July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

Filed Feb. 13, 1933 7 Sheets-Sheet 1

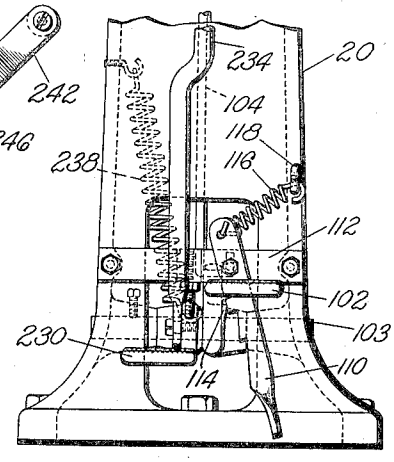


Fig. 19

Fig. 1

INVENTOR:
Karl Engel
By his Attorney
Harlow Davis

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

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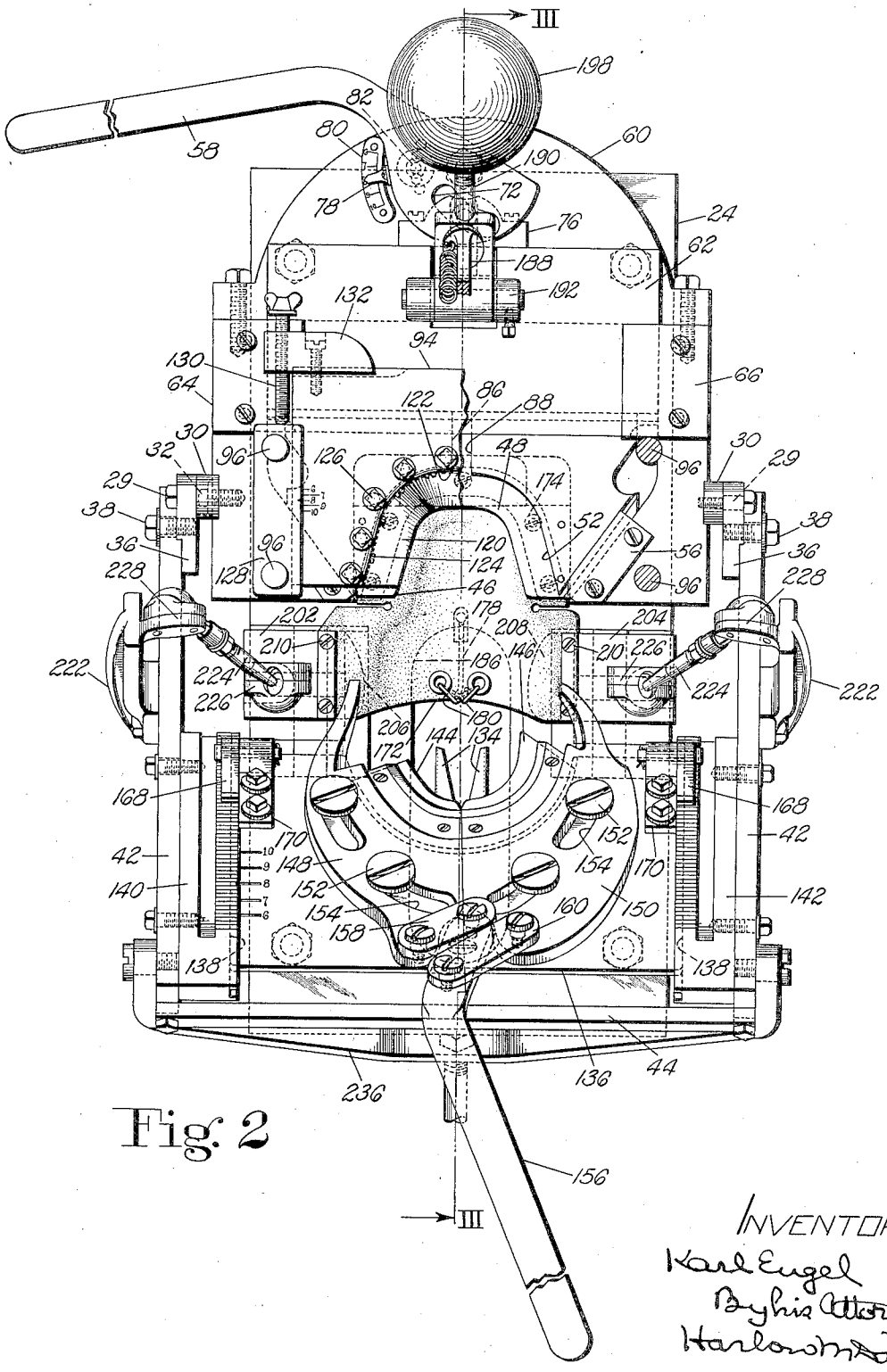


