

P. BEIER.
 BOOT UPPER SHAPING MACHINE.
 APPLICATION FILED APR. 16, 1912.

1,055,123.

Patented Mar. 4, 1913.

5 SHEETS—SHEET 1.

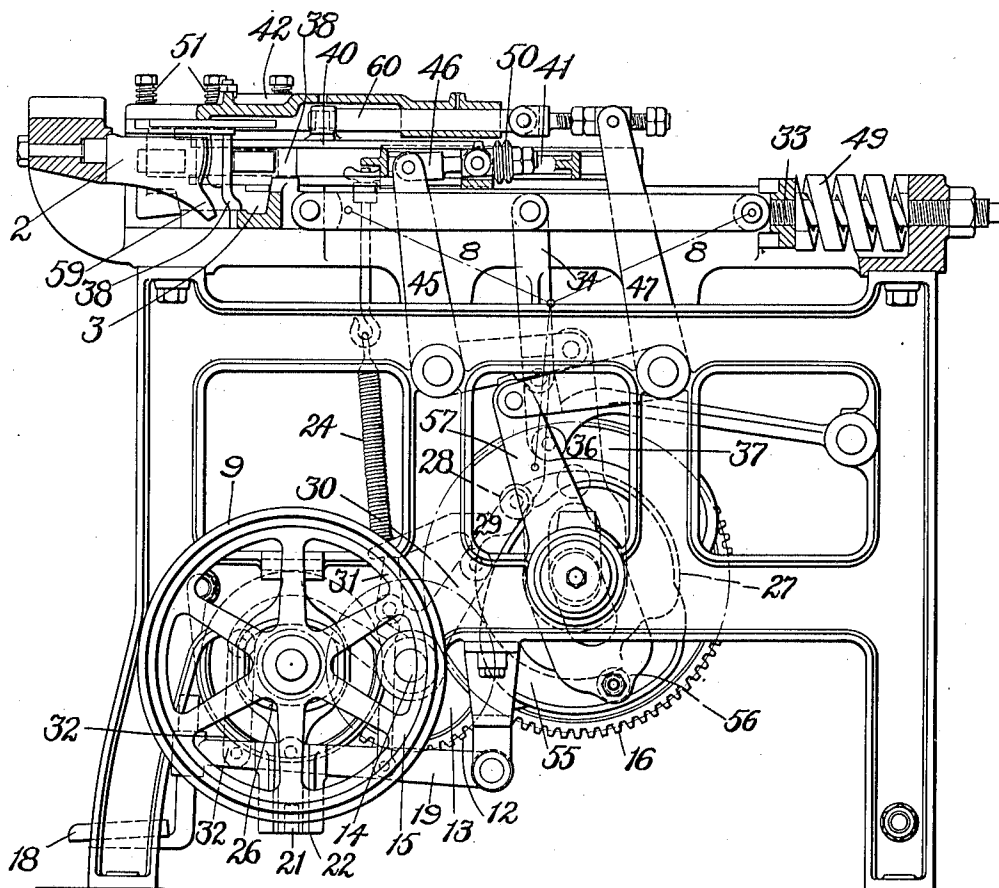


Fig. 1.

WITNESSES.

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INVENTOR.

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 By his Attorney,
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6 SHEETS—SHEET 2.

