

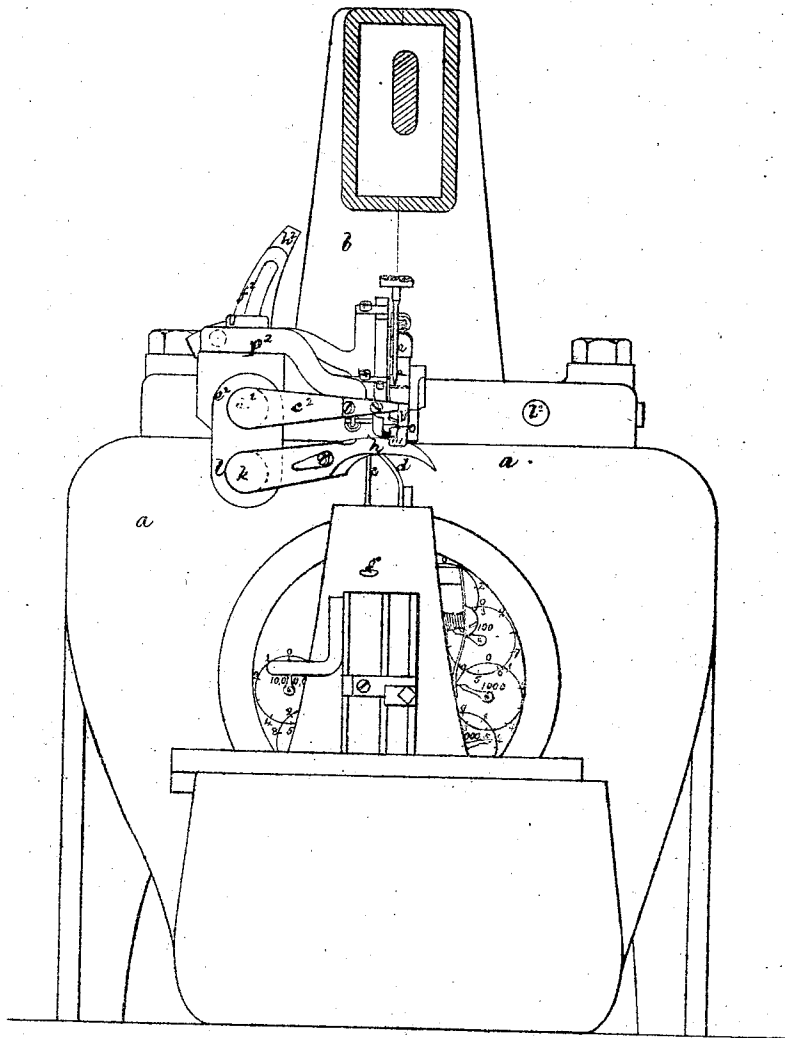
Sheet 1. 3 Sheets.

Lyman R. Blake,
Sewing-Machine.

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Fig. 1.

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Witnesses.
J. B. Hildet.
M. W. Frothingham.