Fig. 2

INVENTOR:
Karl Engel
By his Attorney
Harlow M. Davis

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

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Fig. 18

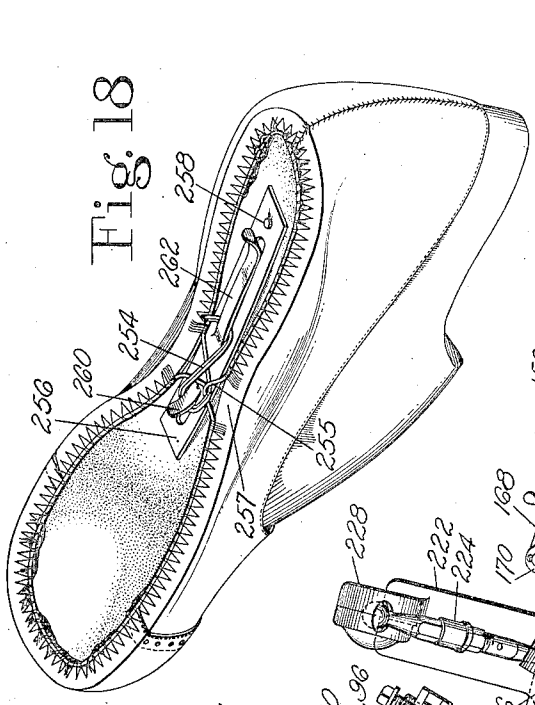


Fig. 3

INVENTOR:
Karl Engel
By his Attorney
Harlow M. Davis

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

Filed Feb. 13, 1933 7 Sheets-Sheet 4

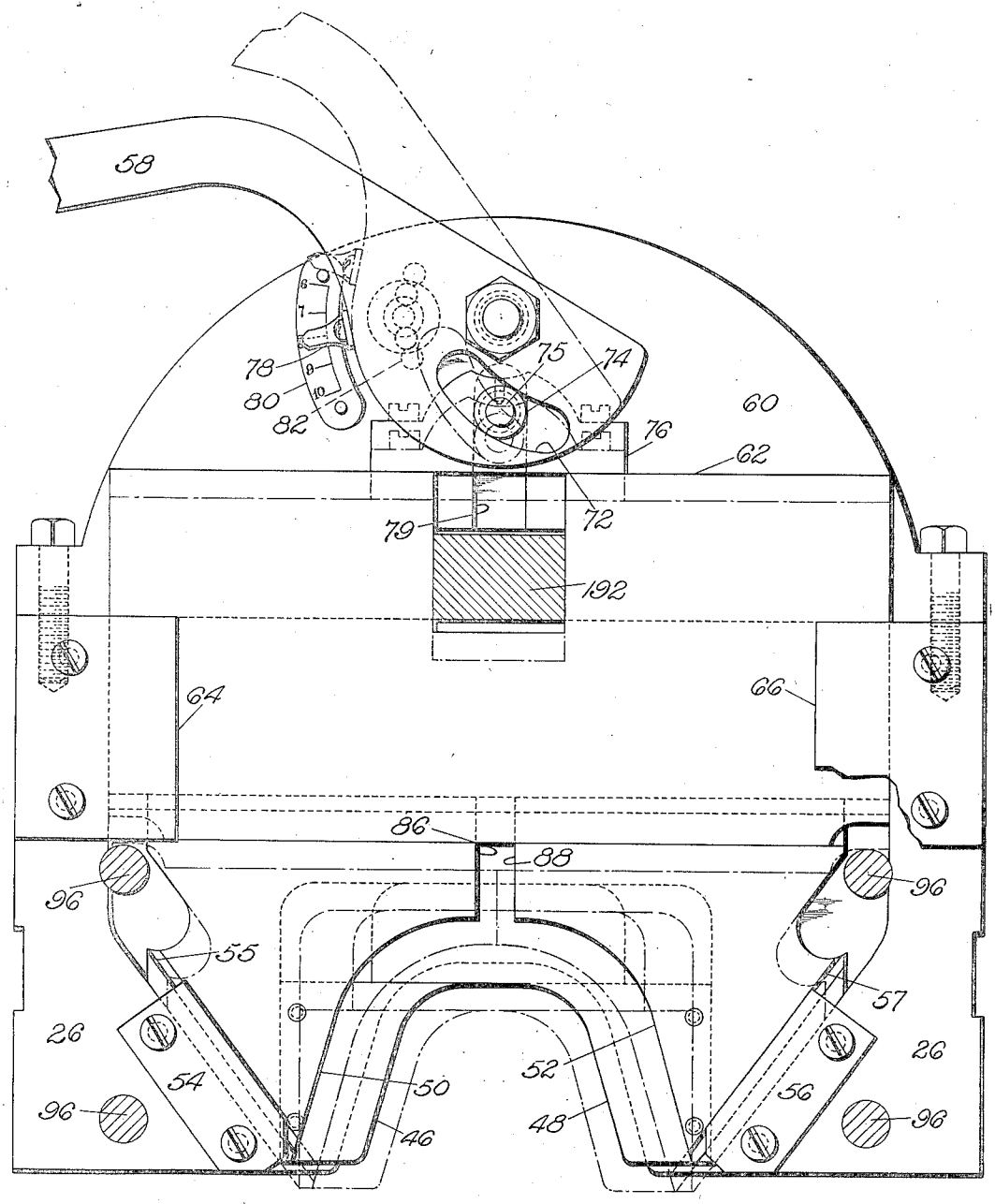


Fig. 4

INVENTOR:
Karl Engel
By his Attorney,
Harlow to Davis

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

Filed Feb. 13, 1933 7 Sheets-Sheet 5

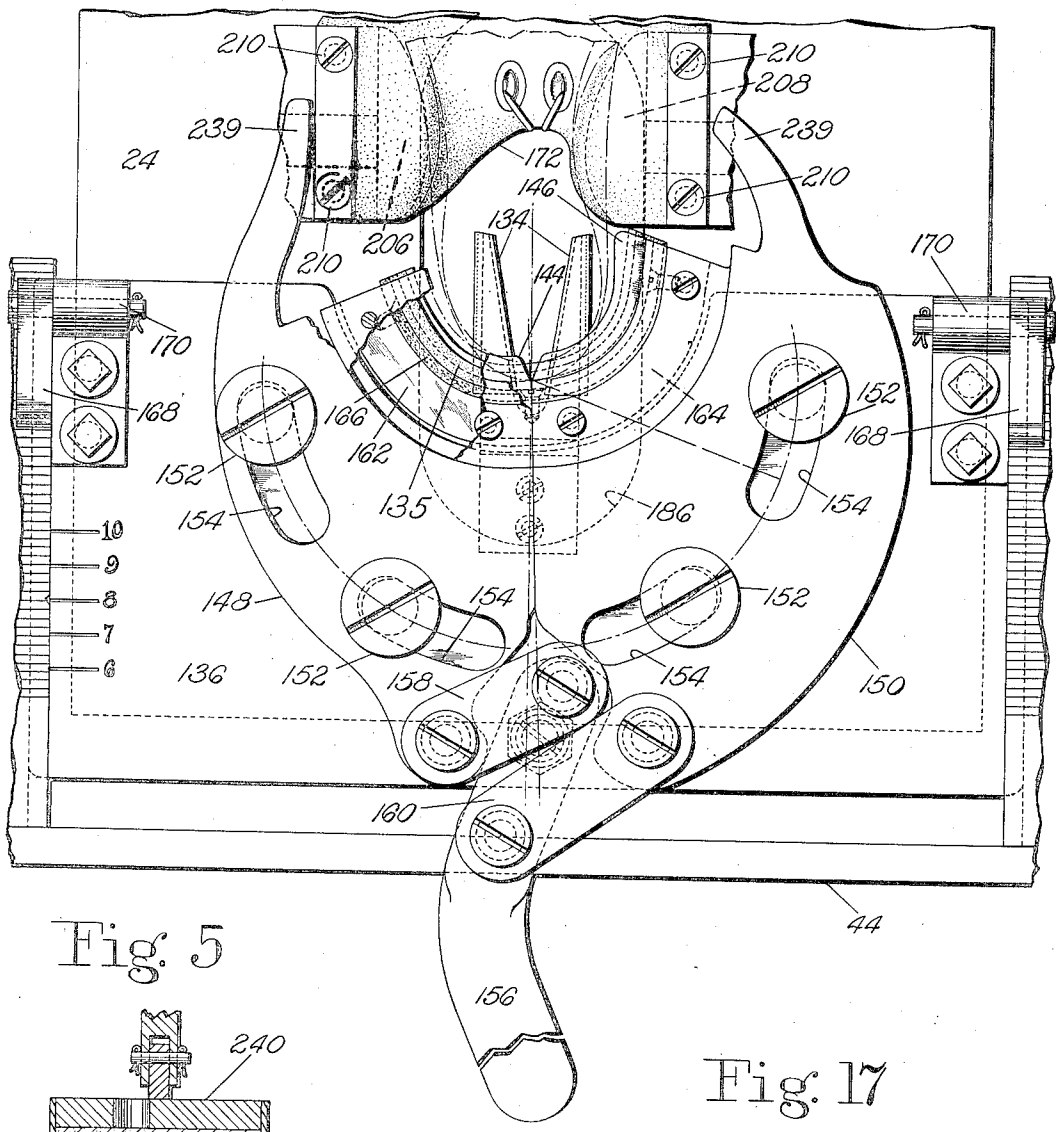


Fig. 5

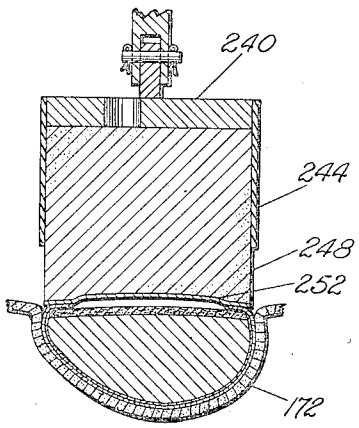
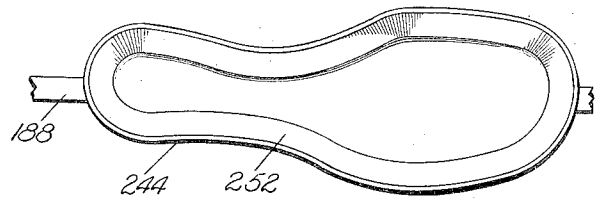


Fig. 16

Fig. 17



INVENTOR:

Karl Engel
By his Attorney,
Harlow M. Davis

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

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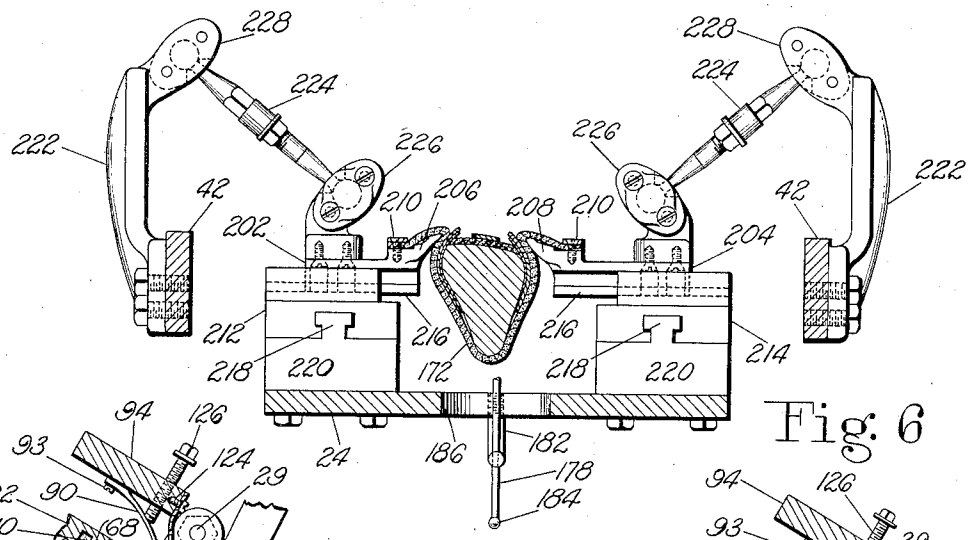


Fig. 6

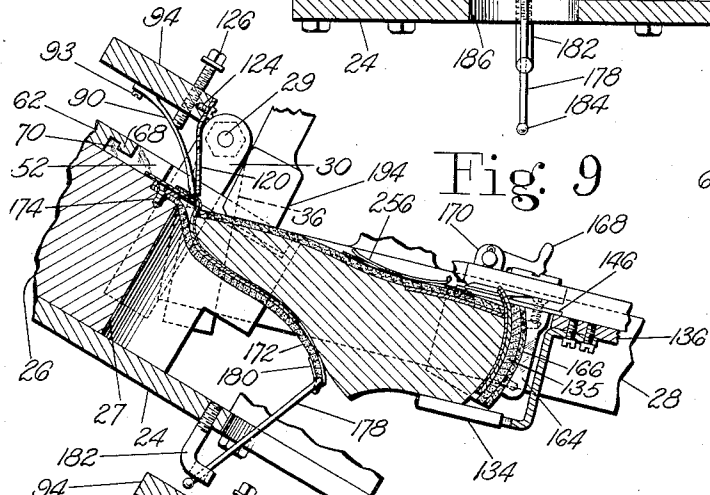


Fig. 9

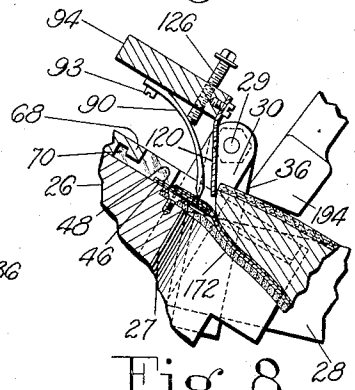


Fig. 8

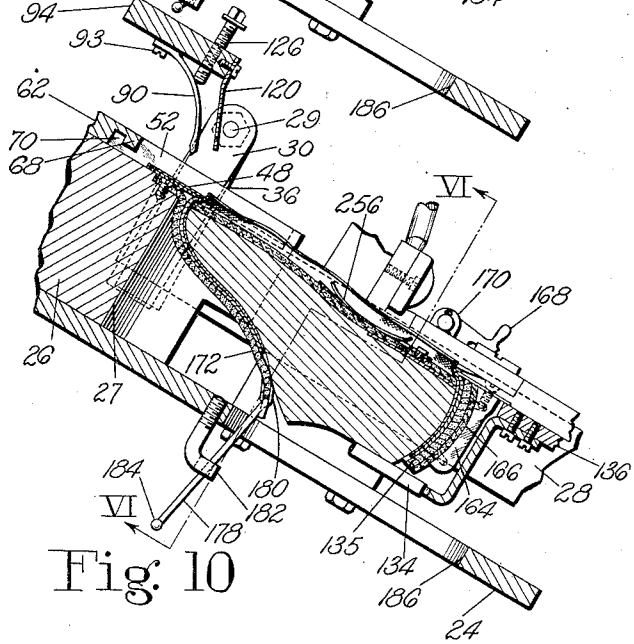


Fig. 10

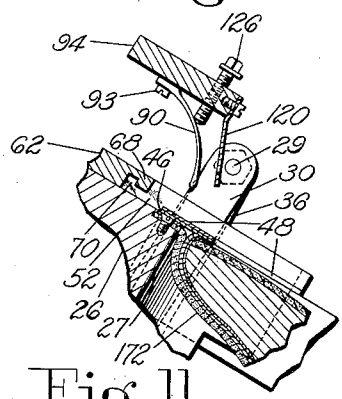


Fig. 11

INVENTOR:
Karl Engel
By his Attorney
Harlow & Harris

July 16, 1935. K. ENGEL 2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

Filed Feb. 13, 1933 7 Sheets-Sheet 7

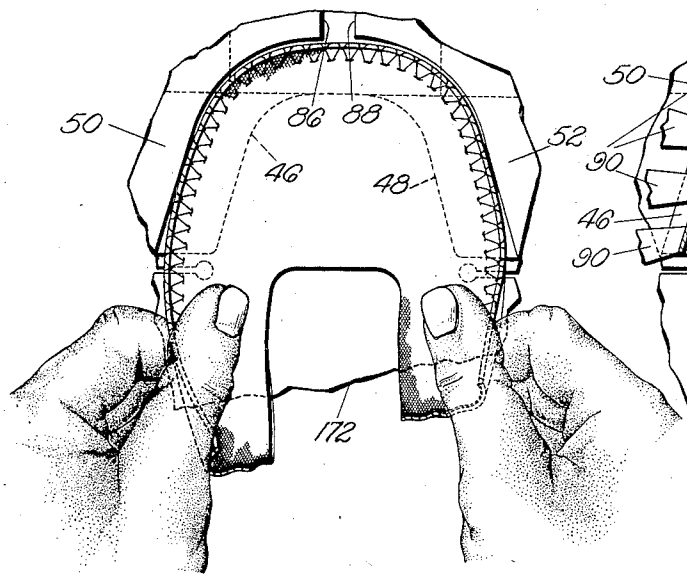


Fig. 7

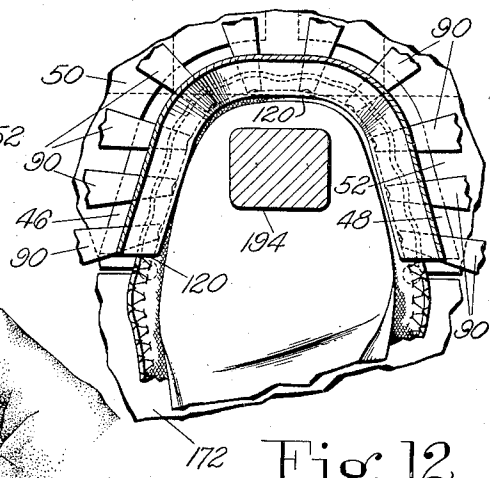


Fig. 12

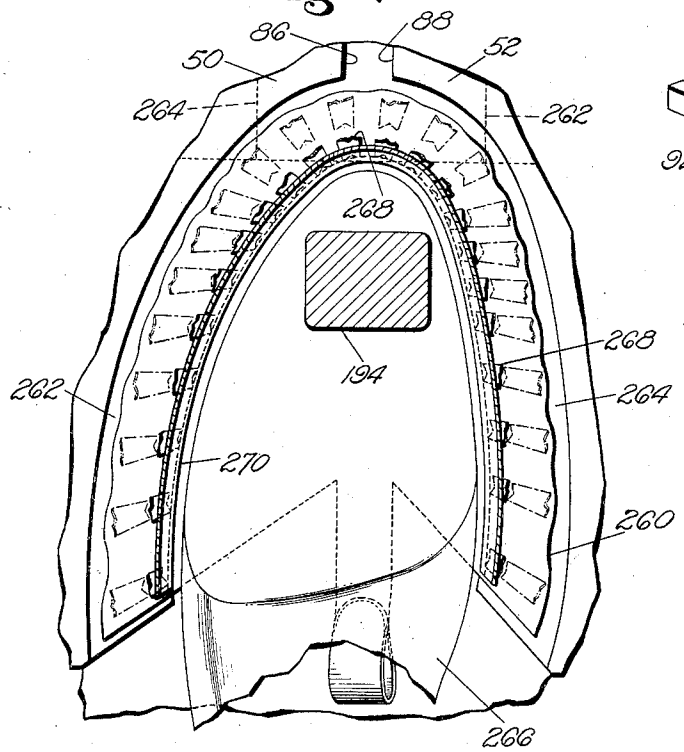


Fig. 13

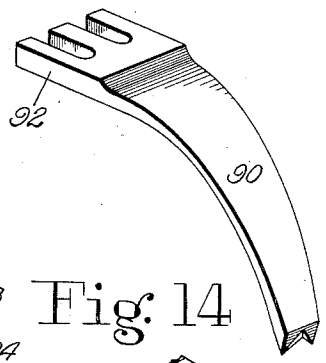


Fig. 14

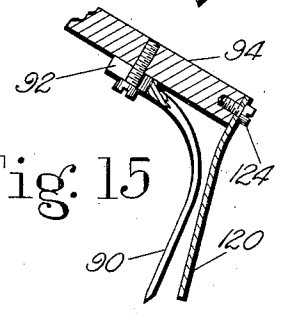


Fig. 15

INVENTOR:
Karl Engel
By his Attorney
Harlow M. Davis

Patented July 16, 1935

2,008,069

UNITED STATES PATENT OFFICE

2,008,069

METHOD OF AND MACHINE FOR LASTING SHOE UPPERS

Karl Engel, Lynn, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application February 13, 1933, Serial No. 656,494

105 Claims. (Cl. 12—7)

The present invention relates to methods of and machines for lasting the uppers of boots and shoes and is illustrated with particular reference to the lasting of children's shoes.

