

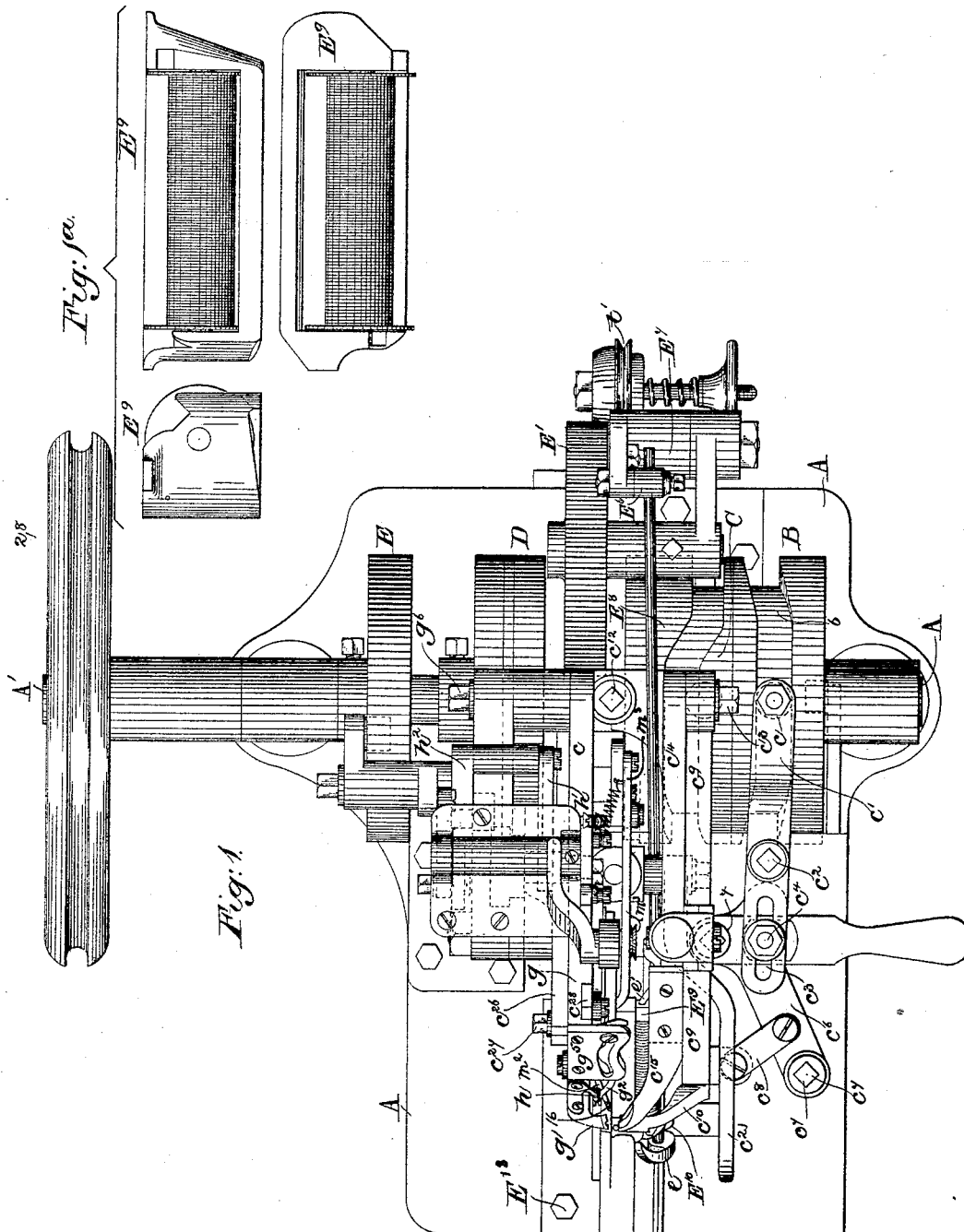
(No Model.)

5 Sheets—Sheet 1.

C. DANCEL.
SEWING MACHINE.

No. 459,036.

Patented Sept. 8, 1891.



