3 Sheets—Sheet 1.

G. W. COPELAND & F. F. RAYMOND, 2d.

Lasting-Machine for Boots and Shoes.

No. 211,294. **Patented Jan. 14, 1879.**

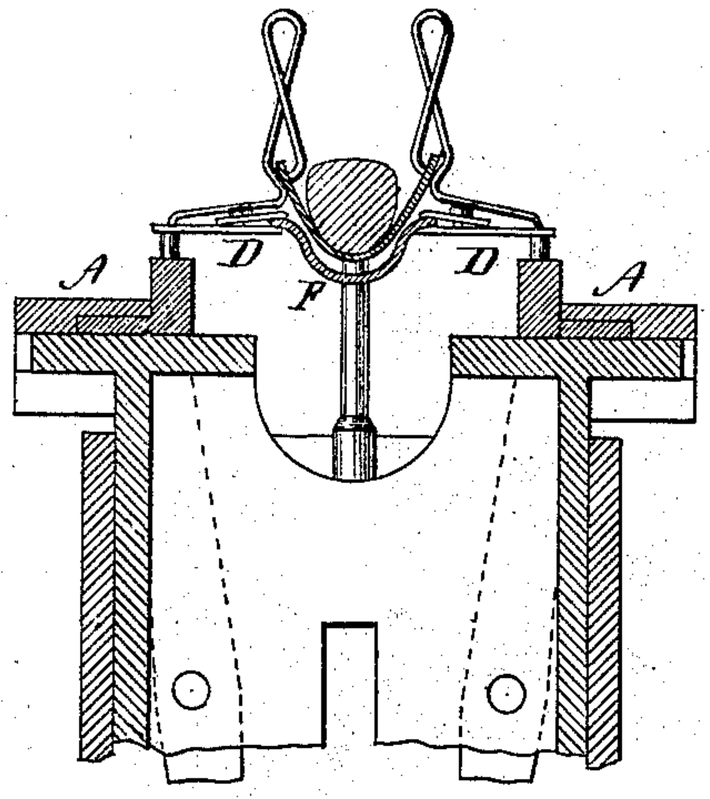

Fig. 1.

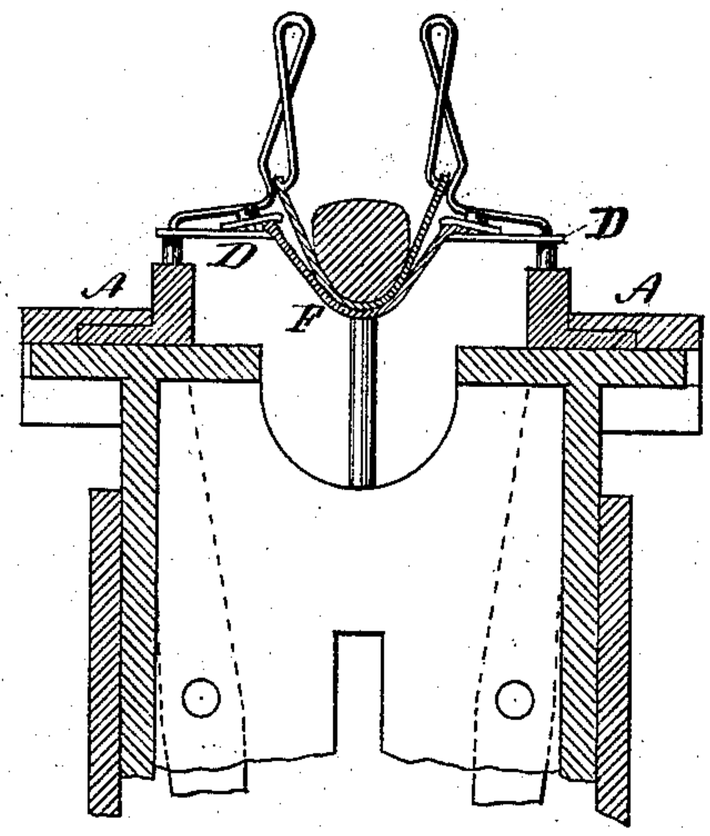

Fig. 2.