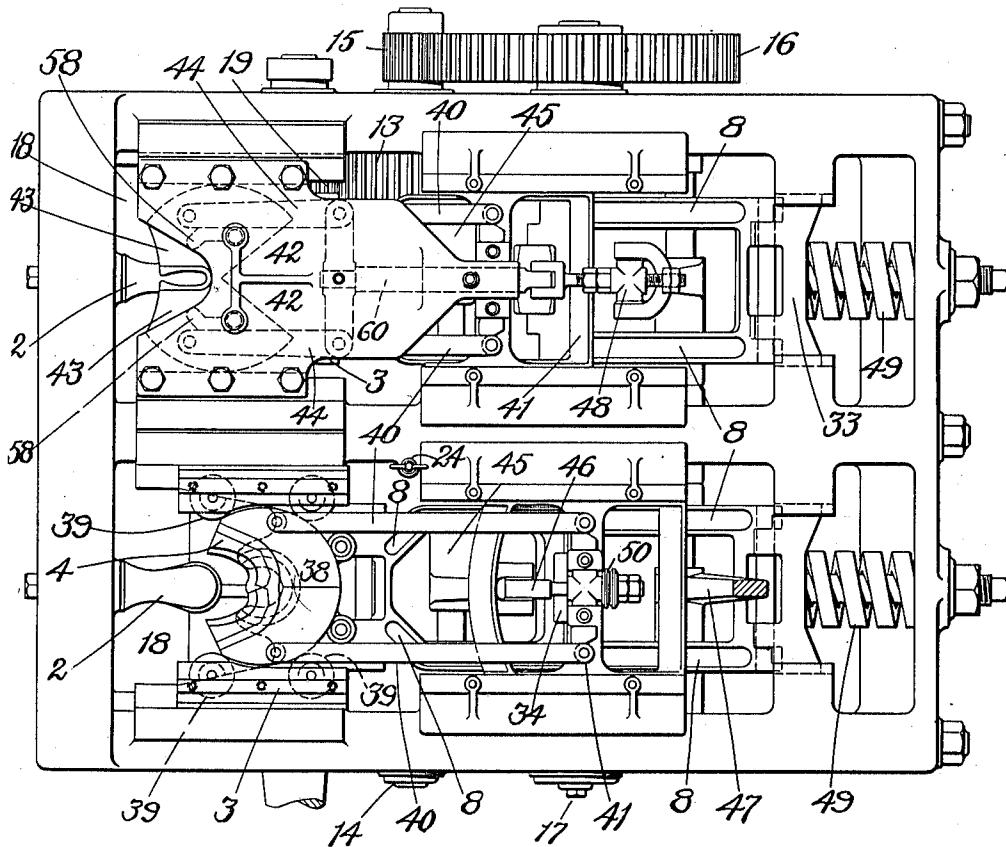


Fig. 2

WITNESSES

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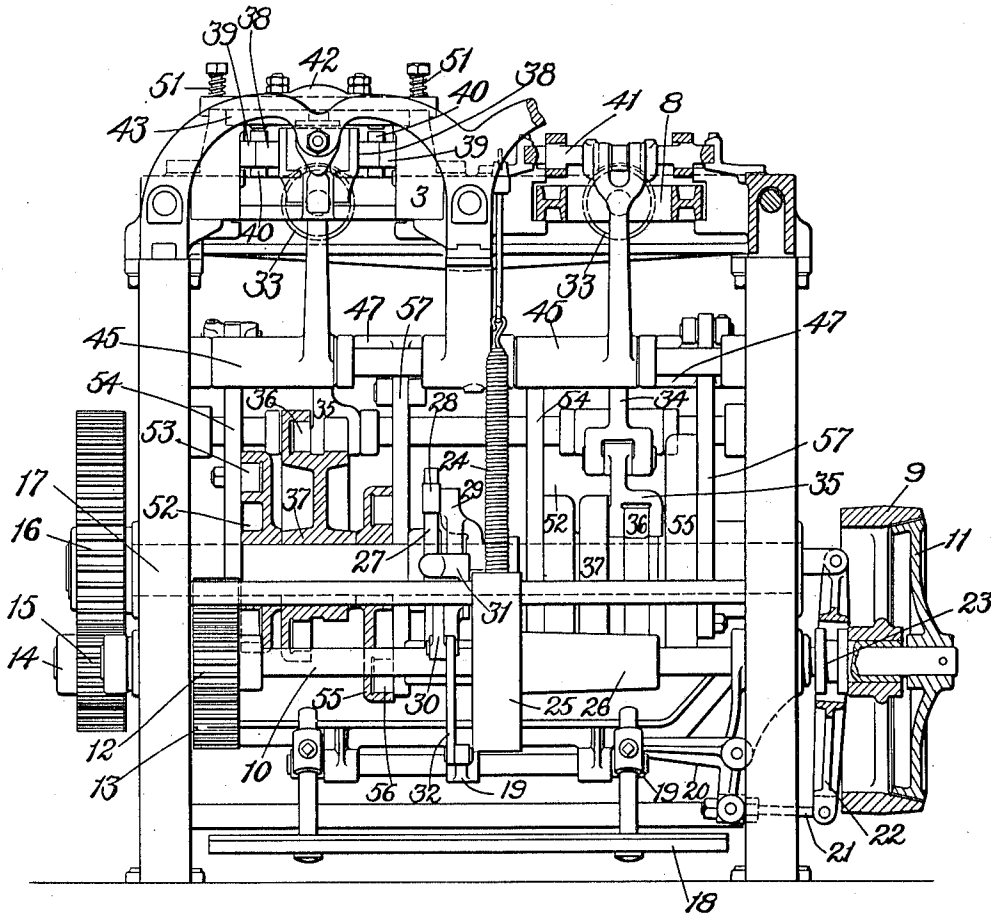


Fig. 3.

