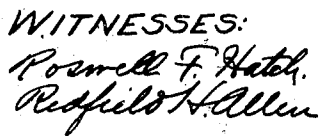


APPLICATION FILED MAR. 14, 1908. RENEWED APR. 14, 1909.

Patented Nov. 23, 1909.

3 SHEETS—SHEET 1.



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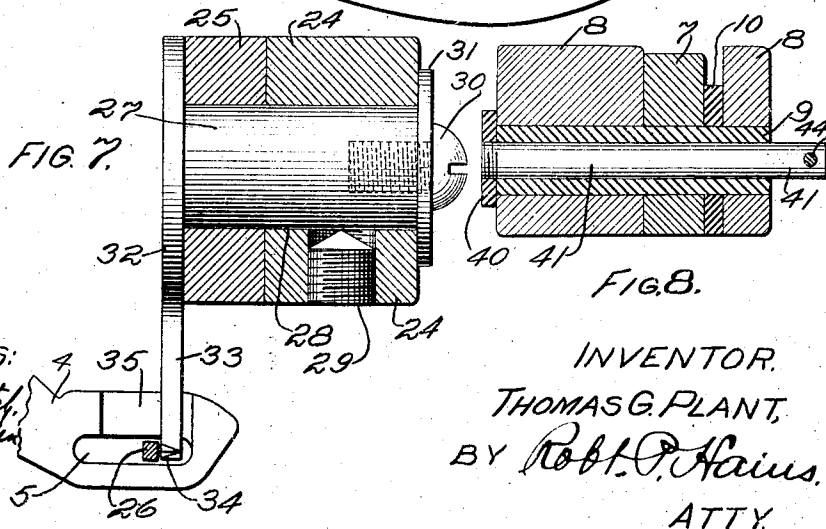
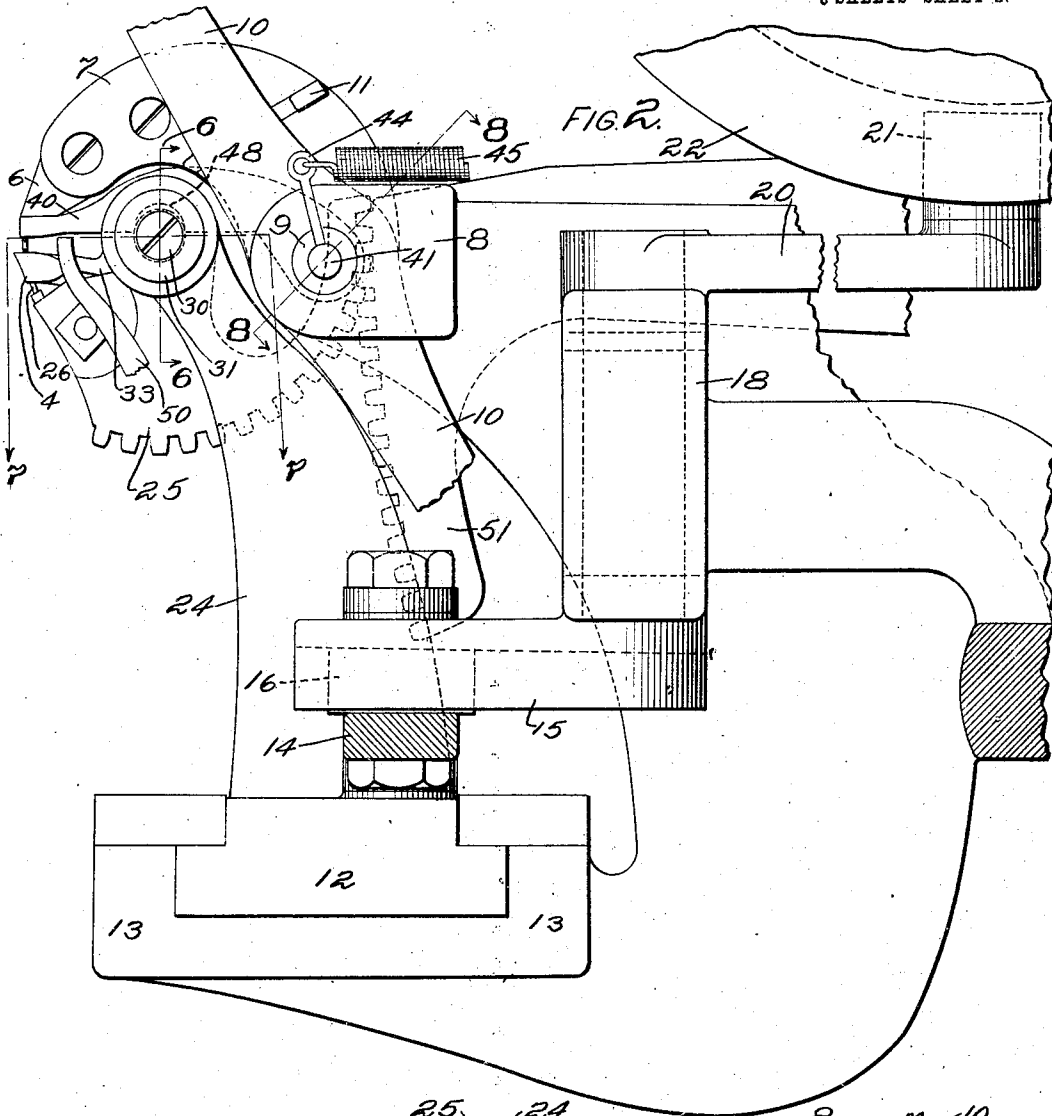
T. G. PLANT.
SHOE SEWING MACHINE.

