(No Model.) 5 Sheets—Sheet 1.

H. F. NASON.

SOLE SEWING MACHINE.

No. 455,870. Patented July 14, 1891.

Fig: 4.

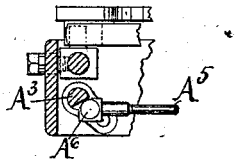


Fig: 1.

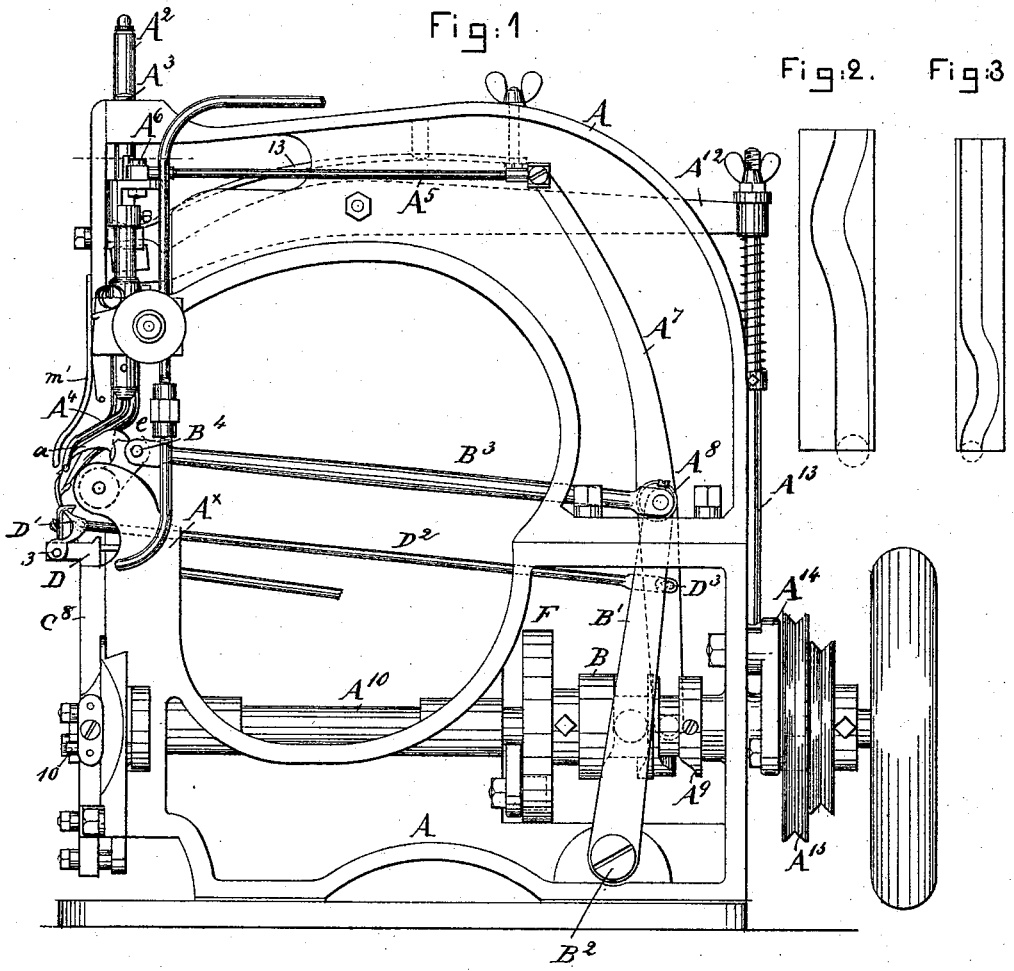


Fig: 2.

Fig: 3

Witnesses.
Andrew L. Emery
George C. Hunting.

Inventor.
Horace F. Nason,
by Crosby & Gregory
Attys

(No Model.) 5 Sheets—Sheet 2.

H. F. NASON.

SOLE SEWING MACHINE.

No. 455,870. Patented July 14, 1891.

Fig: 5.