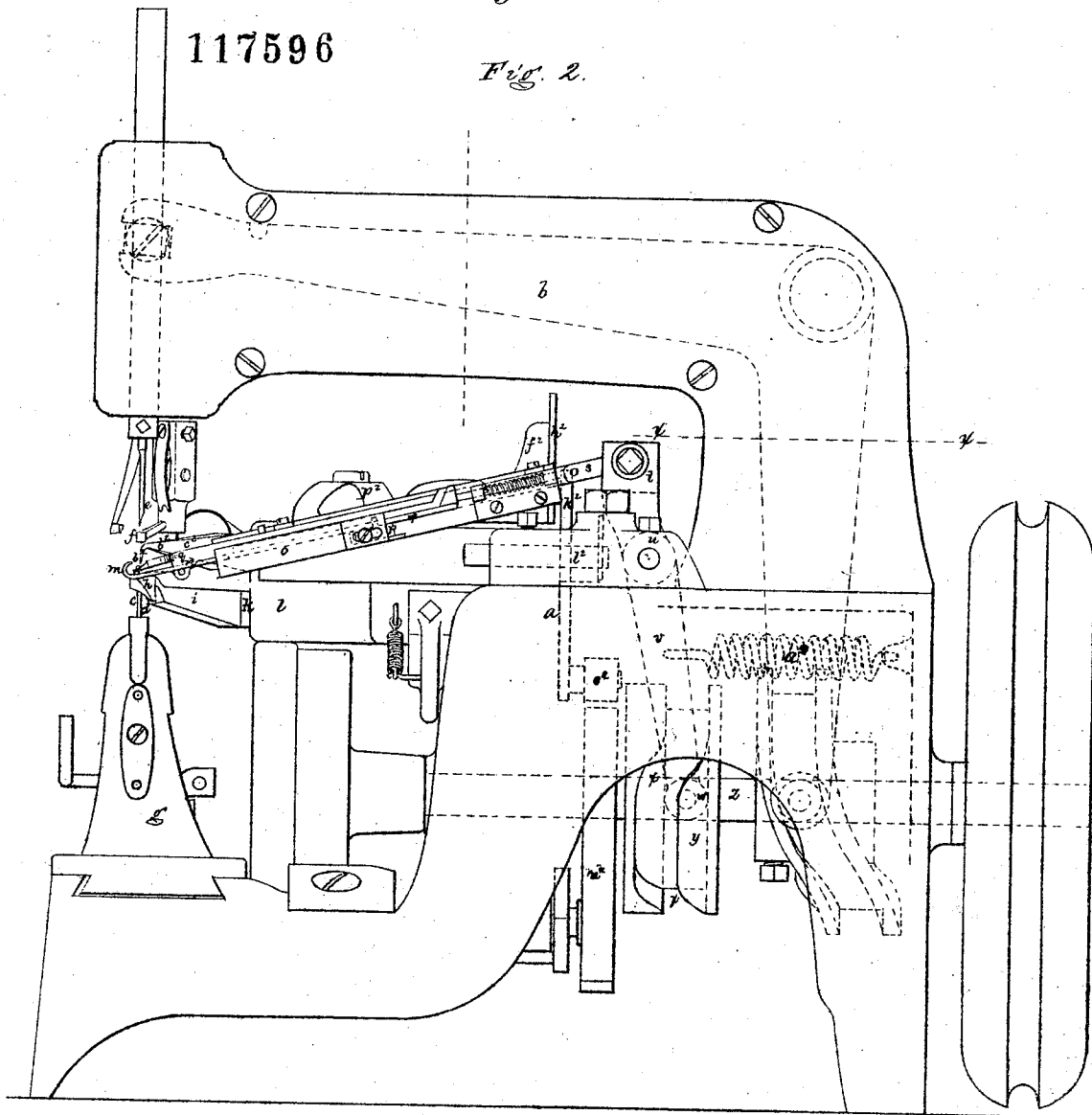
Lyman R. Blake
by his Atty.
Crosby & Gould

Sheet 2 - 3 Sheets.

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Sewing Machine.*

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Fig. 2.



