



(No Model.)

6 Sheets—Sheet 2.

Z. T. FRENCH & W. C. MEYER.

SHOE SEWING MACHINE.

No. 412,704.

Patented Oct. 8, 1889.

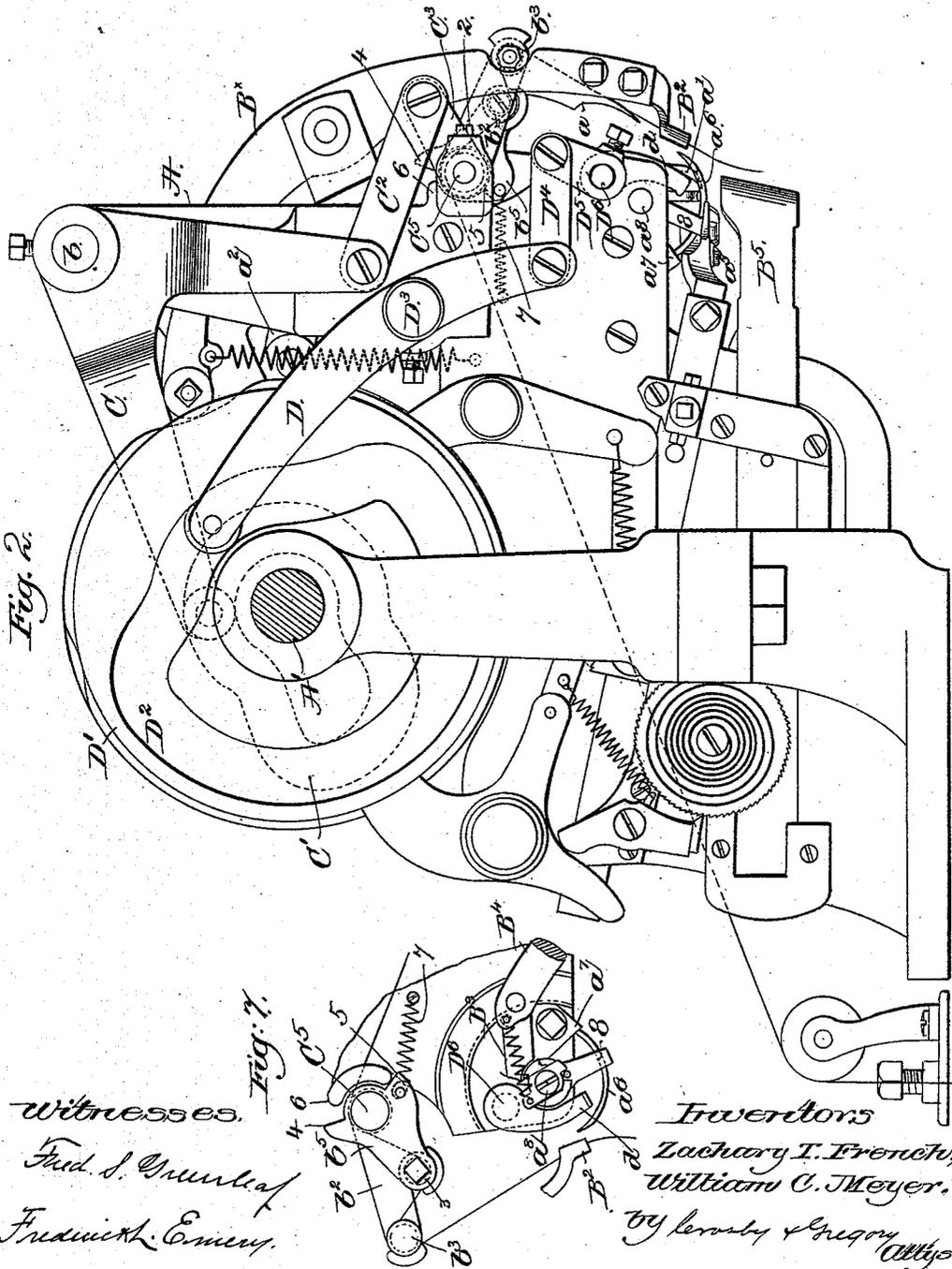


Fig. 2.

