

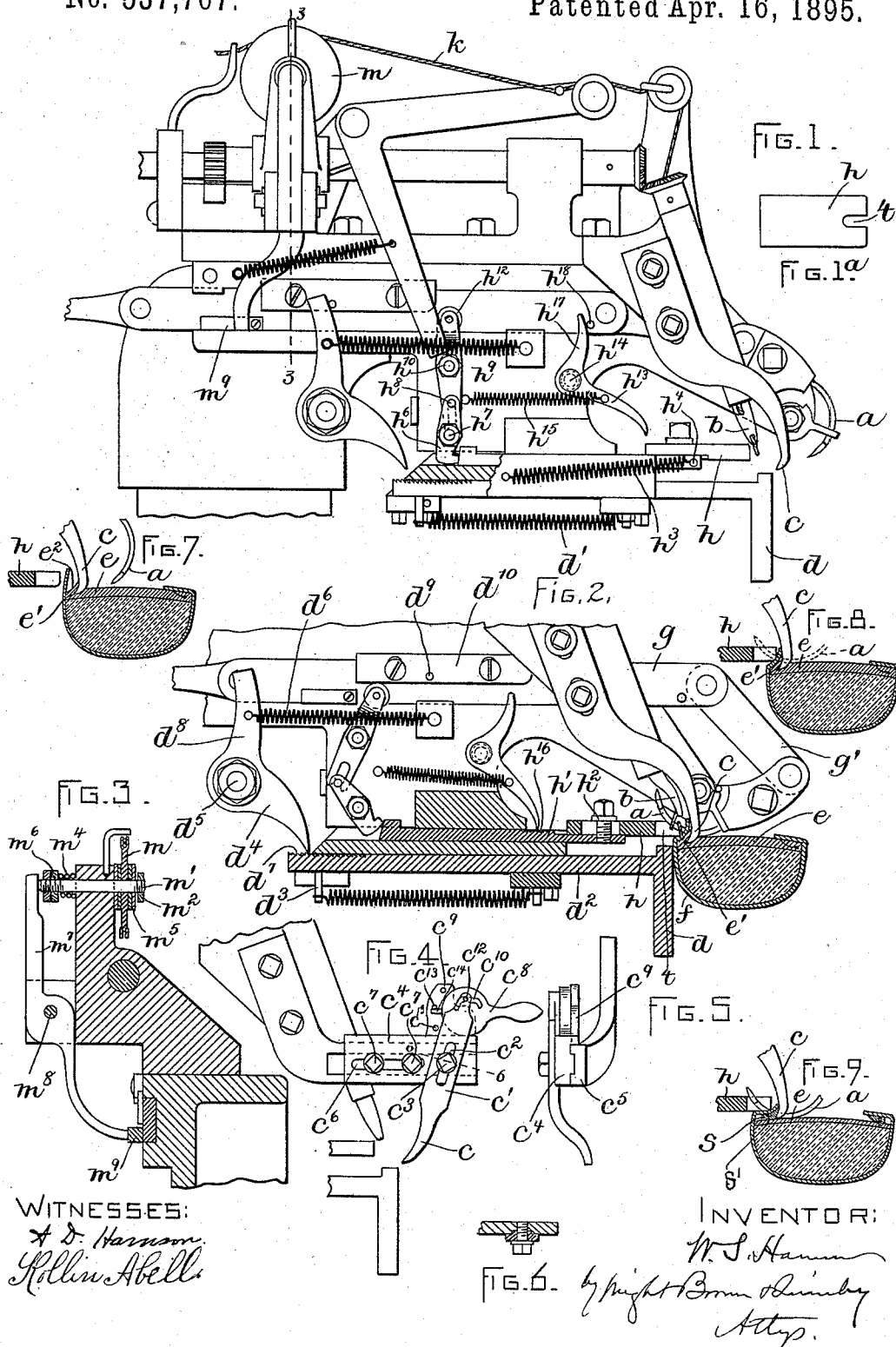
(No Model.)

W. S. HAMM.

SEWING MACHINE FOR LASTING BOOT OR SHOE UPPERS.

No. 537,767.

Patented Apr. 16, 1895.



UNITED STATES PATENT OFFICE.

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SEWING-MACHINE FOR LASTING BOOT OR SHOE UPPERS.