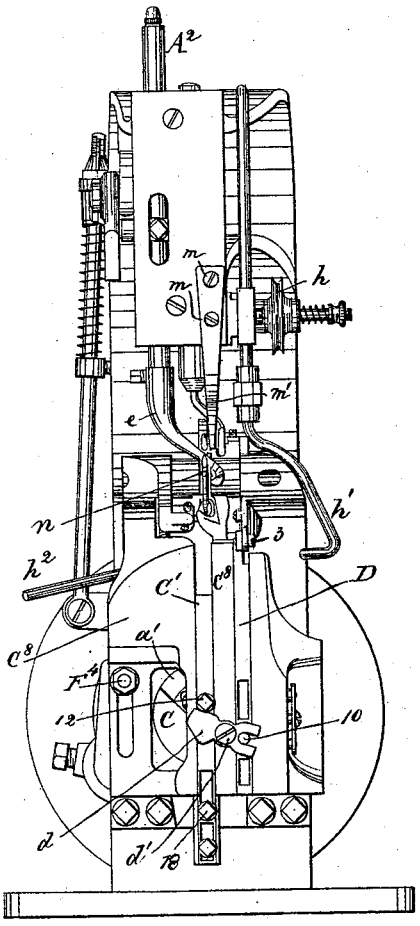


Fig: 6.

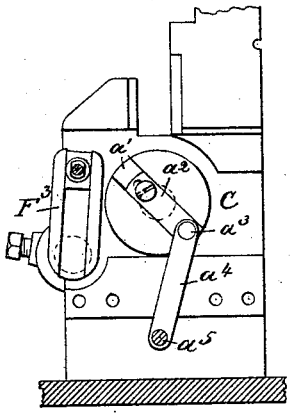
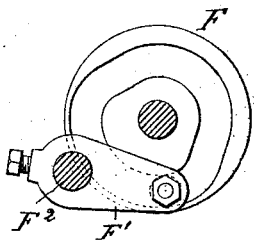


Fig: 7.



Witnesses.
Frederick L. Emery
George E. Hunting.

Inventor.
Horace F. Nason,
by Crosby & Gregory Attys

(No Model.) 5 Sheets—Sheet 3.

H. F. NASON.

SOLE SEWING MACHINE.

No. 455,870. Patented July 14, 1891.

FIG. 8.

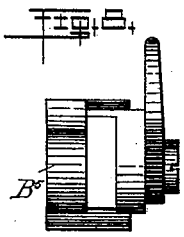


FIG. 9.

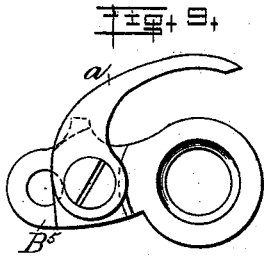


FIG. 10.

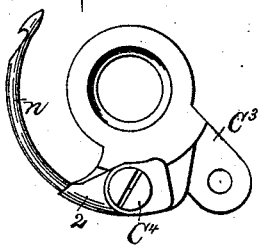


FIG. 11.

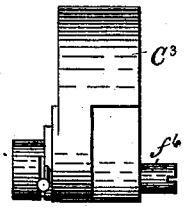


FIG. 12.

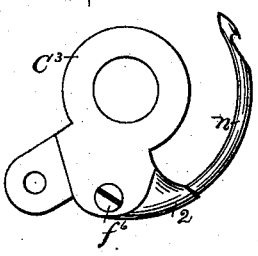


FIG. 13.

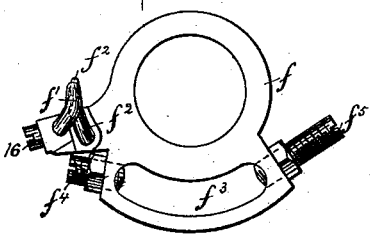


FIG. 17.

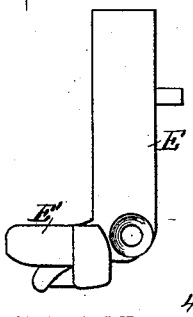


FIG. 18.

FIG. 14.

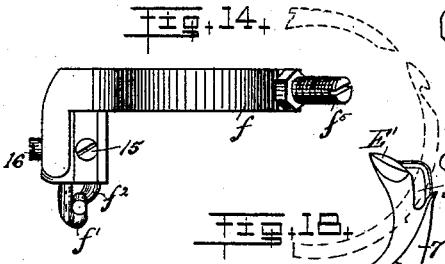


FIG. 16.