It is customary in the manufacture of many types of boots and shoes to pull over or tension the upper upon its last, as a preliminary operation, in a machine constructed and arranged for that operation and known to the trade as a pulling-over machine. It has long been recognized that it would be desirable to last a shoe in a single operation, without any preliminary pulling over, if this could be done without sacrificing the advantages of the present system, and machines have been developed to accomplish this result. An object of the present invention is to provide an improved lasting machine upon which an upper which has not been pulled over may be completely lasted in a single operation without sacrificing the advantages of prior methods of shoe manufacture.

The pulling-over operation is usually effected by a machine which holds the last in a fixed position and provides grippers arranged to grip the margin of the upper at the toe and at the sides of the forepart and to tension the upper upon the last. After the pulling-over operation puckers are found at the toe end of the upper near the edge of the last bottom at points between the grippers. It is the usual practice to eliminate these puckers in the toe-lasting operation and their removal without causing wrinkles at the toe or at the sides of the forepart of the upper requires a skilled and experienced shoe maker.

It is an object of the present invention to provide means for gathering the margin at the toe of the upper before the upper is tensioned upon the last in order to effect a predetermined distribution of the upper materials at the toe end of the upper such that the upper may be tensioned upon the last without producing too prominent wrinkles at the toe. By the attainment of this object the requirement of a further operation to eliminate wrinkles at the toe of the upper after the upper has been tensioned upon its last is obviated.

Features of the invention comprise a lasting machine organization which, in the illustrated embodiment of the invention is provided with means, for example, a series of yielding fingers, for clamping the margin of an upper in a predetermined position, and mechanism for actuating said yielding fingers to feed the margin of the upper inwardly and to gather a measured amount of the margin of the upper at one end thereof. Preferably a last is forced into the clamped upper by means, herein illustrated as a depressor, arranged to engage the forepart of an insole attached to the last bottom. In the illustrated machine the depression of the last is resisted by a girth stretcher in the form of a resilient apron which operates in conjunction with the depression of the last to up-wipe the upper thereupon. Preferably the clamping fingers are actuated, in advance of the introduction of a last into the supported upper, to effect a measured gathering of the margin of the upper and a measured inward movement of the margin of the upper. As herein illustrated, the upper is tensioned lengthwise thereof by causing the toe of the last, in the course of its depression into the upper, to engage an abutment having its last engaging surface inclined to cause the last to move rearwardly of the upper during its depression. In accordance with a further feature of the invention the fingers which engage the margin of the upper preferably have their inward movement arrested by a member, for example, the abutment above referred to, forming an element of the finger assembly and arranged inwardly of said fingers at a predetermined distance therefrom. In accordance with a further feature of the invention the extent of the feed of the margin of the upper inwardly thereof may be predetermined and likewise the extent of the gathering of the margin of the upper may be predetermined.

In order to stretch the upper over the top of the forepart the fingers above referred to are illustrated as extending along the sides of the forepart of the upper; operate to effect a measured feeding of the margin of the sides of the forepart toward the edge of the last bottom; and operate thereafter in conjunction with the abutment member above referred to to hold the margin from further inward movement while the depressor is actuated to press a last into the upper.

In the lasting of shoes it is desirable that the shank portion of the upper be wiped uniformly over the last to cause it to conform closely to the contour of the last, and it is also desirable that the shank of the upper be stretched uniformly in order to avoid the formation of wrinkles in the wear of the shoe. Accordingly, in accordance with a further feature of the invention there is provided in the illustrated machine a resilient stretcher which may or may not be the apron above referred to, for resisting the depression of the last and upwiping the upper, and means, for

example, a pair of wipers, located at opposite sides of the last for actuating the stretcher to wipe in the shank portion of the upper and to impart a uniform tension to the shank of the upper heightwise of the last.

A still further feature of the invention contemplates the provision, in a lasting machine, of wipers for wiping the margin of an upper over the heel of an insole mounted on a last, a heel stop, a support therefor, and yielding last supporting means carried by said support and arranged to press the margin of the upper against said wipers.

While the invention as above defined relates to machines for lasting uppers, the invention is not limited to such machines. Moreover, in certain of its aspects, the invention relates to methods of lasting uppers.

Thus, in one aspect, the invention, as herein exemplified, comprises that method of lasting uppers which consists in clamping the margin of the forepart of an upper in outspread condition, simultaneously feeding said margin inwardly and gathering the margin of the toe end of the upper between predetermined points, then mounting a last in the upper, then simultaneously further feeding the margin of the forepart inwardly toward the edge of the last bottom, further gathering the margin of the toe end of the upper and pressing the last into the upper and thereafter laying the margin of the upper over an insole attached to the last bottom and attaching the upper to the insole. If the margin of the upper is to be secured by adhesive to the margin of an insole, adhesive is preferably applied to the surfaces of the shoe parts to be bonded after the last has been pressed into the upper, the margin of the upper being thereafter laid over the insole and pressure being applied to the margin of the upper to effect a secure bond between the upper and insole. Preferably, the upper is held in upwiped condition during the application of adhesive to the surfaces of the shoe parts to be bonded and during the subsequent overlaying of the margin of the upper upon the insole and application of pressure thereto, by the resilient apron above referred to which has frictional engagement with the upper in order to exert a retaining action thereon.

If desired, the margin of the upper may be held in position after it has been laid over the margin of the insole by applying tension thereto inwardly of the last bottom. Accordingly, in a further aspect, the invention, as herein exemplified, comprises that method of lasting uppers which consists in providing the margin of an upper with a ligature, for example, a draw string, arranged to extend from one side of the shank portion of the upper margin throughout substantially the entire extent of said margin, laying the margin of the upper over the last bottom, then passing the two ends of the ligature about the ligature at the opposite side of the shank portion of the upper margin, tensioning the ligature in order to retain the upper in lasted condition, and securing the end portions of the ligature to the shoe bottom.

These and other features of the invention will appear more fully from the following description when read in connection with the accompanying drawings and will be pointed out in the appended claims.

Referring to the drawings,

Fig. 1 is a side elevation of a lasting machine embodying the several features of the present invention, the center of the machine pedestal being broken away;

Fig. 2 is a plan view of the machine, partly broken away in order to show underlying parts;

Fig. 3 is a sectional elevation of the head of the machine, taken substantially on the line III—III of Fig. 2;

Fig. 4 is a detail plan view of the toe wiping mechanism;

Fig. 5 is a detail plan view of the heel wiping and shank wiping mechanisms;

Fig. 6 is a detail sectional view, taken substantially on the line VI—VI of Fig. 10;

Fig. 7 is a fragmentary plan view illustrating the means for supporting the margin of an upper and the means for gaging its preliminary position;

Figs. 8 to 11, inclusive, are detail sectional views illustrating certain lasting devices as they appear at progressive stages in the operation of the machine;

Fig. 12 is a fragmentary plan view illustrating certain lasting devices in the arrangement in which they are illustrated in Fig. 9;

Fig. 13 is a fragmentary plan view similar to Fig. 12 illustrating a construction and arrangement of the lasting devices adapted to last a vamp which is not attached to the quarter of the upper;

Fig. 14 is a detail perspective view of one of the fingers 96 shown in Fig. 12;

Fig. 15 is a detail view illustrating an alternative construction and arrangement of the fingers 96;

Fig. 16 is a sectional view taken through the forepart of a last and upper supported upon the girth stretcher of the present invention, illustrating particularly the presser for pressing the overwiped margin of the upper;

Fig. 17 is a view of the presser illustrated in Fig. 16 looking in the direction of the arrow in Fig. 1;

Fig. 18 is a perspective view of a lasted shoe illustrating particularly the clamp for holding the draw string; and

Fig. 19 is a front elevation of the lower portion of the machine pedestal illustrating the parts contained therein.

Referring to Fig. 1, the illustrated machine is provided with a pedestal 20 to which the machine head 22 is bolted and on said machine head a table 24 is secured at an inclination such that the operative parts of the machine are within easy reach of the operator and the lasting operation is easily visible at all times. Attached to the table 24 is a block 26 upon which are mounted the devices for overwiping the margin at the toe and at the sides of the forepart of an upper. The block 26 is provided at its rearward extremity with a recess 27 (Fig. 9) which serves to provide clearance for the forepart of a last and for a girth stretcher 172. The block 26 supports an auxiliary frame 28 which carries the wiper plates for overwiping the upper margin at the heel. The frame 28 is arranged to swing about a horizontal axis extending transversely of the machine. For reasons to be explained, it is desirable that the pivots about which the auxiliary frame 28 swings be adjustable in a direction perpendicular to the table 24 and, accordingly, a pair of uprights 30 are slidably mounted in grooves formed at opposite sides of the block 26 and have pivot screws 29 at their upper ends. The uprights 30 may be secured to the block 26 by clamping screws 32 passed through slots 34

in the uprights and arranged to seat against a flange extending inwardly from each of said slots and positioned adjacent to the inner surfaces of the uprights 30. Thus the heads of the clamping screws 32 may extend into the slots 34 in the uprights sufficiently to prevent interference between the heads of the screws and the auxiliary frame as the frame is swung into parallel relation to the table 24. In order that the auxiliary frame may move toward the rear end of the table 24 as it is swung in a direction to bring it into parallel relation thereto it is desirable that the pivots 29 be positioned above said frame. Accordingly a pair of arms 36 are mounted in grooves at the forward ends of the auxiliary frame and pivoted at their upper ends to the screws 29. In order to vary the extent of the forward movement of the auxiliary frame 28 as it is swung into parallel relation to the table 24, the arms 36 are secured to the auxiliary frame by clamping screws 38 passed through slots 40 provided in the arms 36. In the illustrated machine the auxiliary frame consists of a pair of parallel arms 42 (Fig. 2) arranged in longitudinal relation to the table 24 and connected by a cross bar 44 secured to the free ends of said arms.

Referring now to the devices for overwiping the marginal portion at the toe and at the sides of the forepart of the upper, a pair of wiper plates 46 and 48 (Fig. 4) are secured to slides 50 and 52, respectively, which slides are supported within a depression in the upper surface of the block 26, the depth of said depression being substantially equal to the thickness of said slides. In order that the wiper plates may move simultaneously toward each other and toward the front of the machine the outer edges of said slides converge toward the front of the machine at angles of approximately 45° to the sides of the block 26. The converging edges of the slides 50 and 52 have sliding engagement with shoulders formed in the block 26 and are held in engagement with said shoulders by gibs 54 and 56 (Fig. 4) secured to the block 26 and arranged to engage within grooves 55 and 57 formed in the slides 50 and 52, respectively. The inner edges of the slides 50 and 52 extend in parallel relation to the wiping edges of the wiper plates 46 and 48, respectively. The wiper plates are actuated by a hand lever 58 pivoted to an extension 60 of the block 26. The hand lever 58 imparts longitudinal sliding movement to a slide 62 positioned in the aforesaid depression in the upper surface of the block 26 and held against displacement therefrom by guard plates 64 and 66 secured to the upper surface of the block 26 at opposite sides thereof. At its forward edge the slide 62 is provided with a gib 68 (Fig. 3) extending throughout its entire width and arranged for sliding engagement with oppositely disposed gibs 70 formed in the slides 50 and 52 to which the wiper plates are secured. In order that the hand lever 58 may impart longitudinal movement to the slide 62 a cam slot 72 (Fig. 4) is formed therein for the reception of a cam roll 74 pivoted on a pin 75 mounted in a bracket 76 secured to the slide 62. A guide roll 77 (Fig. 3) pivoted to the pin 75 below the bracket 76 and arranged to travel in a groove 79 extending lengthwise of the machine through the extension 60 of the block 26 operates to prevent lateral displacement of the slide 62 by the actuation of the lever 58.

