(No Model.) 2 Sheets—Sheet 1.

C. P. LAWRENCE.

PULLING OVER MACHINE FOR BOOTS OR SHOES.

No. 559,726. Patented May 5, 1896.

Fig. 1.

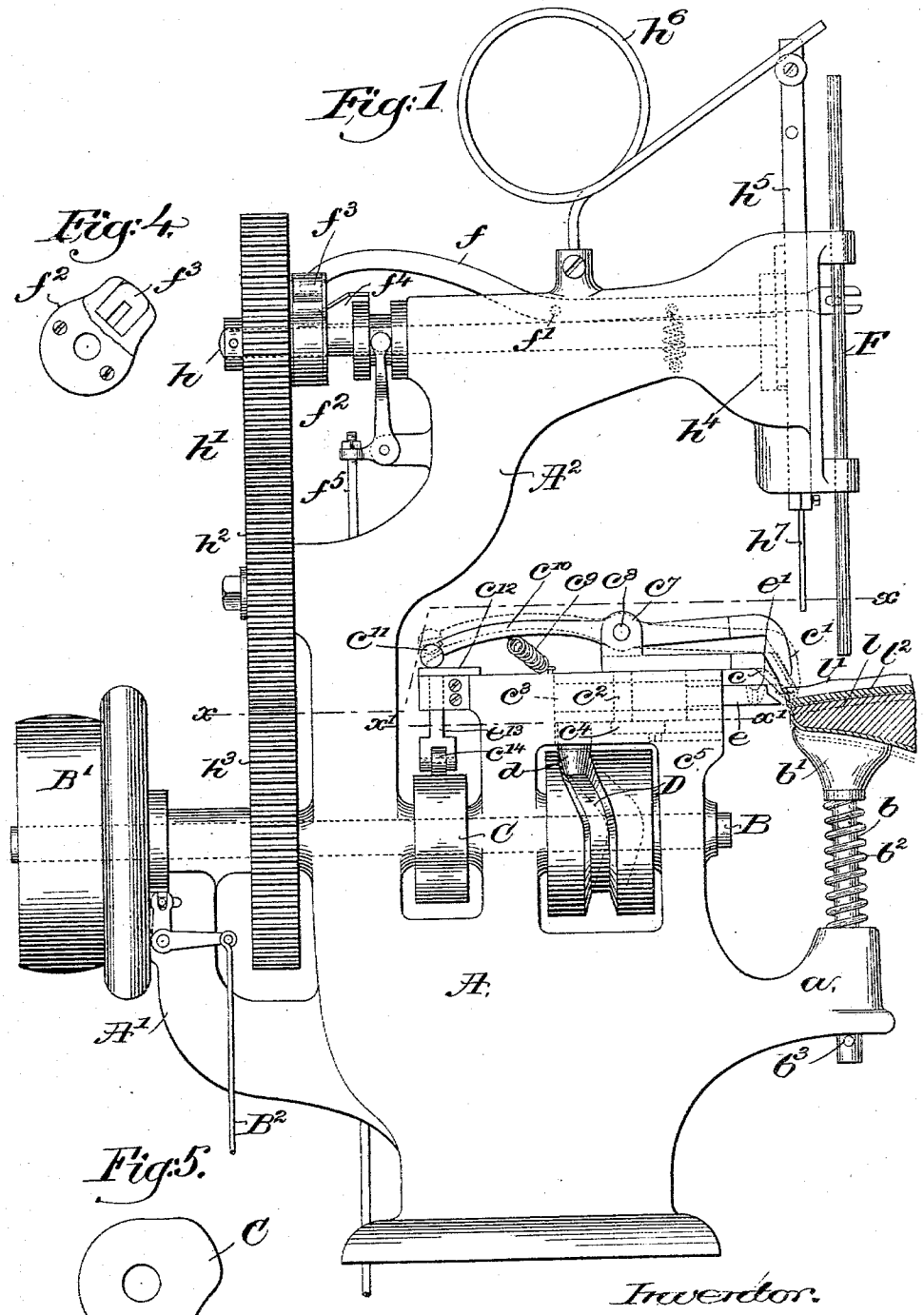

Fig. 4.

Fig. 5.

Witnesses.
Fred. S. Grumbach.
Thomas J. Drummond.