FIG. 19.

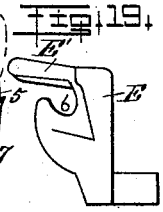
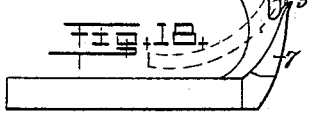


FIG. 15.



Witnesses,
George B. Bunting.
Frederick L. Emery

Inventor,
Horace F. Nason,
by Lemby Gregory
Attys

(No Model.) 5 Sheets—Sheet 4.

H. F. NASON.

SOLE SEWING MACHINE.

No. 455,870. Patented July 14, 1891.

FIG. 20.

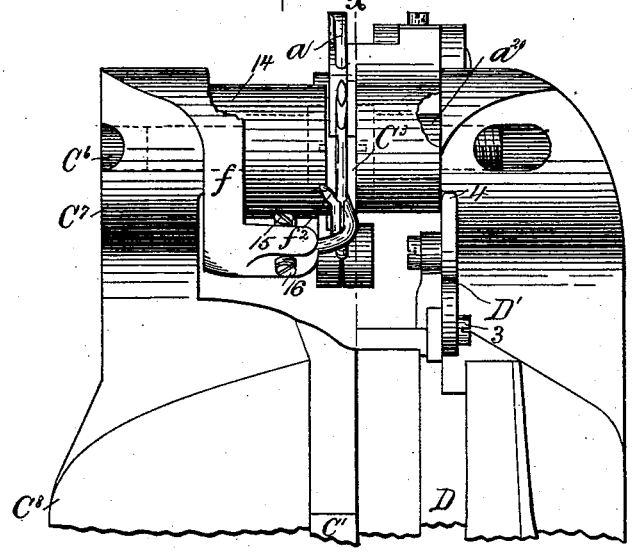


FIG. 21.

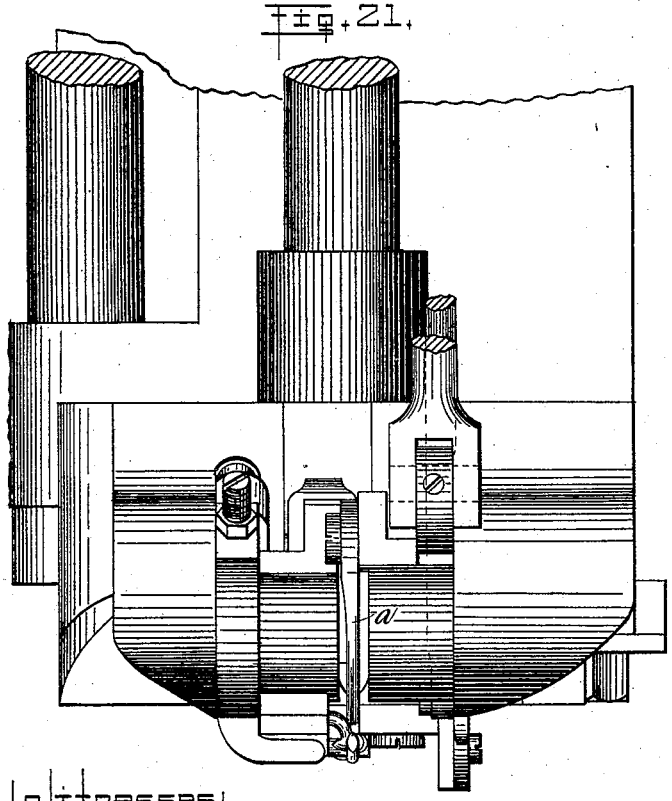
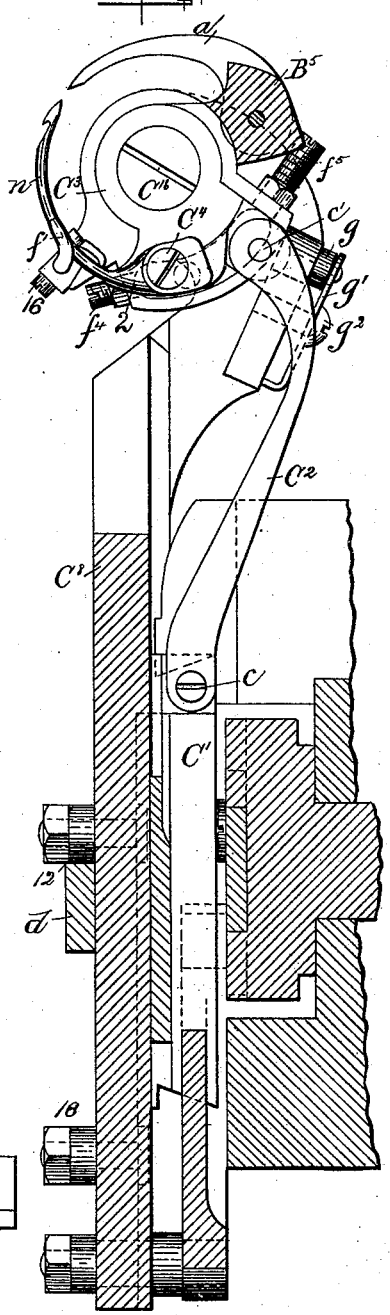


