

Dec. 5, 1939.

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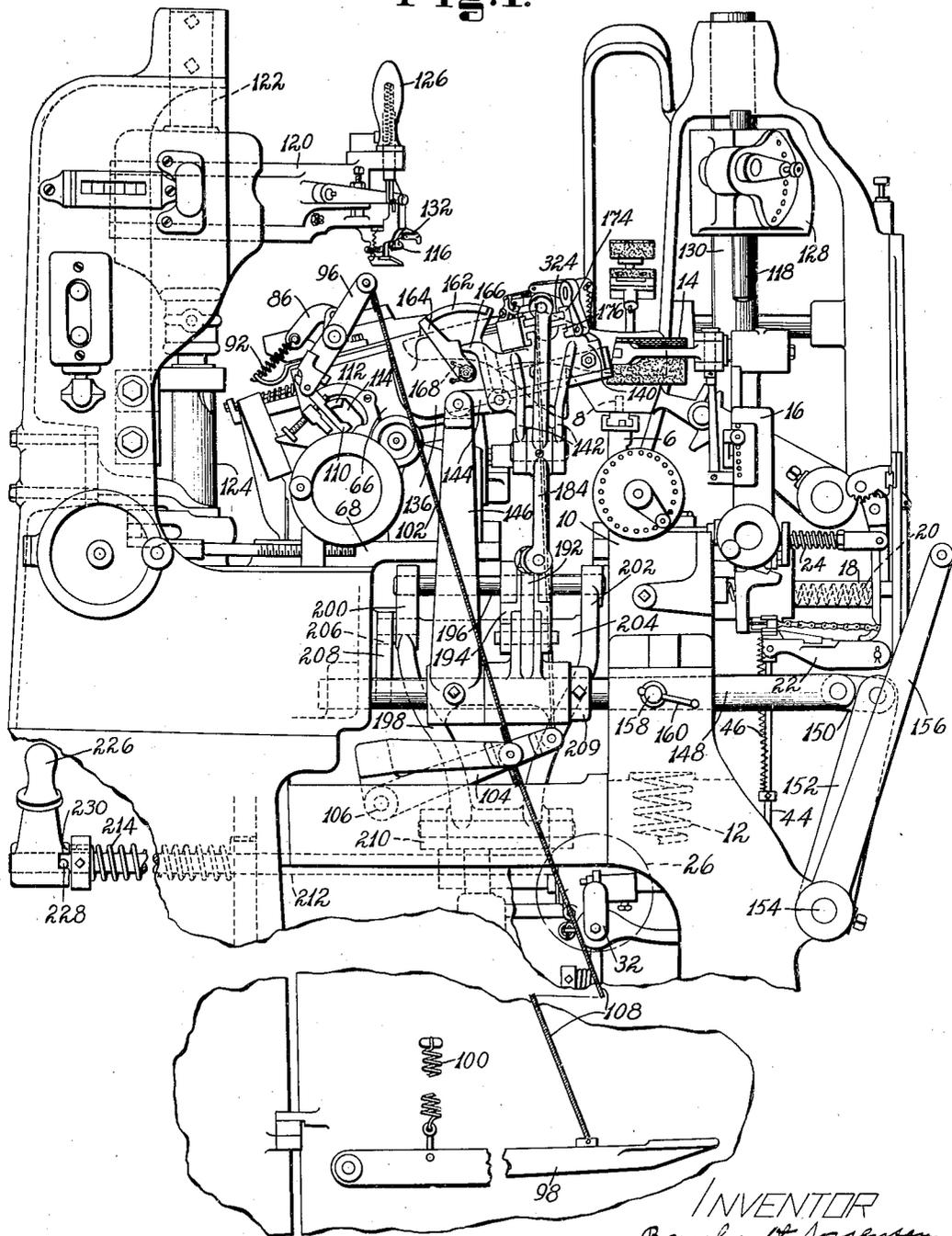
2,181,896

MACHINE FOR SHAPING UPPERS OVER LASTS

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5 Sheets-Sheet 1

Fig. 1.



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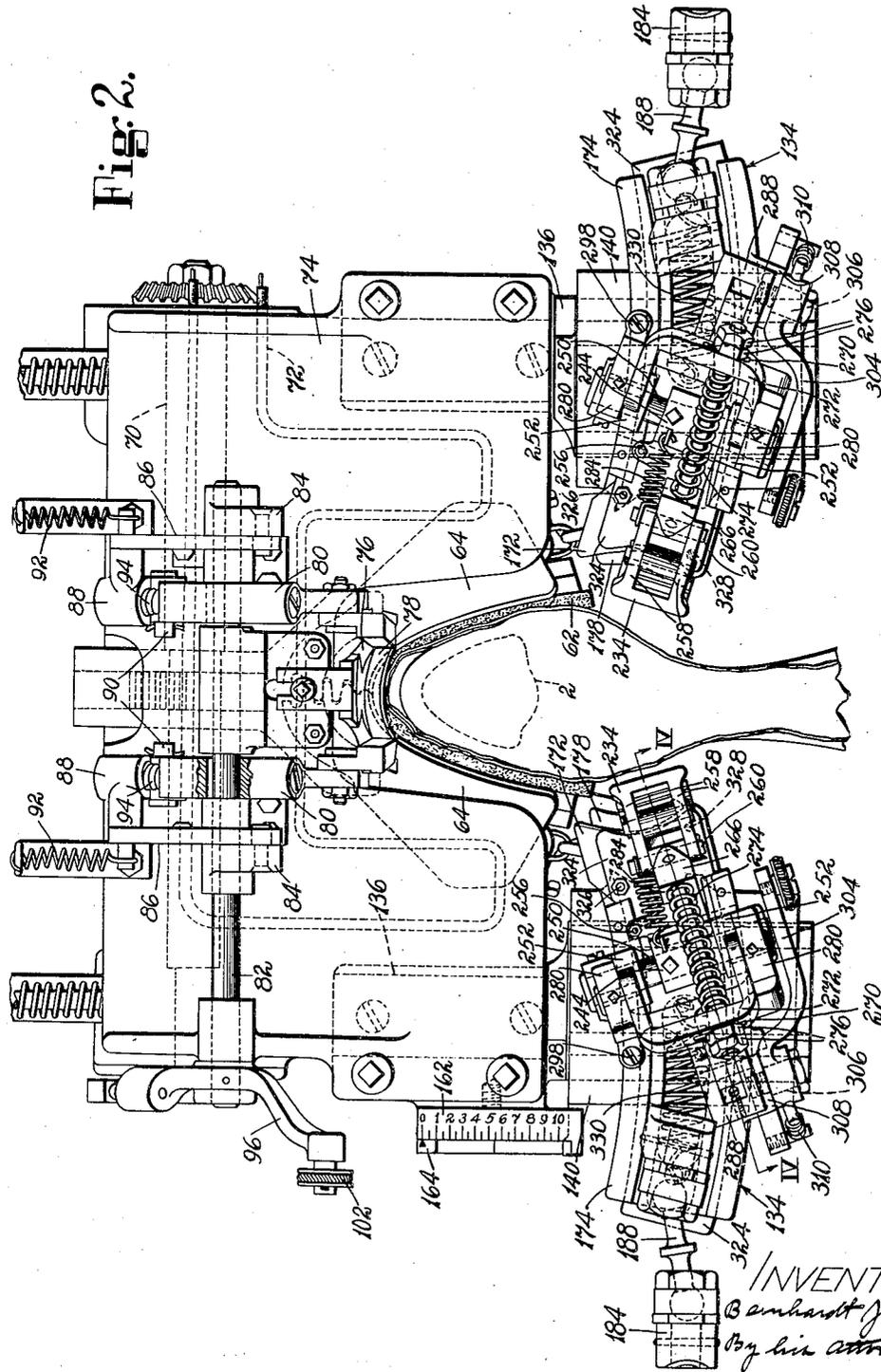
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MACHINE FOR SHAPING UPPERS OVER LASTS

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5 Sheets-Sheet 2

Fig. 2.



