path which removes the welt guide from sliding contact with the upper and obviates the formation of wrinkles or

crimps. In order that this feature of the present invention be made more clear applicant presents, by Fig. 5, the heretofore proposed movements of the welt guides, wherein, assuming as in Fig. 3 that the line of stitches is represented by p', q', and that the welt guide starts from o', it first moves in advance of the needle to p', and while the needle is receiving the loop of thread the welt guide is moved to q' and slides along the work during such movement. The result is that the upper is crimped or wrinkled in front of the moving welt guide to the final injury of the shoe and its finished appearance. From q' the welt guide was moved to r' and during the feed it was moved to starting position at o'.

What is claimed is:

1. In a shoe sewing machine, the combination of stitch forming mechanism, a welt guide to direct the welt for the action of the stitch forming mechanism, and means to move the welt guide in a direction diagonal to the line of feed and out of contact with the work to draw it along the welt.

2. In a shoe sewing machine, the combination of stitch forming mechanism including a needle, a welt guide to direct the welt for the action of the stitch forming mechanism, and means acting to move the welt guide along the welt in a direction substantially diagonally to the plane of movement of the needle and from contact with the work.

3. In a shoe sewing machine, the combination of stitch forming mechanism, including a needle, a welt guide to direct the welt for the action of the stitch forming mechanism, means for moving said welt guide into and out of contact with the work, and means operative to move the welt guide in a direction away from the plane of movement of the needle while said welt guide is being withdrawn from contact with the work.

4. In a shoe sewing machine, the combination of a needle, a welt guide, and means including a back gage for simultaneously moving said welt guide in a direction away from the plane of movement of the needle and from contact with the work.

5. In a shoe sewing machine, the combination of a needle, a welt guide, and means to move said welt guide out of contact with the work in a direction inclined to the line of feed and along the welt while the needle is in the work.

6. In a shoe sewing machine, the combination of a needle, a welt guide, and means to move the welt guide toward the work in advance of the needle, then out of contact with the work in a direction inclined to the line of feed to measure welt for the next stitch, then into contact with the work, then from the work and in the direction of feed to initial position.

7. In a shoe sewing machine, the combination of a needle, a feed slide, a welt guide carried by the feed slide, a back gage connected to said welt guide, and means to move the slide and back gage to cause the welt guide to travel in a direction inclined to the line of feed to measure the welt for the next stitch.

8. In a shoe sewing machine, the combination of a needle, a feed slide, a welt guide pivotally connected to said slide, a back gage, means connecting the back gage and welt guide, and means to move the feed slide and back gage to cause the welt guide to travel in a direction inclined to the line of feed and along the welt.

9. In a shoe sewing machine, the combination of a needle, a feed slide, a welt guide pivotally connected to said slide, a back gage, means operatively connecting the back gage and welt guide for yieldingly actuating said welt guide upon movement of said back-gage, and means to move the feed slide and back gage to cause the welt guide to travel in a direction inclined to the line of feed and along the welt.

10. In a shoe sewing machine, the combination of a needle, a welt guide, a back gage, a bell-crank lever connecting the welt guide and back gage, one arm of said bell-crank lever being formed of flexibly jointed parts, and means for operating the back gage.

11. In a shoe sewing machine, the combination of a needle, a pivotally mounted welt guide, a back gage having a bell-crank lever fulcrumed thereon, a sliding connection between one arm of said bell-crank lever and welt guide, means for holding the other arm of said bell-crank from movement with the back gage, said arm being provided with a flexible joint, and means to move the back gage.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

THOMAS G. PLANT.

Witnesses:

ALFRED H. HANDLEY,

ARTHUR W. CALVER.