FIG. 22.



Witnesses:
George L. Hunting.
Frederick L. Emery.

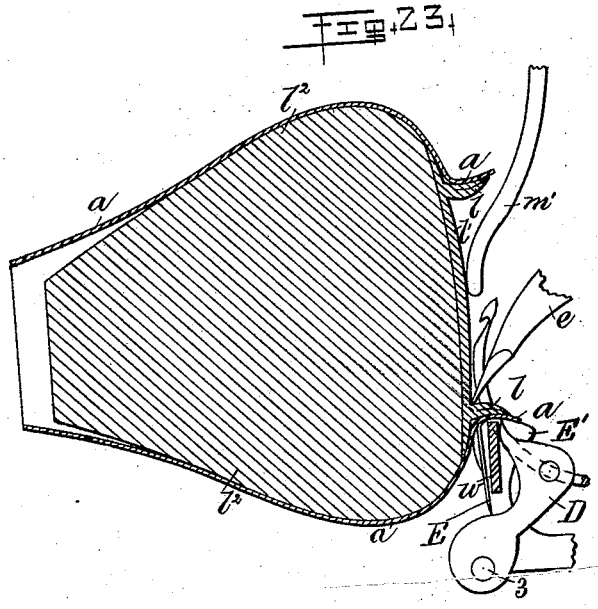
Inventor
Horace F. Nason,
by Crosby & Gregory
Attys.

(No Model.) 5 Sheets—Sheet 5.

H. F. NASON.

SOLE SEWING MACHINE.

No. 455,870. Patented July 14, 1891.



Witnesses,
George C. Hunting
Frederick L. Emery

Inventor,
Horace F. Nason,
by Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

HORACE F. NASON, OF NATICK, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO NATHAN A. BALDWIN, OF MILFORD, CONNECTICUT.

SOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,870, dated July 14, 1891.

Application filed July 14, 1890. Serial No. 358,595. (No model.)

To all whom it may concern:

Be it known that I, HORACE F. NASON, of Natick, county of Middlesex, State of Massachusetts, have invented an Improvement in Sole-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.

This invention has for its object to improve the construction of sewing-machines adapted to sew welts to uppers and outsoles to welts.

In accordance with my invention the upper which is to be united to the welt and inner sole is acted upon by a stretching device which engages the upper on the last just before the welt, upper, and inner sole are united, and stretches the upper closely about the last substantially at the stitch-making point and holds it stretched until the stitch is completed. The stretching device engages the upper about as the point of the needle enters the welt and upper and at a distance from the needle substantially equal to the length of the stitch to be made, and the said stretching device acts to stretch the upper while the shoe is being fed, the needle being at such time in the material. I have combined with the hooked needle and the usual cast-off a feed-point which embraces the needle and enters the welt while the needle is in the stock, thus releasing the needle from strain, which is an important feature, especially when a curved needle is used and the shoe being stitched contains a last. I have combined with the curved needle and awl a channel-cutting presser-foot to cut a channel intermittingly in the inner sole, the point of the awl entering the said channel, the point of the needle after first passing through the welt and upper emerging from the inner sole in the bottom of the said channel. With these parts I have also combined a gage, against which to press the outer face of the inner sole, so that the said sole may be placed at the proper angle with relation to the stitch-forming devices.

