2 Sheets—Sheet 1.

G. W. COPELAND, E. WOODWARD & M. BROCK.

Machine for Lasting the Uppers of Boots and Shoes.

No. 221,668. **Patented Nov. 18, 1879.**

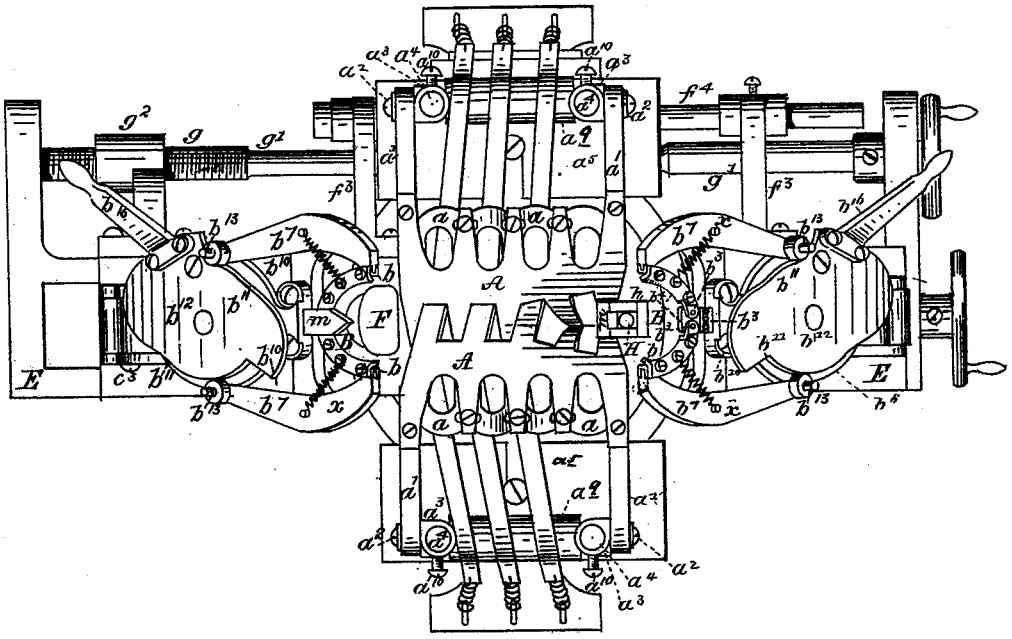

Fig. 1.

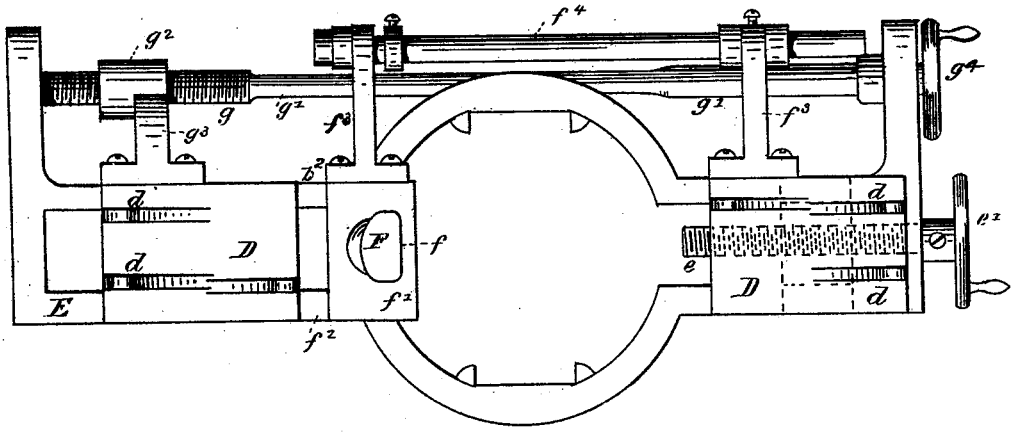

Fig. 2.

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2 Sheets—Sheet 2.

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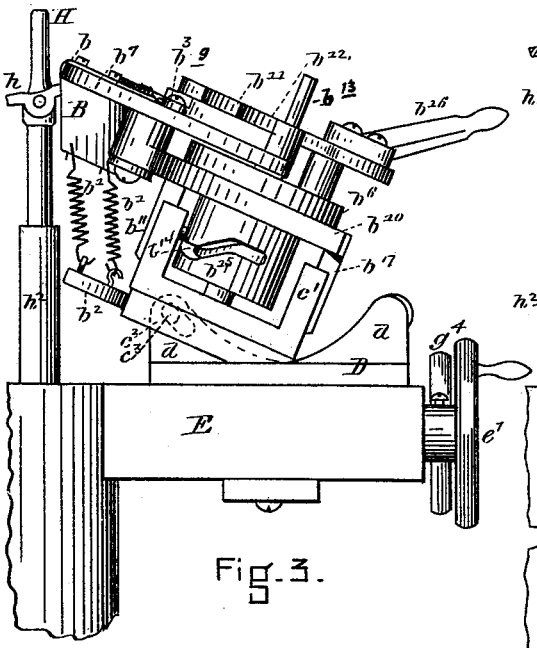

Fig. 3.