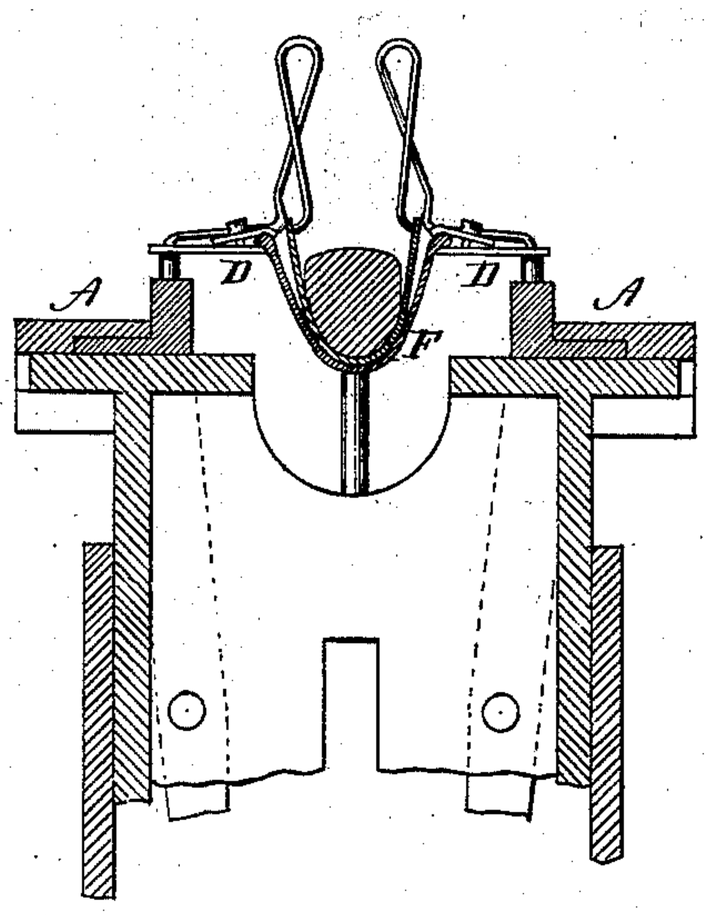

Fig. 3.

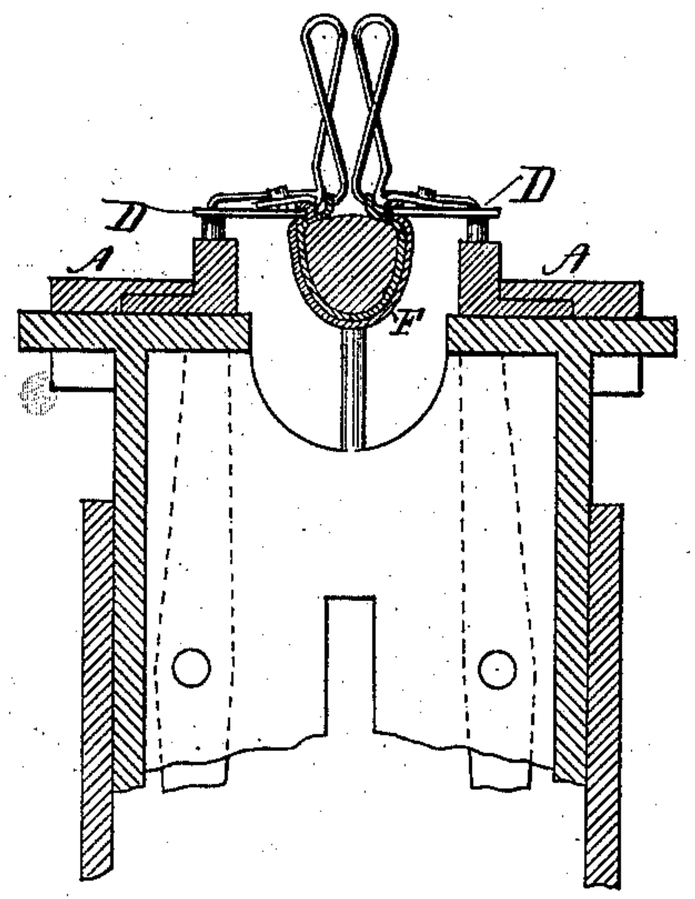

Fig. 4.