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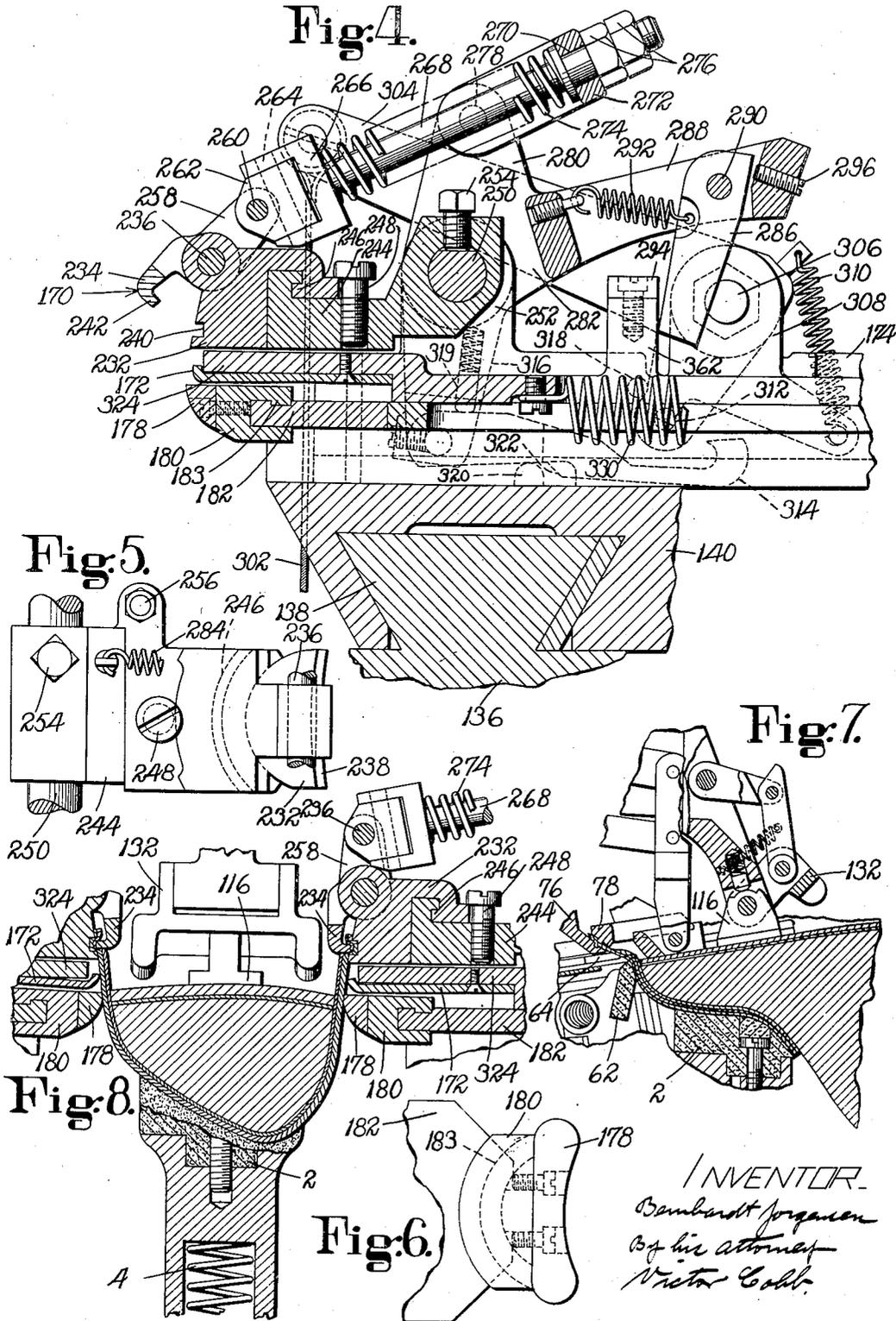
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MACHINE FOR SHAPING UPPERS OVER LASTS

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MACHINE FOR SHAPING UPPERS OVER LASTS

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5 Sheets-Sheet 5

Fig:9.

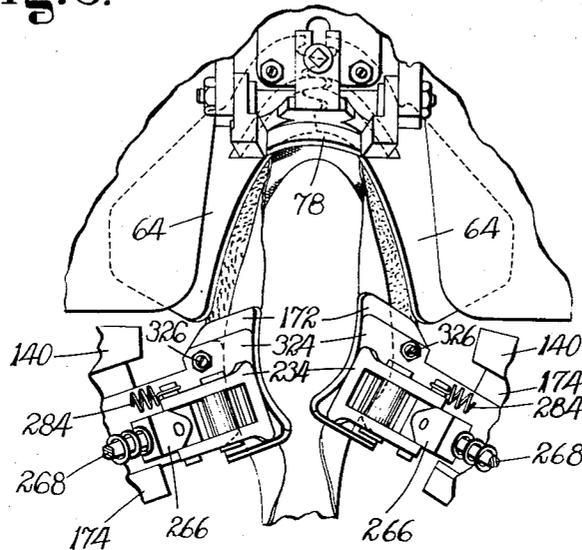
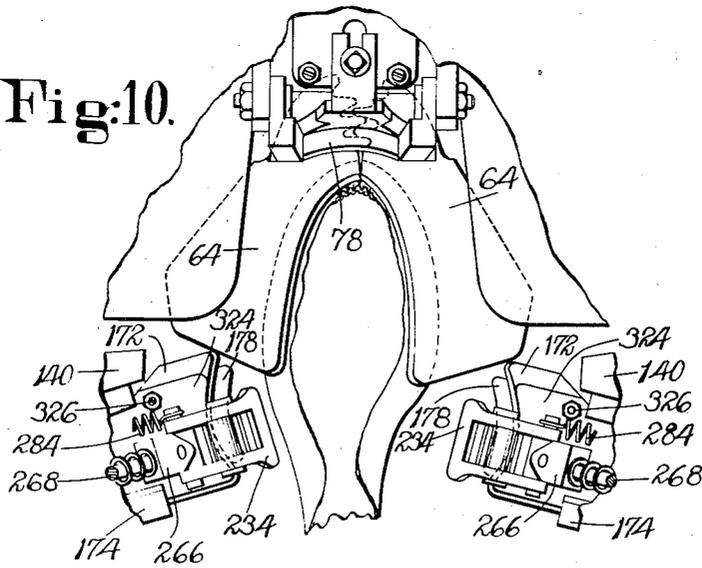


Fig:10.



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## UNITED STATES PATENT OFFICE

2,181,896

MACHINE FOR SHAPING UPPERS OVER  
LASTS

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Application December 1, 1938, Serial No. 243,414

48 Claims. (Cl. 12—7)

This invention relates to machines for shaping uppers over lasts, and is herein illustrated as embodied in a lasting machine of the same general character as disclosed in United States Letters Patent No. 2,075,852, granted on April 6, 1937, upon an application of mine, but modified in certain respects as further disclosed in Letters Patent No. 2,101,069, granted on December 7, 1937, upon another application of mine. It is to be understood, however, that the invention is not limited to machine organizations of the character exemplified by such prior disclosures.

An object of the invention is to provide in a lasting machine means adapted to operate in a rapid and satisfactory manner on high-class work to last not only the toe portion of the shoe, but also the sides of the forepart extending heelwardly of the toe portion, so that the entire forepart as far as the beginning of the shank portion is lasted by the machine. To this end, the machine herein shown comprises toe-lasting mechanism and opposite side-lasting mechanisms constructed and arranged to act on the shoe in a novel cooperative relation to one another, each of these several mechanisms, in the illustrated embodiment of the invention, including a gripper for pulling the upper tightly over the last in response to heightwise movement of the last and means for laying the margin of the upper inwardly over an insole on the last into position to be secured to the insole by an adhesive. For thus laying the margin of the upper over the insole the toe-lasting mechanism in the construction shown is provided with toe-embracing wipers movable lengthwise and laterally of the shoe in the same manner as heretofore in machines of the illustrated type and each of the side-lasting mechanisms also is provided with an inwardly movable wiper. In order to insure against any objectionable wrinkling of the margin of the upper at the sides of the forepart, the toe wipers are so extended as to overlap in their operative movements substantial portions of the margin of the upper operated upon by the side wipers; and since it is considered preferable for the best results that the margin of the upper be laid over the insole first beyond the toe portion of the shoe, i. e., in the vicinity of the ball portion, the construction is such that the side wipers are operated before the toe wipers and are then retracted to avoid interference with the toe wipers.

