(No Model.) 4 Sheets—Sheet 1.

N. LOMBARD.

LASTING MACHINE.

No. 524,445. Patented Aug. 14, 1894.

Fig. 1.

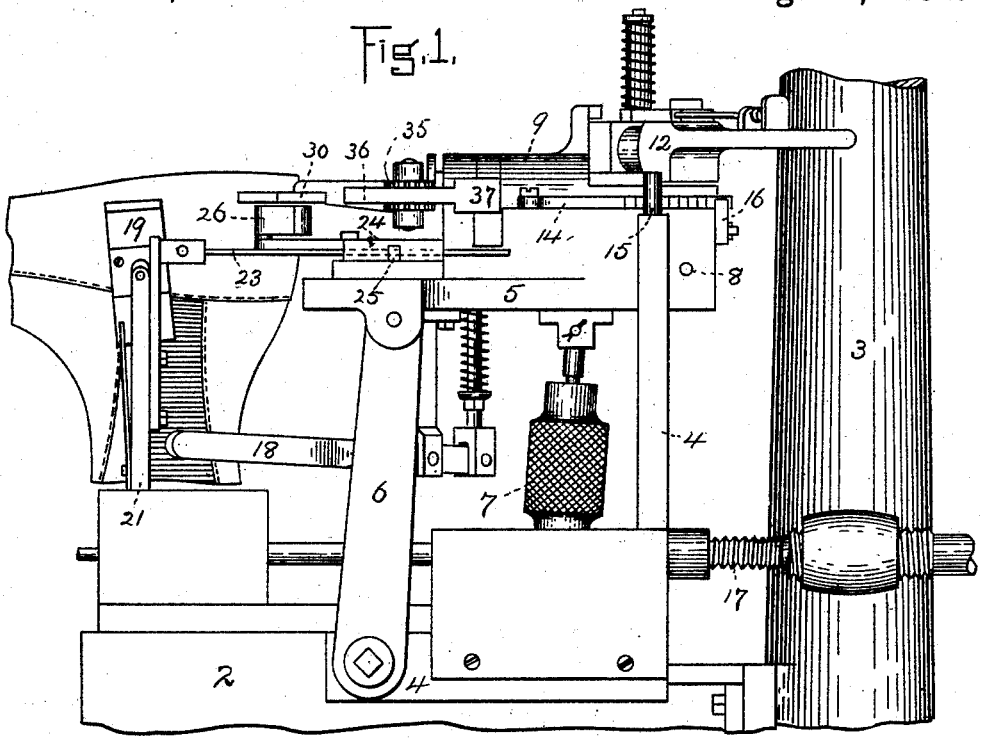
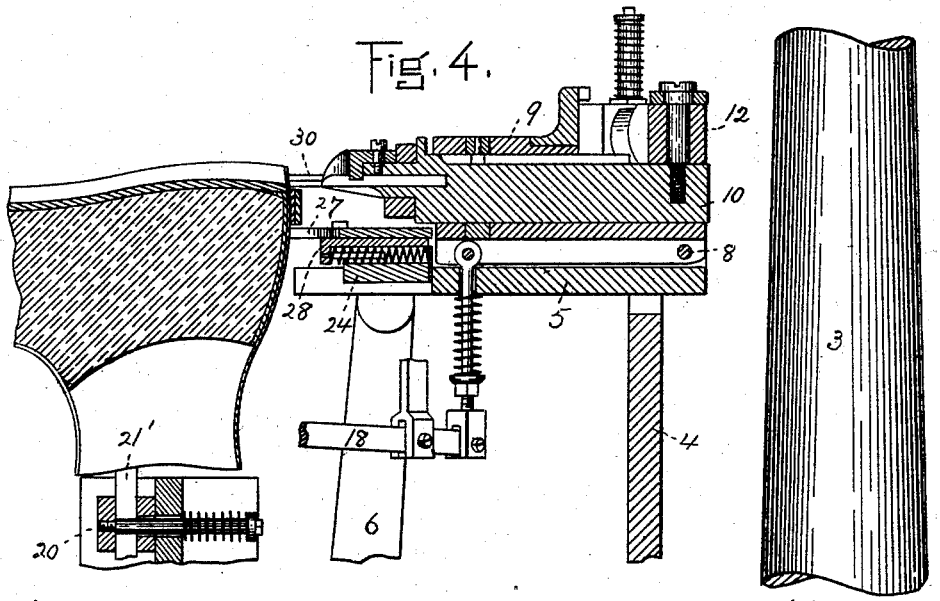


Fig. 4.