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940,725.

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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

FIG. 3.

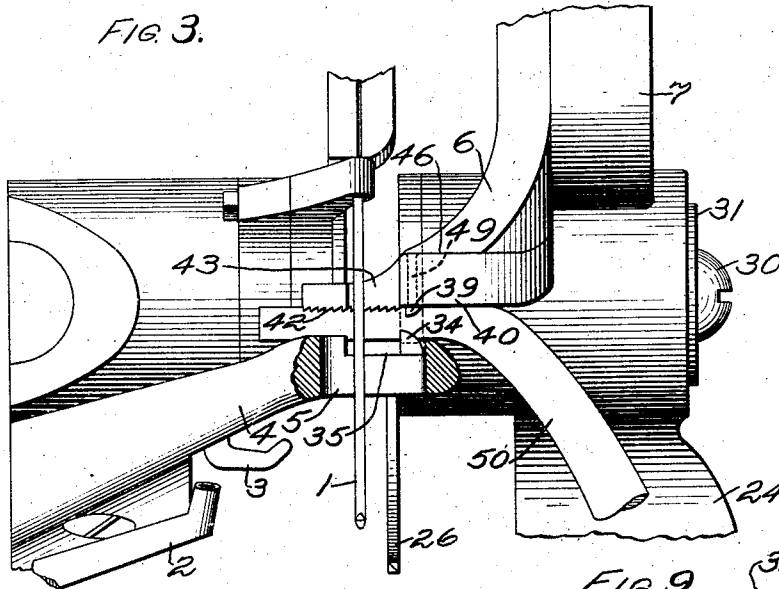


FIG. 9.