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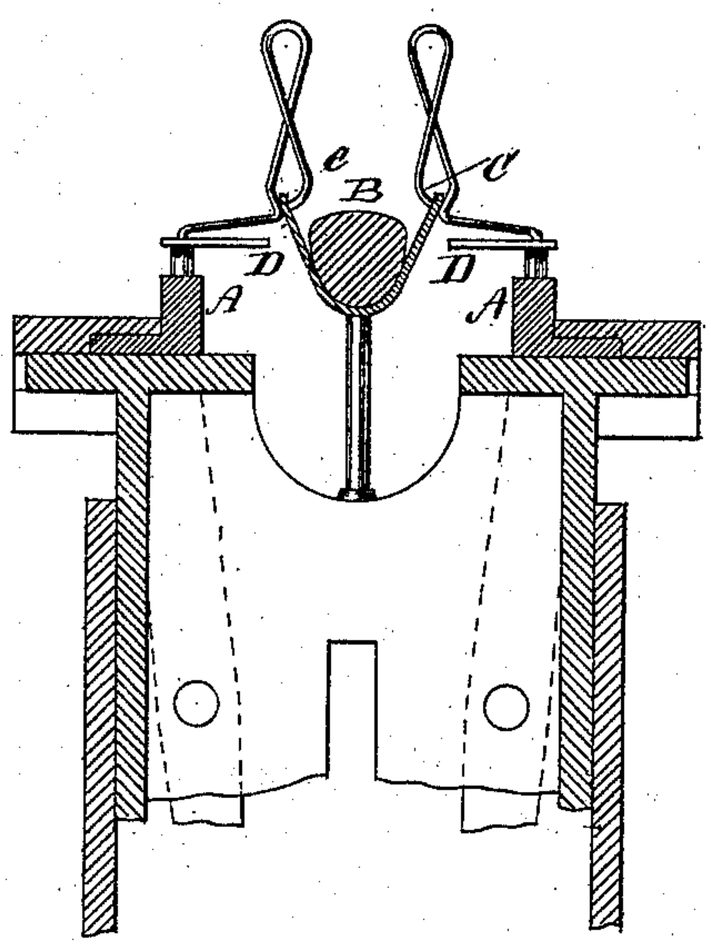

Fig. 6.

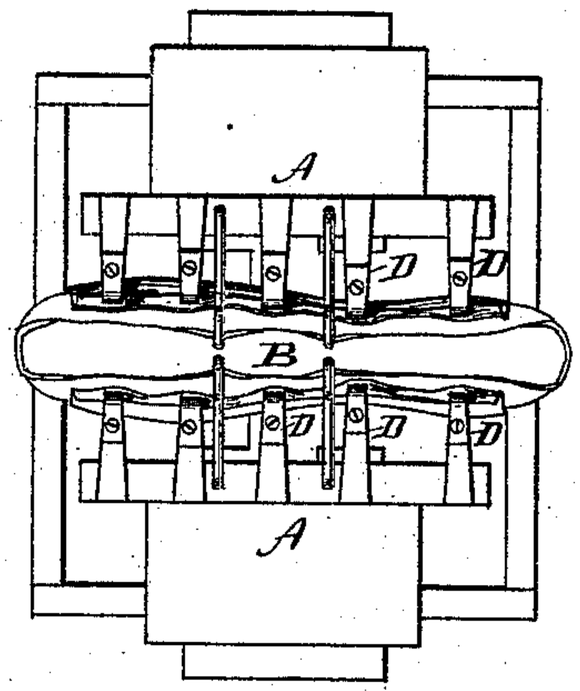

Fig. 5.