WITNESSES

Elizabeth C. Coyle
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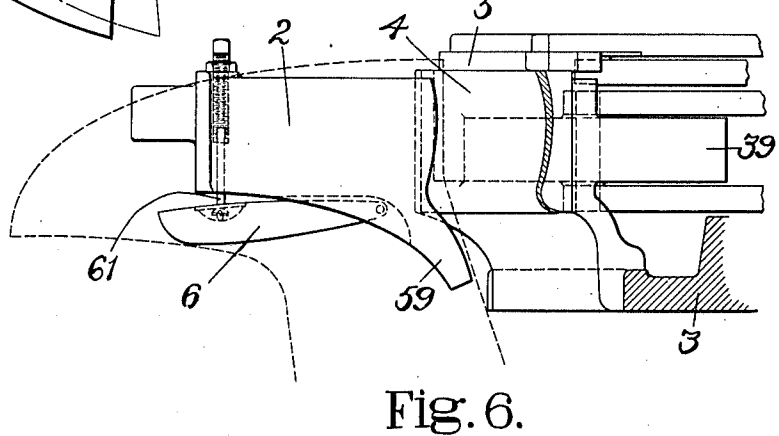
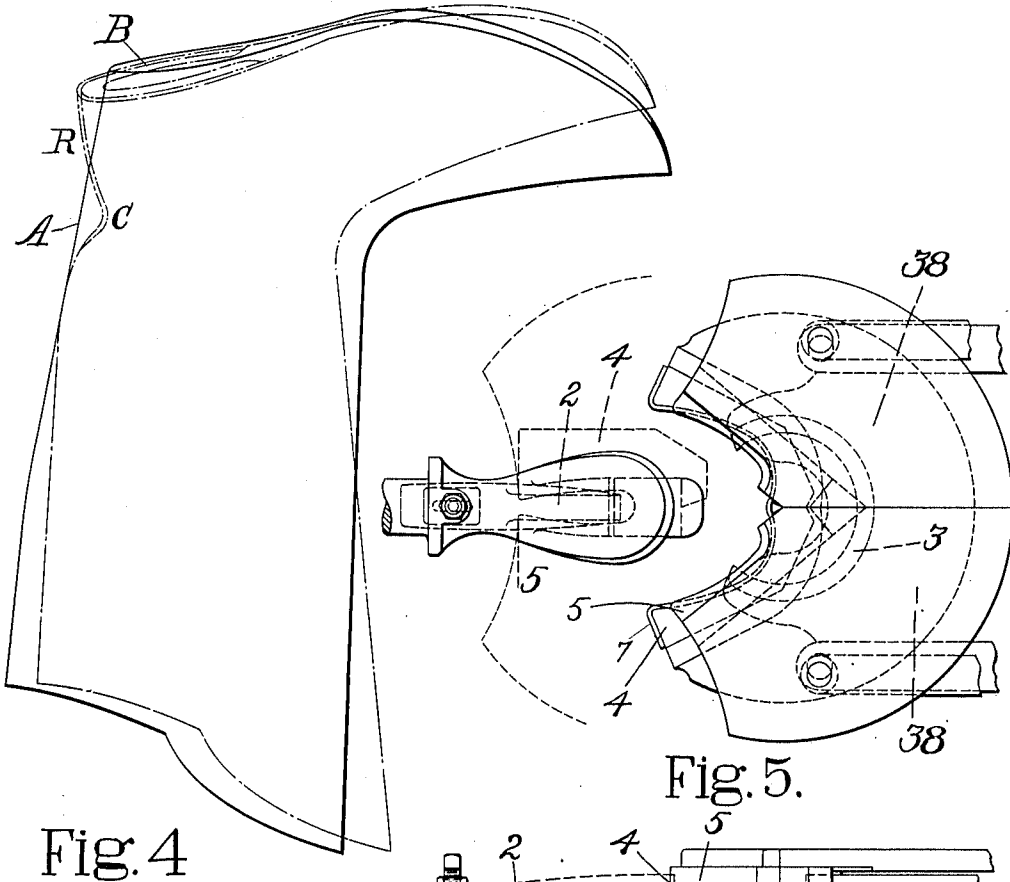
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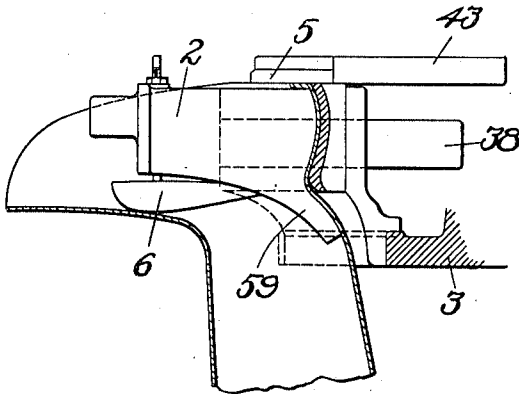


Fig. 8.