Fig. 3.

Witnesses,  
 Fred. S. Quinlan,  
 Frederick Emery.

Inventors  
 Zachary T. French,  
 William C. Meyer.  
 by Lemley & Ferguson Attys

(No Model.)

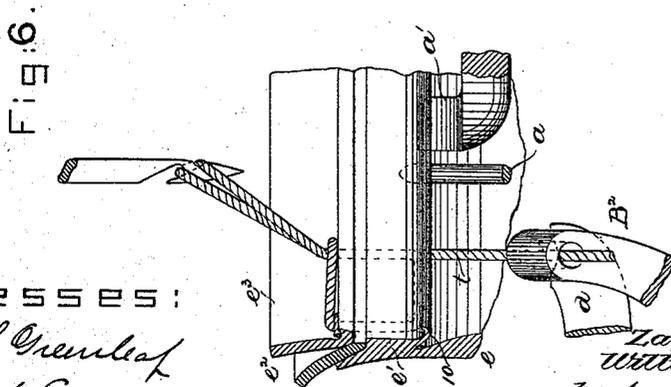
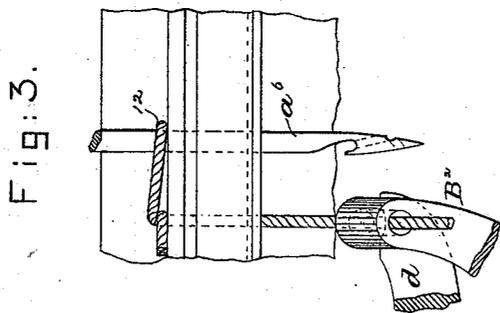
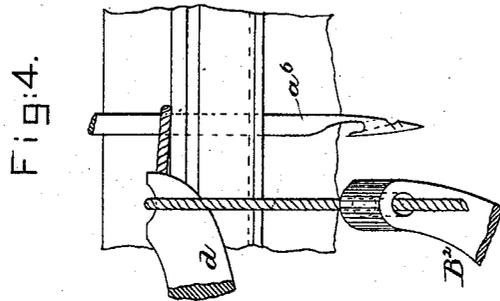
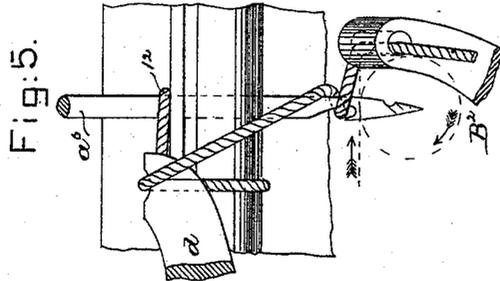
6 Sheets—Sheet 3.

Z. T. FRENCH & W. C. MEYER.

SHOE SEWING MACHINE.

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Witnesses:  
*Frederick S. Greenleaf*  
*Frederick L. Emery.*

