

J. CALLAHAN.
SHOE SEWING MACHINE.
APPLICATION FILED DEC. 29, 1903.

6 SHEETS—SHEET 1.

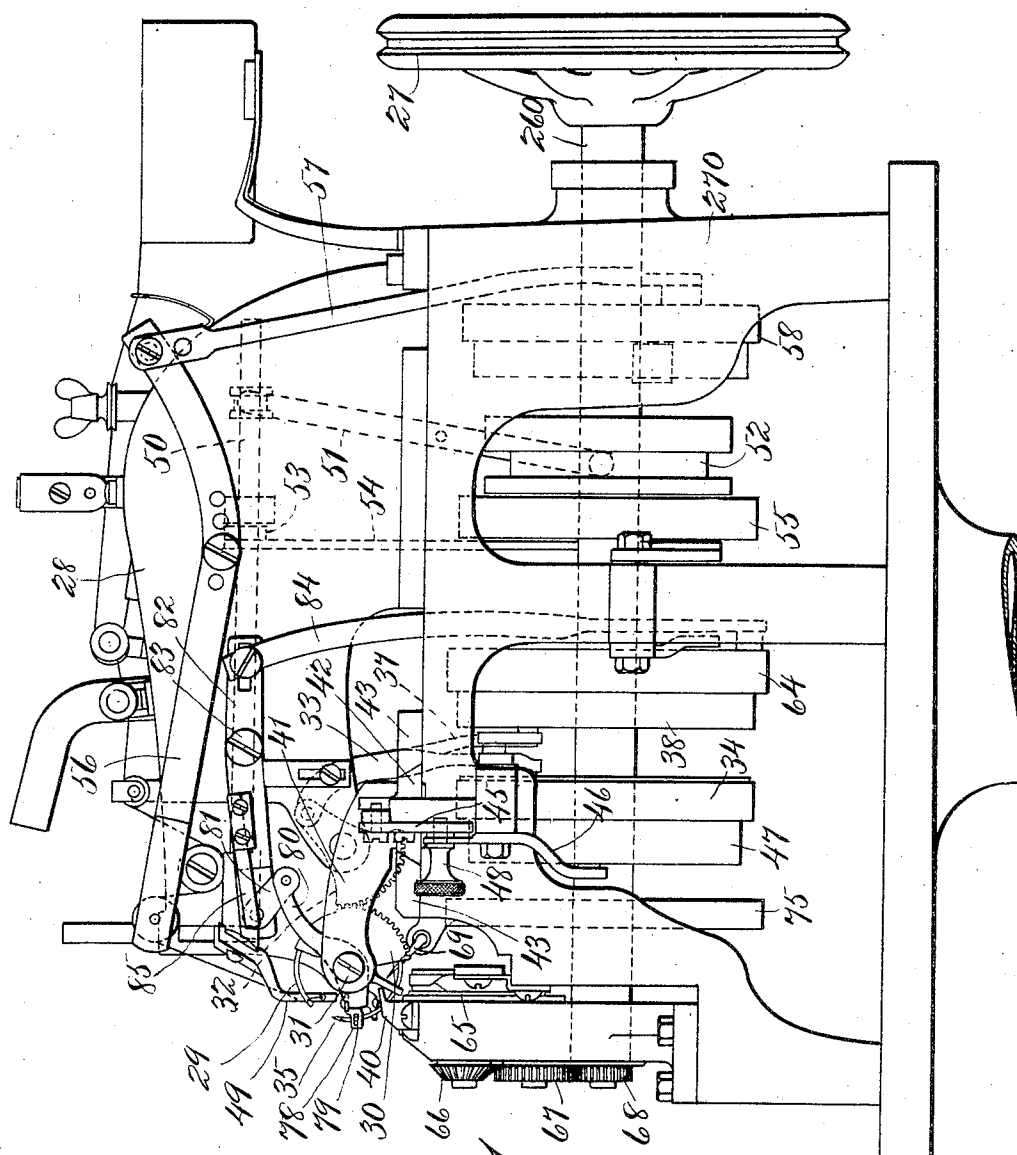


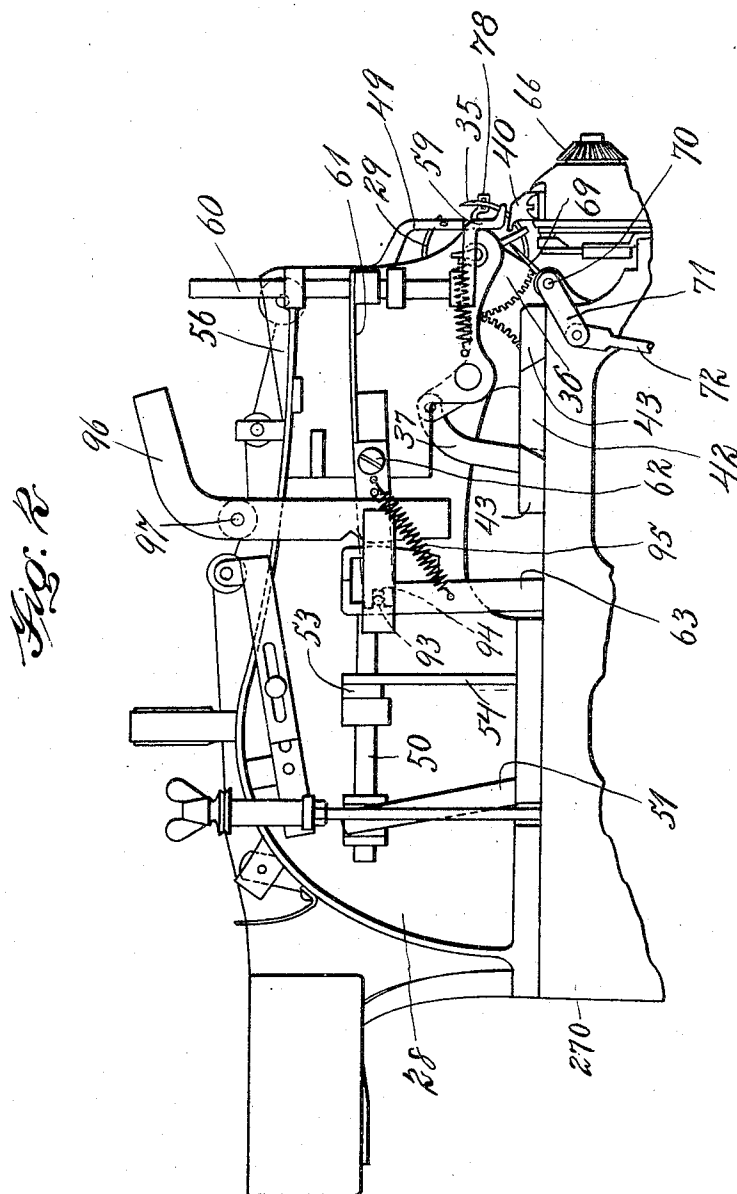
Fig. 1

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6 SHEETS—SHEET 2.