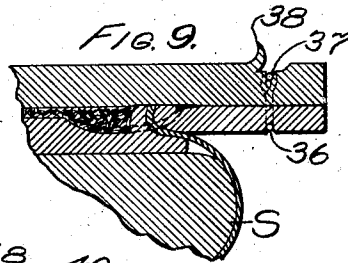
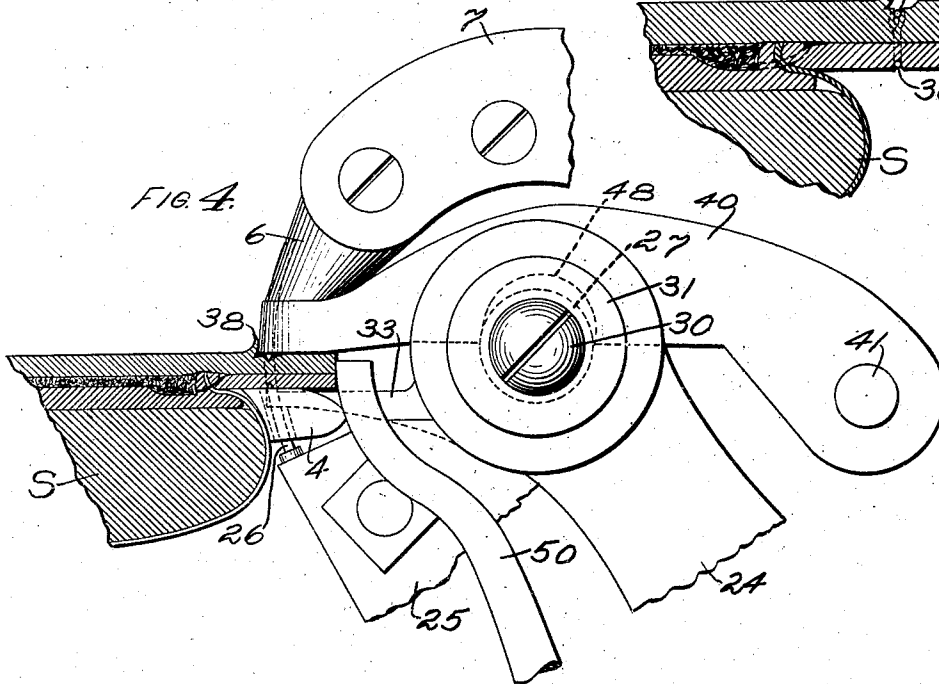


FIG. 4.



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UNITED STATES PATENT OFFICE.

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SHOE-SEWING MACHINE.

940,725.

Specification of Letters Patent.

Patented Nov. 23, 1909.

Application filed March 14, 1908, Serial No. 421,108. Renewed April 14, 1909, Serial No. 489,895.

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 herein to be described relates to sewing machines, and more particularly to that type employed in sewing boots and shoes.

In stitching soles to boots and shoes it is usual to turn up a lip or flap from the sole material to form a channel for receiving the line of stitches, and after the completion of the stitching operation to turn down the previously raised lip to cover the sewing thread. In the subsequent operation of beating-out or leveling, when the sole is subjected to considerable pressure, it frequently happens that an impression of the line of stitches becomes apparent on the outer surface of the channel lip. This impression will be more or less pronounced in accordance with the size of sewing thread used, the character of sole stock, and other considerations, and constitutes a serious objection in the appearance of the finished sole.

In welted shoes, that is where the sole is secured to a welt projecting along the shoe contour, the top surface of the welt is usually ornamented by a series of indentations, known as impressions, either in imitation of stitches or between the stitch loops themselves. In either case, however, the fact that the line of stitches extends along and above the surface of the welt greatly interferes with the proper formation of the stitch impressions, limits the character thereof, and the resultant ornamental effect. Thus, as at present associated with the welted shoe, the line of stitches, while serving to unite the sole and welt, introduces an objection in the finished character of the product on both the surface of the sole and surface of the welt.

With these generally stated matters in view, the object of the present invention is to provide means whereby the objections heretofore present are avoided, and the line of stitching or other fastenings so disposed that it will not interfere with the proper finished appearance of the shoe, all as will

hereinafter more fully appear in connection with the following description and accompanying drawing of one form of the invention selected for elucidation thereof.

In the drawings: Figure 1 is a front elevation of sufficient of a boot and shoe sewing machine to make clear the association of the present invention therewith, parts being broken away; Fig. 2 is a section and side elevation of the parts indicated in Fig. 1, on line 2—2, disclosing the relation of the invention with the fastener inserting means; Fig. 3 is an enlarged detail front view of the table or work support, part of which is broken away; the needle, awl, presser-foot, and elements constituting an embodiment of the present invention; Fig. 4 is a side elevation of the parts represented in Fig. 3, showing a shoe in position being treated; Fig. 5 is a detail section on line 5—5 of Fig. 1, showing more particularly the relation of the presser-foot, the top of the work support, and the upper and lower cutters, other parts being omitted for clearness of illustration; Fig. 6 is a sectional detail on the line 6—6 of Fig. 2, illustrating the means for causing the upper cutter carrier to move with the awl during the feed and contra-feed movements; Fig. 7 is a sectional detail on the line 7—7 of Fig. 2; Fig. 8 is a sectional detail on the line 8—8 of Fig. 2; and Fig. 9 shows an enlarged section of a welted shoe, having the outsole sewed to the welt and the line of stitches countersunk in the channel of the sole and surface of the welt.