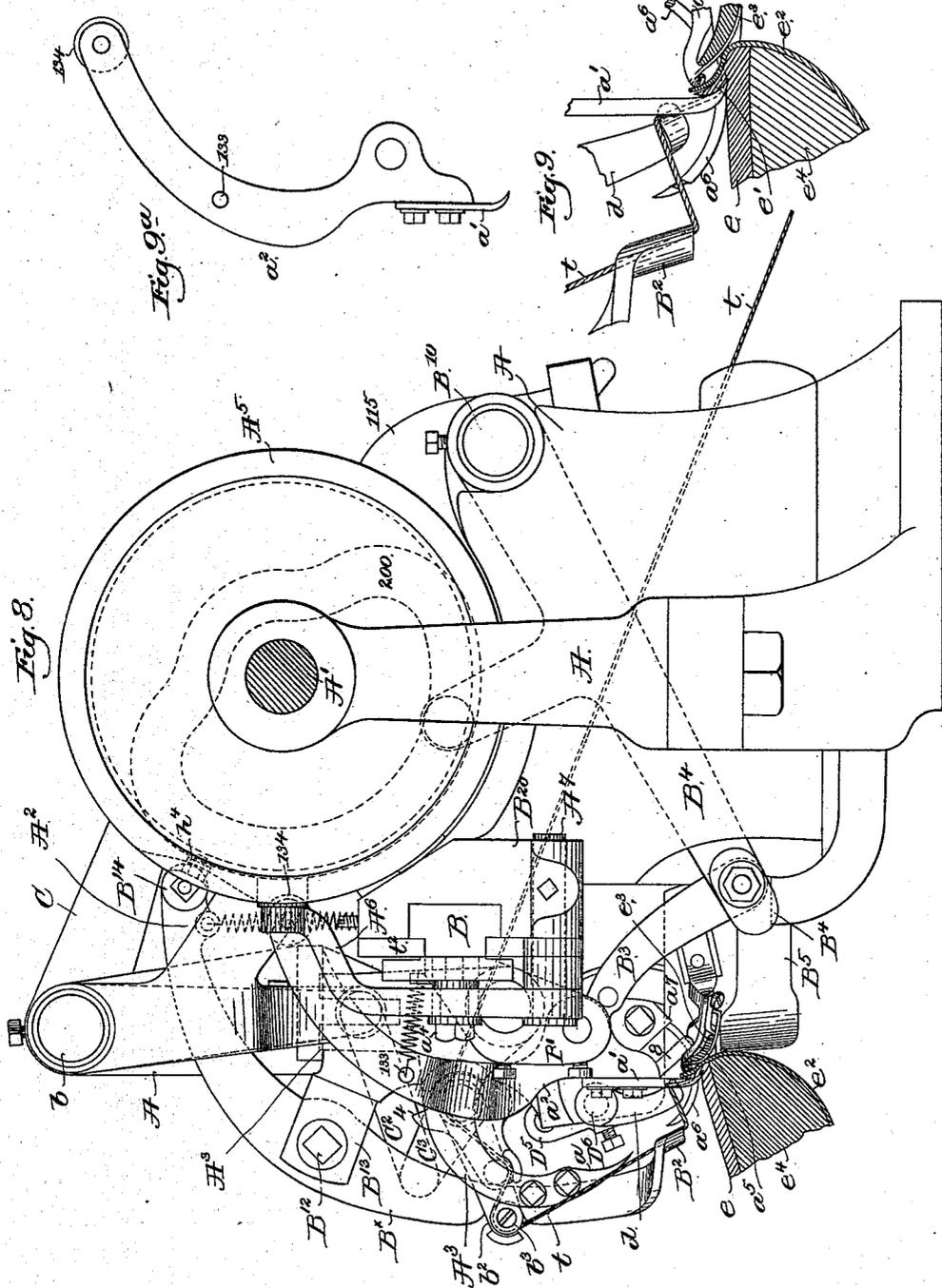
Inventors  
*Zachary T. French*  
*William C. Meyer,*  
 by *Henry S. Rogers*

Z. T. FRENCH & W. C. MEYER.

SHOE SEWING MACHINE.

No. 412,704.

Patented Oct. 8, 1889.



Witnesses.

Edgar A. Godwin  
Frank E. Emery

Inventors.

Zachary T. French,  
William C. Meyer,  
by Crosby & Grayson  
Attys.

(No Model.)