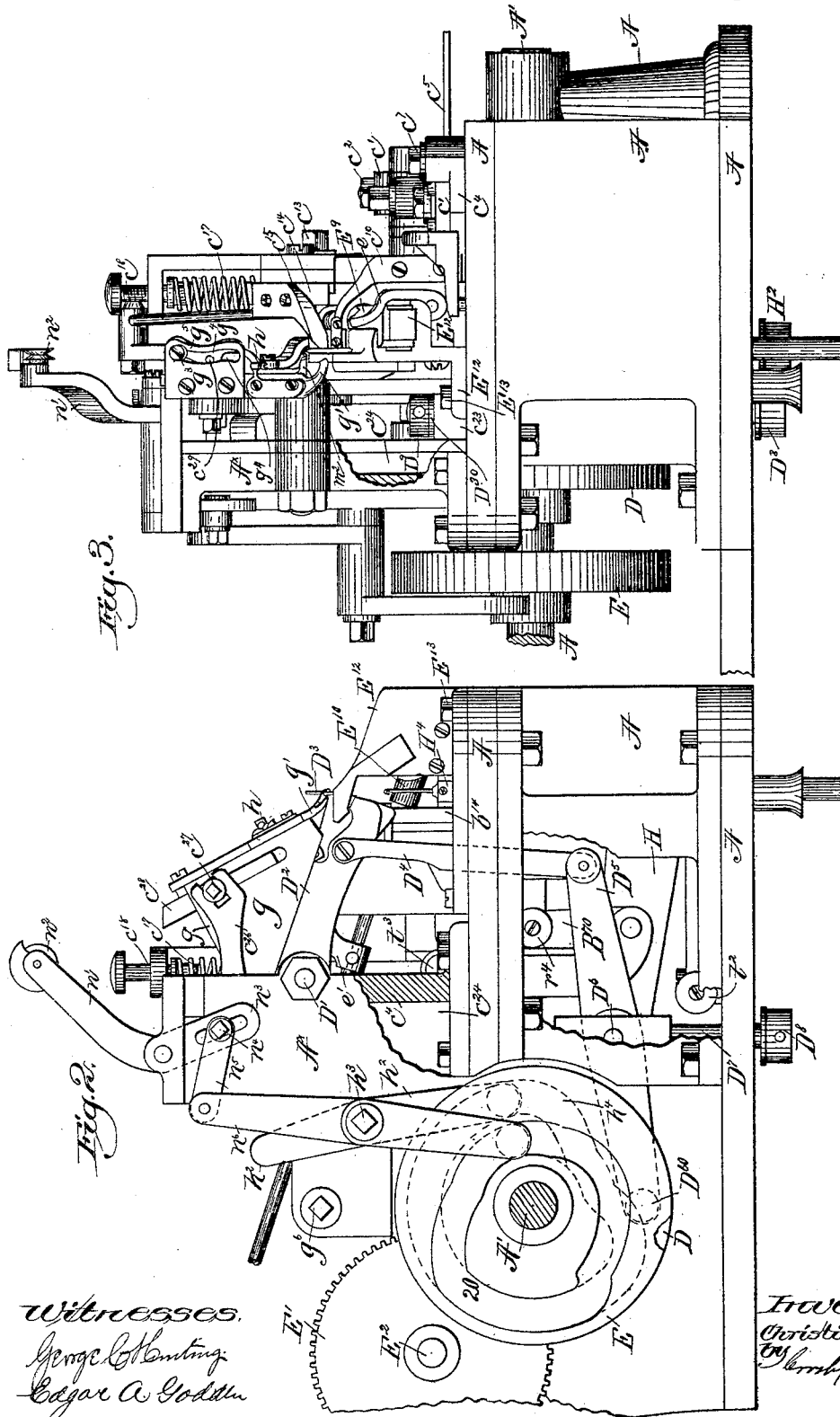
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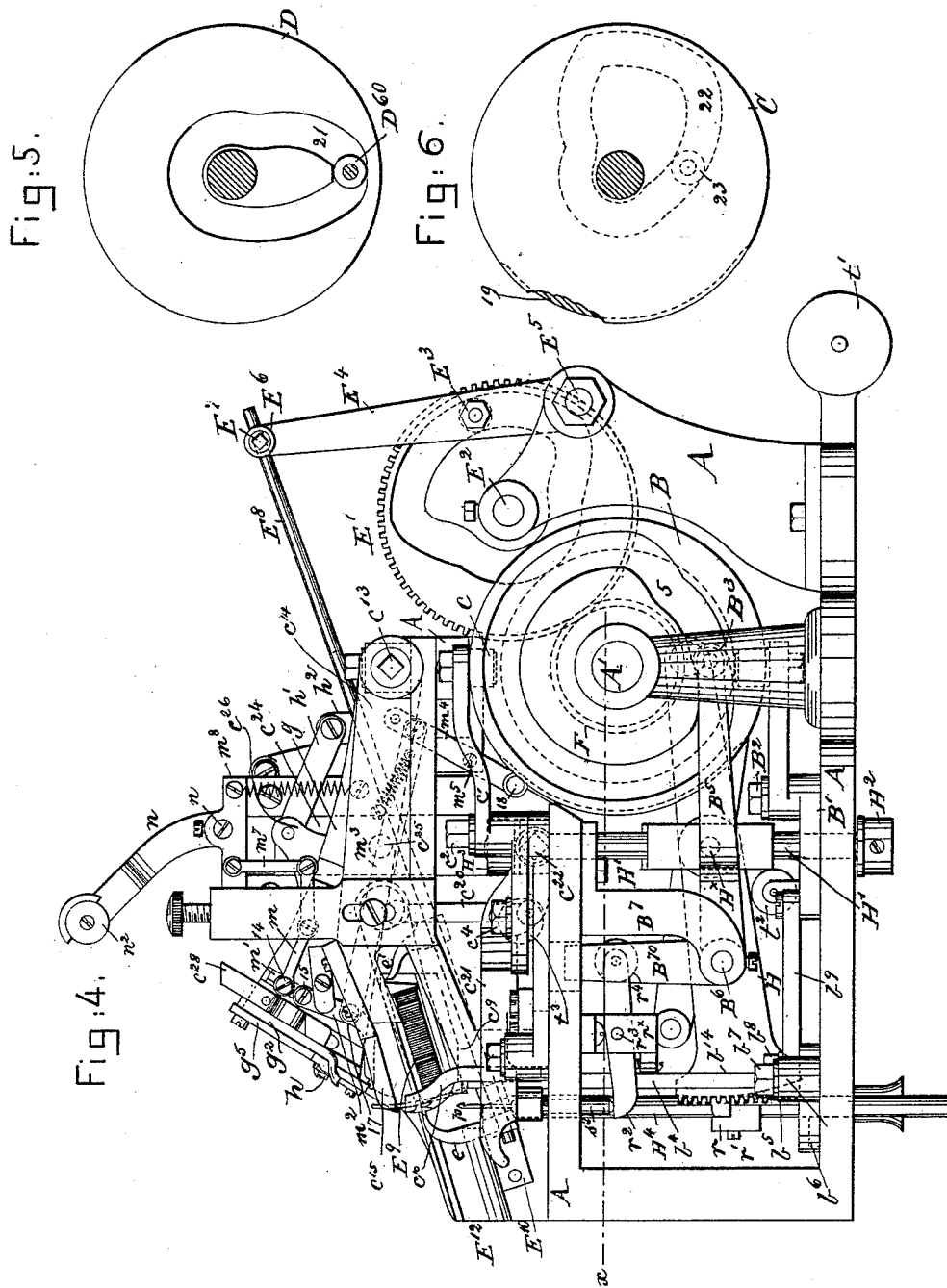
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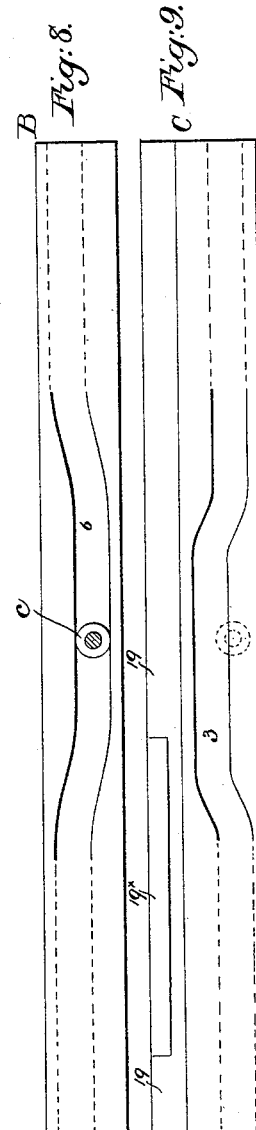