An upper to be lasted is arranged by the operator in inverted position with the margin of the upper at the toe and at the sides of the forepart outspread and supported upon the upper surfaces of the wiper plates 46 and 48. The position of the upper is gaged by bringing its edge against the curved inner edges of the slides 50 and 52. If desired, a notch may be formed centrally of the margin at the toe of the upper in order to permit the upper to be centered relatively to the supporting wiper plates. In order that the slides 50 and 52 may gage the position of the upper correctly, said slides are first adjusted in accordance with the size of shoe to be lasted. This is done by a preliminary actuation of the hand lever 58. For the convenience of the operator the preliminary movement of the hand lever 58 to adjust the slides 50 and 52 may be determined by an indicator 78 secured to said lever and a scale 80 secured to the extension 60 of the block 26. In order to maintain the hand lever 58 in adjusted position a series of sockets 82 are provided in the under surface of the hand lever in concentric relation to its axis, and a spring pressed plunger 84 (Fig. 3) is mounted in the extension 60 for engagement within said sockets. The plunger 84 may be tapered at its upper end in order to permit it to be cammed out of the sockets 82 by the actuation of the hand lever 58.

Referring now more particularly to the construction and arrangement of the wiper plates 46 and 48, said plates are substantially L-shaped (Fig. 4) and have their shorter arms arranged lengthwise of the machine. The longer arms of the wiper plates are one-half the thickness of the shorter arms, and the longer arm of the plate 46 is arranged to underlie the longer arm of the plate 48. In their assembled position the wiper plates are so arranged that the transverse edges of their overlapping arms coincide. It will thus be seen that both the upper surface and the lower surface of the wiper plates present a plane surface to an upper to be lasted. The wipers 46 and 48 are secured within recesses formed in the under surfaces of the slides 50 and 52 respectively, the depth of said recesses being such that the under surfaces of the wiper plates are in the same plane as the under surfaces of said slides (Fig. 10).

The outspread margin of an upper to be lasted is clamped against the wiper plates 46 and 48 by a series of spring fingers 90 (Fig. 12). Each of said fingers is provided at its upper engaging end with a pair of points which extend just far enough from the body of the finger to permit them to pass through the lining and the box and to penetrate the upper. Each of the fingers is provided with a shank 92 (Fig. 14) in which is formed two parallel open end slots arranged to receive a pair of clamping screws 93 (Fig. 1). By releasing said clamping screws, said fingers may be adjusted individually toward and from the edge of the opposing wiper plate and they may also be adjusted to vary the angular relation to each other of planes longitudinally bisecting the respective fingers, and to vary the angle of said planes to the edge of the wiper plate.

The fingers 90 are secured to the under surface of a slide 94 which is supported in parallel relation to the wiper plates 46 and 48 upon sliding posts 96 which slide through holes formed in the table 24 and the block 26. At their lower ends the posts 96 have a plate 98 secured thereto in parallel relation to the plate 94, and a coiled spring 100 is connected at one end to said plate 98 and at the other end to the table 24 in order to maintain the finger plate 94 normally in elevated position. The plate 94 is depressed in order to bring the spring fingers 90

into engagement with the outspread margin of an upper supported upon the wiper plates by a treadle 102 pivoted near its base on a cross shaft 103 secured to the pedestal 20 and connected to the plate 98 by a link 104, a short lever 106 pivoted to the head 22, and a link 108 connecting said lever to a stud 109 extending downwardly from the under surface of the plate 98. In order to hold the fingers 90 in clamping engagement with the outspread margin of the upper supported upon the wiper plates, a swinging ratchet 110 (Fig. 19) is pivoted to a cross bar 112 secured to the front of the pedestal 20 near its base, and a tooth 114 is formed in the treadle lever 102 for engagement with said ratchet. The ratchet 110 is brought into position to engage the tooth 114 by a coiled spring 116 connecting the upper end of the ratchet lever to a lug 118 projecting forwardly from the pedestal 20. At its lower end the ratchet lever may be provided with a tread plate to permit the disengagement of the ratchet from the tooth 114 by the foot of the operator.

The fingers 90 extend inwardly with a downward curvature and engage the outspread margin of an upper at an acute angle thereto (Fig. 8). Because of the acute angle of the fingers to the margin of the upper a further depression of the finger plate 94 after the fingers have been brought into engagement with the margin of the upper causes the ends of said fingers to move inwardly upon the wiper plates thereby feeding the margin of the upper inwardly and bending the spring fingers 90 from their position in Fig. 8 into their position in Fig. 9.

The fingers 90 are preferably arranged in two groups about the wiper plates 46 and 48, one of said groups comprising the four fingers arranged about the forward end of the wiper plates, as shown in Fig. 12, and the other group comprising the remaining six fingers arranged at opposite sides of the wiper plates. It will be seen that the four fingers comprising the first group are arranged in convergent relation to each other while the fingers comprising the second group are substantially parallel to each other. Consequently a further depression of the finger plate 94 after the fingers have been brought into clamping engagement with the outspread margin of an upper will cause the first group of fingers to move inwardly toward the wiping edges of the wiper plates and simultaneously to move toward each other in order to gather the margin of the upper. The second group of fingers, however, move inwardly toward the edges of the wiper plates in substantially parallel relation to each other and, consequently, have no gathering action. The second group of fingers are arranged at an angle to the wiping edges of the wiper plates such that they impart a slight movement to the margin of the upper forwardly thereof as they travel inwardly toward the edges of the wiper plates. The margin at the sides of the forepart of the upper is thus drawn forwardly slightly in order to stretch the upper uniformly at the shank.

It has been found desirable that the margin of the upper at the sides of the forepart be fed inwardly toward the edge of the last bottom to a lesser extent than the margin at the end of the toe in order that the ball portion of the upper may be stretched sufficiently by the depression of the last into the inverted upper to bring the upper down firmly upon the last. To this end the fingers comprising the second group above referred to are somewhat longer than the fingers in the first group and are arranged at a lesser inclination to the plane of the wiper plates than the fingers comprising the first group.

It is to be understood that the groups of fingers above referred to are not sharply defined. The arrangement of the groups is governed by the shape of the last. The extent of the feeding movement of the fingers in a given group may or may not be uniform, depending upon the requirements of a given last.

It is desirable that the inward movement of the spring fingers 90 upon the wiper plates be positively arrested with the ends of said fingers spaced from the edges of the wiper plates just far enough to permit said fingers to prevent any further inward movement of the margin of the upper during the foredrawing and upwiping operations hereinafter described. To that end a guard plate 120 is positioned in advance of the fingers 90 and has its lower edge arranged substantially in parallel relation to the wiping edges of the wiper plates 46 and 48 and is arranged to engage the margin of the upper as the fingers 90 reach the limit of their inward movement (Fig. 9). The guard plate 120 is inclined upwardly and outwardly from the edges of the wiper plates and is received within a recess 122 in the finger plate 94 and secured to said plate by screws 124.

It is desirable that the spring fingers 90 engage the upper margin simultaneously and advance inwardly upon the wiper plates until they engage simultaneously the lower edge of the guard plate. In order to effect this result the ends of the spring fingers 90 are adjusted vertically relatively to each other to bring them into a common plane parallel to the plane of the wiper plates. In the illustrated machine this adjustment is effected by a series of adjusting screws 126 mounted in tapped holes in the finger plate 94 and arranged to engage the upper surfaces of the fingers substantially midway of their length.

It has been seen that the preliminary position of the wiper plates 46 and 48 is adjustable to accommodate varying sizes of shoes. It is desirable that a similar adjustment be provided for the finger plate 94 in order that the desired arrangement of the fingers 90 and the guard plate 120 relatively to the wiper plates may be maintained. Accordingly, the finger plate 94 is arranged to slide lengthwise of the machine, and means is provided for securing the plate in adjusted position. In the illustrated machine the plate 94 is slidably mounted within longitudinal grooves formed in a pair of blocks 128 arranged longitudinally of the machine and secured to the posts 96. Said blocks are maintained in parallel relation to the plane of the wipers and consequently their inclination is such that the plate 94 tends to slide toward the front of the machine. In order to maintain the finger plate in its desired adjustment an abutment screw 130 is mounted in a tapped hole formed in an extension 132 of the finger plate and arranged to engage the rearward end of one of the blocks 128. The several adjustments of the finger plate 94 may be defined by a scale (Fig. 2) at one side of the finger plate arranged to register with a mark on the adjacent block 128.

Referring now to the heel assembly, a vertically yielding heel support 134 (Fig. 1) is secured to a slide 136 which in turn is slidably mounted in longitudinal grooves 138 formed in blocks 140 and 142 (Fig. 2) secured to the longitudinal arms 42 of the auxiliary frame 28 at their inner sur-

faces. The heel support 134 is illustrated as a spring plate screwed to the under surface of the slide 136, extending downwardly at right angles thereto a distance slightly less than the height of the heel of a last to be supported thereon, and from that point extending toward the rearward end of the auxiliary frame a sufficient distance to provide a substantial support for the last. Said supporting plate is preferably bifurcated for the reception of a boot upper and is preferably provided with a pair of leather envelopes to protect the upper from abrasion. The slide 136 is cut away above the heel support 134 to provide sufficient space for the operation of overwiping the heel end of the upper margin. A familiar type of wiper plates 144 and 146 (Fig. 2) is provided for overwiping the heel end of the upper margin, the plate 146 extending forwardly of the plate 144, as shown in the illustrated machine, in order to accommodate a right shoe. The wiper plates 144 and 146 are secured to plates 148 and 150, respectively, which in turn are guided upon the slide 136 by screws 152 arranged to engage within curved slots 154 formed in the plates 148 and 150 and having their center of curvature at the apex of the angle defined by the adjoining surfaces of their wiper plates 144 and 146. The screws 152 may be provided with flat heads positioned to engage the upper surfaces of the plates 148, 150 in order to prevent displacement thereof by the action of the heel support 134 which operates to press the last bottom upwardly against the wiper plates. The wiper plates 144 and 146 are actuated by a hand lever 156 pivoted to the slide 136 and connected to the plates 148 and 150 by parallel motion links 158 and 160, respectively.

In order to position the last in the proper longitudinal relation to the heel wiper plates a heel stop is provided for the reception of the heel end of the last. In the illustrated machine the heel stop consists of a pair of blocks 162 and 164 secured to the under surfaces of the plates 148 and 150, respectively. Said blocks have a horizontal curvature substantially the same as the curvature of the forward edges of the wiper plates, and are spaced rearwardly from the forward edges of the wiper plates a distance substantially equal to the width of the margin of the upper to be lasted over the insole. The blocks 162 and 164 are preferably faced with a single piece of leather 166 arranged to cover their forward surfaces.

The slide 136 is maintained in adjusted position in the auxiliary frame 28 by a pair of pawls 168 pivoted to lugs 170 secured to the slide 136 at opposite edges thereof and arranged to engage ratchet teeth formed in the blocks 140 and 142. Said pawls arrest the rearward movement of the slide 136 while permitting unlimited forward movement thereof. In order to facilitate the adjustment of the heel assembly for varying sizes of lasts a scale may be inscribed upon the slide 136 at the left side thereof, as shown in Fig. 5, and a mark or other indicator may be provided on the block 140 to register with said scale.