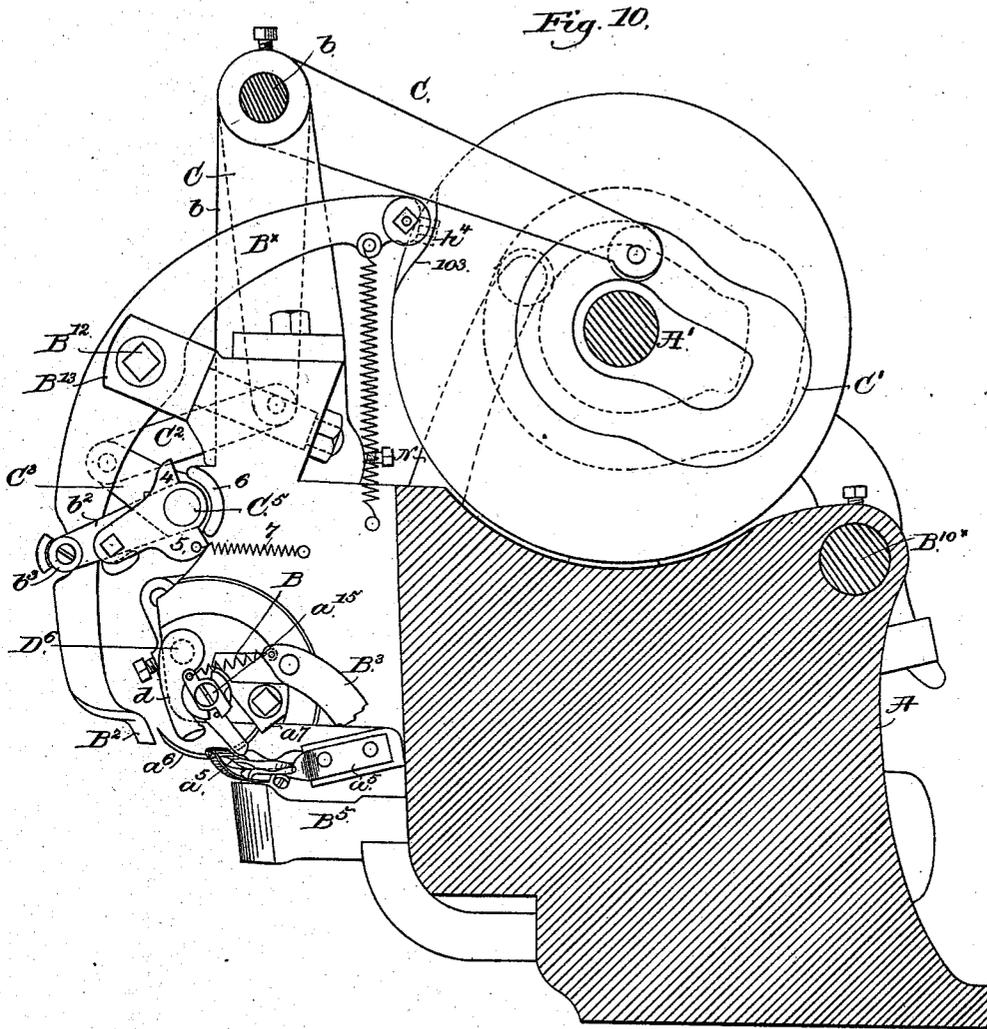
6 Sheets—Sheet 5.

Z. T. FRENCH & W. C. MEYER.

SHOE SEWING MACHINE.

No. 412,704.

Patented Oct. 8, 1889.



*Witnesses,*  
Edgar A. Godkin  
John F. C. Printz

*Inventors,*  
Zachary T. French  
William C. Meyer  
by Crosby & Mayory  
Attys



# UNITED STATES PATENT OFFICE.

ZACHARY T. FRENCH AND WILLIAM C. MEYER, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE GOODYEAR SHOE MACHINERY COMPANY, OF HARTFORD, CONNECTICUT.

## SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 412,704, dated October 8, 1889.

Application filed July 30, 1888. Serial No. 281,382. (No model.)

*To all whom it may concern:*

Be it known that we, ZACHARY T. FRENCH and WILLIAM C. MEYER, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the class of chain-stitch wax-thread sewing-machines for sewing welted and turned work, our invention being an improvement on the machine represented in United States Patent No. 317,758, dated May 12, 1885. In other sole-sewing machines of the class referred to and to be herein described, wherein a hooked needle is employed to attach the channeled sole to the upper, the needle has commonly first entered the welt or upper and then passed into and through the so-called "between substance," or that part of the sole between the channels, the point of the needle emerging from the innermost channel, taking the thread from a thread-guide and drawing it through the stock, leaving the chain of the stitch either on the welt or on the lining of the upper. In machines drawing the loop outwardly, as described, the between substance, especially for welted work, is usually penetrated vertically and held while the stitch is being set by the pull only of the needle, for otherwise the between substance, especially if not of the best material, would be cut through, as at such time the strain upon the thread is very considerable, for such strain has to be and is sufficient to set and finish the previous stitch, and the needle in setting the stitch acts to draw from the waxing device enough thread for the next stitch, and because of this extra duty to be performed by the needle the latter has to be made very strong, so as not to break or spring, and, further, the thread drawn by it, as described, from the waxing device slides through the hooked part of the needle and is frayed and frequently broken. It is a great desideratum to make the needle as fine as possible and the thread as large as possible; but where the needle draws and sets