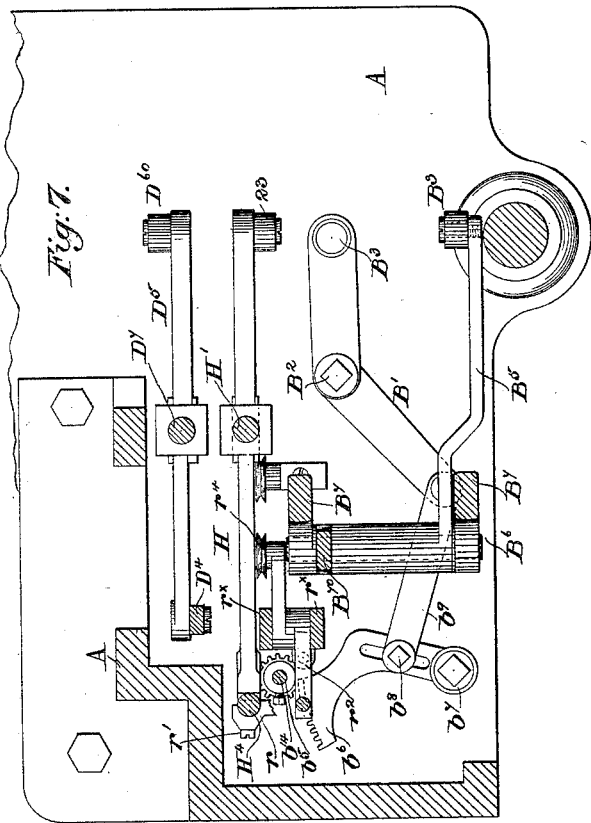
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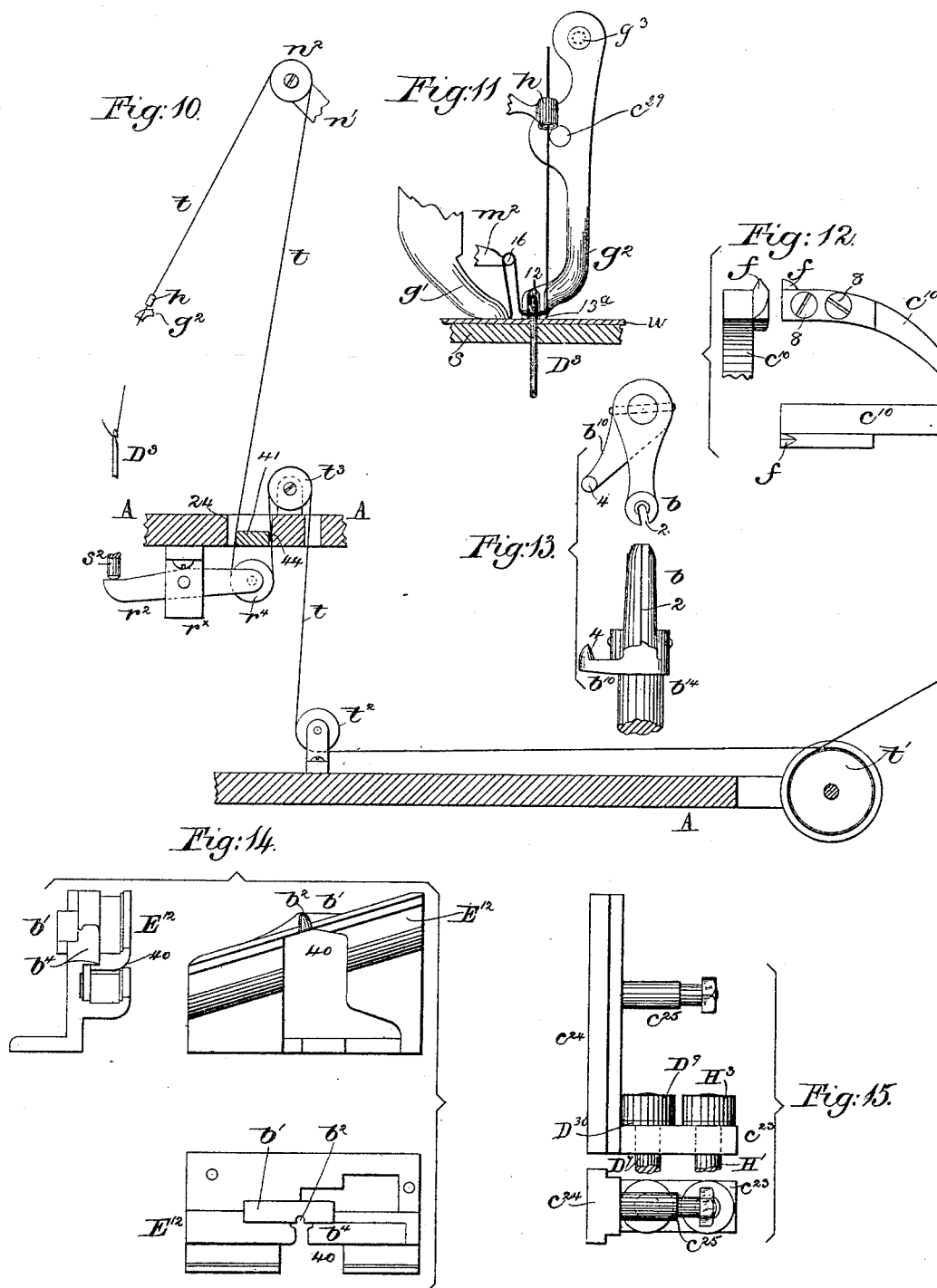
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UNITED STATES PATENT OFFICE.