WITNESSES.

Francis E. Stanwood

Geo. F. Wood.

INVENTOR.

Nathaniel Lombard.

by H. E. Lodge Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 2.

N. LOMBARD.

LASTING MACHINE.

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Fig. 2.

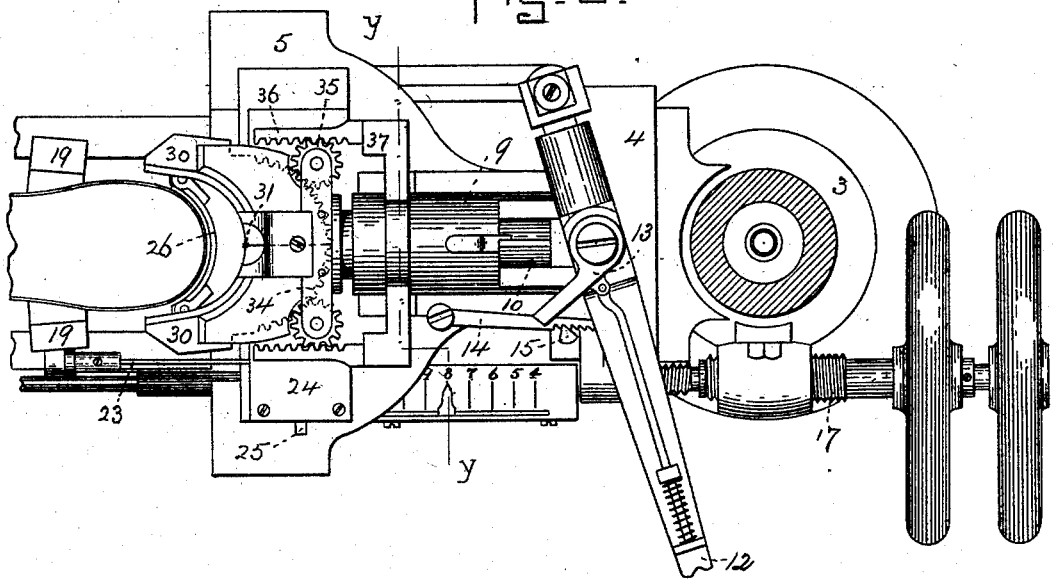
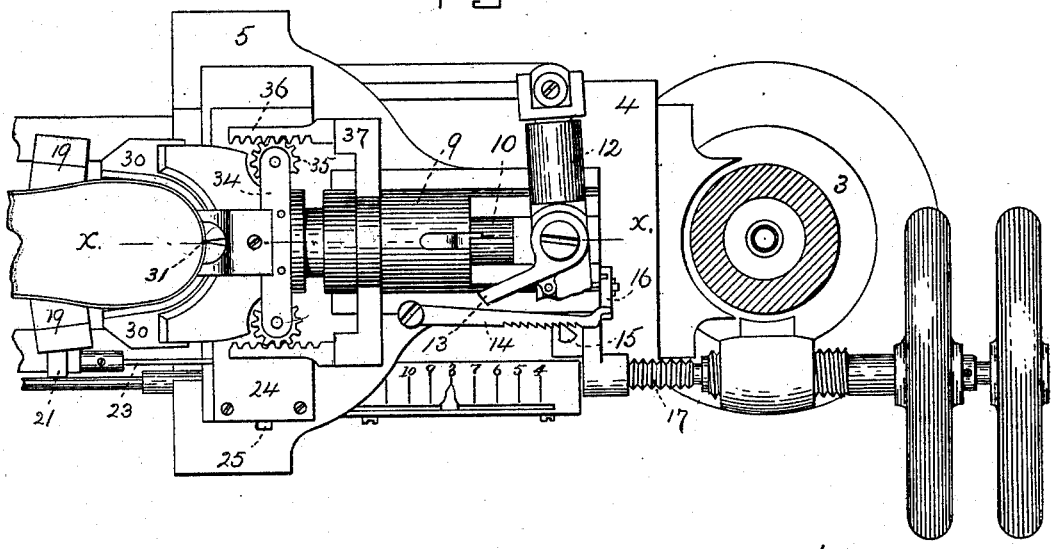


Fig. 3.



WITNESSES.