the stitch and pulls off the thread the minimum-sized needle cannot be employed. Making the stitch by pulling the thread from the innermost channel outwardly through the upper produces an outward stretching strain upon the sole—a strain resisted only by the between substance—whereas if the strain on the thread or the loop of the chain were in the opposite direction it would be resisted by the upper extended about the last, and, further, an inward drawing of the loop causes the welt and upper to be drawn more snugly to the sole than when the strain on the loop is outward. Experiments have been made to obviate the objectionable outward strain referred to, and the position of the hooked needle has been reversed, so as to enter the inner channel and penetrate the between substance, the upper, and the welt in succession and draw the loop back, leaving the loop on the inner channel; but such experiments have been unsatisfactory, because in thin soles the presence of the loops of the chain-stitch in the channel leaves an objectionable ridge, and so, also, by this plan the needle was obliged to set the stitch and draw off thread, as before described, and was consequently, for reasons given, objectionable. The latter plan was also found further objectionable because the needle, when it did not exactly follow the awl, caused the formation of a large stitch-hole in the welt and upper, causing the shoe to grin. In our experiments to overcome the objections referred to we have succeeded in producing a machine wherein the strains are inwardly when the stitch is being set, instead of outwardly; but we leave the chain of the stitch on the welt or on the lining of the upper, according to whether a welted or turned shoe is being stitched or sewed. To do this we have combined with the needle and awl in a chain-stitch wax-thread sole-sewing machine a take-up which is operated in such order of time with relation to the needle that the take-up itself alone performs the duty of setting the stitch, thus relieving the needle of the duty of drawing up the previous loop to set the stitch, and then draw from the thread-supply

thread for a new stitch, which duty has been performed by the needle in all previous wax-thread sewing-machines making a chain-stitch. The take-up described acts while the needle is in the stock and while the loop of thread last drawn through the stock by the needle is yet on the shank of the needle, each stitch being thus set before the loop of the next stitch is drawn through the stock, the said take-up at its extreme stroke pulling from the waxing device enough thread for the next stitch and leaving it to be taken up and held or cared for by an auxiliary take-up, the latter giving up the thread so drawn off to the needle as the latter is being drawn back through the stock, the needle drawing substantially slack thread while passing back through the stock, the needle, however, giving the loop, after it has emerged from the stock, a sufficient pull to draw the thread of the loop being formed snugly back to the previous stitch, leaving it taut on the upper or lining; but at such time the thread does not rend through the hook of the needle. With the described auxiliary take-up we have combined a thread-holder, the purpose and function of which are to act upon the thread between the stock and thread-guide and draw from the supply of thread held by the auxiliary take-up enough for the next stitch to be made, and to thus obviate the rending of the thread through the hook of the needle, leaving substantially slack thread for the needle to draw upon while pulling the loop through the stock.

The particular features in which our invention consists will be hereinafter more fully described, and pointed out in the claims at the end of this specification.

Figure 1 in front elevation represents a sufficient portion of a sole-sewing machine with our improvements added to enable our invention to be understood. Fig. 2 is a right-hand side elevation of Fig. 1; Figs. 3, 4, 5, and 6, details in the formation of the stitch; Fig. 7, a detail showing the needle, the main and auxiliary take-up, and the thread-holder and other parts to be described. Fig. 8 is a right-hand side elevation of the machine shown in Fig. 1, the said figure also showing in section the last with the upper and inner sole thereon, a welt being in position stitched thereto. Fig. 9 is a detail showing the parts represented in Fig. 5 when viewed from another direction, the said figure showing part of the last. Fig. 9<sup>a</sup> is a detail showing the channel-guide and its carrying-lever. Fig. 10 is a partial section of Fig. 1 in the line *y y*. Fig. 11 is a detail showing theawl, theawl-carrier, and means for actuating it. Fig. 12 shows developed the groove in the periphery of the cam A<sup>5</sup>. Fig. 13 shows developed the groove in the periphery of the cam-wheel C', the said groove receiving in it. Fig. 14 is a detail showing the slide-bar and its attached welt-guide a<sup>5</sup>. Fig. 15 is a detail of the link N<sup>2</sup>, to be referred to; Fig. 16, a detail showing in