CHRISTIAN DANCEL, OF BROOKLYN, NEW YORK.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,036, dated September 8, 1891.

Application filed August 4, 1890. Serial No. 360,848. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN DANCEL, of Brooklyn, county of Kings, State of New York, have invented an Improvement in Wax-Thread Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object the production of a novel machine for sewing with wax-thread, the stitch being made from two threads, one manipulated by a hooked needle and the other by a shuttle, the machine
15 herein represented being adapted for sewing outsoles to welts in the manufacture of boots and shoes.

The machine herein to be described contains a straight hooked needle and a curved
20 awl, both adapted to work upwardly from below the work-support, upon which the sole is supposed to rest, the needle-bar-actuating mechanism and the awl-actuating mechanism having combined with them devices whereby
25 they are adapted to accommodate themselves to varying thicknesses of material, the point of the awl and of the hooked needle always rising for substantially the same distance through the top of the welt, whatever may be
30 the thickness of the outer sole and welt. The fulcrum-posts for the levers employed for actuating the needle-bar and awl-carrying lever are varied in their position by or through the presser-foot, which bears upon
35 the stock, which in practice will be the welt, the sole at such time resting upon a fixed work-support. The stock is fed by means of feeding devices, which clamp and move it positively. That member of the feeding-
40 clamp against which the outer sole bears has, as shown, a knife located just in advance of the needle to cut a groove or channel in the sole to conceal the stitch, for in a machine wherein the shuttle is double-pointed and enters successive loops of needle-thread first
45 from one and then from the other side thereof it will be remembered that every other loop of needle-thread is twisted out of line, and were it not for the groove in the sole the
50 stitch would present to the eye a zigzag appearance, which would be apt to render the

shoe unsalable. This groove, if made in the sole before putting it in the machine, must be made in a machine wherein the shoe is held on a last, the upper serving as the gage
55 to define the distance of the seam uniting the welt and outsole from the upper. To however avoid this extra operation, the channel-groove may be cut in the sewing-machine at a point immediately before the stitch-making point and
60 just previous to making the stitch. The needle-thread is led from a suitable spool or bobbin to a thread-eye, which is connected with the rising and falling presser-foot, and the said thread is taken from the thread-eye by a
65 forked thread-carrier, which deposits a quantity of the said thread upon a loop-sustainer, which is maintained in position while the thread-carrier deposits the needle-thread held by it into the hook of the needle. This hav-
70 ing been done, the said thread-sustainer is retracted or moved out of the way, it coming into position again when the thread-carrier is fully lifted and the needle is just about penetrating the material, the thread-sustainer remain-
75 ing stationary while the needle-thread is laid in loop form above it, as described. This thread-sustainer is also adapted to rise and fall together with the presser-foot, according to the variations in thickness of the stock, so
80 that it may always occupy the proper position to correctly co-operate with the thread-carrier whether the stock is thick or thin. The shuttle used is double-ended and adapted to make a stitch in each direction of its move-
85 ment, and the shuttle-race is completely cut through crosswise and has combined with it an oscillating loop-spreader, which takes the loop of needle-thread while held in the hook of the needle and carries it laterally, thus
90 spreading the loop to be entered by the shuttle. Co-operating with the loop-spreader is a cast-off for throwing the loop out of the eye of the needle on the back-stroke of the spreader. The needle-bar as it rises actuates a lever
95 to pull off from the thread-supply a quantity of thread, which varies in amount according to the thickness of the stock, the needle-thread at such time being clamped between the pull-off lever for the needle-thread and
100 the thread-eye referred to. The needle-thread is passed over a take-up, which acts not only

to give up thread to the thread-carrier during its descent, but also to give up thread to the needle while descending and to the spreader, and thereafter to take up the loop of needle-thread. While the needle is completing its descent the needle-thread is unclamped between the take-up and the measuring-roll and clamped between the measuring-roll and the thread-supply, so that the thread previously drawn off positively from the thread-supply has an opportunity to come into the stitch then being made.

Figure 1 is a top or plan view of a machine embodying my invention; Fig. 1^a, three views of the shuttle enlarged; Fig. 2, a left-hand side view thereof; Fig. 3, a front elevation thereof; Fig. 4, a right-hand end view. Figs. 5 and 6 represent the shape of the awl and needle-actuating cam-grooves. Fig. 7 is a partial section below the dotted line *z*, Fig. 4; Figs. 8 and 9, details of the cam-grooves in the peripheries of the feed and spreader cams BC; Fig. 10, a diagram showing the measuring-roll, the acting portion of the thread-clamp, the tension device, the needle, the thread-eye, the thread-carrier, and part of the take-up; Fig. 11, a detail showing part of an outsole and welt with the hooked needle therein and about to be supplied with a measured loop of thread from the thread-carrier, the presser-foot resting on the welt, the thread-sustainer yet supporting the loop of needle-thread about to be drawn through the stock by the hooked needle. Fig. 12 shows three views of that member of the feed-clamp which is provided with the cutter; Fig. 13, a top view and side elevation of the loop-spreader and cast-off enlarged; Fig. 14, three views of the shuttle-race detached, and Fig. 15 two views of the measuring-block.