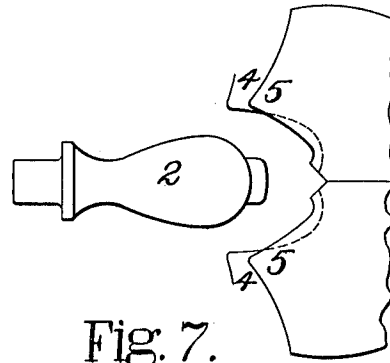


Fig. 7.

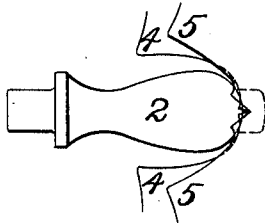


Fig. 9.

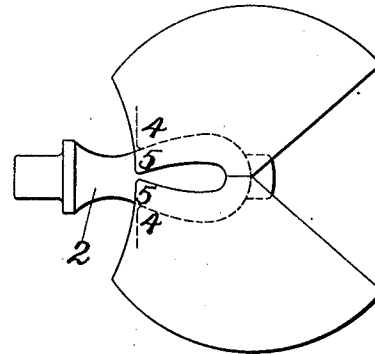


Fig. 11.

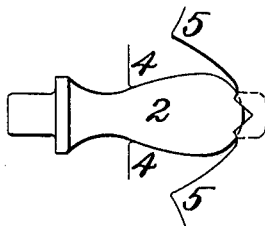


Fig. 10.

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UNITED STATES PATENT OFFICE.

PAUL BEIER, OF RÖDELHEIM-FRANKFORT, GERMANY, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BOOT-UPPER-SHAPING MACHINE.

1,055,123.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed April 16, 1912. Serial No. 691,123.

To all whom it may concern:

Be it known that I, PAUL BEIER, a subject of the Emperor of Germany, residing at Rödelheim-Frankfort, Germany, have invented certain Improvements in Boot-Upper-Shaping Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in the manufacture of boots and shoes and is herein shown as embodied in a boot upper shaping or molding machine.

Much difficulty has been experienced in the present methods of boot manufacture, which have superseded the old hand work, in making the boot upper fit the foot around the heel and particularly just above the ball of the heel, or as it is sometimes called at the "neck" of the foot. The objectionable feature in many faultily made boots is that they do not hug the heel sufficiently to prevent slipping up and down on the foot as the wearer walks. This difficulty is very largely avoided in shoes by dividing the vamp down the back of the heel and cutting out the parts at the meeting edges to give an incurve just above the heel by which the shoe is made to fit the neck of the foot and therefore hug the heel so that it does not slip up and down as the wearer walks. In boots made of heavy material such a back seam is very objectionable and it is the object of this invention to provide a method and a mechanism for obtaining a properly shaped boot upper without cutting and seaming. This result is obtained by manipulating the upper leather to displace it from places where there is fullness and, by working the leather toward and into places where it is needed and can be secured permanently, to establish the upper in its reshaped condition. As an incident to this manipulation other portions of the upper than the heel part are reshaped, particularly over the instep and in the shank, and their adaptation to the foot of the wearer is improved. The steps of this method and also the mechanism herein shown for practising it form features of this invention which it is the present purpose to protect.

As is well known, it is customary to provide boots and shoes with heel stiffeners. It is contemplated that a straight or un-

molded heel stiffener shall be applied to the boot upper prior to the shaping of the upper and that the upper and the heel stiffener shall be shaped or molded together, thereby providing an identity of shape for both the upper and the stiffener which will enable each to assist in maintaining the form of the other during wear of the boot. Prior to being treated, the upper and the heel stiffener extend in a substantially straight line at the back. In the shaping process the entire heel part is made to assume the same curvature as the heel part of the forms, which correspond with that of the last upon which the boot is subsequently assembled. This shaping operation includes, as one of its most essential features, the formation at the upper portion of the stiffener at the back and extending partly along the sides of the heel of a ridge projected inwardly to fit into and around the neck of the foot and cause the boot to hug the heel of the wearer firmly so that the heel does not lift away from the boot sole while walking. In addition to the formation of this ridge it is preferred that the entire heel portion of the upper and stiffener shall be molded between inside and outside formers, and moreover that the flange of the upper and stiffener shall be molded over upon the heel seat between the inside former and devices which are similar to the heel lasting plates of a bed lasting machine. The action of the ridge forming and lateral shaping members, *i. e.*, the described inside and outside formers, appears to be to displace the upper of the heel portion of the boot downwardly and backwardly as indicated by the contrasting views in the drawings, so that while the upper is displaced inwardly around the neck it is bulged outwardly around the ball of the heel whereby a pocket or seat is formed for the large part of the heel of the wearer's foot. Also this action of the said shaping members appears to effect a backward displacement of the entire flange or edge portion of the boot upper, including also the whole forepart of the upper from the instep to the toe, with relation to the leg portion of the boot. Preferably the inside and outside formers are first brought together by a relative movement lengthwise of the boot foot to initially form the ridge. It is during this initial ridge forming that the described displacement appears mainly to