two different positions the auxiliary take-up; Fig. 17, a detail showing the thread-holder *d* and its rock-shaft; Fig. 18, an enlarged detail plan view of the welt-guide with a piece of welt therein; and Fig. 19 is a modification wherein is shown a welted shoe the upper of which is being stitched to the channel-sole.

The frame-work A of the so-called "head" of the machine, cam-shaft A', the awl-actuating lever A<sup>2</sup>, the awl-carrying lever A<sup>3</sup>, its awl *a*, the channel-guide a', its carrying-lever a<sup>2</sup>, the cam A<sup>4</sup> to actuate it, the feed-cam A<sup>5</sup>, the lever A<sup>6</sup>, actuated thereby and pivoted at A<sup>7</sup> and slotted at a<sup>3</sup> to receive a stud a<sup>4</sup>, extended outwardly from the horizontally-sliding carriage B, having a depending portion B', holding the fulcrum for the levers carrying the awl and the channel-guides to thus move them horizontally when the awl is in, and so as to feed the shoe for the length of stitch to be made, the welt-guide a<sup>5</sup>, the thread-guide or looper B<sup>2</sup>, the carrying-lever B<sup>3</sup> to operate it, the hooked needle a<sup>6</sup>, its guide 8, the needle-segment a<sup>7</sup>, pivoted at a<sup>3</sup>, the link B<sup>3</sup> to connect it with the lever B<sup>4</sup> to move the needle-segment, the said lever deriving its movement from a cam-groove, as 200, at the inner side of the cam-disk A<sup>5</sup>, the shape of the said cam being shown by dotted lines in Fig. 8, the sliding gage B<sup>5</sup>, against which the upper on the last is pressed and rests while the stitch is being made, and the locking mechanism for the said sliding gage are and may be all as common to the sole-sewing machine shown in the patent referred to, and so need not be herein further described.

The slide-bar N<sup>3</sup>, to which the welt-guide a<sup>5</sup> is attached, the slot adjustable link N<sup>2</sup> containing the block 138, the adjusting bolt or device 139, to hold the said block in place, the lever N, pivoted at N' and actuated by a suitable groove N<sup>10</sup> at the left-hand side of the cam-disk C', and the locking devices consisting of the pawl 113, pivoted to the lever 115 at 114, and the ratchet-block 112, the said lever 115 being actuated by a cam-groove (see dotted line, Fig. 2) at the inner side of the cam-disk D', are and may be all substantially as in United States Patent No. 317,759, and so need not herein be further specifically described.

To the common parts referred to we have added parts which we will now describe. On the stud *b* we have mounted an elbow-lever C, actuated by a suitable groove in a cam disk or wheel C', the shape of which is represented by full lines in Fig. 10, this lever, as herein shown, having an ear bored to embrace the fixed stud *b*, so as to prevent the lateral movement of the lever C from the said stud. The elbow-lever C is jointed by a link C<sup>2</sup> with an arm C<sup>3</sup> of a short sleeve C<sup>4</sup>, (see Fig. 1,) mounted loosely on a stud C<sup>5</sup>, (see Fig. 10,) held by a screw 2, (see Fig. 1,) the opposite end of the said sleeve having an arm b<sup>2</sup>, provided at its outer end with a roll b<sup>3</sup>, the said arm b<sup>2</sup> constituting a take-up. The stud C<sup>5</sup>, near its inner end, receives upon it loosely