SPECIFICATION forming part of Letters Patent No. 537,767, dated April 16, 1895.

Application filed December 3, 1894. Serial No. 530,636. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HAMM, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines for Lasting Boot or Shoe Uppers, of which the following is a specification.

This invention has for its object to provide a simple and efficient machine for securing uppers to soles of boots and shoes during the operation of lasting, by means of stitches connecting the upper to the sole; and the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a side elevation of a sewing machine embodying my improvements. Fig. 1^a represents a plan view of a part of the machine. Fig. 2 represents a side elevation of a portion of the mechanism shown in Fig. 1, showing the needle and the parts co-operating therewith in different positions from those shown in Fig. 1, parts of the mechanism being shown in section. Fig. 3 represents a section on line 3—3 of Fig. 1. Figs. 4 and 5 represent side and end views of a different arrangement of the channel-guide hereinafter referred to. Fig. 6 represents a section on line 6—6 of Fig. 4. Figs. 7 and 8 represent enlarged sectional views of parts of the mechanism illustrating different stages of the operation. Fig. 9 represents a sectional view of a portion of a boot or shoe showing a strip attached to the inner sole to constitute a lip.

The same letters of reference indicate the same parts in all the figures.

In the drawings—*a* represents a curved oscillating needle.

b represents a looper.

c represents a channel-guide which is fixed or rigidly supported when in operation, and

d represents an automatically adjustable rest against which the lasted upper is held by the operator, as in many boot and shoe sewing machines now in use, said rest being yieldingly pressed outwardly toward the space occupied by the lasted upper by a spring *d'* and provided with automatic locking mechanism

whereby it is locked in any position to which it may be forced by the inward pressure of the upper against it. The said locking-mechanism acts to lock the rest *d* against inward movement before the needle in moving forward reaches the parts which it is to penetrate, and to unlock the rest after the withdrawal of the needle, so that the upper and the between-substance of the sole are securely grasped or clamped between the channel-guide and rest during the stitch-forming operation, and are released so that the operator can freely move the work when the needle is withdrawn. As here shown, the rest *d* is alternately locked and released by the following mechanism:

*d*² represents an arm or bar to which the rest *d* is fixed, said bar sliding in fixed guides on the frame. The spring *d'* is connected at one end with a stud *d*³ on the bar *d*², and at the other end with a fixed support.

*d*⁴ represents a dog pivoted at *d*⁵ to a fixed support and held normally by a spring *d*⁶ in position to engage one of a series of ratchet-teeth *d*⁷ upon the bar *d*². Said dog has an arm *d*⁸ which projects upwardly into the path of a stud *d*⁹ to which a horizontal reciprocating motion is imparted, as hereinafter described, said stud being at the forward end of its movement away from the arm *d*⁸, so that it permits the dog to engage the bar *d*². When said stud is at the rear end of its movement, as shown in Fig. 1, it comes in contact with the arm *d*⁸ and disengages the dog from the bar *d*². The stud *d*⁹ is affixed to a plate *d*¹⁰ mounted upon a slide *g*, which is movable in guides on the supporting frame and is reciprocated by means of a connection with the driving-shaft, (not shown).

The slide *g* operates the needle, as hereinafter described, and the arrangement is such that when the needle is retracted, as shown in Fig. 1, the slide *g* is in position to hold the stud *d*⁹ against the arm *d*⁸ and disengage the dog from the bar *d*², so that the rest *d* is released. When the slide *g* moves forward to advance the needle, the stud *d*⁹ leaves the arm *d*⁸ and permits the dog *d*⁴ to engage the bar *d*² and thus lock the rest *d* against inward movement.

The needle and looper may be operated by any suitable mechanism, and as they co-operate in the usual way in making stitches, I do not describe their operation, nor the mechanism that operates them, further than to state that the looper is located at the opposite side of the channel-guide from the needle when the latter is retracted, and that the preferred means for oscillating the needle comprise the slide *g* above mentioned, and a link *g'* connecting the said slide with an extension *a'* on the needle-carrying arm.