Francis C. Sturwood

Geo F. Wood.

INVENTOR.

Nathaniel Lombard.

by H. L. Lodge. Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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N. LOMBARD.

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Fig. 5.

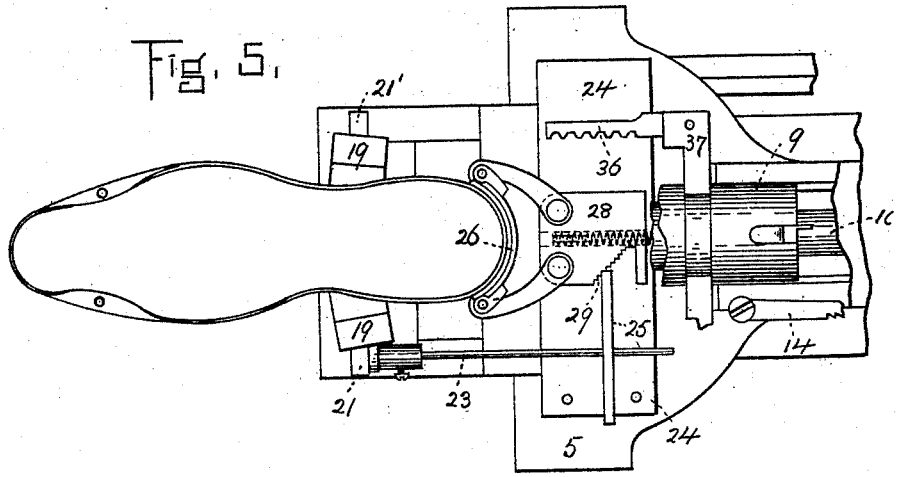
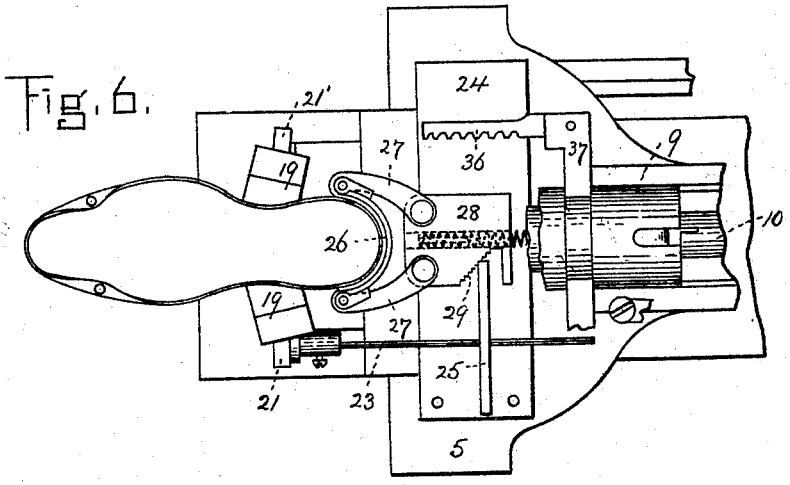


Fig. 6.



WITNESSES.

Francis C. Steinwood

Geo F Wood.

INVENTOR.

Nathaniel Lombard.

By H. C. Lodge Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 4.

N. LOMBARD.

LASTING MACHINE.

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Fig. 8.

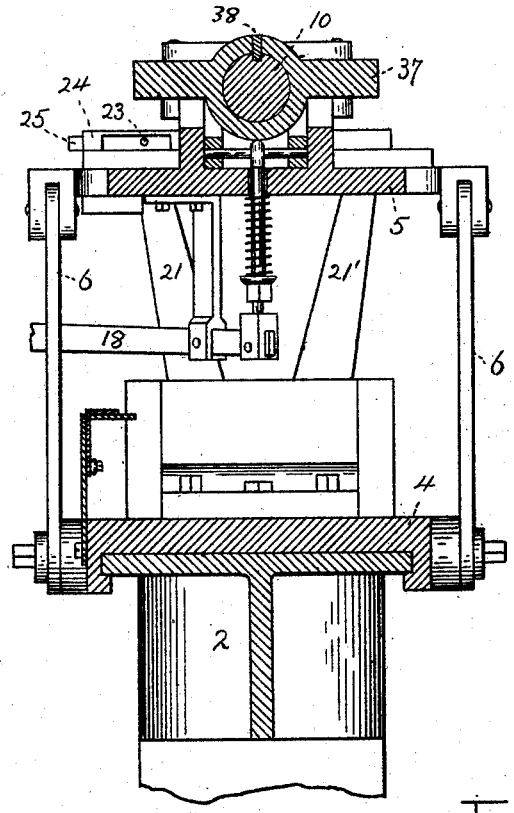


Fig. 7.