The invention herein has been illustrated in connection with a sole sewing machine of the general type of that disclosed in patent to French and Meyer, No. 473,870, dated April 26, 1892, to which reference can be conveniently made for a description of those parts of the machine which do not pertain to the present invention.

The needle 1, its actuating means which causes it to enter the hole made in the stock by the awl, the looper 2, the thread holder 3, and their associated actuating mechanism may be of the general character shown and described in the patent above mentioned, or otherwise as desired.

Secured to a stationary part of the main frame is the work support 4, having a slot 5 therein for the passage of the awl and needle, as will presently appear, and disposed above the work support 4 is the presser-foot 6 carried by a lever 7 fulcrumed

upon a bracket 8, Figs. 2 and 8, secured to the machine frame, said presser-foot lever 7 being preferably mounted to turn upon a bushing 9 carried by the bifurcated bracket 8, as indicated in Fig. 8. The portion of the presser-foot lever 7 extending to the rear of the fulcrum point is shown broken away in Fig. 2, but it may be of the general character as indicated in the patent called to attention, or otherwise as desired. Also fulcrumed upon the bushing 9 is a hand lever 10 adapted, when turned clockwise, to engage a projection 11 on the presser-foot lever and raise the presser-foot from the work, the said lever and connected parts preferably being of the character shown and described in application Ser. No. 414,161, filed by me Feb. 4, 1908.

Mounted in the ways or guides 13, Figs. 20 1 and 2, is the feed slide 12, having connected thereto a feed regulating lever 14, provided with a block or roll 16, which engages a curved groove or slot 17 in the arm 15 of a lever 18 fulcrumed centrally on a stand 19, 25 and having an arm 20, which by means of a roll 21 engages a cam groove 22 of a cam 23 mounted on the main shaft of the machine, all substantially as shown and described in the patent to French and Meyer, of 1892, to 30 which reference may be had, and which, being fully disclosed therein and well understood by those skilled in the art, needs no further description here.

Projecting upward from the feed slide 12 35 is the feed arm 24 which furnishes a support for the awl segment 25 and its connected awl 26, so that as the feed slide is reciprocated from the cam 23 it will impart to the awl a reciprocating movement in the direction of feed and return, the timing of the 40 elements being such that the former of these movements occurs while the awl is in the work, and the latter when the awl has been withdrawn, with the result that the work is 45 fed by the awl and then clamped and held in place by the presser-foot and needle as the awl returns to its initial position, as will be readily understood by those skilled in the art and from the disclosure in the hereinbefore mentioned patent.

In the illustrated form of the invention, the awl segment 25 is mounted on a stud 27, Figs. 6 and 7, held in the bearing 28 of the feed arm 24, said stud being held rigidly in 55 its bearings by a set screw 29, Fig. 7. A screw 30 is threaded into one end of the stud 27, a washer 31 being interposed between the head of the screw 30 and the feed arm 24. The opposite end of the stud 27 is enlarged 60 and preferably formed as a cutter carrier 32 having an arm 33, Figs. 4, 5 and 7, carrying a knife 34, the cutting edge of which faces upward and in a direction opposite to the feeding movement, as will be apparent 65 from Figs. 3 and 7.

The knife 34 and awl 26, Figs. 1, 3 and 7, are disposed close together, and, since both the awl and cutter are mounted upon the feed arm 24, they move in the direction of feed and back to initial position in unison. 70 In order to conveniently permit this movement of the cutter carrier arm 33, while supporting the cutter 34 in position alongside the awl 26 and beneath the work, the table or work-support 4 is cut away, Figs. 3, 5 75 and 7, affording also a support 35 for the end portion of the knife carrier arm, the knife 34 projecting upward a desirable distance therefrom to form a cut 36 in the surface of the welt, as indicated in Figs. 4 80 and 9.