Inventor.
Charles P. Lawrence,
by Crosby & Gregory
Attys

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

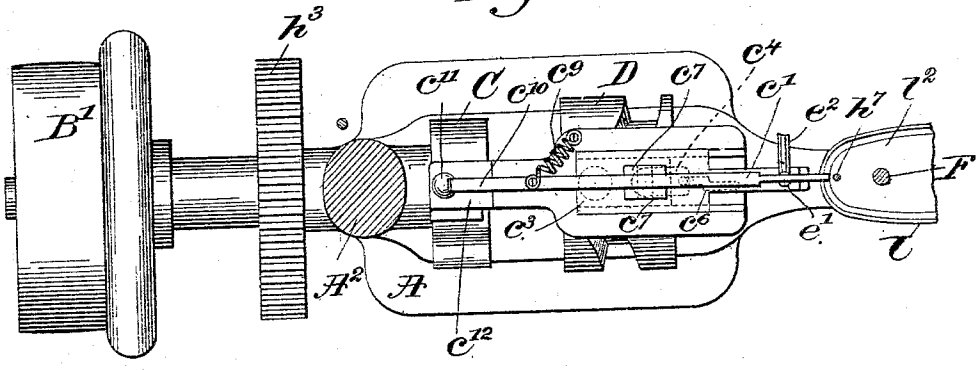
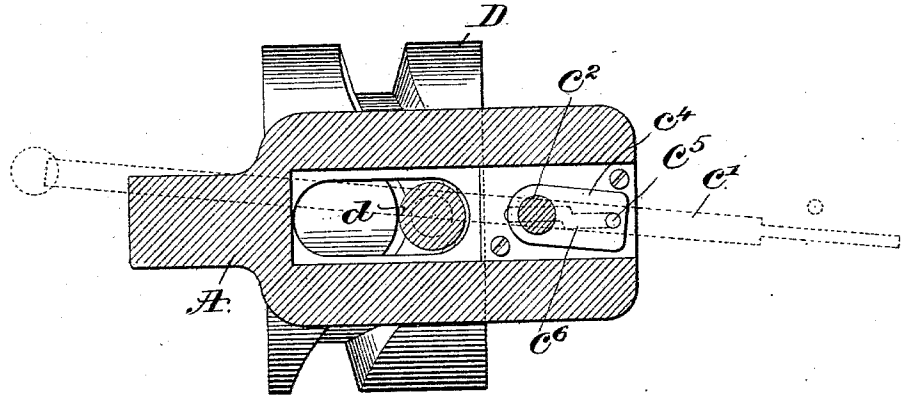


Fig. 3.



Witnesses
W. C. Harmon
Thomas J. Drummond

Inventor:
Charles P. Lawrence
by Crosby & Gregory
attys.

UNITED STATES PATENT OFFICE.

CHARLES P. LAWRENCE, OF NORWAY, MAINE.

PULLING-OVER MACHINE FOR BOOTS OR SHOES.

SPECIFICATION forming part of Letters Patent No. 559,726, dated May 5, 1896.

Application filed April 13, 1894. Serial No. 507,353. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. LAWRENCE, of Norway, county of Oxford, State of Maine, have invented an Improvement in Pulling-Over Machines for Boots or Shoes, 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 provide a novel machine for pulling over the uppers of boots or shoes and tacking the same upon the inner sole preparatory to lasting. This operation is now usually performed by hand, the upper when pulled over being held usually by three tacks, one at the toe and one at each side at about the middle of the ball of the sole.

In accordance with my invention I provide a suitable vertically-movable rest, upon which the last, with the upper and inner sole upon it, is placed. The nippers, which engage the upper and lay it over upon the inner sole, stand, when open, in such position that when the last is placed upon the rest referred to the upper will rest against the inmost nipper. A suitable depressor is provided, which descends upon the inner sole and holds the last firmly upon the rest, and after the nippers have closed upon or engaged the edge of the upper the depressor is moved to depress the last, together with the yielding rest, to cause the stationary nippers to raise the upper above the inner sole. The nippers are next moved forward to lay the edge of the upper upon the inner sole, they being followed by a presser which wipes the upper close down upon the inner sole, where it is held while the nippers release the upper and are moved to one side to permit a driver to descend and drive a tack, carried forward by the presser, through the edge of the upper and inner sole into the last. The depressor is preferably actuated by what I call an "expansion-cam"—such, for instance, as shown in my application, Serial No. 439,992, filed July 14, 1892—in order that the depressing movement may be varied according to the quantity of upper which it is found necessary to raise above the inner sole in order to have sufficient stock to properly lay over and upon the inner sole and be tacked thereto.