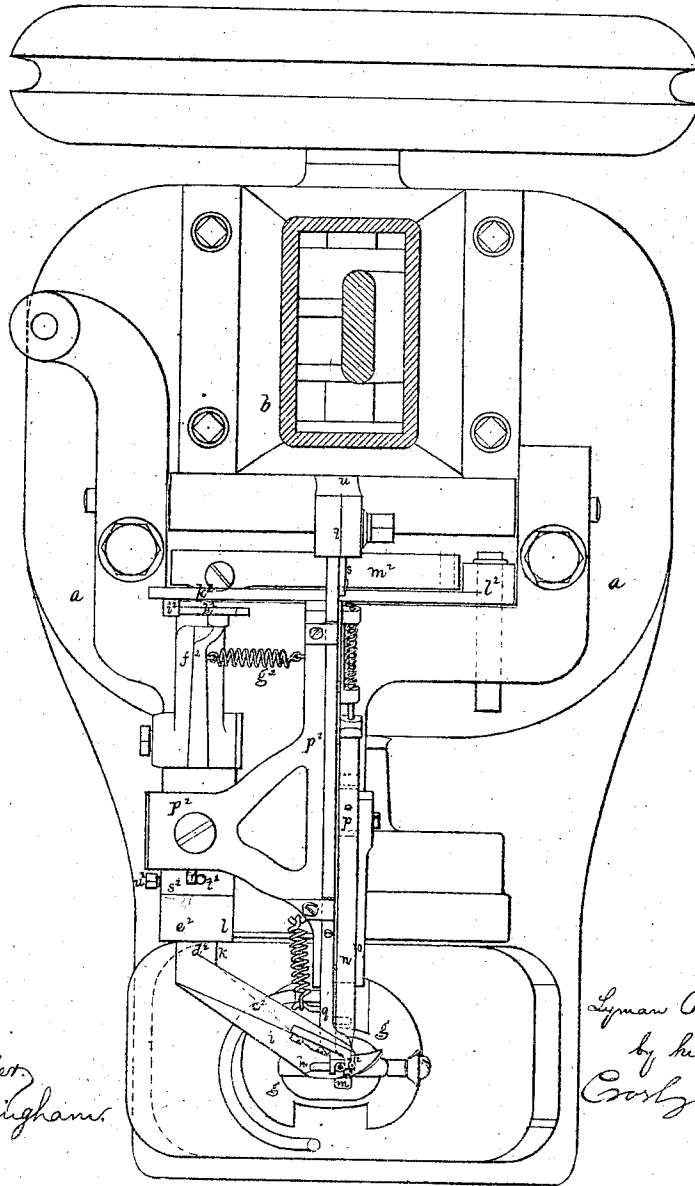
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Fig. 3.



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UNITED STATES PATENT OFFICE.

LYMAN R. BLAKE, OF FORT WAYNE, INDIANA.

IMPROVEMENT IN SEWING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. 117,596, dated August 1, 1871.

To all whom it may concern:

Be it known that I, LYMAN R. BLAKE, of Fort Wayne, in Allen county, State of Indiana, have invented certain Improvements in Machines for Uniting the Soles and Uppers of Boots and Shoes; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practice it.

My improvements relate to some of the details of construction of that class of sewing-machines particularly used for uniting the soles and uppers of what are known as "turns" or "turned shoes," and particularly to that class of machines embodying the invention shown in United States Letters Patent No. 94,134, and to a greater or lesser extent in other patents previously granted on the inventions of E. P. Richardson. In said patent No. 94,134 there are used, in connection with the stitch-forming mechanism and work-supporting plate, the following instrumentalities: A foot that occupies the channel and holds the needle-entering part of the sole in position for the passage of the needle-point; a hook-gauge, into which the edge of the sole is bent to insure the exit of the needle-point at the proper place; and a bender, that presses the edge into the hollow and over the point of the hook.

One part of my invention relates to the arrangement and method of operation of the hook and the reciprocating bender. In the Richardson machine the hook is made adjustable, and the bender has a positive throw, and, in any variation of the thickness of the sole, the needle enters at the same distance from the inner surface of the sole, but varies in distance from the outer or finished surface, the hook having to be adjusted for varying thicknesses. This is not only objectionable, but it is indispensable to the production of good work that the position of the stitch with relation to the ultimate outer surface of the sole should be constant or remain unchanged, both as relates to the "finish" of the boot and as relates to the proper entrance of the needle into the bottom of the channel, the channel being gauged from the outer or tread-surface of the sole. In my invention the hook is fixed, being set in the first place, or before the sewing commences, at such distance as will bring the stitch to the desired distance from the edge, and then remaining in this per-

manent or fixed position, and the bender having a thrust or forward movement, which, though given with sufficient force to always bend the sole into the hook, is made so far yielding that it moves only in accordance with the varying thickness of the sole. One part of my invention consists, therefore, in an unyielding hook-gauge, into the hollow of which the edge of the sole is bent, (to determine the point where the needle shall enter,) in combination with a bender and griper, which bends the sole-edge into the hook and holds it in position while the needle enters, and which is so far yielding, or is actuated by mechanism so far yielding, as to be governed in its extent of forward movement by the thickness of the sole.