The operator actuates the hand lever 156 to wipe the margin at the heel end of the upper over the insole after the auxiliary frame 28 has been swung from its position in Fig. 1 to its depressed position as shown in Fig. 10. While the auxiliary frame, together with the last and shoe parts, are in this position the toe wiper plates 46, 48 are actuated to wipe the margin of the forepart over the insole, and consequently it is desirable that the forepart of the last bottom be substantially parallel to the plane of the toe wiper plates. The relative position heightwise of the last of the forepart of the last bottom and the heel seat of the last bottom varies with different last contours and it is, therefore, necessary to adjust the relative positions of the heel wiper plates 144, 146 and the toe wiper plates 46, 48 in order that a parallel relation between the wiper plates and the last bottom may be effected. In the illustrated machine this adjustment is accomplished by varying the elevation of the auxiliary frame 28. The desired variation of the elevation of the auxiliary frame is effective by releasing the clamping screws 32 (Fig. 1) which secure the uprights 30 to the block 26 and adjusting said uprights in a direction perpendicular to the plane of the wiper plates 46, 48.

The forepart of the last is supported in inverted positon upon a resilient girth stretcher or lasting bag. In the illustrated machine the lasting bag is in the form of a rubber apron 172 (Fig. 3) secured at its forward end to the block 26 by screws 174, the block being shouldered, for the reception of the apron in flush relation with its upper surface. At its forward end the upper surface of the apron 172 is adjacent to the under surfaces of the wiper plates 46 and 48. The sides of the apron 172 are secured to a pair of slides 202 and 204 forming a part of the shank wiping mechanism hereinafter described and arranged at opposite sides of the table 24 for lateral movement toward and from each other. The forward end of the apron 172 is drawn downwardly, as shown in Fig. 3, and is maintained in downstretched condition by a retaining pin 178 having a hook formed at its upper end for engagement with a pair of loop links 180 passed through a pair of eyelets at the forward edge of the apron. Upward movement of the retaining pin 178 is limited by a screw 182 extending downwardly from the table 24, the end of said screw being bent forwardly into parallel relation with the table 24 and provided with a slot for the reception of the retaining pin. A ball 184 at the lower end of the retaining pin engages the screw 182 in order to arrest the upward movement of the retaining pin. An opening 186 in the table 24 provides the necessary clearance for the retaining pin 178 and also for a boot upper. The retaining pin maintains a constant tension on the apron 172 while leaving the apron at an elevation such that a last, as it is introduced into the supported upper, causes the upper to engage the entire length of the apron and distends the apron sufficiently to cause the apron to stretch and thereby to impart a substantial upwiping to the forepart and shank of the upper. The apron 172 by its frictional engagement with the upper holds the upper securely in upwiped condition after the last has been brought to the limit of its depression into said apron.

The last is depressed into the apron 172 by first pressing the toe end of the last into the toe end of the apron and thereafter swinging the auxiliary frame 28 into substantially parallel relation to the table 24 in order to press the last into the full length of the apron. The depression of the toe end of the last brings the edge of the last bottom below the level of the wiper plates 46 and 48 and the swinging of the auxiliary frame operates to move the last toward the rear of the machine until the edge of the last bottom extends slightly beneath the wiper plates, so that the last is held by the wiper plates from being lifted by

the resiliency of the apron 172 after the pressure on the last bottom is released.

In the illustrated machine downward movement is imparted to the toe of the last by a depressor consisting of a lever 188 (Fig. 1) swiveled in an arm 190, said arm being pivoted within a yoke at the upper end of an upright 192 secured to the table 24. An opening is provided in the slide 82 at the point where the upright 192 passes therethrough in order to permit freedom of movement of said slide relatively to the upright. The lever 186 has a presser foot 194 pivoted thereto in a position to engage the toe end of an insole attached to the bottom of a last supported upon the apron 172 and heel support 134. The presser foot is bifurcated at its upper end to permit it to embrace the lever 188 and has its movement toward the axis of the arm 186 limited by the interengagement of the under surface of the lever 188 and the upper end of the presser foot at a point between its bifurcations. In order that the presser foot 194 may be positioned at the limit of its movement toward the axis of the arm 186 as it comes into contact with the insole, a light coiled spring 196 is connected at one end to the presser foot and at the other end to the forward end of the lever 188. The presser foot is yieldingly held at the limit of its forward movement rather than by a fixed or positive connection in order that it may be free to swing slightly about its pivot during the depression of the last, thus preventing the presser foot from scraping the insole as the last moves downwardly. The arm 188 is normally held retracted by a weight 198 secured to the upper end of the arm 190, said retracted position being defined by a stop 200 formed in the arm 190 and arranged to abut against the upright 192. During its downward movement the last is deflected rearwardly thereof by the guard plate 120 to cause its heel end to engage the heel end of the upper. The guard plate also prevents engagement of the last with the spring fingers 98 during its depression. Simultaneously with the depression of the last the finger supporting slide 94 is further actuated to cause the fingers to complete their feeding and gathering movement. The movement of the fingers is arrested by the guard plate 120. Preferably the movement of the fingers is arrested while the depression of the last is in progress. It will be seen, however, that the timing of the actuation of the fingers relatively to the depression of the last is manually controlled by the operator and may be varied at will. After the fingers have been arrested by the guard plate said fingers in conjunction with the guard plate operate to hold the margin of the upper positively from further movement upon the toe wiper plates 46 and 48 (Fig. 9). During the continued depression of the last after the fingers 98 have been arrested by the guard plate the last is moved rearwardly thereof by its engagement with the guard plate as above described, and during its rearward movement the heel end of the last is pressed against the heel end of the upper, thereby exerting a foredrawing action upon the upper. The foredrawing of the upper brings its heel end against the heel stop 166 which has previously been adjusted in accordance with the size of the upper which is being operated upon. The heel stop is provided with a resilient cushion 135 (Fig. 9) which receives the heel end of the upper as the last comes to the limit of its rearward movements.

In the illustrated machine the devices for wiping in the shank of an upper consist of the slides 202 and 204 (Fig. 6) to which the apron 172 is secured, as above described. At their inner ends the slides 202 and 204 have formed integrally therewith a pair of wiper plates 206 and 208, respectively, said plates extending inwardly at an upward inclination from the inner ends of said slides. At their inner ends the wiper plates have the general curvature of the edge of the last bottom at opposite sides of the shank in order to permit them to press the apron 172 against the upper. The apron 172 is extended over the wiper plates 206 and 208 and secured thereto by clamping screws 210. The slides 202 and 204 are mounted to slide laterally of the machine in a pair of slides 212 and 214, respectively, each of said slides 202 and 204 having a depending T guide 216 formed integrally therewith to slide in a T way formed in its supporting member. The slides 212 and 214 have T ways formed in their under surfaces for the reception of upstanding T guides 218 formed in a pair of supporting blocks 220 secured to the table 24 at opposite sides of the machine and arranged to extend lengthwise thereof. It will thus be seen that the slides 202 and 204 may move lengthwise of the machine in order to adjust themselves to varying sizes of lasts. The shank wipers are actuated by swinging the auxiliary frame 28 from its normal position, as shown in Fig. 1, into parallel relation to the table 24, as shown in Fig. 10. In the illustrated machine the motion of the auxiliary frame is transmitted to the slides 202 and 204 through a pair of uprights 222 secured to the auxiliary frame 28 at opposite sides thereof and a pair of links 224 connecting said uprights to the slides. The links 224 have ball and socket connections with brackets 226 and 228 extending upwardly and inwardly from the slides and the uprights, respectively. The links 224 are preferably extensible in order to vary the extent of the movement of the slides 202 and 204.

The auxiliary frame 28 may be actuated by the hand lever 156 provided for the actuation of the heel wiper plates or, if desired, it may be actuated by a treadle 230 (Fig. 1) pivoted on the cross shaft 103 secured to the pedestal 20 near its base. The treadle 230 is connected to the auxiliary frame 28 by a link 234 pivoted at its lower end to the treadle 230 and secured at its upper end to a yoke 236 pivoted at opposite sides of the auxiliary frame. The treadle is held in retracted position by a coiled spring 238 connected at one end to the treadle and at its other end to the pedestal 20. The spring 238 also operates to maintain the auxiliary frame 28 in elevated position, as shown in Fig. 1.

The actuation of the treadle 230 moves the free end of the auxiliary frame 28 downwardly and swings the arms 36 upon which the auxiliary frame is supported in a clockwise direction, as seen in Fig. 1, thereby causing the auxiliary frame to move toward the rear of the machine as it is swung into parallel relation to the table 24. The downward swinging movement of the auxiliary frame presses the heel end of the last and upper into the apron 172 while its movement toward the rear of the machine forces the toe end of the last beneath the wiper plates 46 and 48 which serve to hold the last depressed after the retraction of the presser foot 194. The depression of the heel end of the last into the apron 172 stretches the apron somewhat, and the stretching of the apron, by the frictional contact of the apron with the upper, tends to stretch the

upper heightwise of the last at the forepart and at the shank of the shoe.

The actuation of the heel wiping mechanism operates through a pair of fingers 239 (Fig. 5) formed integrally with the plates 148 and 150, respectively, to supplement the actuation of the shank wiping mechanism by the swinging of the auxiliary frame 28. The fingers 239 impart an inward movement to the slides 202 and 204 stretching the apron 172 over the last bottom and laying the margin at the shank of the upper over the insole. The fingers 239 are arranged to move inwardly during the actuation of the heel wiper plates 148 and 150 and to engage shoulders formed on the shank wiper plates 206 and 208 as the heel wiper plates approach the limit of their wiping movement in order to move the shank wiper plates inwardly over the last bottom.

If desired a ligature may be provided for holding the margin of the upper in overwiped condition throughout its entire extent. Such a ligature is shown in Fig. 18 in the form of a draw string 254 stitched to the edge of the upper margin and extending from the shank of the upper throughout substantially the entire extent of the upper margin and back to the point of beginning. In order to permit the draw string to hold the margin of the upper at opposite sides of the shank a loop or bight 255 is formed in the draw string at the shank of the upper opposite the ends of the draw string and the ends of the draw string are passed through said loop. In order to permit the formation of such a loop the stitching whereby the draw string is attached to the edge of the upper margin is interrupted at 257 (Fig. 18). In the illustrated embodiment of the invention the draw string 254 is employed to hold the margin of the upper in overwiped condition throughout substantially its entire extent, and for no other purpose; but it is to be understood that the invention also contemplates, as an alternative method, the employment of the draw string 254 as a means for drawing in the margin of the upper throughout its entire extent.

In order to secure the draw string in drawn condition a combined clamp and a shank stiffener 256 is secured to the shank of the insole by a tack 258 driven through a hole in the shank stiffener and clencher against the inner surface of the insole. The illustrated clamp and shank stiffener is in the form of a rectangular plate extending lengthwise of the insole and having tongues 260 and 262 stamped therefrom and upturned at their ends for the reception of the draw strings between said tongues and the body of the plate. The ends of the tongues are preferably flattened before the outsole is attached to the shoe.

If cement is employed to secure the margin of the upper in overwiped condition it is desirable that pressing means be provided to press the margin of the upper against the insole and to maintain pressure thereon until the cement has securely bonded the upper to the insole. In the illustrated machine a presser 240 (Fig. 1) is secured to the depressor lever 188 which is swiveled to the depressor arm 190, as above described. In order to permit the depressor lever 188 to be reversed to position the presser for engagement with the last bottom, a D-handle 242, or other swiveling means, may be provided at the free end of the depressor lever. In the illustrated machine the presser consists of a shell or casing 244 provided with depending lugs 246 whereby it is secured to the depressor lever 188. The shell 244 has the same outline as the edge of the last bottom and a rubber block 248 having the same outline as the shell 244 is secured therein by screws 250 near the base of the shell 244. The rubber block 248 extends substantially beyond the shell 244, (Fig. 1) and has secured to its last engaging surface a thin plate 252 (Figs. 16 and 17) which is provided with a raised margin of substantially the same width as the overwiped margin of a lasted upper. The presser 240 is positioned on the depressor lever 188 to register with the overwiped margin of a lasted upper as the depressor lever is swung to bring the presser 240 into operative position. Preferably the presser is actuated after the ligature has been drawn and clamped and the wipers have been retracted.