The channel-guide *c* is located close to the path of the needle, and is formed so that it bears on one side of the channel-lip *c*² and holds the same across the path of the needle, as shown in Fig. 2.

h represents a reciprocating clamp or presser which is located at the same side of the channel-guide as the looper, and above the rest *d*. Said clamp is adapted to hold the edge of the upper against the outer side of the sole while the upper is being perforated by the needle, and is also adapted to slide toward and from the channel-guide, the clamp being reciprocated by suitable automatic means, as hereinafter described. When the needle is retracted, the clamp *h* is also retracted, as shown in Fig. 7, so that the work *d* being at the same time unlocked so that it does not interfere with the movement of the work. Just before the needle advances, the clamp *h* moves forward and presses the interposed edge of the upper inwardly against the sole, as shown in Figs. 2 and 8, the upper being thus firmly held by the clamp while the needle is advancing, and thus prevented from being pushed by the needle toward the looper *b*, so that the upper cannot interfere with the return of the looper. The clamp moves forward in such direction that it exerts a wiping-over action on the upper while moving forward, so that it not only holds the upper against the sole after reaching its outer position, but acts to continuously stretch the upper while moving to said position. This result is due to the fact that the clamp moves in a rectilinear direction and in a plane above the lower end of the channel-guide and substantially parallel with the face of the sole when the latter is held in the position shown, the location of the clamp above the lower end of the channel-guide enabling it to slide over upon the face of the sole. Moreover, the clamp has an upper-supporting end face above its upper-pressing or bottom face, arranged to support the channel lip and upper against the pressure of the needle. The wiping or stretching action, and the upper-supporting action, distinguish the clamp from an oscillating toe or finger which has heretofore been used to press the upper against the corner of the sole, said toe being oscillated in a curved path, so that it descends upon the work and acts abruptly in confining the upper instead of acting gradually or progressively. Moreover, the

toe referred to is pointed, having no upper-supporting end face, and is arranged so that when moved forward its bottom surface is on a level with the lower end of the channel-guide. Hence it is not adapted to move over the face of the sole, but necessarily stops at the corner of the sole.

The mechanism here shown for actuating the clamp *h* is as follows:

h' represents a slide or bar to which the clamp *h* is adjustably secured by a screw *h*³, said bar being adapted to slide in guides on the supporting frame.

*h*³ represents a spring attached at *h*⁴ to the bar *h'* and at the other end to the supporting frame, said spring normally drawing the clamp *h* away from the channel-guide.

*h*⁶ represents a lever pivoted at *h*⁷ to the supporting frame and connected at its upper end by a stud *h*⁸ with a lever *h*⁹ which is pivoted at *h*¹⁰ to the supporting frame. The lower end of the lever *h*⁶ bears against the rear end of the bar *h'*, and the upper end of the lever *h*⁹ has a roll *h*¹² which is arranged in the path of the block *d*¹⁰ on the slide *g*. When the slide *g* is in the position it occupies when the needle is retracted, as shown in Fig. 1, the block *d*¹⁰ is out of contact with the roll *h*¹² and the levers *h*⁶ *h*⁹ stand vertically, as shown in Fig. 1, the levers being held in said position by the spring *h*³ which presses the bar *h'* backwardly against the lever *h*⁶ and thus holds the clamp *h* in a retracted position. When the slide *g* moves forward to advance the needle, as shown in Fig. 2, the block *d*¹⁰ moves over the roll *h*¹² and acts on the levers *h*⁹ *h*⁶ in such manner as to cause the lower end of the lever *h*⁶ to move the bar *h'* and clamp *h* forward.

*h*¹³ represents a dog pivoted at *h*¹⁴ to the supporting frame. Said dog is normally held by a spring *h*¹⁵ in position to engage one of a series of ratchet-teeth *h*¹⁶ in the bar *h'*. The dog is provided with an arm *h*¹⁷ which projects backwardly into the path of a stud *h*¹⁸ on the slide *g*. When the slide is in the position shown in Fig. 1, the stud *h*¹⁸ bears against the arm *h*¹⁷ and raises the dog *h*¹³ on the bar *h'*; but when the slide *g* moves forward, the stud *h*¹⁸ leaves the arm *h*¹⁷, the dog being thus released and caused by the spring *h*¹⁵ to bear upon the bar *h'* and thus engage one of the ratchet-teeth thereof and lock the clamp *h* in the position to which it was moved forward by the lever *h*⁶.

k represents the thread, which passes over a tension-wheel *m* and is acted on by suitable take-up devices between the tension-wheel and the looper. There is, however, no novelty in the take-up devices, and as their operation is well known, I will not describe the same. The tension-wheel is automatically released when the needle has withdrawn from the work, in order that the operator may feed the work along any desired distance, thus making the stitches longer or shorter as he may desire, the tension-wheel being made op-

erative to put tension on the thread during the stitch-forming operation.