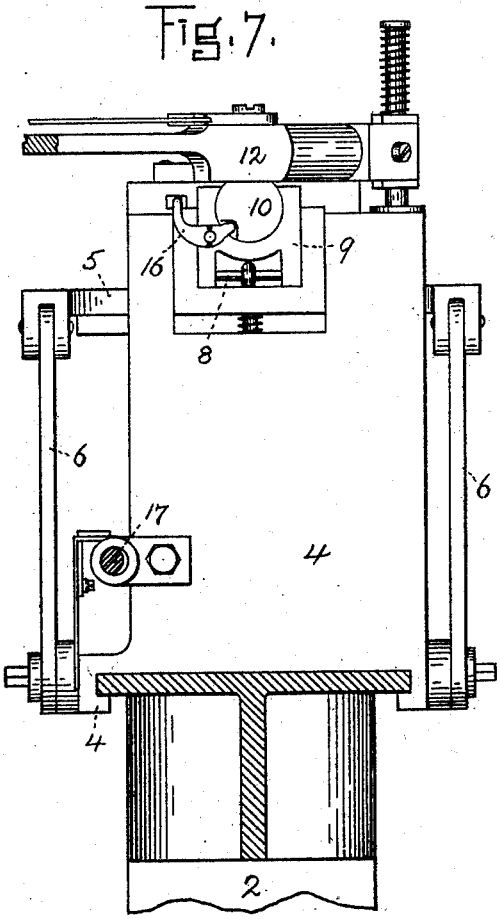
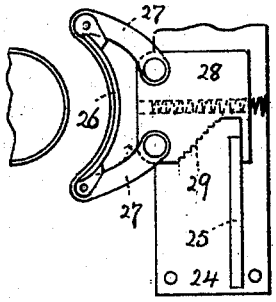


Fig. 9.



WITNESSES.

Francis C. Steward

Geo F. Wood

INVENTOR.

Nathaniel Lombard.

by H. L. Lodge Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE

NATHANIEL LOMBARD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AUTOMATIC LASTING MACHINE AND MANUFACTURING COMPANY, OF PORTLAND, MAINE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,445, dated August 14, 1894.

Application filed November 10, 1893. Serial No. 490,580. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL LOMBARD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Heel-Lasting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to lasting machines particularly that portion which includes mechanism for operating upon the heel upper and comprising the several acts of drawing the upper snugly about the last, and crimping and folding it down upon the insole.

My invention in brief consists in a sliding heel carriage upon which are mounted the various elements, which when assembled constitute the machine, as an entirety.

The primary features consist in a rocking cylinder adapted to swing in line with the longitudinal axis of the last, and likewise in a piston adapted for reciprocating and oscillating movement within the cylinder. Said piston is furnished with folding wipers and these are controlled by the same lever by which the various motions are imparted to the piston.

Furthermore my invention is embodied in the employment of a pair of last-holding devices by which the last proper is supported along the quarter and in a sliding plate fitted with a flexible clamping band for temporarily securing the heel portion of the upper against the last.

One of the most important and characteristic features in my present invention comprises mechanism for automatically adjusting the position of the wipers to the varying contours of the heels of boots or shoes, since it is necessary that said wipers shall approximately coincide with the heel at all points, when contiguous thereto, and just prior to the act of lasting the heel portion. This mechanism in brief consists in a variable stop or bolt, which is changed in position dependent upon the size of the last entered for lasting. Furthermore this stop controls and regulates the distance of the table from the heel portion of the last, after the flexible clamping band is set tightly against the heel. Hence, as the distance of the carriage and the wipers are nearer or farther from the heel, so are the wipers less contracted or more contracted at the time they touch the heel in readiness to perform their duty, since the piston must be moved to bring the wipers about the heel, and such movement acts to fold them toward each other. This mechanism more particularly and in detail consists of a bolt which is positioned transversely on the movable table in the rear of the last and is arranged to engage a plate with a notched edge obliquely of the bolt. Moreover this plate carries the flexible clamping band and slides to and fro with respect to the heel in alignment with the longitudinal axis of the last. Thus it will be understood that the distance between the last-holding devices controls the inward or outward movement of the bolt, while the position of the latter regulates the throw of the table with respect to the flexible clamp. Hence, the table is stopped in some instances sooner than in others and as a result the piston has a greater distance to travel before the wipers reach the heel; consequently the wipers are contracted to a greater extent and are thus adapted to fit a small heel, conversely with a larger heel. Since the position of the bolt is changed for different sizes of shoes, it is evident that the wipers are automatically adjusted for each and every size.