Prior to my invention the hook-gauge and the bender and griper had been arranged in a bed or frame that tipped in a vertical plane right-angular to the line of sewing in accordance with the inequality in thickness of the stock. Now, as the path of vertical movement of the needle is fixed, it followed that this vertical tipping movement of the gripping mechanism would vary the distance of the stitches from the edge of the sole, or the relation of the gripping-points to the needle, or the path of vertical movement of the needle.

To remedy this very serious defect I make provision for vertical movement of the hook and bender-frame or bed on a shaft parallel to the vertical plane of the bender and hook, or so that the vertical movement of the gripping-points shall be in a plane parallel with the needle and the line of sewing, instead of in a plane right-angular thereto, the effect of which is, that no movement of the bender and hook to accord with variation in the thickness of material gripped between them and the plate beneath them can result in changing their position relatively to the path of movement of the needle or awl, or to the line of feed. Such provision for movement of the gripping-bender constitutes another part of the invention.

The sole bent at the edge by the bender and gripped, as regards its opposite surfaces, between the hook-gauge and the bender, is also gripped as regards the needle-entering point and the bottom of the channel (and at the times the needle and the awl enter) between the channel-foot and the slotted work-plate or needle-plate beneath the needle-plate, in effect, supporting the work against the thrust of the awl, though, in fact, it also supports the shank of the hook-gauge, the sole directly

resting upon said shank. The stress of both needle-plate and channel-foot upon the work is removed when the work is fed; but when the awl is descending, and the needle next ascends, the work or throat-plate is locked in position on one side of the work or under the hook-gauge shank, the shank of the hook-gauge is locked in stationary position under the edge of the sole, and the channel-foot is practically locked in position against the bottom of the channel, the bottom of the channel being, in effect, the top of the work. No relative change can now take place between the parts, nor until the feed is to take place, at which latter time the stress upon the throat-plate, that upon the hook-shank, and that upon the channel-foot are all removed, and the work can slide easily between them.

As it is desirable that the distance of the channel from the edge of the sole or the depth of channel should be different in different work, I so arrange the foot-moving mechanism and hook-moving mechanism that the extent of movement of the foot may be adjusted, or be made greater or lesser, in accordance with the position or depth of the channel, or in accordance with the extent of stock between the needle-entering point and the bottom of the channel, this provision also constituting a part of the invention.

The drawing represents a machine embodying my improvements.

Figure 1 shows the machine in front elevation. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional plan taken in the line $x x$.

a denotes the bed or frame of the machine; b , the goose-neck. c is the needle; d , the cast-off; e , the awl; f , the thread-guide; and g , the sliding needle-post; all of which may be constructed and arranged to operate as in an ordinary Townsend wax-thread sewing-machine, my improvements being, in fact, shown in the drawing as connected with such a Townsend machine. h denotes the throat-plate, placed between the top of the post g and the goose-neck head, the needle and awl-points piercing the upper and sole and passing through the throat-plate. This plate is at or forms the end of an arm, i , extending from a rock-shaft, k , turning in a stationary bearing, l , and by suitable mechanism this throat-plate is thrown upward to clamp the work when the needle is passing through the work and when the awl is passing through the work, but is loosened to permit the work to be fed. Above the throat-plate is the hook-gauge m , the hook being at the end of a long shank or bar, n , which rests upon and is fastened to, or with respect to, a bed-plate, o , being secured to such plate or to a block, p , before the sewing commences, and in such position that the unyielding hook shall hold the outer surface of the sole, which is bent against it, at every downward movement of the awl and upward movement of the needle in the same unvarying relation to the path of vertical movement of the awl and needle. Resting upon this gauge is the bender and griper q , the point or points of which play forward beyond the needle-plane and seam and back therefrom, the shank of the bender resting and sliding upon a bed-plate or surface, r , being