Referring to the drawings, A represents the frame-work of the machine, which may be of any suitable shape to support the working parts. This frame-work has suitable bearings for a main or cam shaft A', upon which are secured cams B, C, D and E and a pinion F, (shown by dotted lines in Fig. 4,) it being located between the cams C and E, its purpose being to engage and rotate the cam-gear E', mounted upon a stud E², the said cam-gear having a cam-groove in one side of it, as represented in Fig. 4, which receives a roller or other stud E³ on a lever E⁴, pivoted at E⁵ upon a part of the frame-work, the said lever at its upper end having a swiveled joint E⁶, to which is connected by screw E⁷ a shuttle-driving rod E⁸, having suitable drivers *e e'*, (shown in Fig. 4,) which act against the opposite ends of the shuttle E⁹, (shown separately in Fig. 1^a,) the said drivers acting in usual manner to reciprocate the shuttle and carry it through the loop of needle-thread, to be described; but the speed of rotation of the cam-gear E' is one-half that of the main shaft A', so that the shuttle is passed through one loop in one direction and through the next loop in the opposite direction, thus making a stitch

at each stroke of the shuttle in each direction. The rod E⁸ has an additional bearing in a lug or ear E¹⁰, secured to or forming part of the shuttle-race E¹³, which is attached by a suitable bolt or bolts E¹³ to the top plate of the frame-work A. This shuttle-race is shown separately in Fig. 14, where it will be seen that the race has a broad transverse slot 40, through which works the spreader *b*, to be described, (shown separately in Fig. 13,) the said race having at its upper side a work-support *b'*, provided with a groove *b''*, up through which the needle and awl rise, the one to perforate the material and the other to enter the hole made by the awl.

The portion *b''* of the shuttle-race acts as a support for the under member *c''* of the feed-clamp. It will be noticed that this shuttle-race is substantially straight at its upper side, but that it is slightly inclined from a horizontal plane and that the work-support is elevated above it, such construction permitting the shuttle to move in a straight line, and also enabling the shoe to be tipped as required, in order that the stitch may be made through the welt and outsole close to the inseam or to the upper next to the last.

The shuttle will be provided with any usual tension mechanism, and the shuttle-race and shuttle will be heated in any usual manner to keep the shuttle-thread warm and the wax on the thread soft.

The spreader *b* (shown separately in Fig. 13) is composed, essentially, of an upright arm having a groove 2 for the reception of the loop of needle-thread, the said arm being connected to the upper end of an oscillating shaft *b''*, having at its lower end a pinion *b''*, which is engaged by a toothed segment *b''*, pivoted at *b''*, the said segment having adjustably connected with it by a set-screw *b''* a link *b''*, in turn jointed at its opposite end to a lever B', having its fulcrum on a stud B² and provided with a roller or other stud B³, which enters the groove 3 (see Fig. 9) in the cam C, the shape of the said cam being such as to oscillate the said shaft for about one-half a rotation. The shaft *b''* has connected to it a cast-off *b''*, (shown in Fig. 13,) it having a point 4. In operation this spreader and cast-off swing backward and forward through the transverse slot in the shuttle-race, the center of motion of the pinion *b''* being in the vertical plane in which the shuttle moves.

The cam B has at its outer side (see Fig. 4) a cam-groove 5, which receives a roller or other stud at the inner end of a rocking lever B⁵, having its fulcrum at B⁶ in suitable brackets B⁷, depending from the upper part of the frame-work, the upwardly-extended arm B⁷ of the said rocking lever carrying the movable member 41 of a thread-clamp, to be described, the said arm being shown in cross-section in the detail Fig. 10. The cam B (shown separately in Fig. 8) has at its periphery a cam-groove 6, which receives a roller or other stud *c* of a lever *c'*, having its fulcrum at

c^2 and slotted at its outer end, as at c^3 , to receive a stud c^4 , connected with the feed-regulating lever c^5 , pivoted at 7 on the lever c^6 , pivoted at c^7 (see Fig. 1) upon the frame work and connected by a jointed link c^8 with an ear on the frame c^9 , carrying the under member c^{10} of the feed-clamp. The frame c^9 is pivoted upon a vertical stud-screw c^{12} , about which stud-screw the feeding-clamp is vibrated when feeding the work, the length of the vibration being made greater or less by moving the feed-regulating lever c^5 , as will be well understood. The frame c^9 has a horizontally-arranged stud-screw c^{13} , which serves as the fulcrum for the lever or arm c^{14} , on which is mounted the upper member c^{15} of the feed-clamp. The member c^{15} of the feed-clamp is normally acted upon by a spring c^{17} , which may be adjusted by or through a thumb-screw c^{18} as to its strength, the said spring permitting the upper member to rise and fall and to adapt itself to the varying thickness of the sole and welt or stock passing between it and the lower member of the clamp. To lift the upper member of the clamp by hand, I have connected with the lever c^{14} a link c^{20} , (see Fig. 4,) which is attached to a lever c^{21} , pivoted at c^{22} upon the measuring-block c^{23} , to be described, the said measuring-block being shown best in the detail Fig. 15.

The lower member c^{10} of the feed-clamp has connected to it by screws 8 (see Fig. 12) a knife f , which is located immediately in front of the stitch-making point, so that it cuts a groove in the sole just in advance of the sewing, the needle and awl entering the said groove, the stitch being buried therein. The knife is so shaped as to spread and somewhat open the groove made by it in the sole.