In order to last the sides of the shoe as far heelwardly as required, the opposite side-lasting mechanisms are arranged to operate on portions of the shoe where the side edges of the shoe bottom curve inward heelwardly of the ball line; and their wipers, relatively to which the toe wipers are movable as above described, have components of movement lengthwise of the shoe toward its toe end as they are moved inwardly over

the insole, so that the direction of the wipe at each side is approximately at right angles to the edge of the insole. To accomplish that result, in the construction herein shown, the side wipers are operatively movable in paths that are curved about axes extending heightwise of the shoe. The opposite side-lasting mechanisms, moreover, prior to their operations on the shoe, are moved inwardly from initial retracted positions to positions determined by engagement with the inwardly curved sides of the shoe heelwardly of the ball line, these movements, as illustrated, being also in paths curved as above described with components in directions lengthwise of the shoe. Accordingly it results, by reason of the shape of the shoe, that the mechanism which operates at the inner side of a right or a left shoe moves somewhat farther in its curved path before it is stopped by the shoe than the mechanism at the outer side of the shoe, and its wiper therefore is so positioned that when it thereafter operates on the shoe it has a greater component of movement lengthwise of the shoe than the wiper of the other mechanism, as is desirable by reason of the more pronounced inward curvature of the edge of the shoe bottom at the inner side of the shoe. In accordance also with a feature of the invention the opposite side-lasting mechanisms are thus moved inwardly toward the shoe by spring means which is tripped to render it operative prior to the starting of the power operation of the machine, thus affording the operator the opportunity thereafter to inspect the work and to present the margin of the upper in proper relation to the grippers with which these mechanisms are provided before starting the machine.

It is a further characteristic of the construction herein shown that the gripper which grips the toe end of the upper and the grippers included in the side-lasting mechanisms are conveniently closed on the upper by a member movable by the operator and common to all of them. To facilitate presentation of the margin of the upper to the several grippers, the invention provides novel means for preventing this member from acting on the side grippers when it is operated to close the toe gripper, so that the operator may present the upper first to the toe gripper alone and may thereafter direct his attention to the side grippers. For the purpose in view the construction disclosed comprises means controlled by the inward positioning movements of the side-lasting mechanisms for rendering the above-mentioned member effective to close the side grippers only after those mechanisms have received their positioning movements.

The above and other features of the invention, including novel means for holding the side grippers closed and for thereafter releasing them, novel means for imparting closing movements to

these grippers, and various novel details of construction and combinations of parts will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view in front elevation of a machine in which the invention is embodied, with parts broken away;

Fig. 2 is a plan view of a portion of the machine;

Fig. 3 shows a portion of the machine partly in right-hand side elevation and partly in section;

Fig. 4 is mainly a vertical section through one of the side-lasting mechanisms, the upper portion of the mechanism being sectioned on the line IV—IV of Fig. 2;

Fig. 5 is a plan view of one of the side grippers and parts associated therewith, one jaw of the gripper being removed;

Fig. 6 is a plan view of a portion of one of the side-lasting mechanisms, comprising the means for engaging the shoe to limit the positioning movement of the mechanism;

Fig. 7 is a vertical sectional view lengthwise of the shoe showing parts at the toe of the shoe as they appear just after the shoe has been forced downwardly to effect the pulling of the upper and the upwiping thereof around the toe;

Fig. 8 is a vertical sectional view widthwise of the shoe showing portions of the side-lasting mechanisms as they appear at the same time in the cycle of operations of the machine as indicated by Fig. 7;

Fig. 9 is a plan view of certain parts at the time in the cycle when the side wipers are at the limits of their inward movements over the shoe bottom; and

Fig. 10 is a view similar to Fig. 9 at the time in the cycle when the toe wipers are at the limits of their inward movements.

In view of the disclosures in the above-mentioned Letters Patent and other Letters Patent hereinafter referred to, the drawings show only as much of the machine as is necessary for an understanding of the present invention, and the construction and operation of such parts as are common to the prior disclosures will be only briefly described. The shoe to be lasted at the forepart is mounted on a toe rest 2 (Figs. 7 and 8) which is movable downwardly with the shoe against the resistance of a spring 4, and on a heel-end support comprising a post 6 (Fig. 1) provided with a pin 8 to enter the spindle hole in the last, the post being supported on a slide 10 movable downwardly also with the shoe against the resistance of a spring 12. The shoe is clamped about its heel end by a flexible heel band 14 controlled by mechanism such as disclosed in Letters Patent No. 2,101,069, the heel band and its controlling mechanism being supported on a slide 16 which is movable in directions lengthwise of the shoe along two rods 18 (only one of which is shown) carried by the vertically movable slide 10. The slide 16 is moved toward the left to carry the heel band toward the shoe by a spring 20 when permitted by downward swinging movement of a latch 22 which holds the slide initially retracted against the resistance of the spring. At substantially the same time the post 6 is moved toward the right to carry the shoe into engagement with the heel band by mechanism operated by a spring 24 and released by the movement of the slide 16, as fully disclosed in Letters Patent No. 2,026,539, granted on January 7, 1936, upon another appli-

cation of mine. The movement of the slide 16 is positively limited, and accordingly the heel band serves by its engagement with the heel end of the shoe to determine the position of the shoe lengthwise. As the parts are shown in Fig. 1 the heel band is thus in engagement with the shoe.

The latch 22 is operated to release the slide 16 and thus to cause the heel band to be moved toward the shoe and the shoe to be carried into engagement with the band as above described prior to the starting of the power operation of the machine. For this purpose there is provided mechanism substantially as disclosed in Letters Patent No. 1,843,232, granted on February 2, 1932, upon an application of mine, which includes a plunger 26, shown in Fig. 3 but omitted from Fig. 1, arranged to be moved rearwardly by the knee of the operator against the resistance of a spring 28. The plunger is provided with a stem 30 the rear end of which is arranged to abut against a finger 32 fast on a rod 34 which is movable lengthwise in a bracket 36 on the frame. This rod carries a wedge member 38 extending through a slot in the bracket to prevent the rod from turning and arranged to engage a roll carried by an arm 40 fast on a rock shaft 42. By means not herein shown this rock shaft is connected to the lower end of a rod 44 (Fig. 1) the upper end of which is connected to the latch 22, so that in response to the turning of the rock shaft by the rearward movement of the wedge member 38 the latch 22 is swung downwardly against the resistance of a return spring 46 to release the slide 16. In case the machine should be started accidentally prior to such release of the slide 16, the slide will be released automatically at the beginning of the cycle. For this purpose there is provided a lever 48 (Fig. 3) mounted to swing about a pin 50 and provided at its upper end with a tooth which extends into a notch in the rod 34, the lever being provided at its lower end with a roll 52 arranged to be engaged by a cam 54 on the periphery of a cam wheel 56 fast on a cam shaft 58 with which a machine of the illustrated type is provided. It will be evident that immediately upon the starting of the machine the cam 54 swings the lever 48 to effect the release of the slide 16 if the slide has not already been released by movement of the plunger 26. A coil spring 60 on the pin 50 acts on the lever 48 to return the rod 34, whether the rod is operated by the plunger or by the cam.