In this my improved machine the welt-guide is permanently attached to and made part of the work-support, both being removable from the machine, to be replaced by another work-support when the welt is to be sewed to the outsole, as may be done by the present machine.

The particular features of my invention will be hereinafter more fully specified, and set forth in the claims at the end of this specification.

Figure 1 is a front side elevation of a sole-sewing machine embodying my invention, the heating-pipes being broken off. Figs. 2 and 3 are details showing the shape of the cam-grooves in the cams B and A^9 to be described. Fig. 4 is a detail showing part of the mechanism for actuating the thread-carrier. Fig. 5 is a front end elevation or a view of the machine shown in Fig. 1 from the left; Figs. 6 and 7, details to be referred to. Figs. 8 and 9 are separate details relating to the awl and its carrier; Figs. 10, 11, and 12, details referring to the hooked needle and its carrier; Figs. 13 and 14, details of the cast-off, its co-operating devices, and the feed-point. Figs. 15 and 16 are a side elevation and plan view of the stretching device. Figs. 17, 18, and 19 views of the welt-gage and work-support; Fig 20, an enlarged detail taken from the front end of the machine, chiefly to show the awl, the needle, the cast-off, the feed-point, and the upper-stretching device in their relative positions; Fig. 21, a top or plan view of the parts shown in Fig. 20; Fig. 22, an enlarged sectional detail in the line *x*, Fig. 20, said section running to the bottom of the machine; and Fig. 23, an enlarged sectional detail of the last, upper, insole, and welt, together with the stretching device and other parts to be described.

The frame-work A of the machine, the overhanging arm A′, the presser-foot bar A^2, the thread-carrying bar A^3, its attached thread-carrier A^4, the link A^5, connected to an arm of the thread-carrying bar A^3 by a bolt A^6, the lever A^7, pivoted at A^8 and having a roller or other stud to enter a cam-groove in a cam A^9, fast on the main shaft A^{10}, the presser-foot-lifting lever A^{12}, its connecting-rod A^{13}, and the lever A^{14}, to which it is attached, the said lever being actuated by a cam-groove at the inner side of the wheel A^{15}, are and may be all as usual, and need not be herein more fully described.

The main shaft A^{10}, actuated in any usual

manner, has fast upon it a cam-hub B, which receives a suitable roller or other stud of a lever B′, pivoted at B^2, the upper end of the said lever being jointed to a rod B^3, which in turn is jointed at B^4 to the awl-carrier B^5, to which is attached in usual or suitable manner the awl *a*, which may be of any usual or suitable shape, the hub of the said carrier being free to turn on a horizontal stud a^{20}, screwed into the upright portion $A^\times$ of the frame-work. (See Fig. 20.)

The main shaft A^{10} has at its front end a disk C, herein represented as slotted diametrically across its face, as at *a*′, (see Fig. 6,) to receive an adjustable slide-block a^2, having a crank-pin a^3, which by link a^4 is connected to a pin a^5, extended from the rear side of a bar C′, to the upper end of which is jointed at *c* a link C^2, the said link being jointed at *c*′ to the needle-carrier C^3, (shown separately and enlarged in Figs. 10 to 12 and 20 to 22,) the said needle-carrier having attached to it by screw C^4 a hooked needle *n*.

Preferably the cap or plate 2, applied under the head of the screw C^4, will be elongated to act as a brace for a short distance upon the needle, and this same sort of cap may be employed in connection with the awl.

The needle-carrier is free to be oscillated about a stud-screw C^6 (shown by dotted lines in Fig. 20) and screwed into an ear C^7, forming part of the feed-frame C^8, the said frame also having guideways, in which reciprocates the bar C′, before referred to, as well as the bar D, to be described, upon which is pivoted at 3 the upper-stretching device D′. (Shown separately and enlarged in Fig. 15.)

The upper-stretching device has a point 4 to enter the upper a short distance from the point where the point of the needle enters the welt *w* on its way through the upper and lip *l* of the inner sole *l*′, the welt *w* being delivered against the upper at the stitch-making point by a suitable welt-guide E, attached to the upright part $A^\times$ of the frame-work.