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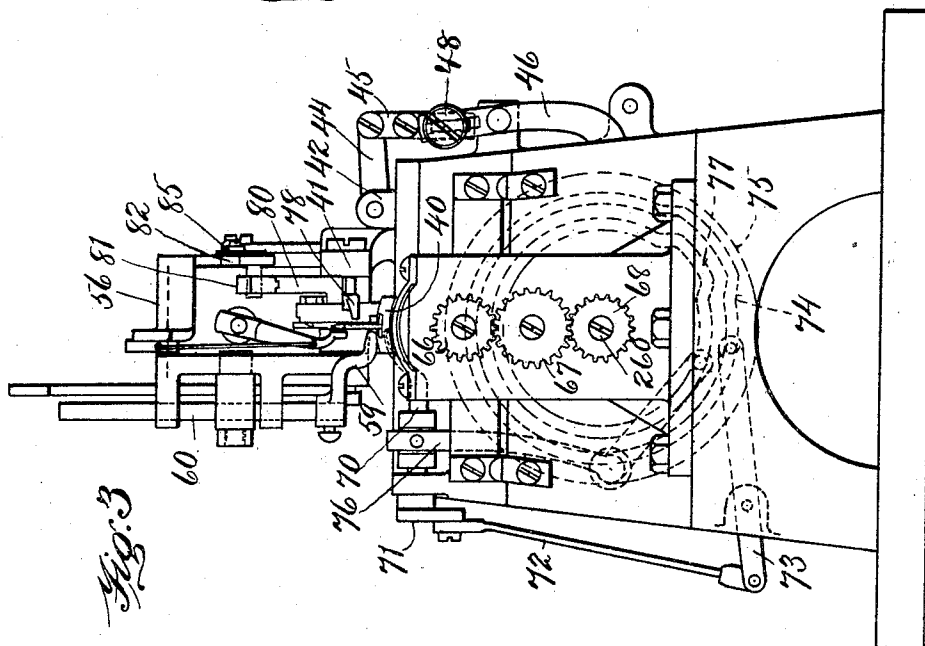
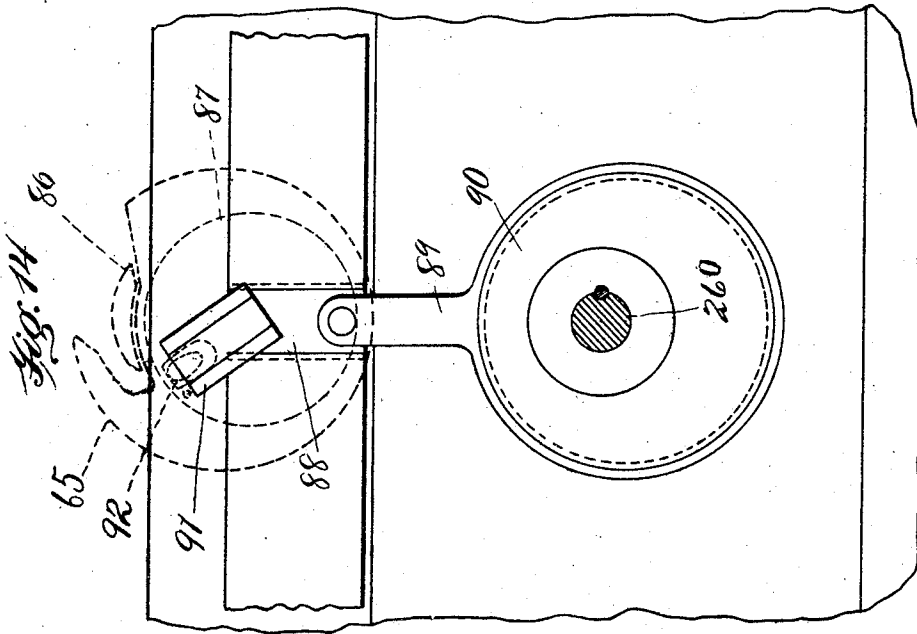
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No. 791,005.