I have here shown as the means for making the tension device alternately operative and inoperative, a stud m' passing through the tension-wheel m and having a head m^2 (Fig. 3) which is normally held pressed by a spring m^4 against frictional washers or disks m^5 interposed between said head and the side of the tension-wheel, said spring being interposed between the frame of the machine and a nut m^6 on the stud m' .

m^7 is a lever pivoted at m^8 to the supporting frame and bearing at its upper end against the stud m' , its lower end being arranged to be acted on by a wedge-shaped projection m^9 on the slide g . When the slide g is in the position shown in Fig. 1, the wedge is interposed between the supporting frame and the lower end of the lever m^7 and causes the upper end of said lever to displace the stud m' , thus separating the head m^2 from the disks m^5 , as shown in Fig. 3, and releasing the tension-wheel so that there is practically no tension on the thread, and the operator is enabled to move the work and pull out as much thread as he may desire. When the slide g moves forward from the position shown in Fig. 1, the wedge m^9 leaves the lever m^7 , whereupon the spring m^4 presses the head m^2 against the disks m^5 and retards the rotation of the wheel m sufficiently to put the desired tension upon the thread.

The operation of the machine as above described is as follows: The needle being retracted and the rest d released and yieldingly held forward by the spring d' , and the clamp h retracted by the spring h^3 , the operator taking the lasted shoe in his hands engages the channel with the channel-guide c , the rest d yielding to accommodate the distance between the channel guide and the portion of the upper against which the rest bears. There is at this time nothing to prevent the free movement of the shoe in any direction to adjust it to the channel-guide. The upper is lightly attached to the last, say at the toe and heel, by tacks, its edge projecting upwardly from the sole at other points. The engagement of the channel-guide with the channel raises the lip, as already described, and holds it in the path of the needle. The machine being set in motion, the rest d is locked, the clamp h advances, pressing the edge of the upper inwardly upon the face of the sole. The needle then advances, and as it commences to advance, friction is applied to the tension-wheel m . The needle passes through the portions of the lip and upper that are held by the clamp and channel guide, receives the thread from the looper, and returns while the parts are held as described. The stitches are formed after the usual mode of operation of machines of this class. After the needle has withdrawn from the work, friction is removed from the tension-wheel, the rest d and clamp h are released, and the shoe, which is then free to

move in any desired direction on the channel-guide, is moved by the operator to form a stitch of the desired length. The cycle of operations above described is then repeated for the next stitch, and so on.

In Figs. 4, 5, and 6, I show means for adjustably supporting the channel-guide, it being desirable in some cases to change the vertical position of the channel-guide, particularly in lasting the upper of a shoe having a toe-cap. This cap and the necessary folds of the upper at the toe raise the surface of the upper on which the clamp h bears, so that it is desirable to depress the channel-guide while stitching around the toe. The channel-guide c is in this case formed on a shank c' which has a slot c^2 , mounted on a stud or bolt c^3 which is affixed to a slide c^4 on a fixed arm or guide c^5 , the slide being movable horizontally and provided with a slot c^6 through which pass bolts c^7 c^7 which secure the slide to the guide c^5 , this construction permitting the channel-guide to be adjusted horizontally in and out. For the quick vertical adjustment of the channel-guide, I employ a lever c^8 , which is pivoted to an ear c^9 on the slide c^4 and has a cam-shaped slot c^{10} receiving a pin or stud c^{12} on the upper end of the shank c' of the channel-guide. A movement of the lever c^8 on its pivot will raise or lower the channel-guide, as the case may be. c^{13} c^{13} represent stops on the ear c^9 which co-operate with a stud c^{14} on the lever c^8 in limiting the movements of the lever c^8 .

It will be seen that the machine organized to operate as above described provides a simple and efficient means for lasting boot and shoe uppers, obviating the use of lasting tacks, excepting the relatively small number of tacks that may be required to retain the upper on the last while the stitches are being formed. The presence of these lasting tacks is rendered unobjectionable, by the absence of tension on the thread when the needle is out of the work, the operator being thereby enabled to locate the work so as to keep the lasting tacks out of the path of the needle. This is an important advantage, it being obvious that when the work is positively fed there is more or less liability of injurious contact between the needle and the lasting tacks.