The machine is driven by suitable clutch mechanism, which actuates the depressor and nippers once only at a time, such clutch mechanism stopping the machine after each pulling-over operation to thereby give the operator sufficient time to remove the last from the rest and again position it thereupon in readiness for the next tack.

In the drawings, Figure 1 represents in side elevation one form of pulling-over machine embodying my invention, the last and the upper and inner sole upon it being shown in section. Fig. 2 is a horizontal section on the dotted line $x\,x$, Fig. 1; Fig. 3, a horizontal sectional detail taken on the dotted line $x'\,x'$, Fig. 1, the nippers being shown in dotted lines in the position into which they are moved to permit the driver to descend; and Figs. 4 and 5, details of the cams f^2 and C, to be referred to.

Referring to the drawings, A is a frame of suitable shape and construction to sustain the working parts, the same, as herein shown, having a forwardly-extended arm a, which sustains the vertically-movable bar b, formed at its upper end to constitute a rest b', upon which the last l, carrying the upper l' and inner sole l^2, is placed, the said rest being acted upon and retained normally in its elevated position by a spring b^2, shown as surrounding the bar b, vertical movement of the latter being limited by a stop-pin b^3, as shown.

c and c' are the nippers, one of which, as c, is shown as provided with a depending stud c^2, (shown in dotted lines, Fig. 1,) which stud is journaled in a longitudinally-sliding block c^3—that is, a block having a movement right and left—Fig. 1, said stud c^2 at the under side of said block having an arm c^4, provided with a roll or other stud c^5, which travels in the cam-groove c^6, formed in the frame A, the said cam-groove having an offset at its middle, as shown best in Fig. 3, to be referred to. The nipper c at its rear end is shown as provided with two vertically-extended ears c^7, between which, at c^8, is pivoted the upper and herein shown as the movable nipper c', a spring c^9 drawing said nippers usually apart. The nipper c' is shown provided with a tail c^{10}, provided at its rear end, as shown, with an antifriction-roll c^{11}, which may be spheri-

cal in shape, as shown, and maintained by the spring c^9 normally in position upon the plate c^{12} on the upper end of the vertically-movable rod c^{13}, provided at its lower end with a roll c^{14}, resting upon and actuated by the cam C upon the main shaft B of the machine, said cam being shown in detail, Fig. 5.

The main shaft B is journaled in suitable horizontal bearings in the frame A, and at its rear end, beyond the supporting-bracket A′, the said shaft is provided with a driving-pulley B′, connected with the said shaft by suitable clutch mechanism (not shown) under the control of the manually or treadle operated rod B^2, and which is of such usual construction that when caused to engage the said shaft it will rotate the latter through one complete revolution, at the end of which it will be automatically disengaged, as will be hereinafter described. A path-cam D, fast upon the shaft B, coöperates with a roll-stud d upon the under side of the sliding block c^3 to move the latter with the nippers forward and back, as will be hereinafter described, the said block being also provided at its front end with a presser e, adapted when moved forward to wipe or lay the upper back upon the inner sole and to there hold the said upper, as will be described.

The frame A is provided with an overhanging arm A^2, in the outer end or head of which is mounted, in suitable bearings, a vertically-sliding depressor F, shown as moved by a lever f, pivoted at f', (see dotted lines, Fig. 1,) and at its rear end resting upon the cam f^2 upon the shaft h, journaled in the said overhanging arm, said cam being what is known as an "expansion-cam" and having a suitable expansion-block f^3, controlled by the wedge f^4, actuated by the rod f^5, all substantially as shown in my application, Serial No. 439,992, referred to.

The shaft h is driven from the main shaft B by means of a train of spur-wheels h', h^2, and h^3, said shaft h at its front end, as shown in dotted lines, Fig. 1, being provided with a cam h^4, of usual construction, which engages and reciprocates the tack-driver bar h^5, mounted in the said arm, the said driver-bar at its upper end being acted upon by a driving-spring h^6, which serves to impart a driving movement to the driver when released by the cam h^4, referred to. The driver-bar h^5 is fitted to receive and hold a suitable tack-driver h^7, as shown.