The measuring-block c^{23} forms a part of a slide c^{24} , fitted to rise and fall in a suitable groove in the upright A^x , fixed upon the frame-work. The slide c^{24} has a stud c^{25} , (see Figs. 4 and 15,) which forms the fulcrum for the lever c^{26} , which is forked at its front end, as shown in Fig. 2, to embrace a loose block fitted upon a stud-screw c^{27} , attached to a carriage c^{28} , adapted to slide in a suitable groove in the arm or lever g , to which is bolted the presser-foot g' , the said carriage having pivoted upon it at c^{29} (see Fig. 3) the thread-carrier g^2 , it having a roller or other stud g^3 , which enters a cam-slot g^4 in a plate g^5 , attached to the arm or lever g , the lower end of the said thread-carrier being bifurcated, as at 12, and being notched at 13^a (see Fig. 11) substantially at right angles to the notch or bifurcation 12. The rear end of the arm or lever g is pivoted by the stud g^6 , (see Fig. 2,) so that the presser-foot carrier at the under side of the said lever normally rests by gravity upon the welt w . The stud c^{25} , extended from the slide c^{24} , is also extended through the lever g , so that as the position of the said lever is changed by the thickness of the stock under the presser-foot carried by it the said

lever will correspondingly raise or lower the said slide c^{24} , and with it the fulcrum-pin c^{25} for the lever c^{26} , such provision enabling the thread-guide to always move the same distance—namely, down to the welt w , (see Fig. 11,) no matter where it may be, and up to a position above the thread-eye to be described, notwithstanding variations in thickness of the stock. The presser-foot has connected with it a thread-eye h , through which the needle-thread is led on its way to the work.

The rear end of the lever c^{26} has jointed to it a link h' , which in turn is jointed to a right-angled extension (see Fig. 1) of a lever h^2 , mounted on a stud h^3 , the lower end of the said lever having a roller or other stud, which enters a cam-groove h^4 , shaped as shown in dotted lines, Fig. 2, and made in one side of the cam D , the said cam, lever, and link vibrating the said lever c^{26} to reciprocate the thread-carrier.

The lever g (see Fig. 4) has pivoted upon it a lever m , the front end of which is connected by a stud-screw 14 to a slide m' , upon which is pivoted by stud-screw 15, the thread-sustainer m^2 , (best shown in Figs. 1, 3, 4, and 11,) it having a point 16, suitably grooved to prevent the needle-thread slipping off from it. The thread-sustainer has jointed to it by stud-screw 17 a link m^3 , (shown by dotted lines, Fig. 4, and full lines, Fig. 1,) which in turn is jointed to a lever m^4 , pivoted at m^5 upon a part of the frame-work, the lower end of the said lever having a suitable roller or other stud 18, which is acted upon at suitable times by a cam-surface 19 19^x (see Fig. 9) at the periphery of the cam C . The rear end of the lever m is jointed by link m^7 to the bracket cap-plate m^8 . This cap-plate has suitable bearings for a stud n , upon which is mounted the take-up lever n' , having a suitable sheave n^2 , the said take-up lever (see Fig. 2) having a second arm n^3 , which is slotted for the reception of an adjustable stud-screw n^4 , which is connected by link n^5 with the lever n^6 , mounted on the stud h^3 , before described, the lower end of the lever n^6 having a suitable roller or other stud, which enters a cam-groove 20 at the outer side of the cam E .

The upright A^x has a stud D' , upon which is mounted the awl-carrying lever D^2 , it having at its front end, as herein shown, a suitable awl D^3 , the awl being held in place in any suitable manner. The awl-carrying lever D^2 has jointed to it a link D^4 , in turn jointed to a lever D^5 , having its fulcrum upon a pin D^6 in a fulcrum-post D^7 , provided at its lower end with a fixed collar D^8 and at its upper end with an adjustable nut D^9 , which nut rests upon the measuring-block c^{23} , or upon a sound-deadening washer D^{30} , (see Figs. 3 and 13,) interposed between the block and nut. The nut D^9 may be adjusted on the fulcrum-post D^7 to compensate for any shortening of the awl due to grinding. The lever D^5 has at its rear end a suitable roller or other

stud D⁶⁰, (see Figs. 2 and 5,) which enters a cam-groove 21 in the side of the cam D. (See Fig. 5.)

The cam C has at one side of it a cam-groove 22, the shape of which is best shown in Fig. 6, which receives a roller or other stud 23 of a lever H, having its fulcrum at H^x on a fulcrum-post H', provided at its lower end with a collar H² and at its upper end with a nut H³, which rests normally upon the measuring-block c²³ alongside of the nut D⁹. The front end of the needle-bar-actuating lever H is provided with sector-teeth, which engage teeth of the needle-bar H⁴, it being a straight bar provided with a straight hooked needle p.

In this my invention the needle and awl work in the same vertical plane, and both rise in the groove b² in the work-support b', the awl making a hole through the outer sole and welt, and then being withdrawn to let the needle p rise up through the sole and welt, it passing through the hole made by the awl. This arrangement of the awl and needle at the same side of the stock and in the same vertical plane, substantially at right angles to the line of stitching, enables one or the other to remain in the stock at the same point for a longer period than is possible when the awl and needle are arranged one alongside of the other in the direction of the length of the stitch, and in this arrangement the awl and needle always remain in the same vertical plane with relation to the work-support—that is, neither of them has to do with feeding the material.