PATENTED MAY 30, 1905.

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6 SHEETS—SHEET 3.



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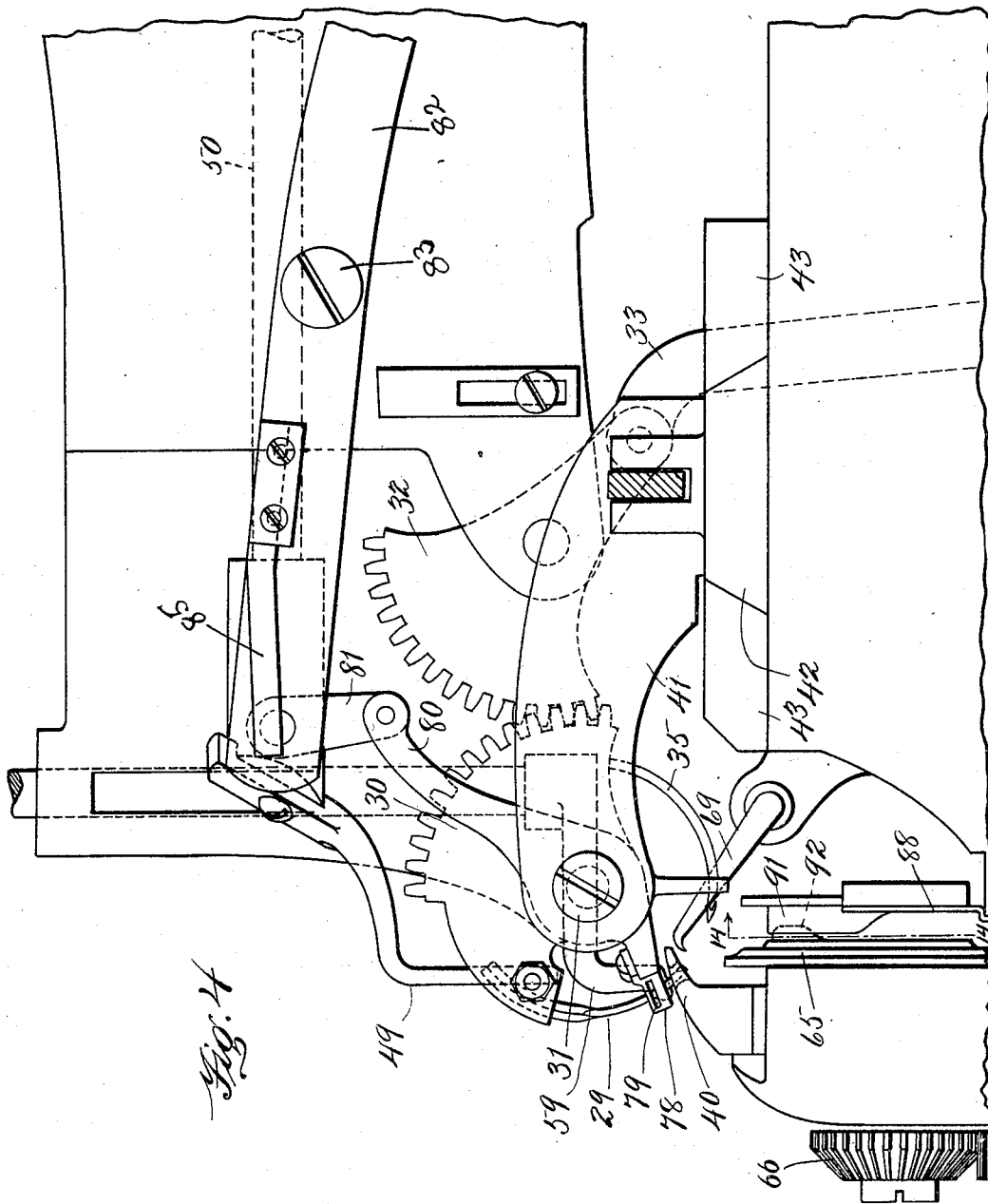


