

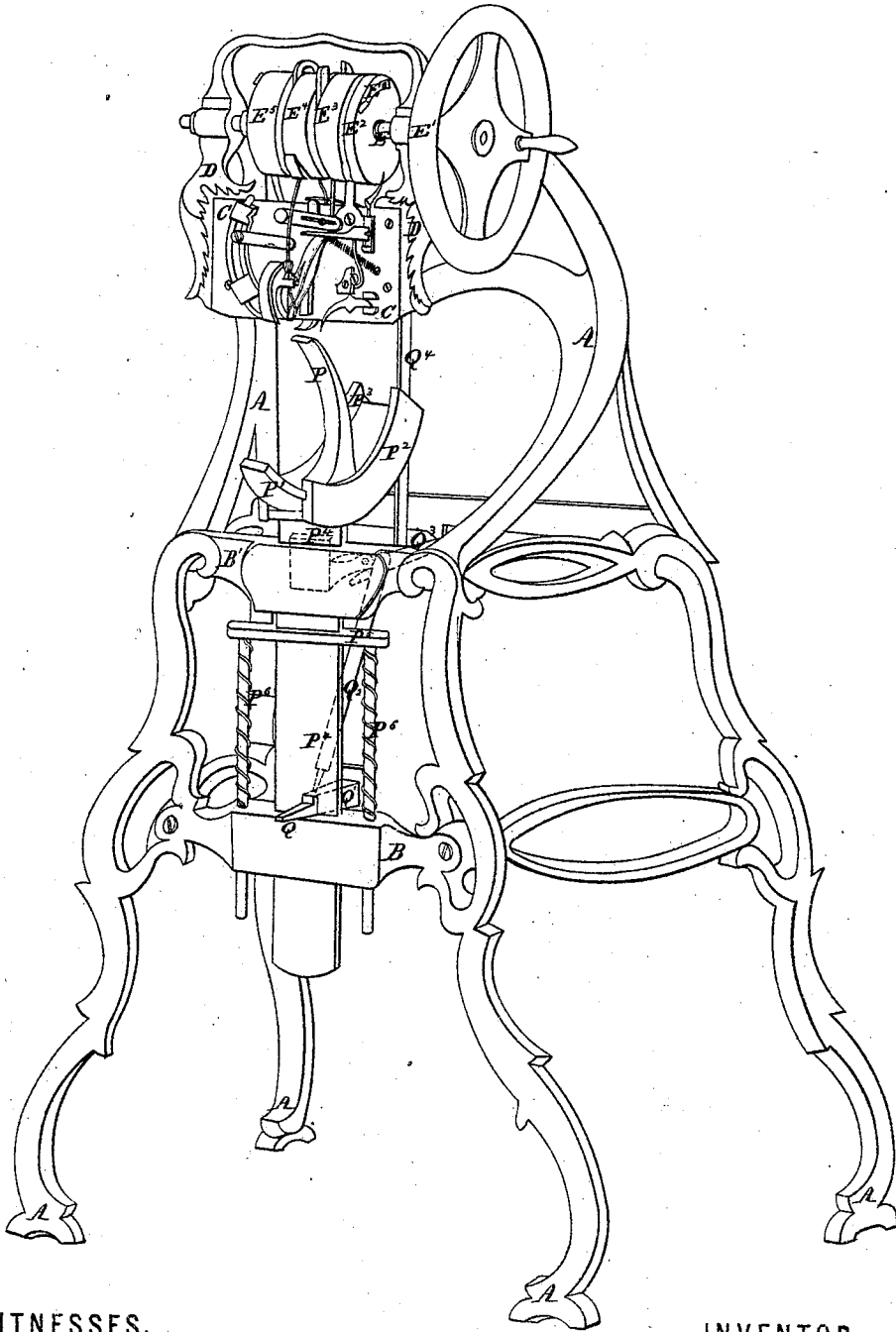
WILLIAM DUCHEMIN.

Machine for Sewing Turned Shoes.

No. 121,237.

Patented Nov. 28, 1871.

Fig. 1.



WITNESSES.

Alex. Mahon
N. H. Doubleday

INVENTOR.