From the construction thus far described it will be noted that the work is supported on the work support 4, Fig. 4; that the awl, by means of its segment and actuating 85 means, is caused to rise through the slot 5 of the work support and penetrate the work. At this time the needle 1 is moved to raised position and the presser-foot 6 is relieved from clamping pressure upon the work, as 90 well understood by those familiar with this type of machine. The feed slide is then moved in the direction of feed, or to the left, Fig. 1, and the awl and knife 34 being 95 then in the work give proper feed movement thereto, after which the awl is withdrawn from the work, followed closely by the needle 1, and the presser-foot clamps the work. The feed slide then moves in the 100 opposite direction carrying the awl and knife 34, the latter at such time cutting a slit or score in the surface of the welt the length of a stitch.

If it is desired that the sewing thread be not visible at all upon the surface of the 105 welt, the slit or score made by the knife 34 may be sufficiently deep to permit the thread to sink below the surface of the welt and lie entirely concealed. This is sometimes desirable, and enables the stitch impression tool 110 to act upon the smooth unobstructed surface of the welt in the production of regular and well defined indentations or impressions. If, on the other hand, it is desirable to have the stitches sunk to a less depth, it is only neces- 115 sary to provide a desirable size of knife, which, in the present form of the invention can be done by substituting a stud 27, having an appropriate knife, for that previously employed. 120

Obviously it is not necessary to have the stud 27 and knife carrier formed in one, as represented by the present illustrated form of the invention, the essential being that a knife shall be supported alongside but inde- 125 pendent of the awl to have a movement therewith in the direction of the line of feed, and a return movement, and that in such return movement, while the work is securely held by appropriate means, it shall form a 130

cut or score in the work in which the line of stitches may sink more or less. In the present invention this cut or score is formed in the surface of the welt so that the line of stitches will not interfere with the proper ornamentation of the welt, as hereinbefore noted.

In order to prevent the line of stitches showing upon the surface of the sole as imprints developed during the leveling or beating-out processes, the present invention contemplates the formation of a score or cut in the bottom of the previously formed channel, as indicated at 37, Fig. 9, into which the floating loops of thread may sink, so that when the channel flap or lip 38 is turned down it may assume its former natural position in the channel and not be raised by or rest upon loops of thread disposed above the channel surface. As one means of forming this groove or cut in the channel, but without circumscribing the invention by particulars of the structure selected for illustrative purposes, the upper knife 39 is mounted upon an upper knife carrier or arm 40, carried by a pin 41, Figs. 2 and 8, adapted to rotate and slide within the bushing 9 upon which is mounted the presser-foot lever 7, said presser-foot and upper knife carrier 40 thus being mounted to turn about the same axial center, yet upon relatively movable elements.

The presser-foot 6, adjacent to or above the work support, has its end turned in the direction of the line of feed, as indicated in Figs. 1 and 2, its lower surface being preferably provided with spurs 42 to engage the work. At its front or work engaging portion the presser-foot 6 is cut away, as at 43, to receive the end of the upper knife carrier 40, which is likewise turned in the direction of the line of feed, said cut away portion of the presser-foot thus affording a passageway for the end of the knife carrier during its movement in the direction of feed and return, as will presently appear.

Secured to the pin 41 is an arm or stud 44 to which is connected one end of a spring 45, Figs. 1 and 2, acting normally to turn the pin 41 in a direction to lift the connected knife carrier 40, and maintain the knife carrying end thereof seated against the shoulder 46, Figs. 3 and 5, of the presser-foot 6. The result is that while the presser-foot 6 and upper knife carrier 40 may move independently or relatively in the direction of work feed and return, yet the knife carrier is maintained in its operative position by the overlying shoulder 46 of the presser-foot, and should the presser-foot at any time be raised from the work, the spring 45 will likewise raise the knife end of the carrier, as will be apparent.