For lasting the toe end of the shoe the machine is provided with mechanism constructed substantially as disclosed in Letters Patent No. 2,075,852. Briefly, this mechanism comprises a band 62 (Figs. 2, 3 and 7) arranged to engage the upper around the toe and to some extent also heelwardly of the toe portion and to wipe it heightwise of the last toward the edge of the insole in response to depression of the last and shoe, and wipers 64 for wiping the margin of the upper around the toe inwardly over the insole, these wipers being of such lengths as to overlap also substantial portions of the bottom of the shoe extending heelwardly of the toe portion. The band and the wipers are supported by a casting 66 (Fig. 1) adjustable as heretofore about an axis extending widthwise of the shoe, and this casting is supported by a slide 68 adjustable also as heretofore in directions lengthwise of the shoe to position the toe-lasting mechanism in proper relation to shoes of different sizes. As fully disclosed in Letters Patent No. 2,075,852, the wipers 64 are advanced lengthwise of the shoe and are closed

inward laterally of the shoe by mechanism including a rock shaft 70 (Fig. 2) operated by a cam (not shown) on the cam shaft 58. Preferably the wipers are maintained in a heated condition by an electrical heating unit 72 mounted in a cover plate 74 which is fast on the casting 66 over the wipers.

There is further provided means constructed substantially as disclosed in the last-mentioned Letters Patent for clamping or gripping the margin of the toe end of the upper prior to the starting of the power operation of the machine, so that in response to the depression of the last a pull heightwise of the last is applied to the upper as it is wiped upwardly by the toe band 62. This clamping means comprises cooperating clamp members 76 and 78 (Figs. 2 and 7) arranged to serve as a gripper for gripping the margin of the upper, the member 78 being movable toward the member 76 thus to grip the margin. For this purpose the member 78 is secured to a pair of arms 80 which are operated, as fully disclosed in the last-mentioned Letters Patent, by the turning of a rock shaft 82 rotatable in bearings on the cover plate 74. This rock shaft carries crank arms 84 connected by links 86 to blocks 88 which are pivotally mounted on pins 90 carried by the arms 80 and are movable by the crank arms against the resistance of springs 92 first to move the arms 80 a limited distance lengthwise of the shoe and then to swing them to cause the member 78 to clamp the upper against the member 76, the blocks 88 being then movable about the pins 90 against the resistance of springs 94 to apply the final clamping pressure yieldingly to the upper. The rock shaft 82 is turned by the operation of a lever 96 fast on the front end thereof in response to depression of a treadle 98 against the resistance of a spring 100. In the construction herein shown the lever 96 is connected by a flexible cable 102, not directly to the treadle 98, but to one arm of a lever 104 mounted to turn about a rod 106 (Fig. 3) on the frame of the machine, the lever 104 being connected to the treadle 98 by another flexible cable 108. After the clamp member 78 has been moved into clamping engagement with the upper by depression of the treadle 98, it is locked in upper-clamping or gripping position until a predetermined time in the power operation of the machine by a latch 110 (Fig. 1) carried by the lever 96 and cooperating with a lug 112 formed on a plate 114 which turns with the wiper-operating rock shaft 70.

Depression of the shoe is effected substantially at the beginning of the power operation of the machine by a toe presser foot 116 and a heel presser foot 118 arranged respectively to engage the toe and heel ends of the insole. The toe presser foot is supported by an arm 120 rigidly connected to vertically aligned rods 122 and 124 mounted for vertical movements and for turning movements in bearings in the frame. The arm 120 occupies initially a position in which the toe presser foot 116 is retracted rearwardly from over the shoe bottom, and the operator swings the arm forwardly to carry the presser foot into position over the shoe by means of a handle 126. Such forward movement of the arm serves to start the power operation of the machine, as disclosed in Letters Patent No. 1,843,232, whereupon the toe presser foot is carried downward simultaneously with the heel presser foot 118 to effect the depression of the shoe. The heel presser foot 118 comprises a rod supported on a carrier 128 which is fast on a rod 130 mounted for ver-

tical movements and for turning movements in bearings in the frame. As the rod 130 starts downward it is quickly turned to swing the presser foot 118 into position over the shoe by means such as disclosed in Letters Patent No. 1,843,232, which may be referred to also for disclosure of means whereby the rods 122, 124 and 130 are operated by the cam shaft 58. As the shoe is depressed it may be tipped laterally to insure that it will be properly positioned relatively to the toe wipers 64 by a member 132 (Figs. 1, 7 and 8) operated and controlled as disclosed in Letters Patent No. 2,075,852.

For purposes of this invention the machine is provided with a pair of side-lasting mechanisms indicated generally by the reference characters 134 (Fig. 2), for pulling the upper and wiping its margin inwardly over the insole at the sides of the forepart heelwardly of the toe portion of the shoe, so that the entire forepart of the shoe is lasted by the machine. Each of these mechanisms is supported on a bracket 136 fast on the casting 66, each bracket being provided with a dovetailed portion 138 (Figs. 3 and 4) which provides a guideway for a slide 140 on which the operating parts of the corresponding side-lasting mechanism are supported. By movement of the slides 140 along these dovetailed portions 138 the two side-lasting mechanisms are preliminarily adjustable in directions lengthwise of the shoe to position them in proper relation to shoes of different sizes. For effecting such an adjustment, arms 142 (Fig. 3) which are integral with the slides 140 are connected by links 144 (see also Fig. 1) to arms 146 which are fast on rods 148 movable lengthwise of the shoe in bearings in the frame. The two rods 148 are connected by links 150, only one of which is shown (Fig. 1), to a lever 152 fast on a rock shaft 154 on the frame, this shaft having also fast thereon a hand lever 156. It will thus be seen that by swinging the hand lever 156 the slides 140 with the parts thereon are adjusted as and for the purpose above described. To hold the slides in adjusted positions one of the rods 148 is engaged by a set screw 158 threaded in the frame and having a pin 160 extending transversely thereof for turning it. In order to indicate to the operator the positions of the side-lasting mechanisms with respect to this adjustment, an arc-shaped projection 162 on the front bracket 136 is provided with a scale, as shown in Fig. 2, to cooperate with a finger 164 pivotally mounted on the bracket, this finger being pressed at all times by a spring 168 against a lug 166 formed on one of the slides 140. It will therefore be evident that any adjustment of the slides 140 is accompanied by a corresponding swinging movement of the finger 164, so that by reference to the scale the positions of the slides are indicated.

Each of the side-lasting mechanisms comprises a gripper 170 (Fig. 4) for gripping and pulling the upper, and a wiper 172 for wiping the margin of the upper inwardly over the insole, these parts being supported as hereinafter described on a carrier 174 which is movable toward and from the shoe along an upraised guiding portion 176 (Fig. 1) of the slide 140. The carrier and its guiding means are curved about an axis extending heightwise of the shoe so that in their movement inwardly toward the shoe the gripper and the wiper have components of movement lengthwise of the shoe toward the toe end of the latter. Initially the two carriers 174 are retracted from the shoe, as illustrated in Fig. 2, to afford ample

room for mounting the shoe on the toe rest 2 and the pin 3, and they are moved inwardly to positions determined by the shoe prior to the starting of the power operation of the machine. Such inward movement of each carrier is limited by engagement of the shoe with a clamp member or bumper 178 (Figs. 6 and 8) fast on a block 180 which is swiveled on a plate 182 fast on the carrier 174, by means of a tongue and groove connection 183 with the plate, to permit it to turn with the member 178 about an axis extending heightwise of the shoe and thus to adjust itself to the shoe. By reference to Fig. 6 it will be seen that the shoe-engaging face of the member 178 is curved somewhat lengthwise of the shoe, the member being arranged to engage the upper in a location where the side of the last curves inwardly toward the shank portion of the shoe heelwardly of the ball line.