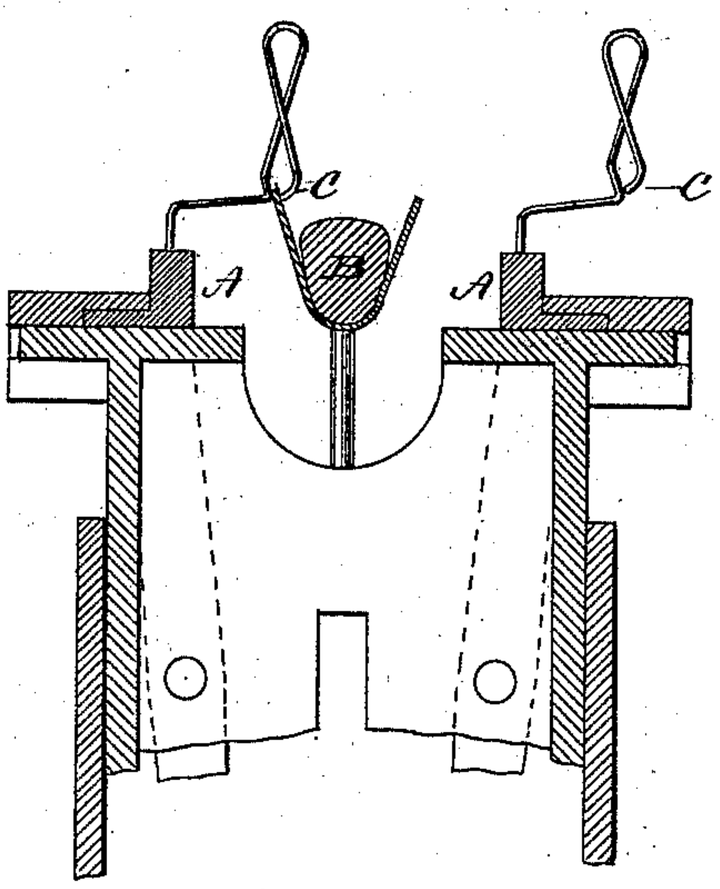

Fig. 7.

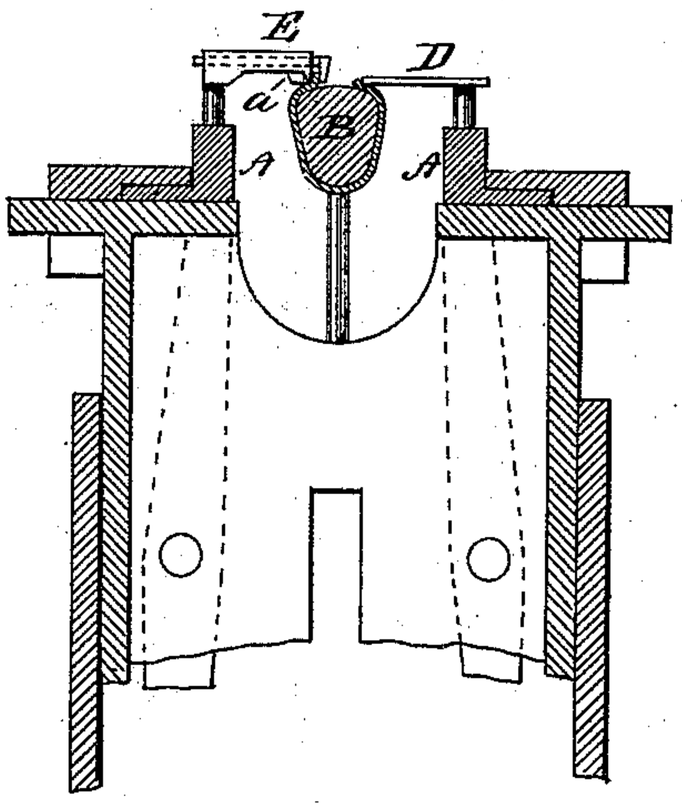

Fig. 8.