The presser e close to its front end is provided with a tack receiving and holding recess e', (see Fig. 2,) and which, when the presser is in its retracted position, (shown in full lines, Fig. 1,) stands opposite the delivery end of the raceway e^2, leading from a suitable tack-hopper, and which delivers to the said presser a single tack at each movement, which, when the presser is moved forward to wipe the upper over or upon the inner sole, is carried into position beneath the driver h^7 to be driven by the latter into the last, the said presser at each forward movement picking off one tack from the end of the raceway.

The operation of my machine is as follows, viz: The last upon which the upper and inner soles are tacked is placed upon the rest b', preferably with the upper at the side of the boot or shoe first presented to the nippers c c', although the said last may have its toe portion first presented to the nippers, as shown in the drawings. When the last is placed upon the rest, it is pressed toward the back, so that the outer face of the upper lies against the gripping-face of the fixed nipper c, as shown in the drawings. The operator now moves the clutch-controller or treadle-rod B^2 to rotate the shaft B through one revolution, rotation of the shaft first acting through the cam C to raise the rod c^{13} and the table c^{12} to cause the nipper c' to move down toward its coöperating nipper c to grip the edge of the upper between them. Simultaneously with this movement of the nippers the expansion-cam f^2 upon the shaft h, rotated from the main shaft, moves the lever f to cause the depressor F to descend and rest upon the inner sole, confining the last firmly in position between the depressor and the rest d'. Rotation of the cam further moves the depressor to push the last and the yielding rest b' down below its position, Fig. 1, into its dotted position, to thereby cause the upper, held at its edge between the stationary nippers, to be stretched or raised above the surface of the inner sole and thereby obtain sufficient material at the edge of the upper to enable the latter to be laid over and tacked upon the edge of the inner sole. The upper having been stretched or raised in this manner the last is held in its depressed condition by the depressor F, and continued rotation of the main shaft B, acting through the cam D, now slides the block c^3 to the right, Fig. 1—that is, toward the operator—such movement of the said block carrying the nippers also to the right, or forward, to lay the upper over or upon the inner sole, as shown in dotted lines, Fig. 1, the presser e also moving forward with the block c^3, it engaging the upper at the edge of the inner sole and wiping the upper down tightly upon the inner sole. While the block c^3 is moving forward and after the presser e has reached the inner sole and has wiped the edge of the upper down thereupon with sufficient force to prevent the upper from slipping back the cam C releases the rod c^{13} and permits the spring c^9 to open the nippers and release the edge of the upper, leaving the latter solely under the control of and to be wiped into position by the presser e, forward movement of the sliding block causing the roll-stud c^5 on the arm c^4 of the fixed nipper c to enter the offset in the cam-groove c^6, which acts to turn the nippers to one side into their dotted position, Fig. 2, out of the path of movement of the driver h^7, which now descends and drives the tack carried by the presser e into position beneath it through the

upper and inner sole into the last. The driver h^7 is raised by the cam h^4 and quickly released, the spring h^6 furnishing the power for driving. The sliding block c^3 is now drawn back to its normal position at the left, Fig. 1, thereby returning the nippers to their central position in alinement with the driver, the latter in the meantime, together with the depressor, having been raised to their elevated full-line position, Fig. 1, by one complete rotation of the main shaft B, which is automatically stopped, as described, at the end of one rotation to enable the operator to reposition the last upon the rest preparatory to the driving of the next tack. Should the operator find that the depressor has not moved the last enough to obtain sufficient upper to enable the latter to be laid over upon the inner sole, the operator by means of his knee or otherwise moves the rod f^5 to force the wedge f^4 into the expansion-cam f^2, to thereby throw out its sliding block f^3 and move the lever f to cause the depressor to push the last still farther down, to further stretch the upper and obtaining sufficient leather to enable the latter to be laid over upon the inner sole.

My invention is not restricted to the particular mechanism herein shown, for the same obviously may be varied in many ways without departing from the spirit and scope of the invention.

Any suitable or usual means may be provided for delivering the tacks singly to the presser as the latter moves forward beneath the driver, and the several parts of the machine, particularly the nippers and presser, may be actuated in other ways than that herein shown, if found desirable or necessary for any particular class of work.

One important feature of my machine (illustrated in Fig. 1) is that when the last is positioned upon the rest it is placed with the outer face of the upper laid directly against the gripping-face of one of the nippers, so that the operator is sure of the nippers obtaining a good grip upon the edge of the upper. This is particularly useful in turned shoework, wherein the upper rarely rises more than one-sixteenth of an inch, and generally less, above the level of the inner sole, for the nipper c engaging the upper for, say, an eighth of an inch at its outer face, the movable nipper c' descends and its point enters between the upper and the edge of the inner sole to get a firm hold upon the former to enable the upper to be raised sufficiently to be laid back upon the inner sole.