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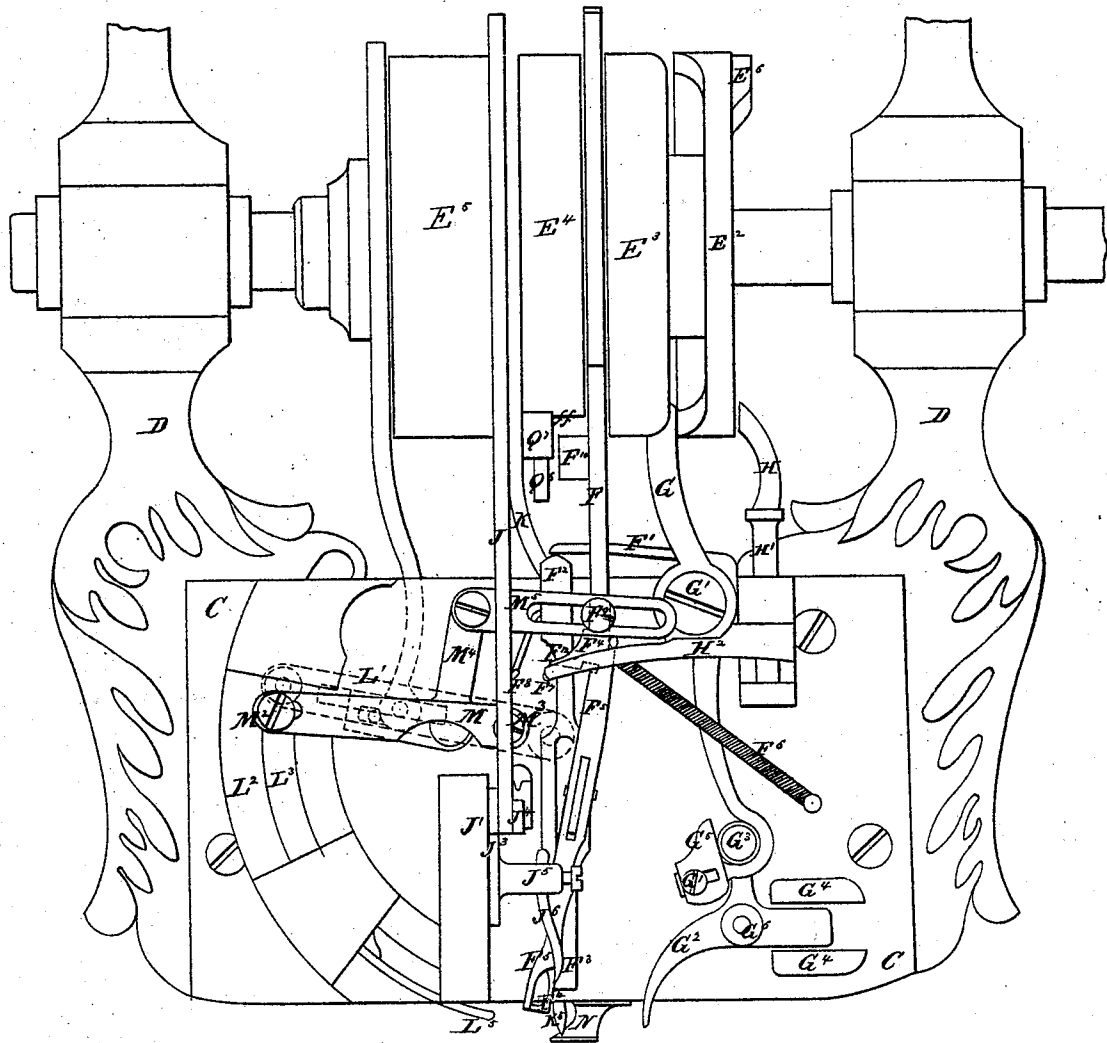
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Fig. 2.