The drawings accompanying this specification represent in Figure 1 a side elevation of heel-lasting mechanism embodying my invention. Fig. 2 is a plan showing the flexible clamping band against the heel with the wipers retracted. Fig. 3 is a similar view with the wipers in readiness to advance over the heel. Fig. 4 is a vertical section on line *x x* in Fig. 3. Fig. 5 is a plan of the machine with the wipers removed showing the transverse bolt and notched plate for automatically adjusting the position of the wipers. Fig. 6 is a similar view showing the changes relatively of the several parts when lasting a small

shoe. Fig. 7 is an end elevation of the machine. Fig. 8 is a vertical cross section on line *y y* in Fig. 2. Fig. 9 shows the normal position of the bolt and notched plate prior to clamping the flexible band against the heel.

In said drawings 2 represents the main standard or frame of the machine fitted with an upright post 3 and a sliding carriage upon which are mounted the principal operating elements. Said carriage consists of a base and a vertical end piece 4 which engage the standard, while a top plate or table 5 is positioned above and united thereto by pivotal supports 6 6. Furthermore an adjusting screw-threaded sleeve 7 serves to give the proper angle to said table 5 with respect to the last. Mounted upon the table 5 and pivoted at 8 is a cylinder 9 adapted to rock in a plane coincident with the longitudinal axis of the last; swinging of the cylinder is produced by aid of the lever 12 which raises or lowers the free end. A piston at 10 is contained within the cylinder and by means of the operating lever 12 may be caused to reciprocate or oscillate as circumstances require. The cylinder and table 5 move in unison toward or away from the last, and such movement is effected with the lever 12 and a spring-actuated pawl 13 which engages said cylinder. The purpose of the swinging motion of the cylinder is to raise or lower the wipers with respect to the top of the heel, and the spring at the end of the lever 18 serves to force the wipers against said heel and break and flatten down the upper. A toothed rod 14 serves to lock the table 5 in proper position by aid of the stop 15, while disengagement of the two is effected by the piston which is rocked slightly to operate a latch 16, see Fig. 7, and separate the rod 14 from the stop, and so permit the table 5 to slide back.

Change in the position of the entire carriage is effected by the agency of the screw rod 17 and after said carriage has once been positioned, so it continues for the same size of shoe. In connection with the act of lasting I provide two lateral last-holding devices 19 adapted to grip the upper at or near the quarter and these devices likewise clamp the counter at its corners, said devices being loosely hung upon a pin 20, see Fig. 4, furnished with a coiled spring in order to provide for variable adjustment of said devices to allow them to yield as the flexible clamp thrusts the last forward until the toe meets the stop. This obviates the restrictions of a rigid joint which otherwise might cause folds in the leather. From the lever bar 21 of one of these holding devices and adjustably secured thereto is a rod 23 which is parallel with the longitudinal axis of the last and projects through a hollow rectangular box 24 bolted to the table 5 of the carriage. Transversely of this rod is secured a bolt 25 which is contained within the box, the rod 23 sliding freely through said bolt. From the above description of said elements it will be evident that according to the movement of the last-holding devices 19 toward or from each other, so will the bolt 25 approach or recede from the median line or a plane coincident with the longitudinal axis of the last. Hence the extremity of the bolt is positioned in accordance with the size of the last and is changed in or out from the median line according to the size of shoe introduced between the last-holding devices.

In the act of lasting the heel of a boot or shoe it has been customary to employ a flexible clamp, such as is shown at 26, see Figs. 5 and 6. In the present instance the ends of this clamp are secured to similar arms 27 affixed to a sliding plate 28, this latter being contained within the box 24 before mentioned. One side of the plate is formed with a V notch while one edge of said notch is toothed or serrated at 29 to serve as variable contact points for the bolt 25. Normally said plate is held in a forward position or advanced toward the last, see Fig. 9, by a spring in order to give free play to the movement of the bolt within the box when the last is introduced.