take place. Then the outside formers are closed about the sides of the heel to complete the formation of the ridge and wrap the upper around the heel in its described displaced condition. While it is so held the heel seat forming plates are brought forward over the rear end of the heel seat and then closed over the sides of the heel seat with an inward sweep to draw the upper inwardly from the end and sides of the heel and complete the formation of the pocket for the heel of the wearer's foot. The displacement of the upper by these manipulations appears to be important, particularly in its effect upon the shank and instep portion of the upper, in shaping the foot portion of the boot upper so that it will fit closely to and around the wearer's foot.

It will be noted from the drawings that the ridge is located low down where it will engage the top incline of the heel, being at or slightly below the narrowest part of the instep so that the foot may slide obliquely into the boot and then the heel settle backward into its pocket. No attempt is made to exhaust the stretch from the leather which forms the ridge, as by pulling or tensioning it toward the toe, but it is left elastic to stretch and then react as the heel is forced past it in putting the boot on the foot or taking it off. The boot shaping operation is essentially a pressing operation in which the upper leather, with the heel stiffener, is displaced in directions and into positions determined by the shape of the formers and then is clamped and finally gathered inwardly and compressed over the heel seat in its new position and held under pressure for a period long enough to permit the acquired shape to become permanent. Thereafter the formers are separated and the boot upper withdrawn ready to be assembled with an insole upon a last over which the forepart will be lasted and tacked to the insole, the heel part being already completely lasted and ready to be tacked.

The invention will now be explained in connection with the accompanying drawings and then pointed out definitely in the claims.

Figure 1 is a side elevation of the machine referred to, parts being shown in section in the upper portion of the machine; Fig. 2 is a plan view, disclosing the duplex construction of the machine, one side being stripped down to the heel clamps which are shown open and the other side showing the seat shapers closed over a boot upper; Fig. 3 is a front elevation, some parts being broken away and others shown in section to amplify the disclosure; Fig. 4 shows in full and dotted lines contrasting views of a boot upper before and after treatment in accordance with this invention and by the machine shown in the earlier figures; Figs. 5 and 6

are plan and sectional views of the shaping devices; Figs. 7 to 11 show other views of the same in different positions.

The driving shaft 10, Figs. 1 and 3, carries a loose pulley 9 which can be made to engage a fast clutch member 11 on the shaft by foot pressure through a treadle mechanism 18, 19, 20, 21, 22, 23 acting against a return spring 24. The shaft 10 carries at its left hand end, Fig. 3, a pinion 12 through which and a pinion 13, an intermediate shaft 14, and pinions 15, 16, it drives a cam shaft 17. This shaft carries a cam 27 through which the machine may be maintained in motion until the end of each half rotation, said cam acting through the action of a lever 30 which has a roll 28 on one arm engaging the cam and is fulcrumed on the shaft 14 from which its other arm extends toward the treadle 18 to which it is connected by a link 32. Depression of treadle 18 lifts the roll 28 out of its recess in the edge of the cam 27 and starts the machine after which the cam and roll 28 hold the treadle down and maintain the machine in motion until its half cycle is completed when the second recess in cam 27 reaches roll 28 whereupon the pull of spring 24 can lift the treadle to draw the loose pulley away from clutch member 11 and discontinue the running of the machine. The roll 28 is connected to the lever 30 through a carrier 31 which, if desired, can be loosened and moved to position the roll out of the path of the cam 27 so that the machine will be wholly under control of the operator through the treadle 18 and can be stopped at any point in its cycle. The shaft 10 carries a hub 26 upon which a usual brake 25 is caused to engage by the spring 24 when the treadle rises. The shaft 17 carries a cam 37, Figs. 1 and 3, in which engages a roll 36 on a roll carrier 35, Fig. 1, which acts through an upright link 34 upon toggle arms 8, 8, Figs. 1 and 2. The rear end of the toggle abuts by rod 33 and cross head against a heavy spring 49. The front end of the toggle is connected to a slide 3 which moves over the top of the frame.