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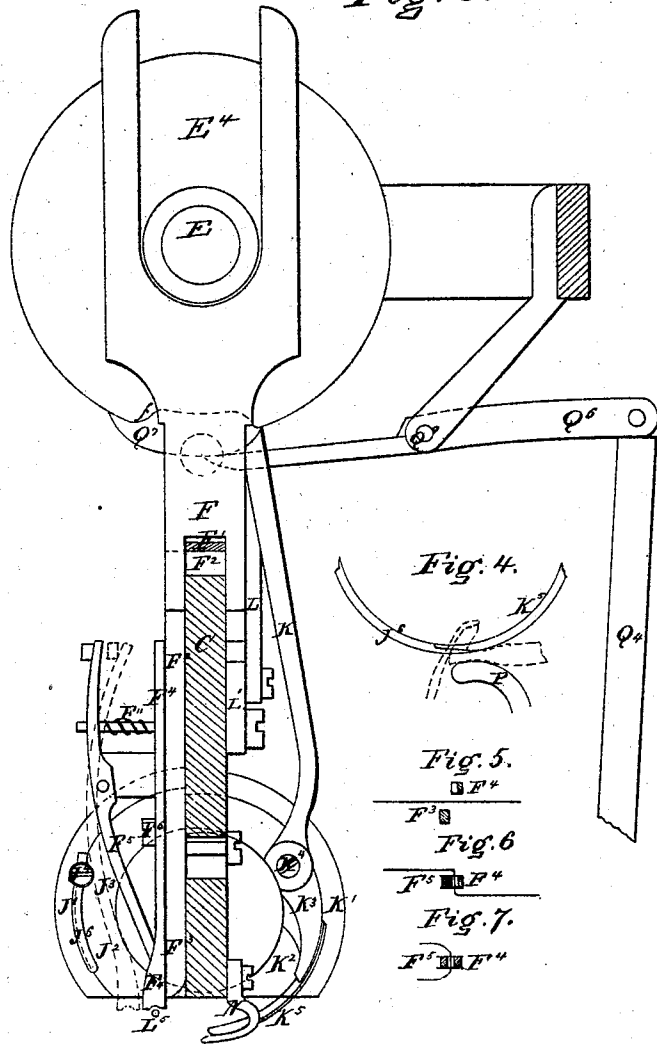
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Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM DUCHEMIN, OF BOSTON, MASS., ASSIGNOR TO HIMSELF, GEORGE B. BIGELOW, WILLIAM EDSON, AND JOHN BIGELOW, OF SAME PLACE; ASSIGNORS TO GEORGE B. BIGELOW, TRUSTEE.

IMPROVEMENT IN SEWING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. 121,237, dated November 28, 1871.

To all whom it may concern:

Be it known that I, WILLIAM DUCHEMIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Machine for Sewing Turned Shoes; and I do hereby declare that the following is so full and exact a description as to enable others skilled in the art to make and use my invention, reference being had to the accompanying drawings and to the letters of reference marked thereon.

To assist the mind in following the description of this machine the same letters, with a number annexed, are used for all parts of the devices that act directly together to produce a desired result.

Figure 1 is a perspective view. Fig. 2 is a front elevation, showing the principal working parts of the machine. Fig. 3 is a cross vertical section of the same. Fig. 4 shows the position of the needle and needle-guard while passing through the shoe. Fig. 5 is a section of the fingers as they appear when open to clasp the thread. Fig. 6 shows the fingers in section closed, giving the thread a quarter-turn. Fig. 7 shows the loop formed by the withdrawal of the thread-carrier, the fingers being shown in section, as before.

E in all the drawings is the propelling-shaft for the whole machine, and has attached to it the cam-wheels E² E³ E⁴ E⁵. N, Figs. 2 and 3, is the fixed point or gauge, which serves as a guide against which the workman holds the shoe while it is being sewed. The arm F¹ is pivoted at one end to the face-plate C of the machine, is curved upward, and the free end rests on the top of the pressure-bar F². The slide F strikes the arm F¹ about centrally, and the curved portion thereof allows the presser to adapt itself to uneven portions of the work and hold the material of varying thicknesses firmly while the needle enters and makes the stitch. F² F³ is the presser-bar, F³ being the presser-foot. This foot is so formed that its outer edge or lip presses the upper-leather into the channel made for its reception at the outer edges of the sole to receive the stitch. The pressure-bar is operated as follows: A spiral spring immediately behind and at the top end of F², not shown in drawings, serves to throw the bar F² F³ up when relieved from pressure, while the cam-rod F, acting through the spring-lever F¹ at proper times, serves to press the bar F² F³ down. The spring-lever F¹ is, in fact, an intermediate spring having two distinct functions—one enabling the