Referring particularly to Fig. 15 the spring fingers 90 may be constructed and arranged to retard the inward movement of the margin of an upper without imparting any positive feeding movement thereto. Said fingers as shown in Fig. 15 engage the margin of an upper substantially at right angles thereto and operate first to clamp the upper margin against the supporting wiper plates 46 and 48 in order to maintain the margin in clamped position until the last is pressed into the upper. As the last is so depressed the fingers spring inwardly in the direction of the guard plate 120 and are finally arrested by engagement with the guard plate, thus permitting a measured feed to be imparted to the upper margin by the depression of the last into the supported upper.

Referring now to the preferred method of lasting uppers in accordance with the present invention, an upper which is cut scant in order to reduce to a minimum the material to be laid over the insole is held in inverted position by the operator, as shown in Fig. 7. The operator places the margin of the upper at the toe and the sides of the forepart in outspread condition upon the wiper plates 46 and 48, gaging the position of the upper by bringing its edge into contact with the edges of the slides 50 and 52 while holding the margin of the upper flat against the wiper plates. The upper is centered upon its support by causing a notch (not shown) formed at the center of the toe of the upper margin to be positioned centrally of the opening between surfaces 86 and 88 of the slides 50 and 52 (Fig. 4). The operator then depresses the treadle 102 bringing the spring fingers 90 into engagement with the margin of the upper, thereby clamping the margin against the wiper plates. The depression of the treadle 102 is continued until the tooth 114 on the treadle lever comes into position to engage the upper tooth of the swinging ratchet 110. At this stage a preliminary feeding and gathering has been imparted to the upper margin by the spring fingers 90, thereby forming a substantial concavity at the toe of the upper for the reception of a last. A last with an insole mounted thereon is then inserted into the upper by positioning the heel end of the last in the heel end of the upper, then swinging the last about its heel end as a pivot and pressing the toe of the last into the concavity formed in the upper for its reception. At this stage the last is in the position illustrated in Fig. 8. The depressor lever 188 is now swiveled, if necessary, to bring the presser foot 194 into position to engage the toe of the insole during the actuation of the depressor lever. The depressor lever 188 is now actuated to bring the presser foot to bear upon the toe end of the insole, as shown in Fig. 8. The treadle 102 is then depressed to impart an additional feeding and gathering move-

ment to the spring fingers 90, and simultaneously the presser foot 194 is actuated to press the last into the upper. The movement of the spring fingers 90 is arrested by the guard plate 120, but the actuation of the presser foot continues after the spring fingers have been so arrested in order further to stretch the toe and forepart of the upper about the last. The depression of the last is continued until the toe end of the last has passed sufficiently below the edges of the wiper plates 46 and 48 to permit the last to pass thereunder in order to secure it against retracting movement. The position of the last and also of the fingers 90 and their associated guard plate, as they appear at the end of the actuation of the presser foot 194, is illustrated by Fig. 9. During the depression of the last a rearward movement is imparted thereto by causing the toe of the last to slide against the inclined surface of the guard plate 120.

During the latter part of the depression of the last the apron 172 is stretched somewhat and its stretching action operates to upwipe the toe and forepart of the upper and to hold the upper in its upwiped condition.

The hand lever 156 or the treadle 230, or both, may now be actuated to swing the frame 28 downward in order to bring the toe of the last bottom into parallel relation to the wiper plates 46 and 48 and also to cause the toe of the last to move forward slightly in order to cause the insole to engage the under surface of said plates. The swinging ratchet 110 is then kicked out of engagement with the tooth 114 on the treadle lever 102 in order to permit the spring 100 to return the spring fingers 90 to inoperative position, as shown in Fig. 10. The depressor lever 188 may then be retracted.

The actuation of the auxiliary frame 28 actuates the shank wiper plates 206 and 208 to carry the apron 172 inwardly to the edge of the last bottom (Fig. 6), thereby bringing the shank portion of the upper firmly into contact with the shank portion of the last and also uniformly upwiping the upper as the apron is stretched by the depression of the last.

At this point in the lasting operation adhesive may be applied to the margin of the insole or the margin of the upper, or both, but it is to be understood that the present invention contemplates the employment of lasting tacks, if desired, or any other suitable means for securing the overwiped margin of the upper.

The wiper plates 46 and 48 and the heel wiper plates 144 and 146 are now actuated to overwipe the margin of the upper, and the ligature 254 is actuated to secure the margin in overwiped condition. The ligature serves merely as a means for holding the upper margin in overwiped condition and may be dispensed with if considered undesirable. The yielding heel support 136 exerts a lifting action on the last and presses the margin of the upper against the wiper plates 144 and 146 thereby pressing the margin against the insole.

If cement is employed to secure the upper margin in overwiped condition the presser 240 may be employed to press the upper margin uniformly against the insole (Fig. 16) in order to obtain a secure bond between the upper and the insole. If cement is not employed the presser 240 may be used to flatten the overwiped margin of the upper against the insole.

If desired, the upper may be assembled on its last in the customary manner before being inserted in the machine of the present invention to be lasted, in which case the upper is handled in accordance with the method heretofore described, except that it is not necessary for the upper to be centered on its support since the upper has been centered on its last in the assembling operation. If desired, however, the toe of the upper margin may be notched, as hereinbefore described, in order to permit the toe of the upper margin to be centered definitely upon its support.

Referring now to Fig. 13 the machine and method of the present invention may be employed to last a toe part or vamp which, both before lasting and in the finished shoe, is not attached to the heel part or quarter of the upper. In Fig. 13 the vamp 260 of such a shoe is shown supported upon a pair of wiper plates 262 and 264 which have substantially the same curvature as the bottom of the last 266 and are arranged to extend from the toe end of the upper to its rearward extremity. In other respects the wiper plates 262 and 264 have the same construction and arrangement as the wiper plates 46 and 48 shown in Fig. 4. Preferably the fingers 268 extend throughout the entire length of the margin of the vamp and are, therefore, greater in number than the fingers 90 shown in Fig. 12. The fingers 268 are constructed the same as the fingers 90 and are actuated as hereinbefore described with reference to the fingers 90. The guard plate 270 is secured to a finger supporting slide (not shown) both the plate and the slide being constructed and arranged to accommodate the arrangement of the fingers 268 illustrated in Fig. 13.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A lasting machine having, in combination, means for clamping the margin of an upper in a predetermined position, means for pressing a last into the clamped upper, and means for actuating said clamping means to feed the margin of the upper inwardly toward the edge of the last bottom and to gather a measured amount of the margin of the upper at one end of the last.

2. A lasting machine having, in combination, a support for the outspread margin of an upper, a gage for determining the position of said margin upon its support, means for clamping said margin against its support, a depressor for pressing a last into a clamped upper, and means for actuating said clamping means to feed the margin of the upper inwardly upon its support and to gather a measured amount of said margin at one end of the last.

3. A lasting machine having, in combination, a support for the outspread margin of an upper, a gage for determining the position of said margin upon its support, a series of yielding members arranged to clamp said margin against its support, and means for actuating said members to feed the margin of the upper inwardly toward the edge of the last bottom and to gather the margin of the upper between predetermined points.

4. A lasting machine for completely lasting an upper in one operation having, in combination, means for supporting the margin of an upper, means for pressing a last into the supported upper, a girth stretcher for resisting the depression of the last and upwiping the upper, means for feeding the margin of the upper inwardly toward the edge of the last bottom, means for wiping the margin of the upper over the toe of an insole mounted on the last, and means for wiping the margin of the upper over the heel of the insole.

5. A lasting machine for completely lasting an

upper in one operation having, in combination, a support for the margin of an upper, a depressor for pressing a last into the supported upper, a girth stretcher for resisting the depression of the last and upwiping the upper, means operable simultaneously with the depression of the last for feeding and gathering the margin of the upper at one end of the last, wipers for wiping the margin of the upper over the toe of an insole mounted on the last, and wipers for wiping the margin of the upper over the heel of the insole.

6. A lasting machine for completely lasting an upper in one operation having, in combination, fingers for clamping the margin of an upper in a predetermined position, a depressor for pressing a last into the clamped upper, a girth stretcher for resisting the depression of the last and upwiping the upper, means for actuating the clamping fingers to feed the margin of the upper progressively toward the edge of the last during its depression, toe wipers, heel wipers, a heel support arranged to move the last forwardly in order to pass the toe of the last beneath the edge of the toe wipers, shank wipers, and means for actuating the heel support and simultaneously actuating the shank wipers to wipe in the shank portion of the upper.

7. In a machine for lasting shoes, wiper plates, and a series of fingers mounted independently of the plates and arranged to cooperate with the plates to clamp an upper thereagainst.

8. In a machine for lasting shoes, wiper plates, and a series of fingers mounted independently of the plates and arranged for movement heightwise of an upper supported by the plates to clamp the upper against the plates.

9. In a machine for lasting shoes, toe wiper plates, and a series of fingers mounted independently of the wiper plates and arranged around the forepart of an upper supported by the plates, said fingers and plates being arranged for relative movement to grip an upper therebetween.

10. In a lasting machine, a support for the margin of an upper, and means operable in advance of the introduction of a last into its upper for effecting a measured gathering of the margin of the upper and a measured inward movement of said margin.

11. In a lasting machine, a support for the toe end of an upper and an abutment arranged to be engaged by the toe end of a last during its depression into the upper, said abutment having its last engaging surface inclined to cause the last to move rearwardly of the upper during its depression.

12. In a lasting machine, a support for an upper, means for clamping the toe of the upper against said support, a depressor for pressing a last into the supported upper, and an abutment arranged to be engaged by the toe of the last during its depression and having its last engaging surface inclined to cause the last to move rearwardly of the upper during its depression.

13. In a lasting machine, a support for the outspread margin of an upper, a series of fingers for clamping said margin yieldingly against said support, a depressor for pressing a last into the supported upper, and a plate for guiding the depression of the last whereby the last is moved rearwardly of the upper in order to impart a forward draw to the upper.

14. In a lasting machine, a support for the outspread margin of an upper, a series of fingers arranged to clamp said margin against said support and arranged to feed said margin inwardly upon said support, a depressor for pressing a last into the clamped upper, and means for holding the last out of engagement with said fingers.

15. In a lasting machine, a support for the outspread margin of an upper, a series of fingers arranged to clamp said margin against said support and arranged to feed said margin inwardly upon said support, a depressor for pressing a last into the clamped upper, and a guard for limiting the feeding movement of said fingers and for preventing engagement of said fingers by the last.

16. In a lasting machine, a support for the outspread margin of an upper, a series of fingers arranged to clamp said margin against said support and arranged to feed said margin inwardly upon said support, a depressor for pressing a last into the clamped upper, and a guard for limiting the feeding movement of said fingers and for preventing engagement of said fingers by the last, said guard being constructed and arranged to cause the last to move rearwardly of the upper during its depression.

17. In a lasting machine, a support for the margin of an upper, a series of fingers constructed and arranged to clamp said margin against its support, a depressor for pressing a last into the supported upper, means for actuating said fingers to feed the margin of the upper inwardly during the depression of the last, and an abutment plate arranged inwardly of said fingers for arresting their feeding movement, said plate having a rearward inclination adjacent to the toe of the last whereby the last is caused to move rearwardly of the upper during its depression.

18. In a lasting machine, a support for the margin of an upper, a series of fingers constructed and arranged to clamp said margin against the support, means for actuating said fingers to feed said margin inwardly upon its support, and a finger arrester forming an element of the finger assembly and arranged inwardly of said fingers at a predetermined distance therefrom in order to arrest their feeding movement.

19. In a lasting machine, means for imparting a measured feed to the margin of an upper comprising a plurality of yielding fingers, and a member arranged in opposition to said fingers, said fingers and their opposing member being arranged for movement toward each other whereby the margin is first clamped therebetween and then fed inwardly upon said opposing member.

20. In a lasting machine, means for imparting a measured feed to the margin of an upper comprising a plurality of spring fingers, and a support arranged in opposition to said fingers, said fingers and their opposing support being arranged for relative movement to clamp the margin therebetween and said fingers also being so arranged relatively to the plane of the opposing support that relative movement of the fingers and the support effects an inward movement of the free ends of said fingers upon said support.

21. In a lasting machine, means for clamping the margin of an upper comprising a plurality of plates arranged to be adjusted to conform to the outline of the toe of a last and constructed and arranged for sliding engagement with said margin, and clamping means comprising a plurality of spring fingers constructed for gripping engagement with said margin and arranged in opposition to said plates and so arranged relatively to said plates that a relative movement of the plates and the fingers to clamp the margin therebetween produces a feeding movement of said fingers upon the surface of said plates.