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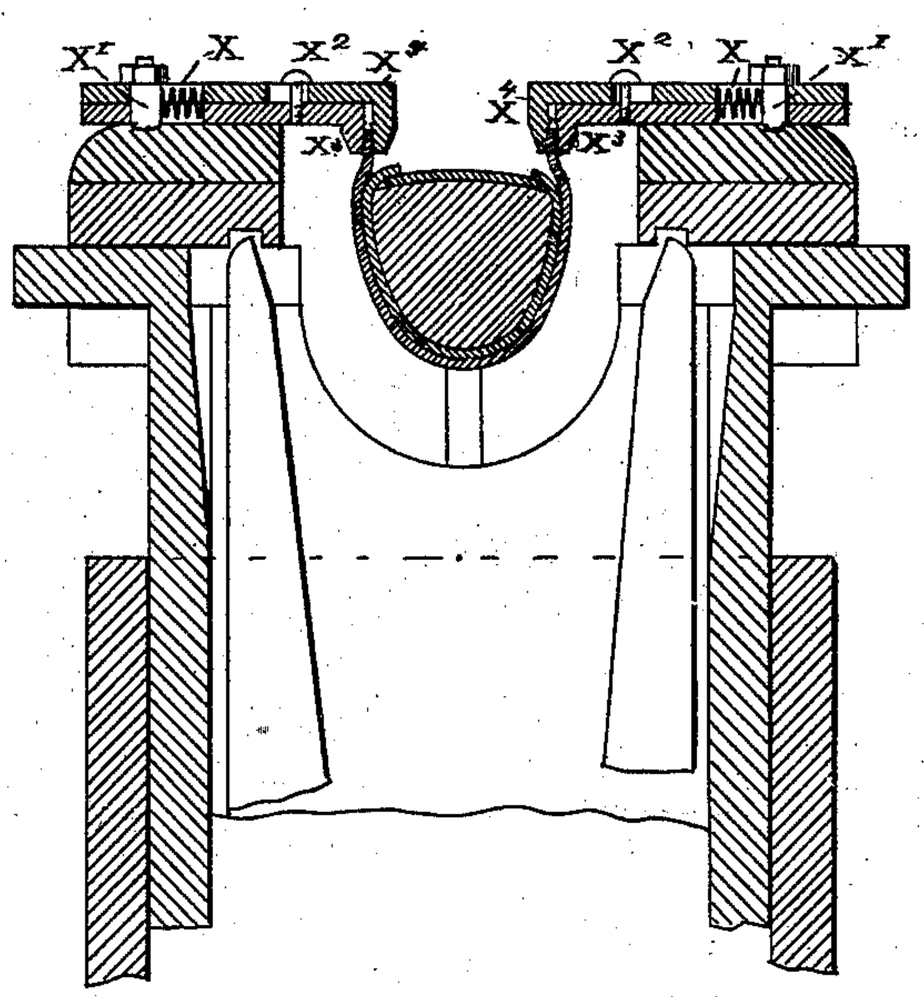

Fig. 9.