To seize the edge of the heel upper and force and fold it over the insole, wipers 30 are likewise provided, these, as shown in Figs. 1 and 4, are positioned somewhat above the flexible clamp; their center of motion is the point 31, while the wipers consist of curved jaws their exterior rear curved peripheries being toothed as shown. In order to impart a scissor-like wiping motion to these instrumentalities a transverse arm 34 is secured upon the piston and at each end is mounted a revoluble pinion 35, these latter meshing in racks 36 which form parts of a yoke 37. This yoke is made fast to the cylinder hence reciprocations of the piston cause rotation of the pinions, and an open and shut movement of the wipers is effected. The yoke is connected to the piston by a pin 38, while the piston is slotted, and thus the yoke may be rocked while the piston can reciprocate freely through it.

In connection with the movement of the wipers and the adjustable position of the bolt 25 dependent upon the size of the last is embodied the chief and most characteristic feature of my invention, whereby the relative position of the wipers is automatically regulated, and consequently such, when in readiness to pass over the leather of the upper, are practically of the same conformation as the contour of the heel. In other words they will touch the heel at all points and such adjustment is effected when the wipers approach the heel, the space between said wipers being increased or diminished according to the size of the last then just entered for the purposes of lasting. I shall now explain this adjustment more fully, reference being had particularly to Figs. 2, 3, 5, 6, and 9.

It is to be understood that the position of the last-holding devices 19 and the rod 23 together with the inner extremity of the bolt 25 are practically fixed points for each size of shoe. Further that the box 24 is fastened to the table 5 of the carriage, while the wipers are free to reciprocate above. With these premises I will say that the last in Fig. 5 is placed in position and the holding devices 19 brought tightly thereagainst thus adjusting the bolt to the position shown. Moreover the plate 28 is in the position shown in Fig. 9 the flexible clamp 26 not being in contact with the heel. This plate has free independent movement of its own although it moves with the carriage. The handle 12 is now grasped, the catch 13 moves to interlock with the cylinder, and the table 5 and all the elements thereupon are advanced, this includes the cylinder, piston, box 24, the bolt 25 and the plate 28 with the clamping band 26, as likewise the wipers. This upper part of the carriage or table 5 swings now upon the arms 6 6 until the band 26 contacts against the heel, when the plate 28 becomes stationary, while the said table 5, bolt 25, and the other co-operating elements still advance, the bolt engaging the serrated edge and forcing the plate 28 and band 26 tightly against the heel. The table 5 of the carriage is now locked in position by means of the toothed bar 14 and stop 15 while the act of lasting now is to take place. The operator is then in readiness to release the catch 13 from the cylinder, and this done he proceeds to move the piston, and this agent now acts to cause the wipers to close together by aid of the pinions and the toothed racks. Oscillating movement may also be given to cause the wipers to break and flatten down the upper upon the insole. This oscillation affects the piston, wipers and their actuating elements, to wit:—the pinions and toothed racks, the latter forming part of the yoke 37.

From the above description it will be observed that the wipers do not advance and consequently do not change their position relatively to each other until the clamping band 26 is firmly locked against the heel. This forcing home of the band 26 will, it is seen, take place at different times consequent upon the position of the bolt 25 with respect to the serrated edge 29 of the plate 28. That is, in some instances when the shoe is small, the bolt, extending farther in, will engage the plate sooner, the result being that the carriage and wipers are not permitted to advance so near to the heel, as when a larger shoe is in process. But inasmuch as the wipers are farther from the heel in a small shoe the piston is required to travel a longer distance and thus the wipers are more contracted when they reach the heel than when a larger size shoe is in process. In the latter example the bolt being more retracted the carriage, wipers and piston are allowed to approach nearer the heel and are closer to the heel at the time the bolt engages the plate 28 which act serves to set the band 26 firmly against the heel. Hence it will be understood that the piston moves only a short distance before the wipers reach the upper, as a consequence they are wider apart, but in any event they always approximate in shape the heel to be lasted, since the bolt and the serrated edge of the plate 28 are adjusted relatively to produce this result. Hence large or small, narrow or wide, as the last may be, the wipers are automatically adjusted to conform to the heel contour when contiguous thereto and this adjustment takes place every time a last is entered, since the bolt is advanced or withdrawn, while the variable stop thus created changes the position of the carriage from the heel and the wipers are being adjusted, while the piston is being advanced; hence they reach the heel in a position which causes them to touch at all points of the heel simultaneously. The advantages attending this adjustment of the wipers are evident: All springs are obviated, while each change is effected positively and without thought from the operator. Heretofore the wipers required constant individual attention.