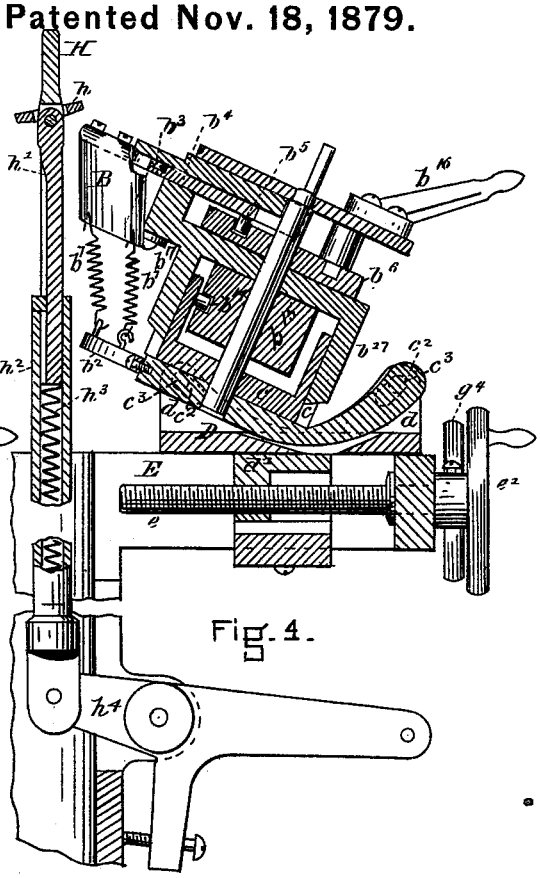

Fig. 4.

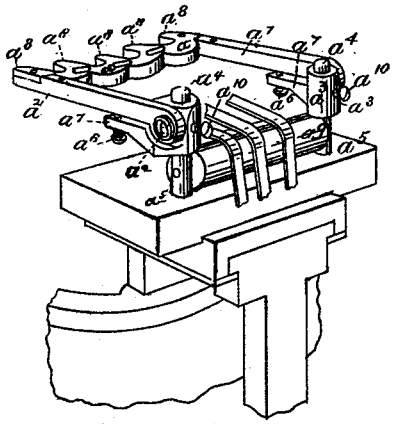

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE W. COPELAND, OF MALDEN, AND ERASTUS WOODWARD AND MATTHIAS BROCK, OF BOSTON, MASS., ASSIGNORS TO THE COPELAND LASTING MACHINE COMPANY, OF HARTFORD, CONN.

IMPROVEMENT IN MACHINES FOR LASTING THE UPPERS OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **221,668**, dated November 18, 1879; application filed June 20, 1879.

To all whom it may concern:

Be it known that we, GEORGE W. COPELAND, of Malden, in the county of Middlesex, in the Commonwealth of Massachusetts, and ERASTUS WOODWARD and MATTHIAS BROCK, both of Boston, in the county of Suffolk, in the said Commonwealth, have invented an Improvement in Machines for Lasting the Uppers of Boots and Shoes, of which the following is a specification.

This invention has for its object, first, an improved means for supporting the side-lasting girth, which dispenses with the use of separate girth-bearing fingers; second, means for lasting the upper at the toe and heel, consisting of a girth or apron provided with an upward and closing movement in relation to the last; third, means for providing the toe and heel girth or apron supports with suitable adjustments both vertical and horizontal; fourth, means for adjusting the heel-lasting mechanism and toe-support simultaneously; fifth, a spindle adapted to be elevated above the upper level of the side and heel lasting devices, in order that the last may be easily placed thereon and arranged to be lowered with the last to its proper level in relation to the lasting devices.

In the drawings, Figure 1 is a plan of our improved machine. Fig. 2 is a plan and section, illustrating the method of adjusting longitudinally in relation to each other the mechanism and the toe-support simultaneously. Fig. 3 is a side elevation of the heel-lasting mechanism and spindle, showing the spindle elevated above the side-lasting mechanism. Fig. 4 is a vertical central section. Fig. 5 is a perspective, representing the means for supporting the side-lasting girth.

In lieu of the girth-supporting fingers shown in the various Copeland patents, we employ for supporting the girth A the rods or bars a, each of which is supported by the arms a', which are pivoted at a^2 to the collar a^3 upon the posts a^4, which project upwardly from the jaws a^5.