If desired, instead of cutting a channel in the sole e to form a lip for the reception of the lasting stitches, I may attach a strip s to the sole e by stitches s' or otherwise, the inner edge of said strip being free and adapted to be raised by the channel-guide and to serve as a lip in the same manner as the lip e^2 . This is desirable when the sole is too thin to be channeled, the lasting stitches passing between the sole and strip without entering the sole.

I do not limit myself to the employment of a lip e^2 or its equivalent projection, the strip s , on the sole; for while such lip or projection is very desirable in most kinds of work to enable the channel-guide to properly guide

the work, it may be dispensed with in some cases. The machine may be operated by using the channel-guide *c* simply as a gage to determine the height at which the sole is held by the operator, and as a dog to prevent the pressure of the clamp *h* when it is moving forward from displacing the sole outwardly. The guide *c* serves in any case as a gage to determine the height of the sole relatively to the path of the needle and of the clamp or presser *h*, and as a guide along which the sole may be freely moved by the operator when the tension is released.

The reciprocating movement of the clamp or presser *h* is particularly desirable in lasting uppers of McKay-sewed boots and shoes, where the folds of the upper at the toe and heel would render the manipulation of the work by the operator very difficult if the clamp *h* were fixed in its forward or operating position.

I claim—

1. In a sewing-machine for lasting boots and shoes, the combination of a fixed sole-guide or gage, a curved oscillating needle, a looper located at the opposite side of the said guide from the needle, a reciprocating upper-clamp or presser located near the looper and having an upper-supporting end face opposing the pressure of the needle against the upper, and means for guiding said clamp in a path substantially parallel with the face of the sole when the latter is in its operative position, the relative positions of the clamp and channel-guide being such that the clamp in moving forward wipes the upper over upon the face of the sole.

2. In a sewing-machine for lasting boots and shoes, the combination of a fixed sole-guide or gage, a curved oscillating needle, a looper located at the opposite side of the said guide from the needle, an upper-clamp or presser located near the looper and movable toward and from the said guide or gage, and having a lip-supporting end face opposing the pressure of the needle, the bottom surface of said clamp being above the lower end of the channel-guide and adapted to press the edge of the upper over upon the face of the sole at the point where the needle passes through the upper, and mechanism for reciprocating said clamp.

3. In a sewing-machine for lasting boots and shoes, the combination of a curved oscillating needle, a fixed channel-guide or gage located close to the path of the needle and adapted

to guide the sole of a boot or shoe, a looper, a reciprocating upper-clamp or presser, means for guiding said clamp in a plane substantially parallel with the face of the sole when the latter is held in operative position, and a yieldingly supported upper-rest located below the guide and clamp and provided with automatic locking mechanism whereby it is locked when the clamp is projected and unlocked or released when the clamp is retracted, the upper being controlled only by the channel-guide when the clamp is retracted and the rest released.

4. In a sewing-machine for lasting boots and shoes, the combination of a curved oscillating needle, a fixed sole-guide or gage arranged to bear on the work close to the point where it is penetrated by the needle, devices opposite the said needle and guide for supporting the work against the said guide and against the pressure of the needle, stitch-forming devices co-operating with the needle, a tension device which is operative when the needle is in the work, and means for releasing the tension device, and means for releasing the supporting devices when the needle is out of the work, whereby the operator is enabled to feed the work indefinitely and avoid contact between the needle and the lasting tacks in the work.

5. In a sewing-machine for lasting boots and shoes, the combination of a curved oscillating needle, a fixed sole-guide or gage located close to the path of the needle and adapted to serve as a support on which the sole may be moved by the operator, alternately operative and inoperative means for supporting a boot or shoe upper against the forward movement of the needle, suitable stitch-forming devices co-operating with the needle, a tension device, and automatic means for applying friction to said device when the needle is in the work and for releasing said device when the needle is retracted, the said upper-supporting means being inoperative when the tension device is released, whereby the work is left free to be moved at the will of the operator upon the channel-guide.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 21st day of November, A. D. 1894.

WILLIAM S. HAMM.

Witnesses:

C. F. BROWN,
A. D. HARRISON.