The welt-guide E is shown separately in Figs. 17 to 19, in which it will be seen (see Fig. 17) that a slot 5 is left, through which may be led the welt *w*, a section of which is shown in Fig. 23, the said welt-guide having a notch at 6, through which the point of the needle passes as it is about to enter the welt and upper, said notch constituting a throat for the needle, the needle while the shoe is being fed, as will be described, passing out through the open side of the said notch. This welt-guide has attached to and forming part of it a work-support E′, of suitable shape to receive upon it and support the upper placed about a last l^2, containing an inner sole. This work-support is narrow, and the needle and awl in their operation pass up and down in the arcs represented by dotted lines in Fig. 18.

The part 7 of the combined welt-guide and work-support serves as a fender for the upper where it rests against the edge of the inner sole, the contact of the welt and upper not taking place except at the stitch-making point, and it is at a point just before the stitch-making point, or in advance of the stitch-making point, that the point 4 of the stretching device engages the upper to pull or strain it about the last preparatory to receiving the next stitch to be made.

The slide-bar D has a point 10, (see Figs. 1 and 5,) which is engaged by the forked end of a lever *d*, pivoted at *d*′ upon the feed-slide C^8, the said lever *d* being acted upon to raise the bar D and cause the point 4 of the stretching device to enter the upper by the action of the pin or stud 12, projecting from the slide-bar C′, the said pin or stud acting during the descent of the said slide-bar, at which time the hooked needle *n* rises through the welt, upper, and inner sole, the point 4 of the stretching device being moved to the right, viewing Fig. 1, or into the position Fig. 23, while so engaged with the upper to thus stretch the upper about the last and the edge of the inner sole preparatory to stitching the welt upon the upper and the upper to the inner sole.

The stretching device has a movement very similar to that of a four-motion feed.

From the foregoing it will be understood that the needle and the stretching device move horizontally in unison with the feed-slide, while the shoe is being fed by the feeding-point to be described, the needle remaining in the stock and the stretching device stretching and holding stretched the upper about the last until the awl enters the upper and the inner sole to hold them in stretched condition, after which the needle retires from the stock, as does the stretching device, and they both move backward with the feed-slide, the needle again rising and entering the hole made by the awl, the point of the needle entering the stock and following closely the point of the awl as the latter is withdrawn from the stock, so as not to let the upper slip back and let the stretch out of the same which was just put in by the stretching device. At this same time the upper and sole are held closely together against liability of slipping by the pressure exerted upon them between the work-support and the presser-foot *e*, to be described. The feed-slide C^8 derives its horizontal movement in usual manner by devices common to wax-thread sewing-machines, chief among which devices is the cam F, (see Fig. 1 and detail Fig. 7,) arm F′, rock-shaft F^2, having a slotted or grooved arm F^3, (see Fig. 6,) which receives a loose block provided with a pin F^4, which enters a slot in the said feed-slide.

The presser-foot *e*, attached to the presser-foot bar A^2, is shaped substantially as shown in Figs. 1 and 5, and at its lower end it is beveled to constitute a cutting-edge to enter the inner sole and cut a channel therein if a channel has not been previously cut. This presser-foot may be used to cut the channel just in advance of the stitch-making point, for it

will be understood that the presser has a rising-and-falling motion, it rising when the material is to be fed, and being held down with the force due to the usual spring 13. (See Fig. 1.)

Referring to Fig. 20, it will be seen that the lug or ear C^7 is reduced at its right-hand side to leave a hub 14, over which is fitted and turns the carrier *f*, (shown enlarged in Figs. 13 and 14,) said carrier having attached to it a cast-off *f'*, and in addition thereto a feed-point f^2. This feed-point is so shaped as to come against the shank of the hooked needle and form a brace or support for it, and while the feed of the shoe is taking place and the needle is yet in the stock this feed-point enters the stock close to the needle and does the feeding without putting any strain at all upon the needle, thus enabling a lighter needle to be used than would be otherwise possible. This feed-point is made adjustable by means of a screw 15, so that it may be adapted to needles of different diameter, and so, also, the cast-off is made adjustable by the screw 16. The carrier *f* has a slot f^3, in the opposite ends of which, as herein shown, are adjusting-screws f^4 f^5, the rotation of the said screws in one or the other direction changing the effective length of the said slot and making either end terminate in the desired position. This slot f^3 is entered by a stud f^6, (see Fig. 11,) extended from one side of the needle-carrier, the said stud imparting movement to the carrier *f* in the proper time with relation to the movement of the needle.