By dispensing with the awl-feed heretofore used the machine is simplified, and by causing the needle to enter the awl-hole just as quick as the awl leaves it without moving the shoe prevents any accidental displacement of the shoe, which would happen if the awl was arranged at the side of the needle and the material had to be fed in order to place the awl-hole over the needle. The needle-bar has a dog r attached to it by a suitable screw r', which dog, about as the point of the needle enters the sole, strikes the end of a lever r², pivoted at r³ on a stud of a hanger r^x, secured to the frame-work, the opposite end of the said lever, called the "pull-off" lever, having a sheave r⁴. (Shown chiefly by dotted lines in Fig. 4 and by full lines in Figs. 7 and 10.) This sheave acts upon a bight of the needle-thread t. The needle-thread, taken from a suitable thread-supply, which may be a cop, spool, or bobbin, is led over any usual tension device, as t', thence under a roll t², thence up over a roll t³, down through a slot (see Fig. 10) in the frame-work under the sheave r⁴, and up over the sheave n², down to and through the thread-eye h to the work. The needle-thread, it will be noticed, passes at opposite sides of the clamping-block 41 at the upper end of the arm B⁷⁰ of the lever B⁵, and as the said arm is moved to the right or left clamps the said thread between it and the frame-work. When the dog r meets the

pull-off lever r² to turn it, the thread is clamped between the clamping-block and the portion 24 of the frame-work, or at the left, viewing Fig. 10, and at such times the sheave r⁴, acting on the needle-thread, pulls off the needle-thread more or less in quantity, according to the thickness of the stock, for it will be understood that the point to which the needle ascends varies through change of position of the fulcrum-post H', according to the variations in thickness of the stock under the presser-foot. As the dog r acts to turn the pull-off lever r² the latter lever acts upon a stud s², fast to the clamp-lifting lever c²¹, and automatically lifts the upper member c¹⁵ of the clamp while the feed-clamps are being moved backwardly over the stock, the stock then being held by the needle and also between the presser-foot and work-support, and it is at this time that the groove or channel is cut in the bottom of the outer sole, the length of the groove being the distance of the feed.

In operation let it be assumed that the outer sole of the shoe lies upon the work-support and upon the lower member c¹⁰ of the feed-clamp then in its most forward position; that the presser-foot g' and the upper member c¹⁵ of the work-feeding clamp rests upon the welt w; that the awl has been thrust up through the sole s and welt; that the needle D³ has been carried down into its lowest position; that the spreader b has engaged the loose or active side of the loop of needle-thread just drawn down by the needle, and that the spreader has been moved to spread the loop of needle-thread across the path of the shuttle then stationary; that the take-up n² is in its most elevated position; that the thread-support m² is retracted; that the thread-carrier g² is in its most elevated position, and that the thread-clamp 41 is moved toward the left (viewing Fig. 10) to clamp the needle-thread between the sheave r⁴ and the take-up sheave n³. In this condition rotation of the main shaft in the direction of the arrow 28 (see Fig. 1) will depress the awl, withdrawing it from the stock, and as the awl commences to descend the needle-bar commences to rise, the point of the needle entering the awl-hole in the stock substantially as the point of the awl leaves the said hole, the needle entering the awl-hole without any change in the position of the stock, thus avoiding any possibility of displacement of the material. As the awl commences to descend, the thread-support m² is moved forward, it arriving in its most forward position about as the point of the needle enters the stock, the thread-carrier g² commencing its descent while the needle is rising through the stock, the thread-carrier in its descent engaging the needle-thread below the thread-eye h and carrying it laterally across the top of the then stationary thread-support, the thread guide or carrier descending in a cam-shaped path to the right of the thread-support (see Fig. 11)

and measuring off a quantity of the needle-thread for the stitch to be made, the thread-carrier taking the thread so being measured off by it and carrying it down to the welt, at which point it meets the hook of the needle, the thread-carrier putting the needle-thread in the hook of the needle, as in Fig. 11. During the descent of the thread-carrier, as described, the take-up also descends, it continuing to descend until the thread-carrier presents the thread held by it to the hook of the needle, when the descent of the take-up stops and the thread-support is quickly withdrawn from the loop of thread placed about it by the thread-carrier leaving the said loop free to be drawn down by the needle in its next descent. While the needle is elevated and in the stock the stock-feeding clamp is moved backwardly or to the right, viewing Fig. 3, the knife *f* then cutting a groove in the sole equal to the length of the feed movement. As the needle descends with the loop of needle-thread so measured off for it, the thread-carrier rises and the take-up continues to descend, giving up thread to the descending needle; but in its descent the thread does not rend through or across the hook of the needle, because thread for that stitch had been previously measured off by the thread-carrier and thread-support. After the needle completes its descent the shaft *b*⁴ is oscillated to cause the spreader *b* (see Fig. 12) to engage the active or loose side of the loop of needle-thread and carry it across the shuttle-race in front of one end of the then stationary shuttle, and during this time the take-up completes its descent, giving up thread to the spreader in order to make the loop of sufficient size for the shuttle. The spreader having come to rest, the shuttle while the take-up is most depressed and while the needle and awl are both depressed below the stock is passed through the loop of needle-thread, and as soon as the shuttle is through the loop of needle-thread the take-up starts to rise and the motion of the shaft *b*⁴ is reversed, causing the cast-off *b*¹⁰ to engage the loop of needle-thread and cast it out of the hook of the needle if said loop has not already been released from the needle, the take-up continuing to rise and the spreader continuing to move back into its farthest position to the left (viewing Fig. 3) and remaining there until the take-up has nearly completed its movement to take up the stitch, at which time the awl again commences to rise toward the material, the take-up completing its upward movement before the awl engages the material, the feeding-clamp moving the material forward between the presser-foot and work-support while the awl approaches the stock, the feed being completed before the awl reaches the outer sole. While the needle rises through the stock the thread is clamped between the sheave *r*⁴ and the take-up; but as soon as the needle is in the stock and before the thread-carrier delivers the

loop of needle-thread to the hook of the needle the thread-clamp shifts its position or moves to the right, (viewing Fig. 4.) clamping the thread at the side 44 and between the sheave *r*⁴ and the thread-supply, it holding the said thread so clamped until the needle finishes its next descent and the take-up sets the stitch, the thread being released just about as the awl commences to enter the outer sole.