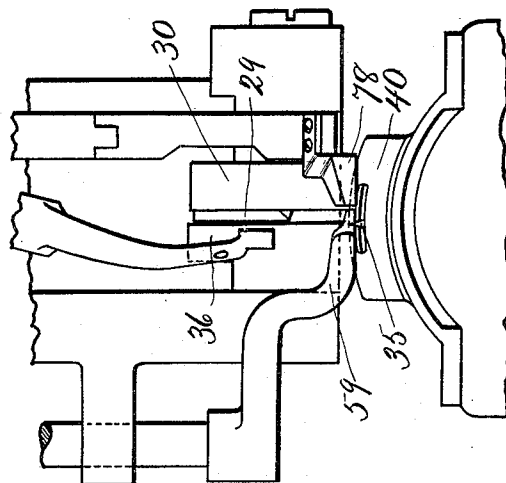
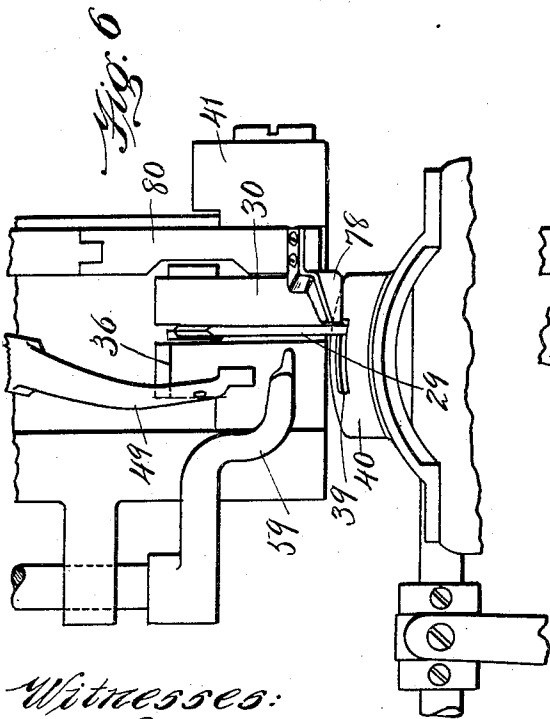
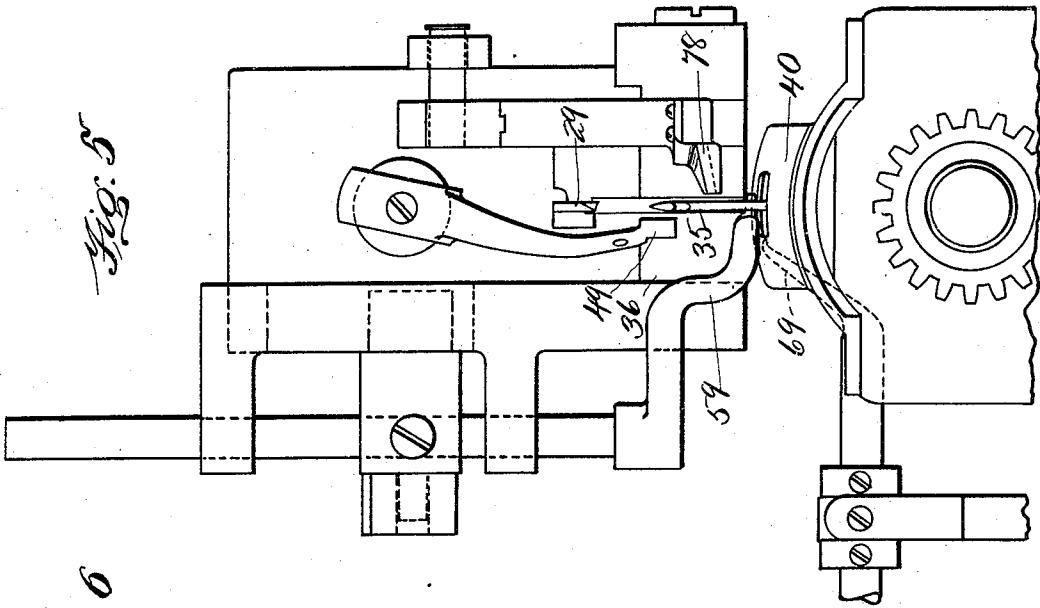
Fig. 4