presser-bar to accommodate itself to the irregularities of the upper stock, which, in turned shoes, by reason of gathering in the toe and heel, is always much thicker at the end of the shoe being sewed; the other, in giving an extra pressure on the toe and heel, thus pressing the parts so gathered smooth and enabling the machine to do its work smooth and firm with the same tension for the thread with which it sews the side or smooth parts of the shoe. In other words, this extra pressure equalizes all differences of thickness in the upper stock in such manner that a uniform tension will sew all parts of the shoe with an equal regularity. This intermediate spring-lever, giving, as it does, a firm yet elastic gripe in combination with my device for pressing the upper stock into its channel, as before named, is really a most valuable part of my invention. It is made a little thinner at the center than at the ends, and is formed on its under side as shown and described. The cam-rod F has a roller, F¹⁰, which is acted upon by the periphery of the cam-wheel E⁴, and is pressed down and so held, excepting at the time that the depression *ff*, Figs. 2 and 3, in the periphery E⁴, is immediately over it and at such time the spring spoken of above is free to lift up the pressure-bar F² and thus free the work for the action of the feed. At the same time that the pressure-foot relieves the work the cam Q⁷ on E⁴, operating through the lever Q⁶ and link Q⁴, Fig. 3, the bent lever Q³ Q², Fig. 1, releases the standard P⁴ by withdrawing the wedge Q Q¹, thus allowing the arm P, which is supported by the standard P⁴, to be depressed sufficiently to allow the workman to turn the shoe. The feed-lever G, swinging upon the pivot G¹ and operated by the peripheral cam-slot between the cam-wheels E² E³, actuates the feed-point G² G³, the feed-point G² G³ swinging on a pivot, G⁶, said pivot being free to slide in the plate C. G⁴ G⁴ are guides fastened to the plate C, which serve to limit the tripping motion of the feed-point G² G³. Thus as the point is pushed forward its rear end will swing upward toward the upper guide G⁴, while its forward or working end will be sufficiently depressed to impinge against the article to be fed forward; but when the feed-point is thrown backward its working part is elevated so as to free itself from the stock and not carry it backward. The amount of motion given to the feed-point—in other words, the length of the

stitch—is regulated by the slotted guide G⁵, Fig. 2, which is held in any desired position by the screw G⁷. The plates K¹ and J¹, Fig. 3, are connected to the face-plate C, and are provided with circular slots K² J². In the slot K² the needle-carrier K³ traverses, while in the slot J² the needle-guard carrier J³ traverses. The needle-carrier K³ is operated by the cam-rod K, while the needle-guard carrier J³ is operated by the cam-rod J, Fig. 2. The radial arm P and its adjunct are peculiar in construction and operation. The arm P is attached to a segment, P¹. This segment is a part of a circle the center of which is near the upper end of the arm P, and is concentric with the curved surface of the upper end of the arm P, so that when P¹ slides in the grooves made in P² P³ the upper end of the arm P maintains its relative position in all respects with relation to the guide N; in other words, the upper end of the arm P is not moved out of position by any movement of the lower end so long as the segment P¹ is within the grooves in P² P³. By this arrangement any part of a shoe may be sewed. By raising the lower end of the arm P the whole arm will assume nearly a horizontal position and will extend to the extreme toe of the shoe. By bringing the arm to a nearly-vertical position the heel of the shoe may be sewed. The thread-carrier L⁵ is connected to the curved slide L³, which is operated by the cam-rod L acting through the lever L¹ on the back of the plate C, shown in Fig. 2 by dotted lines. This thread-carrier is much longer and larger than the needle, as hereinafter described, but otherwise has like it a groove on its under side and an eye a little back from the point, while the point is flat and sharp, but not adapted to sewing like the sewing-needle. The fingers F⁴ F⁵, Figs. 2 and 3, are peculiar in shape and operation, and they close by passing each other edgewise and in line with the center joint of the said fingers. When the jaws are opened for the purpose of seizing the thread brought forward by the thread-carrier L⁵ for forming the loop they assume the position shown in Fig. 5; when closed with the thread between them they are as represented in Fig. 6; and when the thread-carrier has receded the loop is completed, as is shown in Fig. 7, said loop being at right angles with the loop when it is first brought forward by the thread-carrier L⁵, and between the needle K⁵ and the feed G², having received in its formation a full quarter-turn for that purpose. When the fingers are thrown back, as will be hereafter described, the loop will be between the thread-carrier L⁵ and the needle K⁵, and in such a position that the thread-carrier must pass through this loop formed by its own thread before passing under the thread brought forward by the needle K⁵. The fingers serve to seize one of the threads and to place it in the proper position for forming the loop, and are operated as follows: The spring F¹¹, Fig. 3, serves to keep the fingers closed unless they are opened, as they are at the proper time, by the action of the lever H H¹ through the lever H². The side cam E⁶ serves to move H. The lateral reciprocating motion of the fingers is caused by the link M⁵ working in