What I claim is—

1. In a lasting machine the combination with a heel-clamp, and lasting wipers, of a bolt for variable adjustment, levers to grasp the last, and connections from the levers to the bolt, whereby insertion of the last between said levers automatically adjusts the bolt which regulates the movement of the wipers and causes them to reach the heel in a more or less contracted position, substantially as and for purposes explained.

2. In a lasting machine the combination with last-holding levers, and a bolt carried thereby, of a notched plate adapted to reciprocate to and fro with respect to the last, a heel clamp affixed to said plate, a pair of folding wipers, and means to bring the bolt against the said plate and thus regulate the position of the wipers at the time of contact with the heel, substantially as set forth.

3. The combination with a lasting carriage, a pair of folding wipers, and a bolt mounted on the carriage but adjustable transversely to and fro of the median line of the last and regulated by the size of the last, of a toothed plate independently movable to engage the bolt, a pair of folding wipers, and mechanism to bring the bolt in contact with the toothed plate to stop the carriage and thus regulate the position of the wipers when they reach the heel, substantially as described.

4. In combination with last-holding levers, a carriage to support lasting appurtenances, a bolt transversely of the last and mounted on said carriage, a rod extending through said bolt and attached to a last holding lever, a heel clamp, and a toothed plate, the latter to engage the bolt which serves as a variable stop for the carriage, substantially as specified.

5. In a lasting machine the combination with a movable carriage, a sliding piston thereon, folding wipers actuated by the piston, and a bolt adjustable transversely with respect to the last, of a pair of last-holding levers, a rod to connect the bolt therewith, a heel clamp, a spring-actuated toothed plate having independent movement on the carriage, and means to advance the carriage and cause the bolt to engage the toothed plate, substantially as set forth.

6. In a lasting machine the combination with a movable carriage, a rocking cylinder, a piston to reciprocate therein, and a pair of folding wipers actuated by the reciprocations of the piston, of a sliding plate having movement independent of the carriage, a heel clamp affixed thereto, and a bolt transversely on the carriage and serving to contact with the plate to produce variable throw for the wipers, substantially as explained.

7. In combination with a movable carriage, and stationary last-holding levers, a bolt transversely of the last, mechanism interconnecting said levers and bolt by which said bolt moves simultaneously with said levers, a sliding plate carrying a heel clamp, and means to cause the bolt to contact with the plate at points varying in distance from the median line of the last to limit the travel of the carriage toward the heel of the last, substantially as specified.

8. In a lasting machine a movable table, means for locking the same, a rocking cylinder, a piston thereon, and a pair of folding wipers at the extremity of said piston, combined with a yoke the arms of which have rack-teeth, revoluble pinions which interconnect said rack and wipers, and a lever to reciprocate the piston, substantially as stated and set forth.

9. In a lasting machine, a movable carriage, means for moving and locking the same, a pair of folding wipers, a heel-clamp upon the carriage to serve as a stop, a pair of last-holding levers, and mechanism which interconnects the last-holding levers with the heel-clamp, and thereby limits the travel of the carriage toward the heel, such travel to be dependent upon the varying width of the last at its point of contact with the last-holding levers, substantially as described.

10. In a lasting machine the combination with a sliding carriage, its upper table 5, the swinging cylinder, and reciprocating piston notched at one end and furnished with lasting appurtenances at the opposite end, of a toothed bar, a stop, and a latch which engages the piston and upon oscillation of the piston separates the bar from the stop to release the table 5, substantially as explained.

11. In combination a movable table, a swinging cylinder thereupon, a piston, its lever, means to advance the cylinder and piston together or the piston alone, wipers carried upon and actuated by the piston, a toothed plate movable on the table, and a heel clamp secured to the toothed plate, together with a bolt carried on the table, and means for adjusting the bolt transversely with respect to the longitudinal axis of the last, said adjustment to be dependent upon the width of the shoe then in process of lasting, substantially as stated.

In testimony whereof I affix my signature in presence of two witnesses.

NATHANIEL LOMBARD.

Witnesses:
H. E. LODGE,
FRANCIS C. STANWOOD.