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6 SHEETS—SHEET 5.



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6 SHEETS—SHEET 6.

Fig. 12

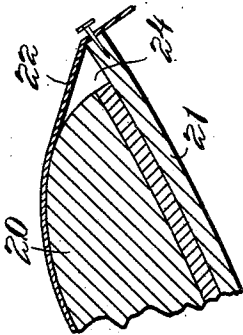


Fig. 13

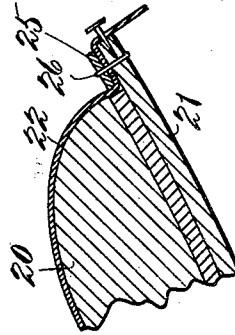


Fig. 10

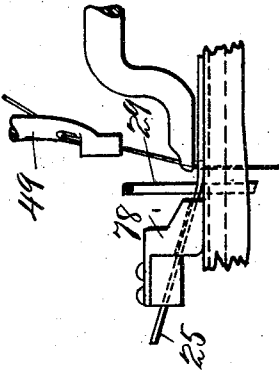


Fig. 11

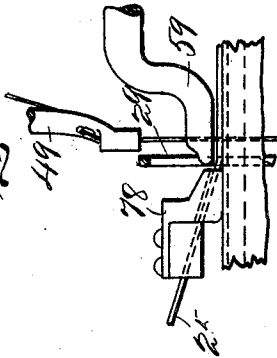


Fig. 8

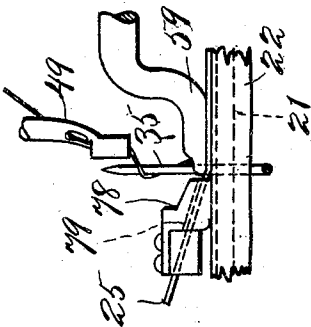
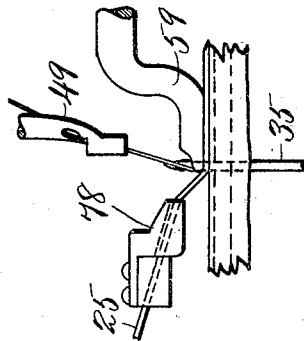


Fig. 9



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UNITED STATES PATENT OFFICE.

JOHN CALLAHAN, OF LYNN, MASSACHUSETTS.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 791,005, dated May 30, 1905.

Application filed December 29, 1903. Serial No. 186,958.

To all whom it may concern:

Be it known that I, JOHN CALLAHAN, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sewing Machines, of which the following is a specification.

This invention relates to a machine for sewing "stitch-down" shoes, or those in which the upper is stretched over the last and the projecting margin of the sole and tacked to the edge of the sole and is then stitched to the sole by applying a welt on top of the sole and stretching the upper into the crease between the last and sole, the upper being secured on top of the sole by stitching the welt over it.

The present invention has for its principal object to provide a machine which shall automatically stitch the welt and upper to the sole in a shoe of the aforesaid character and at the same time stretch the upper into the crease between the last and sole.