conjunction with the spring F⁶. The link M⁵ is connected to the fingers M⁴ by means of the screw F⁹, and motion is communicated to it by the bent lever M⁴, which is connected with the link M, which in turn is operated by the thread-carrier slide L³. The link M⁵ draws the upper end of the fingers over toward the left until the hook F¹², which is attached to F⁴, catches upon the pin F⁷. The fingers are held in this position until the arm F⁸, which is connected to the pressure-foot F², rises sufficiently to raise the hook F¹² off the pin F⁷. This releases the upper end of the finger and the spring F⁶ draws them over to the right into the position shown in Fig. 2. J⁶, Figs. 2 and 3, is the needle-guard, circular in form and round in section to within a quarter of an inch of the point, where it is concavo-convex in section. In forming the point the upper or concave side must be exactly the reverse of the shape of the lower side of the needle K⁵, so that the guard may underlie the point of the needle in such a manner that the needle and needle-guard together will form, as it were, a continuous needle and move together through the same perforation, thus preventing the thin upper stock from being torn by catching on the point of the needle. The needle is circular in form and half an ellipse in shape, being grooved on the lower side for the reception of the thread, and provided with a groove on its upper and outer sides at right angles with and about three-eighths of an inch back from the eye, in which the point of the thread-carrier passes when bringing forward its loop. The needle tapers from the eye for about half an inch to a sharp point, making the use of an awl to assist it in sewing unnecessary.

The method of operating my machine is as follows: Having threaded the needle K⁵ and thread-carrier L⁵, which is done by passing the thread through the eye of each from the under side, the operator places the shoe in such a manner between the arm P and the sewing-gauge N that the point of the gauge N shall be inside of and follow the channel cut for sewing on the sole. The sole is then pressed up against the sewing-gauge N by the spiral springs P⁶, and is kept firmly in place, during the process of driving the needle and drawing the thread to form the stitch, by the wedge Q Q¹. When the shoe is thus secured the pressure-bar F³, Fig. 2, is brought into position and presses firmly the upper-leather of the shoe and keeps it in place while the stitch is being made. The needle-guard J⁶, by the action of the cam E⁶ on the rod J, is brought down just sufficient to pierce the upper-leather of the shoe; then it remains stationary until met by the point of the needle K⁵, when it assumes the position shown in Fig. 4, when it recedes; and as the needle advances, the point of the needle K⁵ being just above the point of the needle-guard J⁶, which thus forms a guard so that the needle may not tear the thin upper stock of the shoe. The needle having come forward the full length of the stitch is drawn back sufficiently to slacken its thread enough to allow the thread-carrier L⁵ to pass between the needle K⁵ and its thread, said thread being on the upper side of the needle,

when the needle K^5 remains stationary long enough to enable the thread-carrier L^5 to perform its part of the work, which consists in bringing forward a second thread, that is caught and held in place by the fingers F^4 F^5 . These fingers F^4 F^5 act as follows: When the thread-carrier L , being acted on by the cam E^5 , has brought forward the thread, the fingers being open by the action of the cam-lever H^2 and moved forward by the mechanism M M^2 M^3 M^4 and M^5 , comes in such a position as to catch the thread of the thread-carrier L^5 ; then the pressure of the cam-lever H^2 is removed, and the lower end of the fingers seize the thread. Now the thread-carrier L^5 recedes, leaving the thread which is thus made to form a loop at right angles with the loop of the needle K^5 . The needle K^5 is then brought back to its original position and a stitch is formed. The pressure-bar F^3 is then relieved from the action of the cam E^4 , and, through the agency of a spring not shown, it rises. In rising a small bar, F^8 , touches the hook F^{12} , releasing the fingers from the position in which they were brought when they caught the thread of the carrier L^5 . Now, by the action of the spring F^6 they are brought back to their original position, still re-

taining the loop in such a position that the thread-carrier L^5 can pass through it before passing the needle K^5 in making the succeeding stitch. The wedge Q Q^1 is then drawn back, relieving P^4 from the fixed position, so that the arm P may be depressed and thus allow the shoe to be moved forward the length of the stitch by feed G^2 .

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The work-supporting arm P P^1 working in a segmental slide, in combination with the standard P^4 , all operating substantially as and for the purpose described.

2. In a machine for sewing turned shoes a reciprocating pressing device, operated by a cam or its equivalent, substantially as described, to retain the upper in close contact with the sole while the needle is entering and being withdrawn from the sole and upper, and which is released when the feed takes place.

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Witnesses:

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