a sheave  $b^4$ , (see full lines, Fig. 1, and dotted lines, Fig. 2,) over which the thread  $t$  passes from the usual waxing device or thread-supply, of usual construction, on its way to the eye of the thread-guide. The stud  $C^5$  also receives loosely upon its inner end the auxiliary take-up  $b^5$ , (shown best in Figs. 7, 10, and 16,) it having at its end a roll 3, the rear end of the lever being notched or cut away to leave a projection, as 4 and 5, to co-operate with a fixed stop 6, forming a rigid part of the frame-work, the upper projection 4 striking against the stop and limiting the upward movement of the auxiliary take-up when lifted by the strain upon it of the thread  $t$ , passed over the roll  $b^3$ . The under projection 5 is normally kept against the stop 6 by a suitable spring 7. We have also added to the machine the lever  $D$ , the cam  $D'$  having a cam-groove  $D^2$  (see Fig. 2) to actuate it, the said lever pivoted at  $D^3$  being connected by a link  $D^4$  with an arm  $D^5$  of a short rock-shaft  $D^6$ , to the inner or opposite end of which is attached the thread-holder  $d$ , the latter vibrating in the arc of a circle just above the material being stitched or sewed, as best shown by the large diagrams, Figs. 3 to 6, and in Figs. 8 and 9, wherein the sole of the shoe is marked  $e$ , the between substance  $e'$ , the upper  $e^2$ , and the welt  $e^3$ .

Referring first to Fig. 3, the needle is shown as thrust through the welt, the upper, and the between substance, the point of the needle emerging in the inner channel 10. With the parts in the positions Fig. 3, or while the needle is in the work, the take-up lever  $b^2$  will be operated to draw upon and pull taut about the shank of the needle then in the stock or sole the loop 12 of thread held thereon and lying against the welt, the needle-thread by the action of the take-up upon it being drawn back through the eye of the thread-guide. The stitch having been fully taken up and set by the action of the take-up, and enough thread having been drawn by the said take-up  $b^2$  from the usual waxing device or thread-supply for another stitch, the said take-up descends quickly, giving up its surplus thread to the auxiliary take-up  $b^5$ , which done, the thread-holder  $d$  is moved quickly back from the position Fig. 3 to the position Fig. 4, taking with it the needle-thread, which is given up to it by the auxiliary take-up  $b^5$ , and then the thread-guide  $B^2$  is started, and, following the dotted-line course, Fig. 5, carries the thread  $t$  around the needle  $a^5$ , as shown in said figure, and then the needle is started on its return movement to draw the thread held by it through the sole, the upper, the welt, and the loop 12, previously drawn taut to the work about the shank of the needle, as described, when setting the stitch. During this backward movement of the needle from the position Fig. 5 to the position Fig. 6 the thread-holder  $d$  is moved forward into the position Figs. 3 and 6, it during such movement gradually giving up the thread held by

it to the needle, and so it will be understood from the description of the operation of the parts that the needle-thread as it is being drawn through the material by the needle is substantially free from tension—that is, the only tension upon it is that due to the light spring 7. This supply of thread given up to the needle as wanted by it in going back through the stock is sufficient to obviate any necessity of the thread being drawn through the hook of the needle; but when the needle has drawn the loop through the stock the needle is given a sufficient movement to draw into the inner channel of the sole that part of the said loop which connects it to the last stitch, the loop of which is represented by 12, and thereafter the awl  $a$  enters and feeds the material, and the needle from the position Fig. 6 again penetrates the stock, as in Fig. 3.

For turned work, for which this invention is equally well adapted, the upper will be lasted wrong side out, and of course the welt will be omitted, and in both cases the chain will fall outside the between substance.

When our machine is to be used to sew a turned shoe, the gage  $B^5$  will be omitted, and in its place will be substituted a gage, as 80, of usual construction, and partially shown in Fig. 15, it being in practice attached to the end of the slide  $N^3$ , carrying the welt-guide  $a^5$ , the latter being at such time removed.

Prior to our invention herein described a wax-thread sewing-machine using a hooked needle to make a chain-stitch has never been provided with a take-up to set the stitch, nor prior to our invention has a machine for making a chain-stitch with a wax-thread and using a curved hooked needle ever had combined with it a take-up to draw the thread, as described, automatically about the shank of the needle, nor has a wax-thread chain-stitch sewing-machine having such a take-up ever had combined with it an auxiliary take-up or a thread-holder to act as do the parts so designated in this present application.