The collar a^3 may be turned upon the posts and fastened thereto in any desired position by the set-screw a^{10}. The adjusting-screws a^6 in the brackets a^7, projecting from each column in relation to the arms a', serve to adjust the girth-supporting rod or bar vertically.

Each of the girth-supporting bars should conform somewhat in shape to the surface of the last, and is preferably provided with short projections a^8, over which the upper ends of the girth are passed, and to which, or to the bar a, they are fastened by any suitable means.

The lower ends of the straps forming the girth are attached to springs, and such of the straps as are interlaced and extended to the opposite side of the machine may pass over a friction-roll, a^9, arranged between the posts a^4.

The toe and heel lasting devices consist of the leather or other flexible aprons or girths, B, each of which is attached to supports b, having a slight vertical movement, followed by a closing and a slight descending movement. The lower edge of the girth or apron is attached to springs b', which are fastened to the covered support b^2, which may or may not oscillate in the block to which it is fastened.

The upper girth-supports, b, are curved to conform to the contour of the last at the toe and heel, and are pivoted at b^3 to a bar, b^4, which is reciprocated by the cam b^5 in the disk b^6. The levers b^7 are arranged to bear upon the outer edge of these supports, preferably in a groove formed therein, and are pivoted at b^9 to the plate b^{10}, and are actuated by the edge cams b^{11} on the disk b^{12}, which bear against the pins b^{13}, or the friction-wheels thereon, projecting upwardly therefrom to move the supports inwardly or toward each other while they are being advanced by the cam b^5 toward and upon the surface of the last.

The springs x keep the levers constantly in contact with the girth-supports. The plate b^{10} and the cam-disks, and therefore the girth-supports and girth, are provided with a slight vertical movement, followed by a descending movement, by means of the cam b^{14} in the face of the cylinder b^{15}, and the said lifting

and closing cams are arranged to be operated by the handle b^{16}.

The plate b^{10}, which supports the cam and other operating mechanism, is provided with the projections b^{17}, which slide in ways c in the block c', and the block is given an adjustment in the carriage D by means of the slots c^2 in the projection d and set-screws c^3, by which adjustment the height and inclination of the girth-supports b in relation to the surface of the insole are varied; but this adjustment can be effected in any other desirable way. The carriage D is provided with horizontal adjustment on the frame E of the machine by the screw e, which passes through a nut, d', secured to the carriage and the hand-wheel e'.

In order that the toe-support may be moved with the carriage carrying the heel-lasting mechanism, I arrange the toe-support F and its standard f upon a carriage, f', arranged to slide upon the ways f^2 on the frame of the machine. This table and the carriage carrying the heel-lasting mechanism are each provided with outwardly-projecting arms f^3, which are connected by the rod f^4, which passes through the end of each arm, and is fastened thereto by set-screws or other similar device in such a manner that the toe-support and the said heel-carriage may be adjusted in relation to each other.

The toe-lasting mechanism is similar in every respect to the heel-lasting devices, and the same is provided with horizontal adjustment by means of the screws g on the end of the shaft g', which extends to the heel end of the machine, and the nut g^2 on the end of the arm g^3, extending from the carriage of the toe-lasting mechanism. The screw is operated by a hand-wheel, g^4.

By this construction the toe-lasting mechanism, as well as the heel-lasting devices and the toe-support, can be adjusted horizontally for varying lengths of last from the heel end of the machine, the last two simultaneously.

The spindle H is provided with a table, h, and is hinged or otherwise fastened to the rod h'. The lower end of this rod is inclosed by a sleeve, h^2, which also incloses a spiral spring, h^3, upon which the rod h' rests, and it is supported upon the end of the lever h^4, or in any other desirable way. This construction enables the upper end of the spindle to be elevated automatically by the spring above the level of the heel and side lasting mechanism sufficiently to allow the last to be readily placed thereon.

The rod h' may be provided with an adjustable stop for regulating the extent of its descent within the sleeve, arranged to contact with the upper edge thereof, in order that the spindle may be provided with a firm bearing when depressed, and not be entirely supported by the spring.

As a modification of this construction, we mention the employment of a spindle provided with a vertical movement by a lever, or in any other suitable way, and to which the last is locked. Such a construction would enable the spindle to be used in drawing the last downward to the side-lasting mechanism, in which case, of course, it would be unnecessary to employ toe or heel down-holds. Some such construction as this is necessary in order that the difficulty now attending the jacking of a last upon a spindle below the level of the heel-lasting mechanism, and which necessitates a considerable adjusting of the last before the spindle-hole is brought in line with the spindle, may be done away with.