Any suitable form of stitching mechanism may be provided. That which I have shown and described includes a curved needle working from underneath and a curved awl working from above operating alternately through the sole in a well-known manner, the feed being performed by moving the awl laterally while it is in the sole. The shoe is stitched with the sole underneath and the last uppermost. To stretch the upper into the crease and at the same time assist in feeding the work and serve to guide the welt, there is provided an upper stretching and pressing member located above the work-plate to one side of the needle and awl and shaped to conform to the crease between the last and sole, said member being formed with an aperture for a welt-guide and having imparted to it movements toward and from the work-plate to alternately hold and release the work and movements longitudinally of the work-plate to feed the work.

Of the accompanying drawings, Figure 1 represents a right-hand side elevation of a shoe-sewing machine constructed according to my invention. Fig. 2 represents a left-hand side elevation thereof. Fig. 3 represents a front elevation. Fig. 4 represents a right-hand side elevation, on a larger scale, of the

working parts with certain members omitted. Figs. 5, 6, and 7 represent enlarged front elevations of the working parts, showing the latter in different positions. Figs. 8, 9, 10, and 11 represent rear elevations of certain of said parts in different positions. Figs. 12 and 13 represent sections of the shoe before and after being stitched. Fig. 14 represents a section taken through the operating-shaft looking toward the rear and showing the device which holds the bobbin from rotation.

The same reference characters indicate the same parts in all the figures.

Figs. 12 and 13 illustrate the kind of shoe on which the machine is designed to operate. 20 indicates the last, 21 the sole, and 22 the upper. As seen in Fig. 12, the upper is first stretched over the last and the projecting margin of the sole and tacked to the edge of the sole. Afterward by the operation of the machine the upper 22 is stretched into the crease 24 and secured by a welt 25 and a line of stitching 26 to the upper side of the sole.

270 is the machine-frame journaling an operating-shaft 260, having belt-pulley 27 and carrying the various cams whereby the operation of the parts is effected.

28 is the arm carrying the presser-foot, take-up, and looper.

The stitching mechanism is of the two-thread lock-stitch type and includes a curved awl 29, attached to a gear-toothed segmental carrier 30, pivoted on a stud 31 and operated by gear-segment 32, link 33, and cam 34 on the operating-shaft, said awl working from above the shoe and a curved needle 35 operating from beneath the shoe and carried by a toothed segmental carrier 36, Figs. 2, 5, 6, and 7, similar to the awl-carrier 30 and oscillated by a segment similar to the awl-operating segment 32 through link 37 and cam 38. The awl and needle operate through an elongated slot 39 in an upwardly-convex work-plate 40, which supports the bottom of the sole. The stud or shaft 31, carrying the needle and awl, is mounted in an arm 41, carried by a cross-slide 42, working in guides 43 and operated through link 44, levers 45 46, and cam 47, an adjustable wrist connection 48

being provided between the levers 45 46 for varying the length of feed.

49 is the looper, which has an annular path around the needle to carry the upper thread 5 into the hook of the latter, said looper being mounted on a shaft 50, which receives longitudinal motion through lever 51 and cam 52 and oscillating motion through an arm 53 on said shaft, link 54, and cam 55. 56 is the take-up lever operated through link 57 and cam 58.

59 is the presser-foot carried by presser-bar 60 and operated through spring-lever 61, Fig. 2, pivoted at 62, link 63 engaging the rear end of said lever and cam 64, Fig. 1.

65, Figs. 1 and 14, is the hook carrying the bobbin for the under thread and rotated continuously in one direction by gears 66 67 68, the latter on shaft 260.

69 is a trigger or finger which clears the loop of the upper thread from the needle 35 below the work and lays it on the hook 65, said finger having a shaft 70, which receives oscillatory motion through arm 71, link 72, lever 73, and cam-path 74 in the cam-plate 75. Said finger-shaft receives longitudinal motion through lever 76 and cam-path 77 in said plate.

All of the above parts are or may be of usual construction, and their operation is familiar.