22. In a lasting machine, a series of spring fingers arranged to engage the margin of the forepart of an upper and normally held in inoperative position, and means for actuating said fingers to impart to said margin a measured feeding movement and a measured gathering movement.

23. In a lasting machine, a series of fingers arranged to engage the margin of the forepart of an upper, and means for actuating said fingers to impart to said margin a measured and non-uniform feeding movement and simultaneously therewith a measured and non-uniform gathering movement.

24. In a lasting machine, a support for the margin at the forepart of an upper provided with a lining and box toe, a series of pointed fingers arranged to penetrate the lining, box toe and upper, said fingers and said support being arranged for relative movement first to cause said fingers to penetrate the lining, box toe and upper, and then to impart thereto a measured feeding movement and a measured gathering movement.

25. In a lasting machine, means for effecting a measured feed of the margin of an upper, and means for arresting the feed.

26. In a lasting machine, means for effecting a measured gathering of the margin of an upper, and means for arresting the gathering.

27. In a lasting machine, a support for the margin of an upper, means for feeding the upper comprising a plurality of fingers arranged to engage the margin, means for actuating said fingers to move the margin inwardly upon its support, and means for arresting the actuation of said fingers.

28. In a lasting machine, wiper plates arranged to support the margin of an upper, means for feeding the upper comprising a plurality of fingers arranged to engage the margin, means for actuating said fingers to move the margin inwardly upon its supporting plates, and an abutment for arresting the actuation of said fingers.

29. In a lasting machine, a support for the margin of an upper, means for imparting a feeding movement to the margin comprising a plurality of yielding fingers, and a finger actuating member arranged for movement toward and from the plane of the margin of the upper.

30. In a lasting machine, a plurality of wiper plates arranged to support the margin of an upper, means for imparting a feeding movement to the margin comprising a plurality of spring fingers arranged to engage the margin, and a holder to which the fingers are secured in a position such that a movement of the holder toward the plane of the margin produces a movement of the free ends of said fingers upon said supporting plate.

31. In a lasting machine, a support for the margin of an upper, means for imparting a measured inward movement to the margin of the upper comprising a plurality of fingers arranged to engage said margin and normally held retracted, means for actuating said fingers, and latching means arranged to latch said fingers against retraction at successive stages in their actuation.

32. In a lasting machine, a support for the margin of an upper, a depressor for pressing a last into the supported upper, and means for feeding the margin of the upper inwardly toward the edge of the last bottom during the actuation of the depressor.

margin of an upper, a depressor for pressing a

33. In a lasting machine, a support for the last into the supported upper, a series of fingers arranged to engage the margin of the supported upper, and means operable during the actuation of the depressor for actuating said fingers to feed the margin of the upper inwardly toward the edge of the last bottom.

34. In a lasting machine, a pair of wiper plates arranged to support the outspread margin of an upper, a depressor for pressing a last into an upper supported on said plates, and means operable during the actuation of the depressor for imparting a measured feed to the margin of the upper inwardly toward the edge of the last bottom.

35. In a lasting machine, a pair of wiper plates arranged to support the outspread margin of an upper, a depressor for pressing a last into an upper supported on said plates, means operable during the depression of the last for imparting a measured feed to the margin of the upper inwardly toward the edge of the last bottom, and means for actuating said wiper plates to wipe said margin over the edge of the last bottom.

36. In a lasting machine, a support for the outspread margin at the sides of the forepart of an upper, means for effecting a measured inward feeding of said margin, means for arresting said feeding movement, and a depressor for pressing a last into the upper.

37. In a lasting machine, a support for the outspread margin at the sides of the forepart of an upper, a plurality of fingers constructed and arranged to effect a measured inward feeding of said margin, means for arresting said feeding movement, and means for pressing a last into the upper comprising a depressor arranged to be actuated during said feeding movement and to a variable extent thereafter.

38. In a lasting machine, a support for the outspread margin of an upper, means for pressing a last into the supported upper, a series of fingers constructed and arranged for positive engagement with the margin of the upper at the sides of its forepart, and means for actuating said fingers to feed said margin forwardly toward the toe of the last.

39. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of pointed fingers arranged to pierce the margin of the upper at the sides of its forepart, and means for actuating said fingers to feed said margin simultaneously inwardly toward the edge of the last and forwardly toward the toe of the last.

40. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of fingers arranged for positive engagement with the margin of the upper at the sides of its forepart, means for actuating said fingers to feed said margin simultaneously inwardly toward the edge of the last and forwardly toward the toe of the last, a series of fingers arranged for positive engagement with the margin of the upper at the toe, and means for actuating said fingers to feed the margin inwardly toward the toe of the last and to impart a measured gathering thereto.

41. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of fingers arranged for positive engagement with the margin of the upper at the sides of its forepart, means for actuating said fingers to feed

said margin simultaneously inwardly toward the edge of the last and forwardly toward the toe of the last, a series of fingers arranged for positive engagement with the margin of the upper at the toe, and means for actuating said fingers to feed the margin inwardly toward the toe of the last and to impart a measured gathering thereto, said two series of fingers operating in unison and in conjunction with said depressor, to stretch the upper smoothly and to position it accurately upon the last.

42. In a lasting machine, means for effecting a non-uniform gathering of the margin of an upper comprising a series of fingers arranged to effect measured gathering between predetermined points in the upper margin.

43. In a lasting machine, a plurality of fingers constructed and arranged to operate in advance of the introduction of a last into its upper, for effecting in one operation, a non-uniform gathering of the margin at the forepart of the upper.

44. In a lasting machine, a support for the margin of an upper, and a plurality of fingers arranged to move inwardly upon said support and arranged at measured and non-uniform degrees of convergence whereby the movement of said fingers effects a measured and non-uniform gathering between predetermined points in the margin of the upper.

45. In a lasting machine, a support for the margin of an upper, a series of fingers arranged progressively about said support, and a holder upon which said fingers are arranged at such angles thereto that a depression of the holder moves the free ends of the fingers inwardly upon said support, said fingers being arranged upon said holder at measured degrees of convergence whereby a measured gathering is effected between predetermined points in the margin of the upper.

46. In a lasting machine, means for clamping the margin of an upper comprising a plurality of plates arranged to be adjusted to conform to the outline of the toe of a last and constructed and arranged for sliding engagement with said margin, a plurality of spring fingers constructed for gripping engagement with said margin and arranged in opposition to said plates and arranged at measured degrees of convergence relatively to each other whereby an inward movement of said fingers upon the surface of said plates effects a measured gathering of the margin.

47. In a lasting machine, means for supporting an upper, a depressor for pressing a last into the supported upper, and means for progressively feeding the margin of the upper inwardly toward the edge of the last bottom during the depression of the last and simultaneously gathering the upper between predetermined points in its margin.

48. In a lasting machine, a support for the outspread margin of an upper, a series of yielding fingers arranged for movement toward and from said support, and means for actuating said fingers first to clamp the margin of the upper against its support and thereafter to feed said margin inwardly and simultaneously to gather said margin between predetermined points.

49. A lasting machine having, in combination, a support for the outspread margin of an upper, a gage for determining the position of said margin upon its support, means for pressing a last into the upper, a series of yielding fingers arranged to clamp the margin of the upper against its support and arranged to feed said margin inwardly toward the edge of the last bottom simultaneously with the depression of the last, said fingers also being arranged to gather the margin of the upper between predetermined points and in predetermined amounts during the feeding operation.

50. In a lasting machine, a plurality of fingers arranged to engage the margin of an upper, means for opposing the movement of said fingers in a given direction, and means for imparting relative movement to said fingers and said opposing means whereby the margin is first clamped therebetween and then moved inwardly and simultaneously with said inward movement gathered between predetermined points and in predetermined amounts.

51. In a lasting machine, a pair of wiper plates arranged to support the margin of an upper, means for simultaneously feeding said margin inwardly and gathering said margin comprising a series of fingers arranged progressively about said plates, and a holder upon which said fingers are secured at such angles thereto that depression of the holder moves the free ends of the fingers inwardly upon said plates, said fingers being arranged at measured degrees of convergence whereby a measured gathering is effected between predetermined points in the margin of the upper.

52. In a lasting machine, a support for the margin of an upper, means for simultaneously feeding said margin inwardly and gathering said margin comprising a series of fingers arranged progressively about said support, a holder upon which said fingers are secured at such angles thereto that depression of the holder moves the free ends of the fingers inwardly upon said support, said fingers being arranged at measured degrees of convergence whereby a measured gathering is effected between predetermined points in the margin of the upper, and means for adjusting the fingers to vary the extent of their feeding and gathering action.

53. In a lasting machine, a support for the margin at the toe of an upper, means for simultaneously feeding said margin inwardly and gathering said margin comprising a series of fingers arranged progressively about said support, a holder upon which said fingers are secured at such angles thereto that the depression of the holder moves the free ends of the fingers inwardly upon said support, said fingers being arranged at measured degrees of convergence whereby a measured gathering is effected between predetermined points in the margin of the upper, and means operable simultaneously with the actuation of the fingers for pressing a last into an upper mounted on said support.

54. In a lasting machine, a support for the margin of an upper, means for pressing a last into the supported upper, means for progressively feeding the upper inwardly toward the edge of the last bottom during the depression of the last comprising a plurality of fingers arranged to engage the margin, means for actuating said fingers to move the margin inwardly upon its support, and means for arresting the actuation of said fingers.

55. In a lasting machine, a support for the margin of an upper, a depressor for pressing a last into the supported upper, means for progressively feeding the upper inwardly toward the edge of the last bottom during the depression of the last comprising a plurality of fingers arranged to engage the margin, means for actuating said fingers to move the margin of the upper inwardly upon its support, and an abutment plate posi-

tioned between said fingers and the last and arranged to guide the depression of the last and to arrest the actuation of said fingers.

56. In a lasting machine, means for feeding the margin of an upper inwardly, and a plurality of wipers for wiping the margin of the upper over the last bottom, said wipers being constructed and arranged to support the margin of the upper as it is fed inwardly.

57. In a lasting machine, a plurality of fingers arranged to engage the margin of an upper and feed said margin inwardly, and a plurality of wipers for wiping the margin of the upper over the last bottom, said wipers being constructed and arranged to support the margin of the upper as it is fed inwardly.

58. In a lasting machine, a plurality of fingers for feeding the margin of an upper inwardly, a plurality of wipers for wiping the margin of the upper over the last bottom, said wipers being constructed and arranged to support the margin of the upper as it is fed, means for adjusting said wipers for different sizes of lasts, and means for adjusting the fingers to bring them into opposition to said wipers.

59. In a lasting machine, a pair of overlapping end wipers constructed and arranged, in their open position, to form a plane upper surface for supporting the outspread margin of an upper and forming also a plane under surface for wiping engagement with said margin, and a pair of slides to which said wipers are secured, said slides being constructed and arranged to form a gage for locating the margin of an upper upon said wipers.

60. In a lasting machine, a pair of overlapping end wipers constructed and arranged to present a plane surface to the outspread margin of an upper and arranged for straight line wiping movement, and a pair of slides to which said wipers are secured, said slides being constructed and arranged to form a gage for locating the margin of an upper upon said wipers.

61. In a lasting machine, a pair of end wipers, a pair of slides to which said wipers are secured, a support on which said slides are mounted for movement rearwardly and inwardly of the upper, and means for arresting said slides with the wiping edges of said wipers a measured distance in from the edge of the last.

62. In a lasting machine a pair of end wipers, a pair of slides to which said wipers are secured, a support on which said slides are mounted for movement rearwardly and inwardly of the upper, and abutting surfaces formed on said slides for arresting said slides with the wiping edges of said wipers a measured distance in from the edge of the last.

63. In a lasting machine, wipers for wiping the margin of an upper over the heel of an insole mounted on a last, a heel stop, a support therefor, and yielding last supporting means carried by said support and arranged to press the margin of the upper against said wipers.

64. In a lasting machine, a heel stop arranged to hold the last from backward movement and arranged to be actuated to impart a forward movement to the last, wipers for wiping the margin of an upper over the heel of an insole mounted on the last, a support for the wipers, and yielding last supporting means carried by the support and arranged to press the margin of the upper against said wipers.