The upper knife 39 is preferably disposed

directly above the lower knife 34, so that as the awl penetrates the work it passes close to each of these knives, although this exact relation is not essential.

To insure the cutting action of the upper knife in the bottom of the previously formed channel while the work is properly held or clamped, and produce the cut in proper relation to the stitch formation, it is desirable that the cut in the bottom of the channel and surface of the welt be produced the length of a stitch and as close to the previously formed stitch as possible, so that curves and turns may be made in the line of stitches as it passes around the toe or other pronounced curve in the shoe contour, and yet such line of stitches always properly occupy the cut or score. To this end the upper knife carrier is connected with the feed slide so as to partake of the feeding and contra-feeding movements thereof, and consequently form a cut the length of a stitch which is, of course, defined by the length of feed movement. As one means of connecting the upper knife carrier to the feeding mechanism, the upper part of the feed arm 24, Fig. 6, is provided with a recess 47 in which the carrier rests when in operative position, said carrier, as indicated in Fig. 4, extending from its supporting pin 41 over the top of the feed arm 24, and preferably being provided with a recess 48 to embrace a part of the stud 27 on which the awl segment and lower knife carrier are mounted. The recess 47 may be made in the face of the arm 24 adjacent the awl segment 25, in which case the awl segment itself forms one wall of the recess for receiving the carrier 40, Fig. 6. From this construction it will be noted that, while the upper knife carrier is free to be turned up from or down upon the work with the presser-foot, and will be held upon the work in operative relation thereto by the overhanging shoulder 46, Figs. 3 and 5, of the presser-foot, it will also be moved with the lower knife carrier and awl in the feeding and return movements, the action of the upper knife carrier being permitted by its carrying pin 41, which is free to move longitudinally in its bearing, as previously described.

It is desirable at times to vary the character or form of cut made by a knife, or to substitute one for another for various reasons, and as one means of readily securing this end, the present invention contemplates providing the end of the carrier with a perforation and detachably mounting therein the knife, as 39, Fig. 3, the said knife 39 being formed of steel on the end of a wire-like shank portion 49, Fig. 3, which snugly fits the said perforation. The frictional hold of the shank 49 against the walls of the perforation is sufficient to maintain the

knife in position, and yet the snug fit permits the knife to be readily driven out and another substituted when desired.

The drawings show an edge gage 50 which may or may not be employed, and as it forms no part of the present invention a description thereof is unnecessary.

The awl segment 25 having the usual teeth is operated in a well understood manner from the toothed actuator 51 to raise the awl and cause it to penetrate the work, and then withdraw it for the passage of the needle.

From the construction described it will be noted that, in securing the outsole of a boot or shoe to the welt, the shoe S, Fig. 4, is usually placed in working position with the surface of the welt resting upon the work support 4, the presser-foot being lowered upon the work to hold it as indicated. With the parts in this position, the awl first rises close alongside the upper and lower knives 39 and 34 respectively, and penetrates the work, the knives at such time sinking in the bottom of the previously formed channel and surface of the welt. The feed slide is then actuated, the awl being in the work and the pressure of the pressure-foot being relieved to a degree at least, as well understood. Such feeding movement carries the awl and with it the work, and the upper and lower knives laterally the length of a stitch, whereupon, the awl is moved downward and out of the work, closely followed by the needle, and the clamping action of the presser-foot is restored. The feed slide is then moved to its initial position, carrying with it the awl, and upper and lower knives, which cut or score the bottom of the channel and surface of the welt respectively the length of a stitch. It will be noted that the said knives produce their cuts substantially from the point where the needle is forming the stitch, and cut from said point only the distance necessary for the next stitch, said cuts being both made in the direction of the line of stitches; in other words, the cuts are produced only from the last stitch the distance of a stitch length so that, in passing around the toe or other pronounced curves, the float or upper portion of the stitch loop will necessarily occupy the cut or score produced. It will be observed also that the cuts or scores made in the manner described will be uniform in character and of like depth throughout, so that the sewing thread will have the same relation to the surface of the work throughout the line of stitches. It is to be noted also that the cut or score produced by one of the knives is in the bottom of a previously formed channel, the other being cut into the surface of the welt, so that in the beating-out or leveling operations upon the sole and in the stitch impression of the welt, properly finished and ornamental surfaces may be produced.