kept in place by suitable guides. The upper or rear end of the bender-shank is connected by a link, s , to an arm, t , of a rocker-shaft or sleeve, u , at one end of which is an arm, v , from which arm a pin projects carrying a roll, w , working in a cam-groove, x , of a cam-wheel, y , on the driving-shaft z . By this cam the bender and griper is actuated, throwing the bender back to ungripe the sole, and throwing it forward to bend the edge of the sole into the hook and gripe it firmly there while the needle and awl are puncturing the work. As the thickness of stock thus griped varies to some extent, and as the hook cannot yield, and as the bender must therefore yield, I make the part of the cam-groove that throws the bender forward wider than the roll w , and connect the arm to the frame a by a stout spring, a^2 , the stress of which keeps the roll firmly against the adjacent side of the cam, and so that the griper is moved forward every time to the same extent, unless the thickness of the work exceeds the normal thickness, in which case the griper-points are not thrown so far forward, or are only thrown forward in accordance with such thickness, the cam-groove enabling the roll to yield, but the stress of the spring being sufficient to practically carry the griper-points positively forward to bend the sole and gripe the stock between the bender and the hook. Above the griper and bender is a channel-foot, b^2 , formed on the end of an arm, c^2 , extending from a rock-shaft, d^2 , journaled in a stationary bearing, e^2 , above the bearing l . At the inner end of the shaft d^2 is an arm, f^2 , to which a slight spring, g^2 , is attached, the stress of this spring tending to keep the presser-foot down, but permitting it to yield freely for the feed-movement of the work. On the arm f^2 is an incline, h^2 , upon which (at proper times) acts a pin, i^2 , projecting from a lever, k^2 , which lever is pivoted at l^2 , is forced down by the stress of a spring, m^2 , and is raised by a cam, n^2 , which acts on a roll, o^2 , placed on a pin extending from the lever k^2 . Before the work is fed the cam raises the lever (against the force of the spring m^2) and releases the incline h^2 , thereby leaving the shaft free to turn and the presser-foot to rise, the presser-foot being only held in place by the stress of the spring g^2 , which is sufficient, however, to keep the presser-foot in the channel while permitting the work to feed freely. But after the feed is effected the cam leaves the roll o^2 , and the spring m^2 then throws down the lever k^2 , bringing the pin i^2 with force against the incline h^2 , turning the shaft, crowding the presser-foot down into the channel, and gripping the work tightly between the presser-foot and the shank of the hook-gauge, the bender first bending the edge of the sole into the hook and the presser-foot then gripping the sole and upper from the bottom of the channel to the outer surface of the upper. The bed-plate, upon which the shanks of the bender and griper are supported and slide, is part of a frame, p^2 , having an arm extending from a sleeve mounted on the rock-shaft d^2 , the shaft running at right angles to the feeding-plane, as before described, so that any vertical movement of the bender does not vary its position relatively to the vertical plane of the needle and

seam. From the side of the arm of the frame p^2 a pin, r^2 , projects, and from a ring, s^2 , on the rocker-shaft d^2 , another pin, t^2 , projects, the two pins being in contact, as seen at Fig. 3. The ring s^2 is adjustable upon the rock-shaft, being fastened by a screw, u^2 , and by loosening this screw the ring may be turned and set in any position, so that the channel-foot may be set to rise a distance just equal to the extent of stock between the bottom of the channel and the hook-gauge shank.

It will be observed that the hook-gauge and the channel presser-foot are hung upon the same shaft, so that they move in one plane, and the position of the presser-foot relatively to the position of the bender and the line of the seam is not disturbed.

I claim—

1. The reciprocating bender and griper, having

a forward motion, governed partially by a spring, in combination with an unyielding hook-gauge.

2. The bender and hook-gauge, moving in the arc of a circle in the vertical plane of the needle and seam or line of feed.

3. The frame p^2 , rocking on a shaft or pivotal axis right-angular to the vertical plane of the feed.

4. In combination with the hook-gauge and bender, the channel-foot, made adjustable as to its extent of positive movement relatively to the hook-gauge shank, between which and said foot the work is held for the passage of the needle.

5. A channel-foot, b^2 , and hook-gauge m , moving together vertically, substantially as described.

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