The inside former 2 corresponds in shape with the rear portion of a last and is mounted exchangeably upon the frame as shown in Fig. 1. The slide 3 carries the lateral heel shaping jaws, or outside formers 4 which are carefully shaped molds made in counterpart of the inside former 2 and removably mounted on holders 38, and moves them forwardly against the rear end of inside former 2. During this forward movement the slide 3, the holders 38 and the outside formers 4 move in a right line, see Figs. 5, 6 and 7, to press and clamp the rear end of the boot upper, and heel stiffener, against the rear end of the inside former 2, as in Figs. 8 and 9.

Between the body portion of the inside

former and an extension 59 thereof is formed a crease to receive the ridge of the upper that is to fit into and around the neck of the foot just above the ball of the heel. The outside formers 4 have a corresponding formation (the gap between said jaws when they are open being bridged by a leather lining 7) to bend the upper into said crease and clamp it under molding pressure to form the ridge C, Fig. 4.

After the rear end of the boot upper has been clamped and ridged as just described the outside formers 4 are swung inwardly from position Fig. 9 to position Fig. 10 being guided over the slide 3 by rolls 39, Fig. 2, on the front link 8 and actuated by links 40 and a slide 41. A link 46, between the rear end of which and the slide 41 are rubber cushions 50, extends forwardly from the slide to the upright arm of a bell crank 45 which is fulcrumed in the frame and has a rearwardly projecting arm from which depends a leg 54 that straddles the shaft 17, Figs. 1 and 3, and has a roll 53 positioned in the side groove of a cam 52, Fig. 3. From this cam the outside formers are closed to wrap the upper around the inside former and hold it under molding pressure.

The extension 59 of the inside former projects backwardly as shown in Fig. 6 to modify substantially the initial position of the boot upper in the machine. The extension holds the upper up to some extent and to a greater extent it holds the leg backward away from the rear end face of former 2. The effect is to cause the upper to draw down from its edge to provide the stock for forming the ridge. The shape of the former 2 having the extension 59 also causes the upper to draw backward from the forepart and the instep as may be seen from Fig. 4 to produce the pocket below ridge C for the heel when the boot is on the wearer's foot and the enlargement of the space in the boot leg above the ridge to receive the heel while the foot is being thrust obliquely into the forepart of the boot.

There is a tendency for the forepart of the upper of the boot to be lifted when the outside formers are thrust against the rear end of the upper to form the ridge. Such a lifting might, if unrestrained, cause a distortion of the foot portion of the upper, including an objectionable fullness and puckering of the margin of the upper in the shank. A stop 6, Fig. 6, is pivoted near its rear end in the lower face of inside former 2 and hangs down by gravity to a position determined by an adjustable nut on the upper end of a rod 61. This provides a gage for assisting a workman to position boot uppers properly and uniformly on the inside former and it then acts to resist free lifting of the forepart of the upper until, in the formation of the ridge, the upward strains tending to

lift the upper, as in dotted lines, Fig. 4, overcomes gravity and draws the forepart of the upper upwardly and backwardly as shown.

It will be understood that when a heel stiffener is included in the boot upper materials and is unattached to the upper, as is a usual practice, the first clamping of the stock by the projecting and the recessed portions of the formers 2 and 4, which occurs near that edge of the stiffener which is to be uppermost in the finished shoe, tends to raise the end portions of the stiffener. These ends are free to rise because they are not held down as is the forepart of the vamp by the stop 6, and in practice they will be more or less raised and then will be wrapped around the sides of the heel in this relatively raised position whereby the edge of the stiffener that is uppermost in the completed shoe will hug the ball of the heel snugly from the rear around the sides and down to the shank. The result secured by this procedure renders unnecessary the usual laster's operation of pulling up the ends of the heel stiffener before overwiping, and may be secured by the use of this feature of the invention in bed types of lasting machines. Herein the seat formers 5, which will be described, break the marginal portion of the stiffener and the upper over the edge of the inside former and mold them down upon the top face of that former so that the ends of the stiffener will not again sag down after the upper is removed from the machine. It is noteworthy that the flanging of the upper and of the stiffener after the displacements which accompany the conformation to the end and side faces of the inside former, including the formation of the ridge R, aids greatly in fixing the upper and stiffener permanently in the boot shape and establishes a definite relation between the ridge R and the edge line of the boot bottom. Upper materials which have not been prepared for lasting as herein described are usually assembled according to the judgment of the workman high or low on the heel so that there is not uniformity in the heel space in the boot or shoe.