The screws f^4 and f^5 will be moved or adjusted according to the particular shoe being sewed or the thickness of its stock, the screw f^4 being turned in and the screw f^5 being turned out as the material increases in thickness, and vice versa, and it will be understood that needles of different lengths will be used according to the adjustment of the said screws.

To prevent the movement of the carrier *f*, except positively by or through the pin f^6, I have applied to the machine a friction device consisting, essentially, of a plug *g*, acted upon by a spring *g'*, which is adjustable by means of a screw g^2.

The lever *d* will be acted upon by any usual friction, so that it will be moved only when the studs 12 and 18 strike the said lever in the upward and downward movements of the slide-bar C'.

In practice the usual tension device *h*, as well as parts of the frame-work of the machine, will or may be heated by gas or by steam in suitable pipes, as *h' h²*.

Prior to my invention I am not aware that the upper laid about a last having an inner sole upon its bottom has ever been automatically stretched just in advance of the stitch-making point and held until stitched in place, so this invention is not limited to the exact form of stretching device shown or to the exact means represented by which to actuate the same.

Fig. 23 shows a section of the last with an upper and inner sole and welt in position to be stitched, and from said figure, together with the foregoing description, the operation of the parts will be thoroughly understood so far as concerns the attaching of the welt to the upper and to the inner sole.

The head of the machine has attached to it by suitable screws, as *m*, a gage *m'*, the said gage being broken off in Fig. 5 to avoid hiding the thread-guide behind it. The lower end of this gage is located somewhat above the delivery end of the thread-guide and serves as a gage, against which bears the outer face of the inner sole at or about the central line of the last, the said gage enabling the operator to present the shoe at the same angle to the stitch-forming devices, so that the stitching falls uniformly with relation to the edge of the last.

Should it be desired to stitch the outer sole to the welt, it is only necessary to remove the combined welt-guide and work-support and substitute in place of the same a work-support having a narrow point to enter the channel made in the outer sole, the needle rising close to the said support and penetrating the bottom of the channel, passing through the outer sole and the welt, the chain of the stitch being laid in the channel in the outer sole to be covered by the usual channel-lip.

I claim—

1. In a sole-sewing machine, the combination, with stitch forming and feeding mechanism, of an upper-stretching device having a point adapted to engage and stretch the upper step by step just prior to stitching the same to the welt, and means to move the stretching device during its engagement with the upper in unison with the feed, substantially as described.

2. In a sole-sewing machine, a hooked needle, means to actuate it, and a feed-slide, combined with an upper-stretching device carried by the said feed-slide and with means to impart to the said upper-stretching device step-by-step movements to cause it to engage and stretch the upper intermittingly, substantially as described.

3. The horizontally-movable feed-slide, the bar D, means to reciprocate the bar, and the upper-stretching device having a point to engage the upper and mounted thereon, combined with means to move the said upper-stretching device about its pivot on the said bar, to operate substantially as described.

4. The curved needle, its carrier, means to actuate the said carrier, and the carrier *f*, provided with a cast-off and with a feed-point, the said feed-point entering the material and being adapted to engage and feed the same while the needle is in the material, substantially as described.

5. The combination, with a curved needle

and awl and means to actuate them, of the welt-guide slotted to receive the welt, having an attached work-support and a notch constituting a needle-throat, to operate substantially as described.

6. The work-support and the welt-guide, combined with the presser-bar and the presser-foot sharpened to cut a channel in the sole in advance of the stitch-making point, substantially as described.

7. In a sole-sewing machine, a hooked needle and awl, means to actuate them, a welt-guide, a work-support forming a part thereof, a thread-guide, and a presser-foot to cut a channel in the inner sole in advance of the stitch-making point, combined with a gage m', the lower end of said gage being extended just above and in front of the delivery end of the thread-guide, said end of the gage bearing against the outer face of the inner sole substantially along its central line to form a rest therefor, whereby the shoe resting on the work-support is presented at the same angle to the stitch-forming devices, substantially as described.

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

HORACE F. NASON.

Witnesses:
GEO. W. GREGORY,
ANNIE S. WIEGAND.