Pivoted on the stud 31 is an upper stretching and pressing member 78, which may be referred to briefly as the "stretcher," whose lower and outer faces conform to the crease between last and sole of a lasted shoe and serve to stretch the upper 22 from its condition shown in Fig. 12 into the condition shown in Fig. 13. The stretcher is also formed with an aperture 79, which acts as a guide for the welt 25, as plainly indicated in Figs. 8 to 11. The stretcher receives its lateral movement from the slide 42 and receives an oscillating movement of approach to and recession from the work-plate 40 from an arm 80, forming a rear extension of the stretcher, link 81, lever 82, pivoted at 83 to the frame-arm 28, link 84, and a suitable cam-groove cut in the cam-plate 64. A spring 85 on the lever 82 is put under tension by the link 81 in the latter's movement to the right, (viewing the front of the machine,) due to cam 47, levers 46 45, and link 44, operating on slide 42, and assists in returning said link in its movement to the left.

The arm 80 and link 81 are moved laterally by movement of the pin 31, mounted on the slide 42, and as it is impossible to avoid some looseness between the arm 80 and link 81 and the various pins and pivots about which they turn there would be liability of the link 81 becoming jammed on the pin which pivots it to the lever 82 and along which it slides during the feeding movement of the arm 80 if some means were not provided for moving

the upper end of the link and retaining it and the arm perpendicular to the pin. This function is performed by the spring 85.

The operation of the parts described is as follows:

Starting position: The shoe is inserted underneath the presser-foot 59, the latter being lifted for the purpose, as hereinafter described, at a time when the point of the needle 35 is just below the surface of the work-plate 40, the needle and awl being in their descending movements, the thread-hook 65 being in its movement of approach toward the needle. The stretcher 78 is in a raised position and about to descend. The looper 49 is retracted behind the needle and (viewing the machine from the front) in a position to the left of the needle. The thread-finger 69 is raised and its point near the needle.

First phase: The needle fully retracts, carrying with it the loop of the upper thread, and as it does so the thread-finger 69, descending and moving to the right, lays the loop from the hook of the needle over the revolving hook 65. The awl pierces the work at a point one-stitch length to the right of the path of the needle, and at the same time the stretcher 78 descends upon the work. After the thread-finger has laid the loop on the revolving hook it retracts to its original position. During this phase the presser-foot 59 automatically descends upon the work. Figs. 6 and 10 show the position of parts during this phase, Fig. 6 showing the presser-foot before it has descended and Fig. 10 showing it after it has descended and just as it is about to rise.

Second phase: The presser-foot 59 rises while the awl is in the work to permit the feed of the work, and the stretcher 78 rises slightly to partially relieve its pressure during the feed and to allow for the convexity of the work-plate 40. The awl 29 moves to the left while it is in the work to feed the work, and at the same time the stretcher 78 moves to the left to assist in the feeding operation. Meanwhile the loop of the upper thread has passed around the hook 65 and locked the under thread from the bobbin, and the needle 35 starts to rise. The position of the parts after the feed is indicated in Fig. 11.

Third phase: After the feed the presser 59 descends upon the work, and the stretcher 78 descends harder upon the work to resist the thrust of the needle, the needle and awl rise, and the needle pierces the work. This is shown in Fig. 7.

Fourth phase. The looper 49 moves around in front of the needle 35 to lay the upper thread in the hook of the latter, encircles the needle, and returns to its original position as the needle starts to descend, this operation being indicated in Figs. 8 and 9. During this phase the stretcher 78 rises, Fig. 5, and returns to the right to its original position, Fig. 9.

In Figs. 4 and 14 is shown an improved device for holding from rotation the bobbin carrying the lower thread. Fig. 14 is a section back of the bobbin, showing the revolving hook and bobbin in dotted lines. The operation of the hook is familiar, said hook being held loosely in a holder and propelled by a carrier 86, rotated by the gear 66. 87 indicates the bobbin mounted eccentrically in the hook 65, and 88 indicates a vertically-reciprocating slide having connection with the strap 89 of an eccentric 90 on the main shaft 260, said slide carrying a guide 91, which engages a lug or projection 92 on the bobbin. This guide is inclined to the path of the slide in order to prevent the lug 92 from escaping upwardly out of said guide. It has been customary heretofore to provide a fixed vertical guide for preventing the rotation of a bobbin eccentrically mounted in a thread-hook; but by providing a guide which follows the back-and-forth movements of the bobbin I shorten the guide, and thereby decrease the length of surface over which the loop of the upper thread is obliged to travel as it passes around the hook 65 and is drawn up between the bobbin 87 and guide 91.

An operative connection is effected between the vertical link 63 and the presser-operating lever 61 by means of a pin 93, Fig. 2, on said link occupying a notch 94 in the rear end of said lever. This pin is impelled toward the bottom of the notch by a spring 95. The presser-foot 59 is thus positively connected with its operating mechanism throughout both upward and downward strokes.