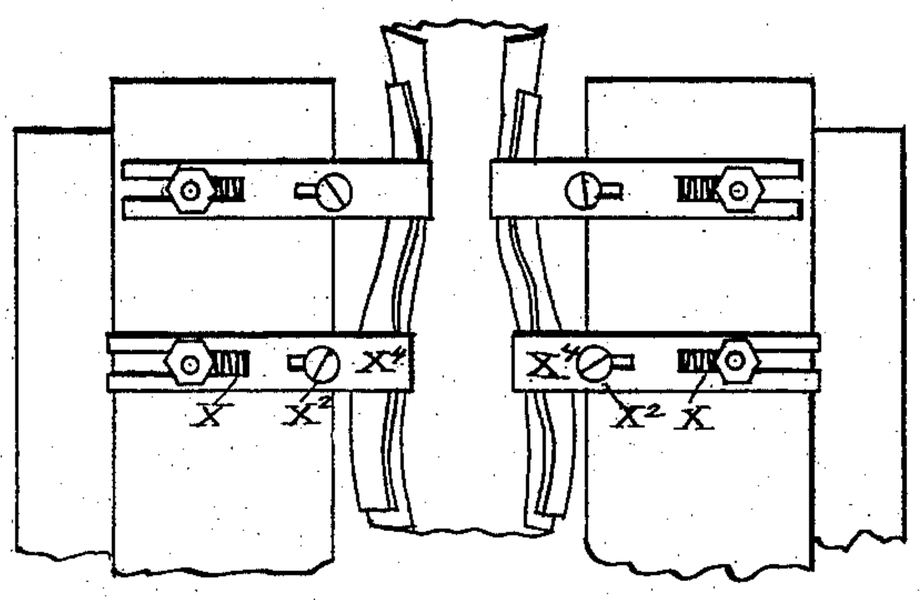

Fig. 10.

WITNESSES

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INVENTORS

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F. F. Raymond 2d.

UNITED STATES PATENT OFFICE.

GEORGE W. COPELAND AND FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN LASTING-MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **211,294**, dated January 14, 1879; application filed February 18, 1878.

To all whom it may concern:

Be it known that we, GEORGE W. COPELAND, of Malden, and FREEBORN F. RAYMOND, 2d, of Newton, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Machines for Lasting the Uppers of Boots and Shoes, of which the following is a specification:

This invention relates to an improvement in machines for lasting the uppers of boots and shoes.

In the drawing, Figure 1 is a cross-section of my machine, showing the jaws in position to lift, with the lasting-pinchers laying hold of the edge of the upper. Fig. 2 represents the jaws partly raised, with the pinchers lifting the upper by its edge, and the girth straining, stretching, and clamping the same to the last. Fig. 3 shows the jaws elevated to their highest point, and the pinchers and girth still acting conjointly in fitting the upper upon the last. Fig. 4 is a view of the jaws when closed upon the insole in folding the edge of the upper thereon. Fig. 5 is a plan of the machine when the jaws are closed. Fig. 6 represents the pinchers laying hold of the edge of upper and lifting it upon the last without the aid of a girth, showing the upper partly fitted thereon. Fig. 7 is a cross-section of the machine, showing the jaws, having a horizontal movement only, wide open, preparatory to closing upon the insole. Fig. 8 is a view representing on one side the pinchers or edge-clamping devices, also acting as crimping or folding fingers, and on the other side the edge of the upper released from the pinchers, and the crimping of its edge performed by the advance of an independent folding and crimping mechanism. Figs. 9 and 10 represent the pinchers provided with an automatic action, whereby any tendency to exert a strain upon the edge of the upper severer than can be safely applied is counteracted by the yielding of the pincher against a spring, shown at *x*, the pincher being provided with lateral movement upon the jaw in opposition to the stress of the spring.

The vertical and closing movements of the jaws are effected by the same mechanism set forth in previous patents to Geo. W. Copeland, and need not be again described here; and the operation of the girth or other side-lasting devices of a like nature operated by the said lifting and closing jaws, or either, to strain and lift the upper upon the last by commencing to act on the upper sufficiently distant from its edge to insure the removal of all stretch therefrom and its perfect fitting to the last by the advance of said action to the edge of the insole are also sufficiently represented in the various patents above referred to, and there is no necessity of herein explaining the individual action of the girth, or the other appliances which may be used as substitutes or equivalents for the girth, on account of the said description, it being sufficient to remark that in speaking of side-lasting appliances we mean to include not only the girth shown in the drawing, but all the girths and other appliances which have been patented to Geo. W. Copeland for lifting, straining, or smoothing an upper to a last by the upward advance of straining or lifting devices in combination with jaws provided with the movements herein set forth.