Each carrier 174 is thus moved inwardly toward the shoe by a lever 184 (Figs. 1 and 3) pivotally mounted between its ends on a pin 186 supported in the bifurcated lower end portion of the previously mentioned arm 142. The upper end of each lever 184 is connected to the carrier associated therewith through a link 188, as more particularly hereinafter described, so that the carrier is operated by the lever. At its lower end each lever 184 is connected by a link 190 to the upper end of an arm 192 mounted to swing about one of the previously mentioned rods 148, the link having ball-shaped ends seated in corresponding sockets in the lever and the arm. Between their opposite ends the two arms 192 are pivotally connected to the outer bifurcated ends of toggle links 194 the inner ends of which are pivotally connected together by a rod 196 (Figs. 1 and 3) on which is pivotally mounted a depending link 198. By reference to Fig. 1 it will be seen that this link comprises arms 200 and 202 spaced a considerable distance apart and mounted on the opposite ends of the rod 196, the two arms being connected together by a web 204. A roll 206 mounted on the arm 200 is guided between parallel lugs 208 on the frame to control the toggle links 194 and thus maintain the arms 192 at all times at substantially equal distances from a vertical plane midway between the two rods 148. A collar 209 (Fig. 1) fast on each of the rods 148 holds the hub portion of the arm 192 against the arm 146 adjacent thereto, so that in the movements of the rods 148 to adjust the slides 140 lengthwise of the shoe as hereinbefore described the arms 192 and the connections between them and the carriers 174 move with the rods. In this adjustment the toggle links 194 slide along the rod 196.

At its lower end the link 198 is pivotally connected to the front end portion of a lever 210 the rear end of which is fast on a rock shaft 212 supported in bearings in the frame. A torsion spring 214 connected to the rock shaft 212 tends to swing the lever 210 downwardly and thus through the toggle links 194 to swing the arms 192 and the levers 184 in the directions to move the carriers 174 toward the shoe. Initially, however, the lever 210 is held upraised, with the carriers in their retracted positions, by means of a lever 216 provided with a plate 218 arranged to underlie an edge portion of a plate 220 on the lever 210, as illustrated in Fig. 3. The lever 216 is swung to release the lever 210, and thus cause the carriers 174 to be moved toward the shoe, by movement of the same plunger 26 through the action of which the slide 16 supporting the heel band is initially released as hereinbefore described. The arrange-

ment, however, is such that the lever 210 is released only in response to further movement of the plunger 26 after the plunger has been moved far enough to release the heel band slide. For this purpose the rod 34 operated by the plunger is spaced initially from the lower end of the lever 216, as shown in Fig. 3, and engages the lever only after the slide 16 has been released, further movement of the rod by the plunger 26 then serving at the will of the operator to swing the lever 216 far enough to carry the plate 218 out from under the plate 220. Such movement of the lever 216 is effected against the resistance of a spring 222 which returns the lever when permitted and holds it normally in a position determined by its engagement with a stop screw 224. It will be evident that after releasing the heel band slide 16 the operator may delay the release of the lever 210 until after the toe end of the upper has been gripped by depression of the treadle 98. In case the lever 210 should be released prematurely, it may be returned into position to be again held by the lever 216 by means of a hand lever 226 mounted on the rock shaft 212 and arranged to act on a pin 228 to turn the shaft, this pin extending from the shaft into a notch 230 in the hub of the lever. The hand lever 226 may be moved lengthwise of the shaft 212 far enough to disconnect it from the pin 228 and thus prevent it from being swung by the shaft in the normal operation of the machine. The previously mentioned cam 54, which in the event of premature starting of the machine serves to release the heel band slide 16, also serves under those conditions to release the lever 210, thus preventing breakage of parts of the machine.

Each gripper 170 comprises a jaw 232 (Fig. 4) and a cooperating jaw 234 pivotally mounted on a pin 236 supported by a lug on the jaw 232. The upper-engaging face 238 (Fig. 5) of the jaw 232 is curved lengthwise of the shoe in approximate conformity to the curvature of the edge of the shoe bottom in the location where the gripper operates, and in this jaw is provided a recess 240 into which portions of the margin of the upper are forced by a tongue 242 on the jaw 234 to insure that the upper will be firmly gripped. The jaw member 232 is mounted on a block 244 and is provided with a tongue 246 curved about an axis extending heightwise of the shoe and extending into a complementary recess formed in the block 244, so that the gripper is swiveled on the block for adjustment about that axis for better conformity to the shapes of different shoes. The head of a screw 248 threaded in the block 244 is arranged to engage the upper face of the jaw member 232 and thus to clamp the gripper in adjusted position on the block.

Each block 244 is mounted on a pin 250 which is rotatable in ears 252 (Figs. 2 and 4) formed on the carrier 174 and is fastened to the pin by a set screw 254. The space between these ears is greater than the width of that portion of the block which is mounted on the pin, and accordingly the gripper may be adjusted along the pin in directions lengthwise of the shoe relatively to the wiper 172, the block being held in adjusted position by the set screw. A screw 256 (Fig. 2) threaded in an ear on the block 244 is arranged to rest at its lower end on the carrier 174 and may be used to adjust the gripper heightwise of the shoe relatively to the wiper 172 by swinging the block 244 about the axis of the pin 250.

Each gripper jaw 234 has two upwardly ex-

tending arms 258 pivotally connected by a pin 260 (Fig. 4) to a block 262 between the arms, this block being pivotally mounted on a pin 264 extending at right angles to the pin 260 and carried by the yoke-shaped head 266 of a rod 268 which extends through a slot 270 in a U-shaped member 272. Surrounding the rod 268 between its head 266 and the member 272 is a compression spring 274, and threaded on the rod are two nuts 276 one of which engages the member 272 on the opposite side thereof from the spring. The two arms of the U-shaped member 272 are rotatably mounted on pins 278 which are fastened in upwardly extending arms 280 of a gripper-closing member or device 282 mounted to swing about the pin 250. It will thus be seen that by swinging movement of the member 282 in a counterclockwise direction (Fig. 4) the gripper jaw 234 is swung toward the jaw 232 to grip the margin of the upper by movement of the arms 280 in a direction toward the last, such swinging movement of the jaw being effected against the resistance of a jaw-opening spring 284 (Fig. 2) connected at one end to the pin 260 and at the other end to the block 244. After the jaw 234 has arrived in upper-gripping position further movement of the member 282 serves to compress somewhat the spring 274 by moving the U-shaped member 272 along the rod 268, so that the upper is yieldingly gripped. To maintain the jaw 234 in upper-gripping position the member 282 is locked against reverse swinging movement by a latch 286 lying in a slot formed in an arm 288 of the member 282 and pivotally mounted on a pin 290 in the arm, this latch being controlled by a spring 292 which swings its lower end over the top of a plate 294, supported as hereinafter described, as soon as permitted by the swinging of the member 282. Movement of the latch 286 by the spring is limited by engagement of the upper end portion thereof with a stop screw 296 in the arm 288. It will be understood that engagement of the lower end face of the latch 286 with the plate 294, which serves as an abutment for the latch, prevents the reverse swinging movement of the member 282. A stop screw 298 (Fig. 2) threaded in the member 282 is arranged to rest at its lower end on the top of the carrier 174 and thus to cooperate with the spring 284 to determine the normal position of the member. It will be evident that the connections between the arms 258 of the jaw 234 and the rod 268, including the provision for turning of the block 262 about the pin 264, permit adjustment of the gripper relatively to the block 244 in the manner hereinbefore described.

The two gripper-closing members 282 of the opposite side-lasting mechanisms are operated to close the gripper jaws 234 on the upper as above described by depression of the same treadle 98 which is used, as hereinbefore described, to effect the gripping of the toe end of the upper by the members 76 and 78. For this purpose the lever 104, operated by the treadle through the flexible cable 108, is provided with two arms 300 (Fig. 3) connected by flexible cables 302 to bell-crank levers 304 pivotally mounted on studs 306 supported in upstanding ears 308 on the carriers 174. These bell-crank levers are movable against the resistance of springs 310, and each of them carries a pin 312 arranged to engage the hook-shaped end of a link 314 the other end of which is pivotally mounted on a depending arm 316 of the member 282. A stud 318 threaded in

the carrier 174 determines the normal position of the bell-crank lever 304 by engagement with one arm thereof. It will be evident that by engagement of the pin 312 with the link 314 the member 282 is swung in the direction to impart closing movement to the jaw 234 in response to the swinging of the bell-crank lever 304 effected by the depression of the treadle 98. The two links 314, however, rest on upstanding lugs 320 formed on the slides 140, and when the opposite side-lasting mechanisms are in their initial retracted positions the positions of the links 314 are such that their hook-shaped ends are not engaged by the pins 312 when the bell-crank levers 304 are swung by the first movement of the treadle 98 to effect the gripping of the upper at the end of the toe. Accordingly this movement of the treadle has no effect on the gripper jaws 234. When the side-lasting mechanisms are moved inwardly toward the shoe the lugs 320 engage inclined faces 322 (Fig. 4) on the links 314 and swing these links upwardly so that their hook-shaped ends are in the paths of movement of the pins 312 when the treadle 98 is depressed a second time. Accordingly this second depression of the treadle, after the side-lasting mechanisms have been released by movement of the plunger 26 and have been moved inwardly toward the shoe, closes the jaws 234 on the upper.