The jack or means by which the last is held in the machine during the operation of the side-lasting mechanism consist in toe and heel down-holds m and the spindle. The jack or means for holding the last in the machine during the operation of the toe and heel lasting girths consist of the spindle and the side-lasting mechanism.

We do not, however, confine ourselves to this method of jacking the last.

In operation the last is inserted upon the spindle and jacked, and the toe and heel carriages are closed sufficiently to cause the toe and heel down-holds m to project upon the surface of the insole sufficiently to clamp the last upon the spindle and toe support. The side-lasting mechanism is then operated, the girth being lifted along the sides of the last and closed upon the insole in a manner common to all the Copeland girth-lasting machines, the difference in the manner of supporting the girth causing substantially no difference in the manner of its operation. The heel and toe lasting devices are then operated, and as the last is firmly held on the spindle by the side-girth supports, which are closed thereon, the toe and heel down-holds may then be lifted from the insole. The toe and heel girths are advanced along the sides of the last with a gradual closing movement, and their upper edges are then advanced upon the surface of the insole by the inward and closing movements of their supports. The upper is thus adjusted upon the last and the edge folded upon the insole in a position to be united thereto by pegs or tacks.

The spirit of this improvement relates, chiefly, to the manner of lasting the toe and heel.

We are aware that the Patent No. 156,405, granted Ballou and Copeland November 3, 1874, shows and describes two jaws supporting a girth, which are provided with a vertical and closing movement in relation to the last, and which are so formed that when closed their edges lap upon the last to a line parallel to the outer conformation of the last's bottom. This is not the object of that portion of our invention which relates to the girth-supporting jaw, as said jaws are shaped or formed upon their edges to lap upon the surface of the last to, or nearly to, the median line extending from heel to toe of the last's bottom, without regard to the vertical conformation of

the last, whereby right and left boots or shoes of a number of sizes may be lasted without any adjustment of the side-lasting mechanism.

Having thus fully described our invention, 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 the girth A with the supporting-bars a, each of which is fastened to the arms a' projecting from the operating-jaw a^5, and each of which is adapted to support the upper end or ends of the girth, substantially as and for the purposes described.

2. The combination of the girth A with the girth-supporting bars a, provided with a vertical and closing movement in relation to the last, shaped to close upon the surface of the insole to, or nearly to, a line coincident with the median line of the insole from toe to heel, substantially as and for the purposes described.

3. The combination of the girth A, girth-supporting bars a, the arm a', and the described means for operating the same, as indicated, substantially as and for the purposes described.

4. The combination of the girth-supports a, their supporting-arms a', the collar a^3, and posts a^4, all substantially as and for the purposes described.

5. In a machine for lasting the uppers of boots and shoes, a girth or apron at the toe and heel, in combination with suitable supports having upward, inward, and closing movements, and the springs b', arranged to hold the lower end of the girth or apron, and to be fastened to any suitable portion of the machine, all operated substantially as and for the purposes described.

6. The combination, in a lasting-machine, of a girth adapted to adjust the upper to the last along its sides, and to fold the edge of the upper upon the surface of the insole, and the toe and heel girths B, supports b, and springs b', adapted to adjust the upper at the toe and heel to the surface of the last, and to fold its edge upon the surface of the insole by the lifting and closing movement of said supports in relation to the last, all substantially as and for the purposes described.

7. The combination, in a lasting-machine, of the heel and toe girth supports, pivoted as described, having a movement to and from the last, with the levers b^7, springs x, and cam b^{11}, for providing them with a closing movement in relation to each other, all operated substantially as described.

8. In combination with heel or toe girth supports having movements to and from the last and to and from each other, the cam b^{14} and suitable mechanism for adjusting said supports vertically, all substantially as described.

9. In a machine for lasting the uppers of boots and shoes, the combination of the carriage f', carrying the toe-support F, the heel-carriage D, the arms f^3, and the connecting-rod f^4, with the adjusting-screw e, whereby the toe-support and heel-lasting mechanism are provided with simultaneous movement in the same direction, substantially as described.

10. The combination, in a lasting-machine, of the carriage f', carrying the toe-support and heel-carriage D, and the adjustable connecting-rods f^4, whereby the carriages may be adjusted in relation to each other for varying lengths of last, substantially as and for the purposes described.

11. In a lasting-machine, the combination of the carriage carrying the toe-lasting mechanism with the screw-shaft g', arranged to extend to the heel end of the machine, and to pass through the nut g^2 on the end of the arm projecting from the toe-carriage, whereby the toe-carriage can be adjusted from the heel end of the machine.

12. In a machine for lasting the uppers of boots and shoes, the combination of the spindle H, either with or without a table, h, and rod h', sleeve h^2, spring h^3, and the lever h^4, all arranged to operate substantially as and for the purposes described.

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