Another important feature is that the last receives no lateral movement when once positioned upon the rest, it having simply a downward or depressing movement, the nippers and presser afterward themselves moving to lay the upper over in its proper position.

I claim—

1. A machine of the class described, containing nippers, and actuating mechanism for and to cause the same to positively engage and hold the edge of a shoe-upper, a yielding work-rest for the last carrying the said upper, and mechanism to change the relative positions of said yielding work-rest and nippers to thereby stretch the said upper between the last and nippers, and lay the edge of said upper laterally over the edge of the last, substantially as described.

2. In a machine of the class described, nippers, and actuating mechanism for and to cause the same to positively engage and hold the edge of a shoe-upper; a yielding work-rest for the last carrying the said shoe-upper; a depressor, means to actuate the same to depress the said last and work-rest and thereby stretch the said upper between the last and the nippers, and means to change the relative positions of said nippers and yielding work-rest to thereby lay the upper laterally over and upon the said last, substantially as described.

3. In a machine of the class described, nippers, and actuating mechanism for and to cause the same to positively engage and hold the edge of a shoe-upper; a yielding work-rest upon which the last is positioned; a depressor, and means to actuate the same; and mechanism for and to move said nippers in a direction lateral to the said last, whereby the upper is not only stretched by depression of the last, but is also by the lateral movement of the nippers referred to laid over and upon the inner sole upon the last, substantially as described.

4. A machine of the class described, comprehending the following instrumentalities, viz: a yielding work-rest upon which the last is positioned; a depressor; means to actuate the same to depress said work-support and thereby stretch the upper between the last and nippers; nippers adapted to grip the edge of the upper, and means to change the relative positions of said nippers and yielding work-rest to carry the edge of said upper over upon the inner sole; a presser and means to move the same to hold the said upper down upon the last after the nippers have released their grip, substantially as described.

5. A machine of the class described, containing the following instrumentalities, viz: a yielding work-rest upon which the last is positioned, and a depressor to depress said work-rest to thereby stretch the upper between the last and the nippers, nippers adapted to engage the edge of the upper and means to change the positions of said nippers and work-rest to lay the same upon the inner sole, a tack-carrying presser and a tack-driver, to operate, substantially as described.

6. A machine of the class described, containing the following instrumentalities, viz: a yielding work-rest upon which the last is positioned; a depressor for and to depress the same to stretch the upper between the last and the nippers; nippers and means to move the same to grip the edge of the upper and thereafter change the relative positions

of said yielding work-rest and nippers to lay the upper over and upon the inner sole; a presser and a tack-supply adjacent thereto whereby said presser at each forward movement receives and carries with it a tack, and a tack-driver, to operate, substantially as described.

7. A yielding work-rest upon which the last is positioned, a depressor, a cam to operate the same, and means to vary the throw of said cam, combined with nippers, and means to actuate the same, a tack-carrying presser, and a driver, all to operate, substantially as described.

8. In a machine of the class described, normally open nippers, and means to close the same to engage the edge of an upper and to move the same to lay the upper over and upon the last, combined with a yielding work-rest normally retained in such position that in positioning a last the face of the upper will be laid against the clamping-face of one of the said nippers, and a depressor, to operate, substantially as described.

9. In a pulling-over machine, a work-rest, nippers and means to cause the same to engage the edge of an upper, and thereafter move said nippers to lay the upper over and upon the last, combined with a main shaft to operate the several parts of the machine, and a clutch mechanism to operate said shaft and automatically stop the latter at the end of each complete revolution, substantially as and for the purpose specified.

10. In a machine of the class described, a yielding work-rest upon which the last is positioned, a depressor and means to actuate the same, combined with nippers adapted to engage the edge of the upper, means to move the said nippers to lay the upper upon the inner sole and to thereafter release the said nippers and turn the same to one side, a tack-carrying presser to hold the upper upon the inner sole during the movement of the said nippers to one side, and a tack-driver, all to operate, substantially as described.

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

CHARLES P. LAWRENCE.

Witnesses:
HOWARD D. SMITH,
MORRILL M. FULLER.