It has been found in the practical use of the girth principle and its modifications that, although for most grades of work it operates perfectly, there are certain classes of uppers which can be lasted to better advantage by a device or devices for laying hold of its edge at opposite points, provided with a positive and uniform motion, either vertical or horizontal, or both, in relation to the sides and bottom of a last, and adapted to lift or draw the upper by its edge upon a last by an automatic lifting and closing movement, or by either, of the edge-clamping device; and for this purpose I have arranged upon the positively-actuated jaws A, having either a vertical or closing movement in relation to the last B, or a combined vertical and closing movement, two or more pinchers or other edge-clamping devices, C, for laying hold of the upper at its edge, or any portion thereof, and for supporting and lifting it while the jaws are in operation, or until the edge of the upper is laid upon the insole by the advance of an independent folding or crimping mechanism. For instance, when the edge-clamping device or pinchers C are given a simple upward move-

ment substantially parallel to the sides of the last, the edge of the upper is inserted between the jaws of the seizing mechanism, which is then automatically lifted by the rising of the jaws, supporting the same until the upper is drawn onto the last, and the edge-clamping device lifted to or a little above the level of the insole or last's bottom. The jaws may then close without the edge of the upper being released from the pinchers or edge-clamping device, in which case the edge-clamping device may also act as crimping-fingers in laying the edge of the upper upon the insole, and the pinchers or edge-clamping mechanism have then a combined lifting and closing movement; or the edge of the upper may be released from the lifting device simultaneously with the advance of independent crimping devices D; or the edge-clamping device and the crimping mechanism may shut together upon the insole.

When a simple horizontal or closing movement is provided the jaws A and the edge-clamping device C lay hold of the edge of the upper, above set forth; but instead of lifting the same by an upward movement of the jaws, it draws the upper to the last by its advance over the edge thereof upon the insole upon a plane substantially parallel therewith.

We prefer to support the pinchers or edge-clamping device designed to close upon the insole upon the ends of fingers or arms E, projecting from the jaws A, as represented in Fig. 8, and these fingers may be roughened or armed with rubber *a* upon their under surface, and caused to clamp the upper to the insole in shutting upon the same, as shown.

We also prefer to provide the pinchers or other edge-clamping devices either with a yielding movement, that shall cause the said appliances to give sufficiently when straining or drawing an upper to a last to prevent any injury thereto from an excess of strain, or from any tendency of the upper not to stretch when under the strain of the lifting action of the jaws, or with an adjustable positive movement adapted to release an upper at any desirable point, either automatically or at the will of the operator.

We show one form of providing the pinchers or other edge-clamping devices with provision for yielding when under severe strain, for the purpose of preventing the breakage of the pinchers, or other device for laying hold of the edge of the upper, or injury to the upper, in Figs. 9 and 10. The pinchers have the portions X^3 X^4, Fig. 9, opposed to the stress of the spring X, which is arranged to abut against the stud X^1, and against the inner end of the slots cut in the two parts of the pinchers, to allow of their play upon the jaws.

It will be seen that the two portions of the pinchers are slotted where they surround the stud X^1, which fastens them to the jaws; also, that the portion X^3 of the pinchers is provided with a lateral movement in the portion X^4 by means of a slot and set-screw; and that the pressure of the spring upon the end of this lower portion of the pincher constantly acts to keep the pincher closed.

It will be observed that in operation the pinchers will yield or slide back somewhat against the pressure of the spring when compelled to exert a strain upon the upper sufficient to injure it, or upon the pincher sufficient to strain or break it.

In some instances we employ, in addition to the lifting and closing edge-clamping device above described, any of side-lasting appliances above referred to, which may be adapted to act conjointly with edge-lifting appliances in fitting the upper to the last, and this joint action is represented in Figs. 1, 2, 3, 4, and 5.