With the upper displaced from its original form and shape as above suggested, the outside formers swing together and wrap the boot upper in its new form about the inside former where it is allowed to set until its new shape becomes permanent. This permanency of form is made more sure and secure by the action of the heel seat formers 5, 5 while the upper is so held. These seat formers are advanced from the position shown in Fig. 7 to that shown in Fig. 9 and then pause while the outside formers close after which their advance is completed and then they are closed to gather the margin of the upper inwardly over and mold it into

lasted shape upon the top face of the inside former. This movement is communicated to the seat formers 5 and their carriers 43 through links 44 and rods 60, 48 from a bell crank 47 to the upright arm of which the rod 48 is adjustably connected and from the horizontal arm of which depends a leg 57 which is slotted to straddle shaft 17 and has a roll 56 in a path of the cam block 55, Fig. 3. The seat formers 5 and their carriers 43 slide under a cap plate 42 which is acted upon by stiff springs 51 that press the wipers close to the plane of the top face of inside former 2 and compel the seat formers to wipe frictionally over and press heavily down upon the upper flange to draw and mold it into lasted shape.

The boot upper with its heel stiffener remains on the shaping forms and under molding pressure while another one is being prepared and applied, or throughout such period as may be required to give permanency of shape to it, and then the machine is restarted to release the shaped boot upper and heel stiffener with its heel portion in lasted form and to put another one into similar condition by the operation of the duplex parts on the other half of the machine.

The manipulation of the upper and the mode of operation of the mechanism have been adequately described to enable the invention to be understood, although that portion of the invention which relates to improvements in methods of making boots is not to be herein claimed but has been made the subject-matter of a divisional application Ser. No. 730,000, filed Nov. 7, 1912, and

I now claim and desire to secure by Letters Patent of the United States:—

1. A boot upper shaping machine having, in combination, an inside former, outside formers, and relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper adapted to engage over the ball of the boot wearer's heel.

2. A boot upper shaping machine having, in combination, inside and outside formers, said inside member being provided with a recess or depression in its rear end face located at the top of the ball of the heel and extending around to the sides of the heel in decreasing depth and said outside member being provided with a correspondingly shaped and located projection to produce an inwardly extending ridge in the boot upper adapted to restrain the boot from slipping up and down at the heel.

3. A boot upper shaping machine having, in combination, an inside former adapted to receive a boot upper and having a recess or depression in its rear end face and an extension 59 downwardly and backwardly

from said recess, outside forming means having a projection corresponding to said recess, and means for actuating said forming devices to mold an inwardly projecting ridge into the rear portion of the boot upper adapted to prevent the boot from slipping up and down at the heel.

4. A boot upper shaping machine having, in combination, inside and outside formers shaped to produce in the heel end of a boot upper a ridge projecting inwardly to hold the boot from slipping up and down at the heel, said machine having provision for so holding the boot upper that the stock for forming the ridge shall be mainly drawn down from the foot portion of the upper as distinguished from being drawn up from the leg portion of the boot.

5. A boot upper shaping machine having, in combination, an inside heel former and outside heel formers, the inside former having a work supporting projection extending rearwardly and downwardly below and beyond the acting face of the outside formers when said formers are closed upon the boot upper, and means for actuating said formers relatively to do their work, substantially as described.

6. A boot upper shaping machine having, in combination, an inside former, outside formers, relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper, and means for positioning the forepart of the boot upper vertically while the ridge is being formed.

7. A boot upper shaping machine having, in combination, an inside former, outside formers, relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper, and means for yieldingly resisting the tendency for the forepart of the boot upper to be drawn upward by the strains set up in the upper while the ridge is being formed.

8. A boot upper shaping machine having, in combination, an inside former, outside formers, relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper, and the swinging stop 6 adjustably sustained in position to locate the forepart of the boot upper at the beginning of the boot shaping operation and to yield to allow the forepart of the upper to be drawn upwardly and backwardly as the shaping proceeds.

9. A boot upper shaping machine having, in combination, an inside former, outside formers, relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper,

and means for imparting relative movement to said formers to produce the ridge first in the rear end of the upper and then to close the outside formers around the inside former to wrap the upper about the latter and extend the ridge along each side of the heel.

10. A boot upper shaping machine having, in combination, an inside former, outside formers, relative projections and recesses on the outside formers and the inside former respectively to produce an inwardly extending ridge in the heel portion of the upper, and means for relatively actuating said formers to produce the ridge by bending the upper into the recess first at the back end of the boot and then at the sides of the heel.

11. A boot upper shaping machine having, in combination, an inside former, means for supporting it exchangeably and with free space below and back of it to receive a boot upper, outside formers located in the rear of the inside former, said formers having a projection and a cooperating recess to form a ridge in the upper for preventing the boot from slipping up and down on the heel of the wearer's foot, and mechanisms for advancing the outside formers to clamp the boot upper against the inside former first at the rear end of the heel and then to close said formers to mold the upper around the sides of the heel.