96 is a lever pivoted at 97 to the machine-frame and adapted to engage the upper end of link 63, whereby the pin 93 may be driven out of the notch 94. When this is done, the presser-foot 59 may be manually lifted away from the work-plate 40 for the purpose of inserting the work, and the pin 93 then resides against the end of the lever 61 above the notch. As the link is raised when this lifting of the presser-foot is effected in the shoe-inserting position of the parts, the subsequent lowering of the link 63 by its cam will cause the pin 93 to reënter notch 94, and thereby automatically reconnect the presser with its operating mechanism without attention on the part of the operator.

It will be noted in this machine that the work is always under pressure except when the operator voluntarily releases it by raising the presser-foot, for during the operation of the machine when the presser-foot rises to permit the feed of the work the stretcher is then pressing on the work and when the stretcher rises and retracts the presser-foot is pressing on the work.

I claim—

1. In a shoe-sewing machine, the combination of a sole-support, stitching mechanism operating transversely to the working face there-

of, and a presser-foot and an upper-stretching device opposed to said sole-support.

2. In a shoe-sewing machine, the combination of an upper-stretching device formed with a welt-guide, and mechanism for stitching the welt and upper to the shoe-sole.

3. In a shoe-sewing machine, the combination of an upper stretching and pressing device shaped to conform to the crease between the last and sole of a lasted shoe and arranged to enter such crease, means to impart a feed movement thereto, and stitching mechanism.

4. In a shoe-sewing machine, the combination of an upper stretching and pressing device formed with a welt-guide, means to impart a feed movement to said device, and mechanism for stitching the welt and upper to the shoe-sole.

5. In a shoe-sewing machine, the combination of a work-plate, a member opposed thereto and shaped to conform with the crease between the last and sole of a lasted shoe, said member having a welt-guide, and mechanism for stitching the welt and upper to the sole.

6. In a shoe-sewing machine, the combination of a work-plate, a member opposed thereto shaped to conform with the crease between the last and sole of a lasted shoe and arranged to enter such crease means for imparting a work-feeding movement to said member, and stitching mechanism.

7. In a shoe-sewing machine, the combination of a work-support, an upper-stretching member and a presser both coöperating therewith, and stitching mechanism operating between said member and presser.

8. In a shoe-sewing machine, the combination of a work-support, a presser having an automatic movement toward and from the same, an upper stretching and pressing member coöperating with said work-support, mechanism timed to impart a work-feeding movement to said member while the presser is away from the work-support, and stitching mechanism.

9. In a shoe-sewing machine, the combination of a work-support, an upper stretching and pressing member coöperating therewith, mechanism for imparting movements to said member both toward and from the work-support and longitudinally thereof, and stitching mechanism.

10. In a shoe-sewing machine, the combination of a convex work-support, stitching mechanism, an upper stretching and pressing member, and mechanism for causing said member to automatically move toward the work-support, then slightly away therefrom and longitudinally of the work-support to feed the work, and subsequently to retract.

11. In a shoe-sewing machine, the combination of a convex work-support, stitching mechanism, an upper stretching and pressing member, and mechanism for causing said member to automatically move toward the

work-support, then slightly away therefrom and longitudinally of the work-support to feed the work, then again toward the work-support while the needle pierces the work, and subsequently to retract.

12. In a shoe-sewing machine, the combination of a work-support, an automatic presser-foot opposed thereto, stitching mechanism having a lateral movement to feed the work, and an upper stretching and pressing device opposed to said work-support and having a lateral work-feeding movement coincident with that of the stitching mechanism.

13. In a shoe-sewing machine, the combination of stitching mechanism including a needle and an awl, the latter having a lateral movement to feed the work, a work-support, and an upper stretching and pressing member having a movement toward and from said work-support and a lateral movement coincident with that of the awl for feeding the work.

14. In a shoe-sewing machine, the combina-

tion of a work-support, stitching mechanism, and two work-pressing devices opposed to said support, one of which presses the work while the other releases it and vice versa.

15. In a shoe-sewing machine, the combination of stitching mechanism, a work-support, a presser-foot having an automatic movement toward and from the work-support to alternately press and release the work, and an upper stretching and gripping member opposed to said work-support and having a movement toward and from the work-support to alternately press and release the work, said member being in pressing position when the presser-foot is in releasing position and vice versa.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN CALLAHAN.

Witnesses:

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A. C. RATIGAN.