We claim—

1. In a chain-stitch wax-thread sole-sewing machine, the following instrumentalities, viz: a channel-guide, a hooked needle, the needle-segment, feeding mechanism, actuating means for the said needle-segment, as the link  $B^3$ , lever  $B^4$ , and cam 200, to force the needle with a loop upon its shank into the stock and out through the inner channel of the sole and there hold the said needle temporarily substantially at rest while the stitch is being set, a thread-guide, means to actuate it to supply the hooked needle with thread, and a take-up, as  $b^2$ , a cam, as  $C'$ , and connecting devices intermediate the said cam and the said take-up, the said cam through the said connecting devices actuating the said take-up to pull upon the loop of needle-thread about the shank of the needle while the needle is in the stock and holds the said loop upon its shank, the said take-up drawing the said loop about the shank of the needle, as described, to set

the last stitch, of which the said loop forms a part, without straining the between substance, the said stitch being set before the loop to form the next stitch is drawn through it, substantially as described.

2. In a chain-stitch wax-thread sole-sewing machine, a hooked needle, a thread-guide to supply it with thread, feed mechanism to feed the stock while the hooked needle holds on its hook a loop of thread, and means to actuate the said needle to force it into the upper and sole and out through the channel therein and temporarily hold the said needle substantially at rest in the stock, combined with a take-up, as  $b^2$ , and means to actuate it to act upon the thread and draw the same back through the sole and upper while the last loop formed by the needle is yet on the shank of the needle, the needle yet remaining in the stock, the said take-up completing the setting of the stitch before the said needle is withdrawn from the stock and out from the old loop upon its shank, substantially as described.

3. In a chain-stitch wax-thread sole-sewing machine, a hooked needle, means to actuate it to enter the upper and sole and emerge therefrom in the inner channel thereof, and a thread-guide and means to actuate it to supply the hook of the needle with thread, combined with a feeding mechanism, a take-up, a cam, and intermediate devices to actuate the said main take-up to draw the thread about the shank of the needle and set the stitch while the needle is in the stock and the loop of thread last drawn through the stock by it is yet on the shank of the needle, the said cam and intermediate devices at the same time moving the take-up far enough to draw thread from the thread-supply sufficient for a new stitch, and with an auxiliary spring-actuated take-up to take up the slack in the needle-thread drawn off by the main take-up, the said auxiliary take-up thereafter giving up the said slack thread to the needle as the latter again acts to draw a loop of thread through the stock, substantially as described.

4. In a chain-stitch wax-thread sole-sewing machine, the take-up  $b^2$  and the auxiliary take-up  $b^5$ , the thread-guide, and the hooked needle and actuating means therefor, combined with the thread-holder  $d$  and means to actuate it, whereby the said thread-holder is made to act upon the needle-thread between the said thread-guide and the stock and while the needle is in the stock and the last loop of thread drawn therethrough is yet upon the shank of the needle, the said thread-holder taking from the auxiliary take-up and through the said thread-guide before the latter acts to lay its thread in the hook of the needle a sufficient quantity of thread to prevent the rending of the same across the hook of the needle as the loop is being drawn by the needle through the stock, substantially as described.

5. In a chain-stitch wax-thread sole-sewing machine, a hooked needle, a thread-guide to supply the needle with thread, means to actuate the needle to draw the thread in the form of a loop from the inner channel of the sole through the between substance and upper, feeding mechanism to move the sole, and means to move the needle forward to pass through the upper and between substance and come substantially at rest, combined with a take-up, as  $b^2$ , and means to actuate it while the needle is in the stock to pull upon the loop of thread yet on the shank of the needle next the outer side of the shoe and pull the said thread back through the upper and about the said needle to set the stitch, the pull on the thread in setting the stitch being in the direction to draw the upper closely to the sole, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ZACHARY T. FRENCH.  
WILLIAM C. MEYER.

Witnesses:

G. W. GREGORY,  
B. DEWAR.