12. A boot upper shaping machine having, in combination, the exchangeably supported inside former 2, about the sides and lower and rear faces of which is free space for the application of a boot upper to said former, the outside formers 4, 4, a slide on which said outside formers are advanced against the upper on the rear face of the inside former, and means for swinging the outside formers to fold the upper around the inside former.

13. A boot upper shaping machine having, in combination, an inside former adapted to receive in inverted position a boot upper with a heel stiffener, outside formers, means for relatively actuating the inside and outside formers to clamp the work first near the lower edge of the stiffener and thereby tend to raise the free front ends of the stiffener and for thereafter closing the outside formers to mold the upper and stiffener around the sides of the heel with the stiffener ends raised.

14. A machine of the class described having, in combination, a heel shaped form to receive in inverted position an upper and a heel stiffener, means for initially pressing said materials toward and against the back end of the form at the lower edge of the stiffener to cause the free front ends of the stiffener to tip up, and then wrapping the upper and stiffener about the sides of the heel with the stiffener ends upraised.

15. A boot upper shaping machine having, in combination, an inside former adapted to receive an inverted upper, outside formers, said formers being shaped to grip the upper first at the lower edge of the heel stiffener, means for advancing the outside formers to clamp the upper against the rear end face of the inside former, other means to close the outside formers to wrap the upper about the sides of the heel, heel seat formers, and means to advance and close them.

16. A boot upper shaping machine having, in combination, an inside former, outside formers, means for actuating said formers to mold the heel portion of the upper about the end and side faces of the inside former, heel seat formers, and guiding means that holds the seat formers under yielding pressure in a plane close to that of the bottom face of the inside former and is made to yield as the seat formers ride over the work in shaping the flange of the upper.

17. In a machine of the class described, end embracing plates adapted to lay an upper over the end portion of a shoe form with a wiping movement, a cover plate under which the end embracing plates advance to do their work, and means confining said cover plate in place including springs against which it is permitted to yield as the end embracing plates ride over the upper.

18. In a machine of the class described, heel end embracing means formed to engage the upper first at or about the location of the lower edge of the heel stiffener and tip the stiffener ends up relatively to the plane of the shoe bottom, and means for breaking the flange of the upper and stiffener inwardly to form the edge line of the heel seat while the stiffener and upper are so held.

19. A machine of the class described having, in combination, an inside heel former having a rear end face extending below and rearwardly from the ball of the heel, outside forming means shaped to press the upper into the depression so made between the ball and said rearward extension and then to wrap the upper about the sides of the former, and heel seat formers to lay the flange over upon the bottom face of the inside former while the upper is so held.

20. A machine of the class described having, in combination, inside and outside formers to shape the side and end faces of an upper, heel seat formers pivoted to turn about a center that lies outside their operative edges and persenting, when open, a V-shaped notch at their meeting edges, and means for actuating said notched seat formers forwardly over the rear end of the heel seat and then closing them inwardly over the sides of the heel seat.

21. A machine of the class described hav-

ing, in combination, inside and outside formers to shape the sides and end faces of an upper, heel seat formers and operating means arranged to advance the seat formers over the heel seat first at the back of the heel and thereafter to close the formers laterally over the sides of the heel seat.

22. A machine of the class described having, in combination, an inside former, means for supporting the former in inverted position and so as to prevent an unobstructed space below and on all sides of the shank and rearmost part of the former for the reception of a boot upper, outside formers to embrace and mold the end and sides of the heel, seat formers, and operating means to advance and close the seat wipers over the bottom face of the inside former and come to rest with the upper under shaping pressure.

23. A machine of the class described having, in combination, means for pressing the upper materials, including the heel stiffener, toward the rear end of the heel of an inverted last first at the lower edge of the heel stiffener and then at the upper edge of the stiffener, and then pressing the ends of the stiffener against the sides of the last, and means arranged for operation thereafter and while the several parts of the stiffener are maintained in the position to which they

have been so pressed for forming the margin of the upper materials over the bottom of the last.

24. A machine of the class described having, in combination, an inside former for the heel part of an upper and means for forcing the upper materials from the rear end of the boot forwardly and upwardly toward and into the shank to provide the fullness required for laying over the innersole along the incurve of the shank.

25. A machine of the class described having, in combination, an inside former for the heel part of an upper and means operating by external pressure on the upper to force the upper materials and the ends of the heel stiffener forwardly and upwardly along the sides of the heel toward the shank to provide the fullness required for laying the margin over the innersole along the incurves of the shank, and means for rendering permanent the formation of the upper materials thus secured.

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

PAUL BEIER.

Witnesses:

WALLACE ELLISON,
JEAN GRUND.