Each wiper 172 consists of a resilient plate fastened to one end of a slide 324 the side edges of which are curved similarly to the carrier 174, the slide being mounted in correspondingly curved guideways in the carrier to move relatively to the carrier widthwise of the shoe in a path curved similarly to the path of movement of the carrier so that the wiper will have a component of movement lengthwise of the shoe toward the toe end of the latter as it is moved inwardly over the insole. The inner edge portion of the wiper, which first engages the upper, is curved lengthwise of the shoe in approximate conformity to the curvature of the corresponding edge of the shoe bottom, and this edge portion of the wiper is also upturned to facilitate its movement over the edge of the shoe bottom. Portions of the wiper may be sprung downwardly more or less for better conformity to the contour of the shoe bottom by means of screws 326 and 328 threaded in the slide 324 and engaging the wiper at their lower ends. The outer ends of the two slides 324 are connected to the levers 184 by the previously mentioned links 188 which have ball-shaped ends lying in corresponding sockets provided respectively on the levers and on the slides, so that wiper-operating movements are imparted to the slides by these levers. When these levers, however, are operated in the manner hereinbefore described to move the carriers 174 and the parts thereon inwardly toward the shoe upon release of the lever 210 by the movement of the plunger 26, the slides 324 are prevented from moving relatively to the carriers 174 by springs 330 each of which is connected at one end to the slide and at the opposite end to the carrier and lies partly in a slot formed in the slide. Accordingly the inward movements are imparted to the carriers through these springs which are strong enough to prevent them from yielding at this time. At the time in the cycle of operations when the wipers 172 are moved inwardly over the shoe bottom by the slides 324 the springs 330 yield to permit such movements of the slides. The levers 184 are operated for this purpose by further downward swinging movement of the lever 210 effected by

a path cam 332 (Fig. 3) formed in the cam wheel 55. This cam engages a roll 334 mounted on a lever 336 which is connected to the lever 210 by a link 338. This link consists of two members 340 and 342 pivotally connected respectively to the lever 210 and the lever 336, the member 342 being movable relatively to the member 340 against the resistance of a spring 344 in the event of unusual resistance of the shoe to inward movement of the wipers 172. The spring 344 abuts at one end against the member 340 and at its other end against a washer 346 held by a nut 348 on one end of a rod 350 the other end of which is threaded in a wedge member 352 movable in an opening extending transversely of the member 340 and supported on a ball bearing 354. A roll 356 mounted on the upper end of the member 342 rests on an inclined wedge face 358 of the wedge member 352. It will accordingly be evident that in the event of unusual resistance to downward movement of the member 340 the wedge member 352 will be forced toward the right (Fig. 3) against the resistance of the spring 344 by the action of the roll 356 thereon, permitting the member 342 to be moved farther downward relatively to the member 340 by the cam 332. This path cam is enlarged at 360 to permit such downward movement of the lever 336 as occurs when the lever 210 is released by the plunger 26 to cause the side-lasting mechanisms to be moved inwardly toward the shoe prior to the starting of the power operation of the machine.

The plates 294 previously referred to as engaged by the latches 286 to hold the gripper jaws 234 in their closed positions are fastened to lugs 362 extending upwardly from the slides 324. Accordingly when these slides are operated to move the wipers 172 inwardly over the shoe bottom the plates 294 are carried out from under the latches to permit the grippers to open and release the upper. This operation is timed to occur just as the side wipers begin to wipe the margin of the upper inwardly over the insole.

A shoe to be operated upon by the above-described machine will preferably have been assembled and pulled over in the customary manner, and it may or may not have been previously lasted along the shank portion. The shoe herein shown for illustrative purposes is to be lasted at the shank portion as well as at the heel end after it has been operated upon by the machine. Before the shoe is presented to the machine, or at least prior to the operation of the machine thereon, such trimming of the toe-end portion of the upper materials as is customary when the upper is fastened to the insole by an adhesive will have been performed and suitable adhesive will have been applied around the toe and along the sides of the forepart. As herein illustrated, all the pulling-over tacks are removed prior to the operation of the machine on the shoe, although, if preferred, tacks fully driven at the sides of the toe in the pulling-over operation may remain in the shoe.

After mounting the shoe on the heel pin 8 and the toe rest 2 the operator releases the heel band slide 16 by pressing against the plunger 26, thus causing the heel band 14 to be applied to the shoe and the shoe to be positioned lengthwise as determined by the band, in the manner hereinbefore described. The operator then spreads the margin of the upper at the end of the toe outwardly over the clamp member 76 of the toe gripper and by depression of the treadle 98 moves the cooperating clamp member 78 into upper-

gripping position, this member being locked in that position by engagement of the latch 110 (Fig. 1) with the lug 112. Thereafter the operator again presses on the plunger 26 to release the opposite side-lasting mechanisms and thus cause them to be moved inwardly toward the shoe to positions determined by engagement of their clamp members 178 with the sides of the shoe. These mechanisms move inwardly in curved paths, as described, and since the members 178 engage the shoe in locations where its opposite sides curve inward heelwardly of the ball line, the two mechanisms assume the proper relation to either a right or a left shoe for thereafter operating thereon with the best results, the mechanism which operates at the inner side of the shoe moving somewhat farther inwardly than the mechanism at the outer side by reason of the shape of the shoe. After the opposite side-lasting mechanisms have thus assumed positions determined by the shoe, the operator again depresses the treadle 98 to close the side grippers on the margin of the upper, these grippers being locked in upper-gripping relation by engagement of the latches 286 (Fig. 4) with the abutment plates 234. The operator then swings the arm 120 forwardly by means of the handle 126 to bring the toe presser foot 116 into position over the shoe, thereby starting the power operation of the machine.

Immediately after the starting of the machine the toe presser foot 116 and the heel presser foot 118 are moved downwardly to depress the shoe against the resistance of the springs 4 and 12, the heel band and its support moving downwardly with the shoe. As a result of such depression of the shoe the upper is pulled tightly over the last by the toe gripper and the side grippers and it is wiped upwardly about the toe portion of the last by the toe band 62. The positions of the parts at the end of such downward movement of the shoe are illustrated in Figs. 7 and 8. Thereafter the side wipers 172 are moved inwardly to wipe the margin of the upper over the insole in the manner illustrated in Fig. 9 by the action of the cam 332 on the mechanism which operates the wiper-carrying slides 324. As these wipers start to wipe the upper over the edge of the insole the side grippers are caused to release the margin of the upper by reason of the fact that the plates 294 are carried by the slides 324 out from under the latches 286. It will be evident by reference to Fig. 9 that by reason of the relation of the side-lasting mechanisms to the opposite sides of the shoe, determined by the shape of the shoe as hereinbefore explained, that wiper 172 which operates at the inner side of the shoe has a greater component of movement lengthwise of the shoe toward its toe end than the other wiper, as is desirable for the best results. After wiping the margin of the upper inwardly the side wipers are immediately retracted from over the shoe bottom by the cam 332 and the side-lasting mechanisms are returned to their outermost positions where they are held by the lever 216, to provide room for the operation of the toe wipers 64. These wipers, by reason of the relation of their operating cam to the cam 332, are then advanced and closed to wipe the margin of the upper inwardly over the insole around the toe portion of the shoe, the wipers being of such lengths that they overlap substantial portions of the margin of the upper previously operated upon by the side wipers, as illustrated in Fig. 10. Just as the toe

wipers start to wipe the upper over the insole the toe end of the upper is released by the toe gripper by reason of the fact that the lug 112 moves out from under the latch 110. While the toe wipers are thus over the shoe bottom the presser feet 116 and 118 are moved upwardly slightly to permit the shoe to be forced more firmly up against the toe wipers by the spring 4, the support for the heel end of the shoe being preferably restrained from upward movement at this time by mechanism such as disclosed in Letters Patent No. 2,075,852. At this point the machine is preferably brought automatically to a stop by controlling mechanism of the character disclosed in the last-mentioned Letters Patent to permit the overwiped margin of the forepart of the upper to remain for a short time under the pressure of the heated toe wipers, after which the machine is automatically started again to permit it to complete its cycle of operations. During the remainder of the cycle the parts of the machine not already in their starting positions are returned to such positions, the shoe being released from pressure and then removed from its support by automatic shoe-removing mechanism with which machines of the illustrated type are provided.