To those skilled in the art, changes in form, character, or relation of parts will suggest themselves, the particulars of structure herein presented being only one of the many mechanical embodiments the invention may assume.

What I claim is:—

1. A sewing machine comprising, in combination, stitch forming means, an awl, means to cause the awl to penetrate the work, an upper and a lower work slitting device disposed adjacent the plane of movement of said awl as it penetrates the work, means to move the awl and said slitting devices together in the line of feed and with the work as the latter is fed, and to return the awl and said slitting devices to initial position to cause the slitting devices to slit the work.

2. A sewing machine comprising, in combination, stitch forming means, work feeding means, upper and lower slitting devices to act upon the work in the production of stitch receiving slits, and means to cause said upper and lower slitting devices to move with the work in the line of feed and back to initial position to cut their respective slits during such backward movement.

3. A sewing machine comprising, in combination, stitch forming means, work feeding means, upper and lower slitting devices to act upon the work in the production of stitch receiving slits, and connections between said slitting devices and feeding means to cause said upper and lower slitting devices to move with the work during feed movement, and relatively to the work on their contra-feed movement to cut their respective slits.

4. A sewing machine comprising, in combination, stitch forming means, awl feeding means, a work support, an upper and a lower work slitting device to act upon the work on the work support in the production of stitch receiving slits, and connections between the awl feeding means and said slitting devices to cause them to partake of the movements of the awl feeding means.

5. In a shoe sewing machine, the combination of stitch forming and awl feeding means, a work support, means to clamp and release the work upon the work support, upper and lower slitting devices to act upon the work in the production of stitch receiving slits, and means actuated by the awl feeding means to impart movement to the said upper and lower slitting devices in a direction opposite the feed while the work is clamped upon the work support to form their respective slits.

6. In a shoe sewing machine, the combination of stitch forming and work-feeding means, a work support, a sole slitting device and a welt slitting device oppositely disposed in the line of stitch formation and

adapted to receive the work between them, and connections between said sole and welt slitting devices and the work feeding means to cause said slitting devices to travel with the work during feed movement and to travel relatively to the work and form their respective slits between feed movements.

7. In a shoe sewing machine, the combination of stitch forming and work feeding means, a work support, a presser-foot movable toward and from said work support, oppositely disposed slitting devices to act upon the opposite surfaces of the work in the production of stitch receiving slits, and means connecting said devices with the work feeding means to cause said oppositely disposed slitting devices to produce their respective slits.

8. In a shoe sewing machine, the combination of stitch forming means, an awl and its operating connection for causing it to penetrate and withdraw from the work, a rising and falling presser-foot, an upper knife carrier associated with said presser-foot to rise and fall therewith, a lower knife carrier, means for imparting movement to the awl in the direction of feed and return, and connections between said means and said knife carriers to impart corresponding movements thereto.

9. In a shoe sewing machine, the combination of stitch forming means, an awl, a feed slide carrying said awl, means for causing

the awl to penetrate the work and withdraw therefrom, a lower knife carrier connected to said feed slide to move therewith, a slitting knife mounted on said carrier, and means to reciprocate said feed slide to give to said awl and lower knife carrier movement with the work in the direction of feed and movement relative to said work in the opposite direction to return the awl and slitting knife to initial position and cause the slitting knife to slit the work on such return movement.

10. In a shoe sewing machine, the combination of stitch forming means, a work support, a feed slide and its actuating means, a lower slitting knife, a lower knife carrier on which said knife is mounted, connections between the carrier and said feed slide, an awl segment also mounted on said feed slide, and an awl carried by said segment, said awl and slitting knife being disposed in the line of stitch formation and means to reciprocate the feed slide to cause the awl and knife to move with the work in the line of feed and the knife to slit the work on its return movement to initial position.

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

THOMAS G. PLANT.

Witnesses:

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MARION F. KIMBALL.