65. In a lasting machine, the combination with side wiper members of end wiper members so constructed and arranged that during their advancing movement they engage and advance the side wiper members.

66. In a lasting machine, the combination with side wiper members of end wipers respectively provided with extensions constructed and arranged to engage and advance the side wiper members.

67. In a lasting machine, side wipers respectively provided with shoulders disposed opposite to their wiping edges and end wipers respectively provided with fingers constructed and arranged to engage said shoulders and thus to advance the side wipers during the advancement of the end wipers.

68. In a lasting machine, side wipers respectively provided with shoulders disposed opposite to their wiping edges, means for imparting to said wipers an initial wiping movement, and end wipers respectively provided with fingers constructed and arranged to engage the shoulders in the side wipers after an initial advancement of the end wipers and thus to impart to the side wipers a final wiping movement.

69. In a lasting machine, means for wiping in the shank portion of an upper, a pair of wipers for overwiping the margin of the heel end of the upper, and connections from said wipers for actuating said shank wiping means.

70. In a lasting machine, a pair of last fitting wipers for wiping in the shank portion of an upper, a pair of wipers for overwiping the margin of the heel end of the upper, and connections from said last-mentioned wipers for actuating said shank wipers to overwipe the margin of the shank portion of the upper.

71. In a lasting machine, means for clamping the margin of an upper in a predetermined position, means for pressing a last into the clamped upper, a girth stretcher for resisting the depression of the last and upwiping the upper, and means for actuating said stretcher to wipe in the shank portion of the upper and to impart a uniform tension to the shank of the upper heightwise of the last.

72. In a lasting machine, means for clamping the margin of an upper in a predetermined position, a depressor for forcing a last into the clamped upper, a resilient apron for resisting the depression of the last and upwiping the upper, a pair of wipers arranged at opposite sides of the shank of the upper, and means for actuating said wipers to cause the apron to wipe in the shank portion of the upper and to impart a uniform tension to the shank of the upper heightwise of the last.

73. In a lasting machine, a girth stretcher, means for actuating a last to wipe an upper against the stretcher, and means for progressively feeding the upper inwardly toward the edge of the last bottom during the actuation of the last.

74. In a lasting machine, a girth stretcher, means for actuating a last to wipe an upper against the stretcher, and means for progressively feeding the margin of the upper inwardly toward the edge of the last bottom during the actuation of the last and simultaneously gathering the upper between predetermined points in its margin.

75. In a lasting machine, a girth stretcher comprising a resilient apron secured to the machine frame, means for actuating a last to wipe an upper against the apron, and means for progressively feeding the margin of the upper inwardly toward the edge of the last bottom during the actuation of the last and simultneously gather-

ing the upper between predetermined points in its margin.

76. In a lasting machine, a support for the outspread margin of an upper, means for pressing the margin against said support, a depressor for forcing a last into the supported upper and thereby effecting an inward movement of the margin of the upper upon its support, means for arresting the inward movement of the upper margin upon its support, and a resilient apron arranged to co-operate with the last depressor to upwipe the upper.

77. In a lasting machine, a support for the outspread margin of an upper, means for pressing the margin against said support, a depressor for forcing a last into the supported upper and thereby effecting an inward movement of the margin of the upper upon its support, means for arresting the inward movement of the upper margin upon its support, and a resilient apron arranged to co-operate with the last depressor to upwipe the upper, said apron having frictional engagement with the upper in order to hold the upper in upwiped condition after said pressing means has been released.

78. In a lasting machine, a support for the outspread margin of the forepart of an upper, a series of fingers for clamping the margin against said support, means for actuating said fingers to feed the margin inwardly toward the edge of the last bottom, a depressor for pressing the forepart of the last into the supported upper during said actuation of said fingers, and a resilient apron arranged to co-operate with the last depressor to upwipe the upper.

79. In a lasting machine, a support for the outspread margin of the forepart of an upper, a support for the heel end of a last and upper, said heel support being arranged to swing about an axis extending transversely of the machine, means for clamping the margin of the forepart against its support, a girth stretcher, means for depressing the toe of the last into the girth stretcher, and means for swinging the heel support in order further to press the last into the girth stretcher.

80. In a lasting machine, a support for the outspread margin of the forepart of an upper, an auxiliary frame constructed and arranged to support the heel end of a last and upper and mounted to swing about an axis extending transversely of the machine, means for clamping the margin of the forepart against its support, a girth stretcher, a depressor for pressing the toe of the last into the girth stretcher, and means for swinging the auxiliary frame in order further to press the last into the girth stretcher.

81. In a lasting machine, wiper plates constructed and arranged to support the outspread margin of the forepart of an upper, a support for the heel end of a last and upper arranged to swing about an axis extending transversely of the machine, means for clamping the margin of the forepart against its supporting wiper plates, a girth stretcher, means for depressing the toe of the last into the girth stretcher, and means for swinging the heel support downwardly and forwardly in order to bring the toe of the last under the edge of the wiper plates and further to press the last into the girth stretcher.

82. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, and a series of yielding fingers arranged for gripping engagement with the supported margin of an upper in order to resist the inward movement of said margin toward the edge of the last bottom during depression of the last.

83. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, and a series of yielding fingers constructed and arranged to pierce the margin of an upper and to resist the inward movement of said margin toward the edge of the last bottom during the depression of the last.

84. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of fingers arranged about the toe of the last, said fingers being yieldingly movable inwardly toward the edge of the last bottom and arranged for gripping engagement with the upper margin in order to resist the inward movement of said margin toward the edge of the last bottom during the depression of the last, and means for arresting said fingers.

85. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of fingers arranged about the toe of the last, said fingers being yieldingly movable inwardly toward the edge of the last bottom and arranged for gripping engagement with the upper margin in order to resist the inward movement of said margin toward the edge of the last bottom during the depression of the last, and an abutment positioned in parallel relation to the edge of the last bottom and arranged to arrest said fingers.

86. In a lasting machine, a support for the outspread margin of an upper, a depressor for pressing a last into the supported upper, a series of fingers arranged about the toe of the last, said fingers being yieldingly movable inwardly toward the edge of the last bottom and arranged for gripping engagement with the upper margin in order to resist the inward movement of said margin toward the edge of the last bottom during the depression of the last, and an abutment positioned in parallel relation to the edge of the last bottom and arranged to arrest said fingers, said fingers being adjustable to vary the extent of movement of the upper margin inwardly toward the last.

87. In a lasting machine, a heel stop, an auxiliary frame on which said heel stop is adjustably mounted, and depending swinging arms to which said frame is secured whereby a downward movement imparted to said frame moves the heel stop forwardly of the machine.

88. In a lasting machine, an auxiliary frame, a pair of depending swinging arms to which said frame is adjustably secured, a slide mounted in said frame for movement lengthwise therof, and a heel stop mounted on said slide.

89. In a lasting machine, an auxiliary frame, a pair of depending swinging arms to which said frame is adjustably secured, a slide mounted in said frame for movement lengthwise thereof, a heel stop mounted on said slide, and means for securing said slide in adjusted position.

90. In a lasting machine, a plurality of toe wipers, a heel stop for the reception of the rear end face of a last, and an auxiliary frame on which said heel stop is mounted, said frame being arranged for movement lengthwise of the machine in order to bring the forward extremity of the toe of the last beneath said toe wipers.

91. In a lasting machine, a heel stop, a yielding support for the heel end of the last, and a slide by which said heel stop and heel support

are carried, said slide being arranged for movement lengthwise of the last.

92. In a lasting machine, a heel stop, a yielding support for the heel end of the last, a slide by which said heel stop and heel support are carried, and an auxiliary frame on which said slide is mounted for movement lengthwise of the last, said frame being itself arranged for movement lengthwise of the last.

93. In a lasting machine, a heel stop, a yielding support for the heel end of the last, a slide by which said heel stop and heel support are carried, an auxiliary frame on which said slide is mounted for movement lengthwise of the last, said auxiliary frame being arranged for swinging movement to impart a forward movement to the last, and yielding means for holding said auxiliary frame in retracted position.

94. In a lasting machine, a heel stop, a yielding support for the heel end of the last, a slide by which said heel stop and heel support are carried, an auxiliary frame on which said slide is mounted for movement lengthwise of the last, said auxiliary frame being arranged for swinging movement to impart a forward movement to the last, and a plurality of wipers mounted on said auxiliary frame and arranged to overwipe the margin of the heel end of the upper.

95. In a lasting machine, a heel stop, a yielding support for the heel end of the last, a slide by which said heel stop and heel support are carried, an auxiliary frame on which said slide is mounted for movement lengthwise of the last, said auxiliary frame being arranged for swinging movement to impart a forward movement to the last, and wiping means arranged to be actuated by said auxiliary frame for wiping in the shank portion of the upper.

96. In a lasting machine, an auxiliary frame arranged for swinging movement to impart a forward movement to the last, a resilient apron arranged to embrace the last at its instep, and connections between said apron and said auxiliary frame whereby the actuation of said frame causes the apron to wipe in the shank portion of the upper.

97. In a lasting machine, means for laying the margin of an upper over the edge of an insole mounted upon a last bottom and a presser for applying pressure to the overlaid margin comprising a resilient block provided with a plate constructed and arranged to engage the margin of the upper.

98. In a lasting machine, means for laying the margin of an upper over the edge of an insole mounted upon a last bottom and a presser for applying pressure to the overlaid margin, comprising a resilient block provided with an upper contacting plate having the outline of the last bottom and having a raised margin arranged for engagement with the margin of the upper.

99. That method of lasting uppers which consists in clamping the margin of the forepart of an upper in outspread condition, simultaneously feeding said margin inwardly and gathering the margin of the toe end of the upper between predetermined points, then mounting a last in the upper, then simultaneously further feeding the margin of the forepart inwardly toward the edge of the last bottom, further gathering the margin of the toe end of the upper and pressing the last into the upper, and thereafter laying the margin of the upper over an insole attached to the last bottom and attaching the upper to the insole.

100. That method of lasting uppers which consists in pressing a last into an upper having the margin of its forepart held outspread, simultaneously feeding said margin inwardly toward the edge of the last bottom and gathering the margin of the toe end of the upper, wiping the margin of the upper over the insole, and securing said margin in overwiped position.

101. That method of lasting uppers which consists in simultaneously feeding the outspread margin of an upper inwardly and gathering the margin of the upper at its toe end, then positioning a last in the upper, then simultaneously feeding and gathering the margin of the upper and pressing the last thereinto, wiping the margin of the upper over the insole, and securing said margin in overwiped position.

102. That method of lasting uppers which consists in pressing a last into an upper having the margin of its forepart held outspread, simultaneously feeding the margin of the upper inwardly toward the edge of the last bottom and gathering the margin of the toe end of the upper, applying adhesive to the surfaces of the shoe parts to be bonded, overwiping said margin, and applying pressure thereto.

103. That method of making shoes which comprises supporting an upper off its last upon wipers of a bed lasting machine, clamping the upper against the wipers, pressing a last into the supported upper, partially advancing the wipers in order to hold the last in the upper, unclamping the upper, and advancing the wipers to wipe the upper over the shoe bottom.

104. That method of making shoes which comprises supporting an upper off its last upon wipers of a bed lasting machine, clamping the upper against the wipers, pressing into the supported upper a last having an insole positioned on its bottom, partially advancing the wipers in order to hold the last in the upper, unclamping the upper, applying adhesive to the shoe parts to be united, and advancing the wipers to wipe the upper over the shoe bottom.

105. That method of making shoes which comprises supporting upon wipers of a bed lasting machine an upper having the margin of its forepart outspread, clamping the upper against the wipers, pressing a last into the supported upper, feeding the margin of the forepart toward the edge of the last bottom, and simultaneously gathering the margin of the toe end of the upper.

KARL ENGEL.

CERTIFICATE OF CORRECTION.

Patent No. 2,008,069. July 16, 1935.

KARL ENGEL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 7, first column, line 49, for "clencher" read clenched; and page 10, first column, line 74, strike out the words "margin of an upper, a depressor for pressing a" and insert the same after line 75, of same page and column, as the second line of claim 33; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of October, A. D. 1935.

Leslie Frazer

(Seal) Acting Commissioner of Patents.