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

1. In a machine for shaping uppers over lasts, side-lasting members movable to lay the margin of an upper inwardly over an insole on a last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, toe-lasting members movable relatively to said side-lasting members to lay the margin of the upper inwardly over the insole around the toe end of the shoe, said toe-lasting members being formed to extend substantial distances lengthwise of the shoe heelwardly of the toe portion when they are over the insole to overlap portions of the margin of the upper operated upon by the side-lasting members, and means for moving the side-lasting members inwardly over the insole before the toe-lasting members lay the margin of the upper inwardly and for then retracting them to avoid interference with the toe-lasting members.

2. In a machine for shaping uppers over lasts, side wipers movable to wipe the margin of an upper inwardly over an insole on a last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, toe wipers movable lengthwise and laterally of the shoe relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe, said toe wipers being formed to extend substantial distances lengthwise of the shoe heelwardly of the toe portion when they are over the insole to overlap portions of the margin of the upper operated upon by the side wipers, and power-operated means for operating the toe wipers and side wipers in such time relation to one another as to cause the side wipers to wipe the margin of the upper inwardly and then to retract before the toe wipers enter the paths of movement of the side wipers.

3. In a machine for shaping uppers over lasts, side wipers movable to wipe the margin of an upper inwardly over an insole on a last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, toe wipers movable lengthwise and laterally of the shoe relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the

toe end of the shoe, said toe wipers being formed to extend substantial distances lengthwise of the shoe heelwardly of the toe portion when they are over the insole to overlap portions of the margin of the upper operated upon by the side wipers, and power-operated means for operating the side wipers to wipe the margin of the upper inwardly and for then retracting them from over the insole before the toe wipers begin their overwiping movements.

4. In a machine for shaping uppers over lasts, side-lasting members movable widthwise of a last with predetermined components of movement also lengthwise of the last toward its toe end to lay the margin of an upper inwardly over an insole on the last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, and toe-lasting members movable lengthwise and widthwise of the last relatively to said side-lasting members to lay the margin of the upper inwardly over the insole all around the toe end of the shoe.

5. In a machine for shaping uppers over lasts, side wipers movable widthwise of a last with components of movement also lengthwise of the last toward its toe end to wipe the margin of an upper inwardly over an insole on the last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, and toe wipers movable lengthwise and widthwise of the last relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe and to overlap portions of the margin of the upper on which the side wipers operate.

6. In a machine for shaping uppers over lasts, side wipers movable widthwise of a last with components of movement also lengthwise of the last toward its toe end to wipe the margin of an upper inwardly over an insole on the last at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, toe wipers movable lengthwise and widthwise of the last relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe, the toe wipers being of such lengths as to overlap portions of the margin of the upper operated upon by the side wipers, and power-operated means for operating the toe wipers and side wipers in such time relation to one another as to cause the side wipers to act on the margin of the upper before the toe wipers and thereafter to retract in time to avoid interference with the toe wipers.

7. In a machine for shaping uppers over lasts, side-lasting members arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line and movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to lay the margin of the upper inwardly over an insole on the last, and toe-lasting members movable relatively to said side-lasting members to lay the margin of the upper inwardly over the insole around the toe end of the shoe and as far heelwardly as the portions on which said side-lasting members operate.

8. In a machine for shaping uppers over lasts, side wipers arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line and movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to

wipe the margin of the upper inwardly over an insole on the last, toe wipers movable to wipe the margin of the upper inwardly over the insole around the toe end of the shoe and as far heelwardly as the portions operated upon by the side wipers, and power-operated means for operating the toe wipers and side wipers in time relation to one another to wipe the margin of the upper inwardly first by the side wipers and then by the toe wipers.

9. In a machine for shaping uppers over lasts, side wipers arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line and movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to wipe the margin of the upper inwardly over an insole on the last, the wiper engaging the upper at the inner side of the shoe having a greater component of movement lengthwise of the last than the wiper at the outer side of the shoe, and toe wipers movable relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe and as far heelwardly as the portions on which the side wipers operate.

10. In a machine for shaping uppers over lasts, side wipers arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, said wipers being movable in paths curved about axes extending heightwise of the last with components of movement lengthwise of the last toward its toe end to wipe the margin of the upper inwardly over an insole on the last, and toe wipers movable relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe and as far heelwardly as the portions on which the side wipers operate.

11. In a machine for shaping uppers over lasts, side wipers arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said wipers and movable inwardly to positions determined by engagement with the sides of the shoe in those locations to position the wipers relatively to the shoe before they operate on the upper, means for moving the wipers widthwise of the shoe relatively to said carriers with components of movement also lengthwise of the shoe toward its toe end to wipe the margin of the upper inwardly over an insole, and toe wipers movable relatively to said side wipers to wipe the margin of the upper inwardly over the insole around the toe end of the shoe and as far heelwardly as the portions on which the side wipers operate.

12. In a machine for shaping uppers over lasts, overlaying members arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said overlaying members and movable inwardly widthwise of the shoe to positions determined by engagement with the sides of the shoe prior to the operation of said members on the upper, and means for moving said members widthwise of the shoe relatively to the carriers with components of movement also lengthwise of the shoe toward its toe end to lay the margin of the upper inwardly over an insole.

13. In a machine for shaping uppers over lasts, overlaying members arranged to engage the mar-

gin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said overlaying members and movable inwardly widthwise of the shoe with components of movement also lengthwise of the shoe toward its toe end to positions determined by engagement with the sides of the shoe in said locations prior to the operation of said members on the upper, and means for moving said members widthwise of the shoe relatively to the carriers with components of movement also lengthwise of the shoe toward its toe end to wipe the margin of the upper inwardly over an insole.

14. In a machine for shaping uppers over lasts, overlaying members arranged to engage the margin of an upper on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said overlaying members and movable in paths curved about axes extending heightwise of the shoe with components of movement lengthwise of the shoe toward its toe end to positions determined by engagement with the sides of the shoe in said locations prior to the operation of said members on the upper, and means for moving said members relatively to the carriers in paths curved similarly to the paths of movement of the carriers to lay the margin of the upper inwardly over an insole.

15. In a machine for shaping uppers over lasts, side wipers arranged to wipe the margin of an upper inwardly over an insole on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said wipers and movable inwardly widthwise of the shoe to position the wipers relatively to the shoe prior to their operation on the upper, and means for moving the wipers relatively to said carriers to wipe the margin of the upper inwardly, the wipers being thus movable relatively to the carriers in paths curved about axes extending heightwise of the shoe with components of movement lengthwise of the shoe toward its toe end.

16. In a machine for shaping uppers over lasts, side wipers arranged to wipe the margin of an upper inwardly over an insole on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said wipers and movable inwardly widthwise of the shoe to position the wipers relatively to the shoe prior to their operation on the upper, and slides supporting the wipers on said carriers and guided by the carriers for movements in paths curved about axes extending heightwise of the shoe for imparting to the wipers their wiping movements widthwise of the shoe with components of movement also lengthwise of the shoe toward its toe end.