I am aware that sewing machines of this class have been provided with a pull-off to act upon the needle-thread before it is passed through the eye of the looper to be supplied to the hook of the hooked needle, the said pull-off being operatively connected with the work-support through a variable-motion mechanism, whereby the pull-off has more or less movement imparted to it through changes in position of said work-support, such position being determined by the thickness of the stock; but such construction is not herein claimed.

I claim—

1. A work-support and a presser-foot to hold the stock between them, combined with a curved awl to penetrate the stock and with a needle to enter the hole made in the stock by the awl as the latter emerges therefrom, the said needle and awl being arranged at the same side of the stock and in the same vertical plane substantially at right angles to the line of stitching, whereby the needle enters the awl-hole while the stock is in the same position in which it was penetrated by the awl, substantially as described.

2. In a sole-sewing machine, a work-support, a presser-foot, a curved awl, means to actuate it, and a straight hooked needle and means to actuate it, the needle and awl both located below and rising from the under side of the work-support through the material, substantially as described.

3. The combination, with a hooked needle, a thread-carrier, a work-support, of a feeding-clamp, one member of which is provided with a channel-cutter to intermittently cut a channel in advance of the stitching, substantially as described.

4. A work-support, a hooked needle, a thread-carrier, and a double-ended shuttle to make a stitch during each stroke in each direction of its movement, combined with a feeding-clamp having a channel-cutter, to operate substantially as described.

5. A work-support, a hooked needle, a self-adapting presser-foot, a thread-carrier and a thread-sustainer for the needle-thread, both supported in such manner as to rise and fall with the presser-foot according to variations in thickness of the stock, combined with means to move the said thread-carrier and thread-sustainer, whereby the needle-thread is measured off prior to its engagement by the needle to prevent it from being drawn across the hook of the needle while the loop is being formed on the needle-thread, substantially as described.

6. A work-support, a presser-foot, a cam-plate connected thereto and rising and falling therewith, and a pivoted thread-carrier rising and falling with the presser-foot and having a projection to enter a slot in the said plate to move the thread-carrier laterally prior to the formation of each stitch, to operate substantially as described.

7. A work-support, a presser-foot, a thread-eye *h*, and a thread-sustainer, each connected with the rising and falling presser-foot, a hooked needle, a thread-carrier, a carriage upon which it is mounted, and a cam-plate, combined with means to actuate said carriage, whereby the said thread-carrier has imparted to it both vertical and lateral movements to thereby engage and carry the needle-thread laterally across the thread-sustainer and thereafter present it to the needle, substantially as described.

8. A work-support, a presser-foot, a hooked needle, and a thread-eye, combined with a thread-carrier having an open notch to embrace the upper end of the hooked needle, and having a transverse notch *13*^a, intersecting the front of the open notch to engage the needle-thread below the thread-eye and present it across the hook of the needle after the latter has entered the open notch, substantially as described.

9. A vertically-reciprocating hooked needle, a thread-carrier to present to it a loop of thread, and an inclined shuttle-race having a transverse slot *40* and a work-support on the upper side of said race, combined with a shuttle, the spreader, and the oscillating shaft to which it is attached, the spreader moving backward and forward in said transverse slot, substantially as described.

10. The vertically-reciprocating hooked needle and thread-carrier, a transversely-slotted shuttle-race, a shuttle therein, and means to move it, combined with a loop-spreader and cast-off, and the vertically-placed oscillating spreader-shaft *b*¹⁴, substantially as described.

11. A work-support, a presser-foot, a movable carrier therefor, an awl, an awl-carrier, a hooked needle, a needle-bar, an awl-actuating lever, connections between it and the awl-carrier, a needle-bar-actuating lever, variable fulcrum-posts for said levers, connections between the said fulcrum-posts and the movable carrier for the presser-foot, and means to actuate said levers, substantially as described.

12. A work-support, a carrier *g*, a vertically-movable block upon which it is mounted, a presser-foot connected to the said carrier, two fulcrum-posts connected with said block, an

awl-carrier having an attached awl, and a needle-bar having a hooked needle, combined with awl and needle-bar operating levers and means to actuate the said levers, whereby the awl and needle are adapted to rise through the sole and welt for a uniform distance notwithstanding variations in thickness of the stock, substantially as described.

13. In a sole-sewing machine, the following instrumentalities, viz: a work-support, a presser-foot, a straight hooked needle, an awl, and actuating devices therefor, whereby the needle enters the awl-hole as the latter emerges therefrom, as described, combined with an independent clamping feed device and means to vibrate the latter while engaging and clamping the stock to feed the same while the needle and awl are out of the stock, substantially as described.

14. The work-support, a hooked needle, needle-bar, and the projection *r*, carried by the said needle-bar, combined with the pull-off lever actuated thereby and means to automatically vary the stroke of said needle-bar according to the thickness of the stock, substantially as described.

15. The work-support, a hooked needle, straight needle-bar, and the projection *r*, carried by the said bar, combined with the pull-off lever actuated thereby and means to automatically vary the stroke of said needle-bar according to the thickness of the stock, and with a thread-clamp *41*, to operate substantially as described.

16. The work-support, a hooked needle and needle-bar, and the projection *r*, carried by the needle-bar, combined with the pull-off lever actuated thereby and means to automatically vary the stroke of said needle-bar according to the thickness of the stock, and with the feeding-clamp, the pin *s*², and connections between it and the feeding-clamp to actuate the latter to lift the upper member thereof, substantially as described.

17. The work-support, a hooked needle, a straight needle-bar, and the projection *r*, carried thereby, combined with the pull-off lever actuated thereby and means to automatically vary the stroke of said needle-bar according to the thickness of the stock, and with a take-up to act upon the needle-thread, substantially as described.

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

CHRISTIAN DANCEL.

Witnesses:

H. G. DALLIORS,
CHARLES M. MILLER.