The girth F, or other straining device having a lifting movement independent of that of the upper, and acting upon it against the surface of the last, is operated simultaneously or successively with the pinchers or edge-clamping device in the following manner: The edge of the upper being inserted within the jaws of the pinchers or edge-clamping device, the jaws carrying the same and supporting the side-lasting mechanism are caused to lift, thereby exerting a drawing or straining action from the edge of the upper, which removes its tendency to wrinkle or fold under the action of the girth or side-lasting mechanism alone, and also partially shape the upper on the last. This action from the edge of the upper is immediately followed by the lifting of the side-lasting devices, which tend to equalize and distribute the strain already upon the upper and applied by the edge-lifting appliances, at the same time finishing the fitting, as it were, by its smoothing action, while it also acts as a clamp in preventing the upper from springing back to its original position by any relaxation of the strain at its edge. This combined action of drawing from the edge and pushing, smoothing, and clamping from beneath is continued until the clamping device reaches the edge of the bottom of the last or of the insole, when the edge of the upper is drawn, forced, or laid upon the surface of the insole by the closing of the edge-lifting device, of the side-clamping mechanism, or of independent crimping devices.

It will be seen that in some instances the strain upon the upper developed from the edge-lifting appliances may not be continued to the edge of the insole; but this is a matter for the operator to determine.

It will be seen, also, that the edge-lifting device, having exerted a sufficient strain upon the upper to prepare it for the action of the side-lasting mechanism, may thereafter serve only in holding the edge above the side-lasting mechanism under a very slight strain, perhaps, to prevent its own weight and tendency to wrinkle when not supported from interfering with the perfect working of the girth.

It will be observed, also, that we can last a section of the upper by the combined operation of edge-drawing and side-straining mech-

anism, or that we can employ them upon the entire upper, as may be desired.

A variety of English patents, notably those to Bernard, No. 13,382 of A. D. 1850, No. 14,287 of 1852; to Dumery, No. 1,400 of 1856; to Desborough and Middleton, No. 3,163 of 1860; to Mayore and Lemercier, No. 2,479 of 1860, show various combinations of pinchers to hold and strain the upper upon the last; of side and end lasting plates to fold the edge of the upper upon the insole; of yielding springs which modify the straining action of the pinchers and of the plates; of water-bags to lift, and of exhaust apparatus and presser-rods to depress or to hold down, the last in the lasting operation, and thus modify the relation of the bottom and sides of the last to the other parts of the lasting mechanism. The American patent to Francis D. Ballou, No. 150,123, of 1874, shows side lasting-devices which rise and fall along and close inward upon the last, whose upper parts carry plates adapted to engage the edge of the upper, and lift and strain the upper upon the last, and fold it over upon the bottom of the last, and this machine was so organized that by means of lost motion in the joints the plates yielded somewhat to the stress put upon the upper: but our machine differs from these contrivances, and we do not desire to claim pinchers in combination with a last, side-lasting mechanism, toe-lasting mechanism, springs, mechanism to change the relative levels of the last, and the other mechanism, as such combination we believe to be old, and practically useless for commercial purposes unless in combination or in co-operation with other things; but

We claim and desire to secure by Letters Patent of the United States—

1. In a machine for lasting the uppers of boots and shoes, the combination of a device provided with an upward movement on the jaws A, and adapted to lay hold of the edge of the upper and lift the same vertically in drawing it upon a stationary last, with an independent mechanism for folding and crimping the edge of the upper upon the insole, substantially as described.

2. In a lasting-machine for lasting the uppers of boots and shoes, the combination of jaws having a vertical or horizontal movement, or either, in relation to the sides and bottom of a last, or either, with fingers supporting at their ends devices or pinchers for laying hold of the edge of an upper in lifting the same upon the last, provided with frictional pads *a* upon their under surfaces, to clamp the edge of the upper upon the insole by the closing of the fingers thereon, whereby the upper is lifted upon the last, and its edge clamped upon the insole in position to be tacked, substantially as and for the purpose described.

3. In a lasting-machine, the combination of the pincher-jaws X^3 X^4, one of which is movable in relation to the other, as shown, with the spring X and stud X^1, substantially as described, and for the purposes set forth.

4. In a lasting-machine, the combination, with jaws or fingers having a positive vertical or horizontal motion, of pinchers or grippers which accompany the motion of such jaws or fingers, and are adapted to grasp the edge of the upper and strain it upon the last, substantially as described.

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Witnesses:
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F. O. YOUNG.