17. In a machine for shaping uppers over lasts, side wipers arranged to wipe the margin of an upper inwardly over an insole on a last in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, carriers supporting said wipers, supports on which said carriers are guided for sliding movements in paths curved about axes extending heightwise of the shoe to position the wipers relatively to the shoe prior to their operation on the upper, and slides supporting the wipers on said carriers and movable relatively to the carriers in paths curved similarly to the paths of movement of the carriers to operate the wipers.

18. In a machine for shaping uppers over lasts,

the combination with means for laying the margin of an upper on a last inwardly over an insole around the toe end of the last, of members movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to lay the margin of the upper inwardly over the insole at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, spring means arranged to be tripped to move said members into positions thus to operate on the upper, and additional means for thereafter imparting to said members their operative movements.

19. In a power-operated machine for shaping uppers over lasts, the combination with means for laying the margin of an upper on a last inwardly over an insole around the toe end of the last, of members movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to lay the margin of the upper inwardly over the insole at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, spring means arranged to be tripped to move said members into positions thus to operate on the upper prior to the starting of the power operation of the machine, and additional cam-operated means for imparting to said members their operative movements in the power operation of the machine.

20. In a machine for shaping uppers over lasts, means for gripping the margin of an upper and for pulling the upper heightwise of a last at the toe end of the last and at the opposite sides of the forepart in locations heelwardly of the toe portion, side wipers movable to wipe the margin of the upper inwardly over an insole on the last at the sides of the forepart after the pulling of the upper, toe wipers movable to wipe the margin of the upper inwardly around the toe end of the shoe, said shoe wipers being formed to extend substantial distances lengthwise of the shoe heelwardly of the toe portion when they are over the insole to overlap portions of the margin of the upper operated upon by the side wipers, and means for moving the side wipers inwardly over the insole and for thereafter retracting them before the toe wipers are moved into positions thus to overlap the portions of the margin operated upon by the side wipers.

21. In a machine for shaping uppers over lasts, a toe gripper for gripping the margin of an upper at the toe end of a last, side grippers for gripping the margin of the upper at the opposite sides of the forepart in locations heelwardly of the toe portion of the shoe, means for moving the last heightwise relatively to said grippers to cause the grippers to pull the upper, side wipers movable to wipe the margin of the portions of the upper operated upon by the side grippers inwardly over an insole on the last, toe wipers movable to wipe the margin of the upper inwardly around the toe end of the last, said toe wipers being formed to extend substantial distances lengthwise of the shoe heelwardly of the toe portion when they are over the insole to overlap portions of the margin of the upper operated upon by the side wipers, and power-operated means for operating the toe wipers and side wipers in such time relation to one another as to cause the side wipers to act on the margin of the upper before the toe wipers and thereafter to retract in time to avoid interference with the toe wipers.

22. In a machine for shaping uppers over lasts, a toe gripper for gripping the margin of an upper

at the toe end of a last, side grippers for gripping the margin of the upper at the opposite sides of the forepart in locations where the edges of the shoe bottom curve inward heelwardly of the ball line, means for effecting relative movement of the several grippers and the last heightwise of the last to cause the grippers to pull the upper, means for laying the margin of the upper inwardly over an insole on the last around the toe end of the last after the pulling of the upper, and members movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to lay the margin of the portions of the upper operated upon by the side grippers inwardly over the insole.

23. In a machine for shaping uppers over lasts, a toe gripper for gripping the margin of an upper at the toe end of a last, side grippers for gripping the margin of the upper at the opposite sides of the forepart in locations where the edges of the shoe bottom curve inward heelwardly of the ball line, means for effecting relative movement of the several grippers and the last heightwise of the last to cause the grippers to pull the upper, toe wipers movable to wipe the margin of the upper inwardly over an insole on the last around the toe end of the last after the pulling of the upper, side wipers movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to wipe the margin of the portions of the upper operated upon by the side grippers inwardly over the insole, and power-operated means for operating said toe wipers and side wipers in such time relation to one another as to cause the side wipers to complete their overwiping movements before the toe wipers.

24. In a machine for shaping uppers over lasts, a toe gripper for gripping the margin of an upper at the toe end of a last, side grippers for gripping the margin of the upper at the opposite sides of the forepart in locations where the edges of the shoe bottom curve inward heelwardly of the ball line, means for effecting relative movement of the several grippers and the last heightwise of the last to cause the grippers to pull the upper, toe wipers movable to wipe the margin of the upper inwardly over an insole on the last around the toe end of the last after the pulling of the upper, side wipers movable widthwise of the last with components of movement also lengthwise of the last toward its toe end to wipe the margin of the portions of the upper operated upon by the side grippers inwardly over the insole, the toe wipers being formed to overlap substantial portions of the margin of the upper operated upon by the side wipers, and means for moving the side wipers inwardly over the insole before the toe wipers and for then retracting them to avoid interference with the toe wipers.

25. In a machine for shaping uppers over lasts, the combination with toe-lasting means, of opposite side-lasting mechanisms arranged to act on a shoe at the sides of the forepart in locations heelwardly of the toe portion, each of said mechanisms comprising a gripper for gripping and pulling the upper and a member for laying the margin of the upper inwardly over an insole, spring means arranged to act automatically when released to move said mechanisms from initial retracted positions inwardly toward the shoe into positions to operate on the shoe, and mechanisms for holding said spring means initially idle and for releasing it to permit it thus to act on said side-lasting mechanisms.

26. In a power-operated machine for shaping uppers over lasts, the combination with toe-lasting means, of opposite side-lasting mechanisms arranged to act on a shoe at the sides of the forepart in locations heelwardly of the toe portion, each of said mechanisms comprising a gripper for gripping and pulling the upper and a member for laying the margin of the upper inwardly over an insole in the power operation of the machine, spring means arranged to act automatically when released to move said mechanisms from initial retracted positions inwardly toward the shoe into positions to operate on the shoe, and mechanism for holding said spring means initially idle and for releasing it to permit it thus to act on said side-lasting mechanisms prior to the starting of the power operation of the machine.

27. In a machine for shaping uppers over lasts, the combination with a shoe support, of mechanisms arranged to operate on a shoe in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, each of said mechanisms comprising a gripper for gripping and pulling the upper and a member for laying the margin of the upper inwardly over an insole, and means for moving said mechanisms from initial retracted positions inwardly toward the shoe prior to their operation on the shoe with components of movement lengthwise of the shoe toward its toe end as well as widthwise of the shoe.

28. In a machine for shaping uppers over lasts, the combination with a shoe support, of mechanisms arranged to operate on a shoe in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, each of said mechanisms comprising a gripper for gripping and pulling the upper and a member for laying the margin of the upper inwardly over an insole, and means for moving said mechanisms from initial retracted positions inwardly toward the shoe prior to their operation on the shoe, said mechanisms being thus movable in paths curved about axes extending heightwise of the shoe with components of movement lengthwise of the shoe toward its toe end as well as widthwise of the shoe.

29. In a machine for shaping uppers over lasts, the combination with a shoe support, of grippers for gripping and pulling a shoe upper in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, and supports for said grippers movable inwardly toward the shoe with components of movement lengthwise of the shoe toward its toe end into positions determined by engagement with the sides of the shoe in said locations before the grippers grip the upper.

30. In a machine for shaping uppers over lasts, the combination with a shoe support, of grippers for gripping and pulling a shoe upper in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, and supports for said grippers movable in paths curved about axes extending heightwise of the shoe into positions determined by engagement with the sides of the shoe in said locations before the grippers grip the upper.

31. In a machine for shaping uppers over lasts, the combination with a shoe support, of grippers for gripping and pulling a shoe upper in locations where the opposite side edges of the shoe bottom curve inward heelwardly of the ball line, supports for said grippers movable in paths

curved about axes extending heightwise of the shoe into positions determined by engagement with the sides of the shoe in said locations before the grippers grip the upper, and spring means arranged to act automatically when released thus to move said supports.

32. In a machine for shaping uppers over lasts, a toe gripper for gripping and pulling an upper at the toe end of a last, side grippers for gripping and pulling the upper at the opposite sides of the last, supports for the side grippers movable inwardly toward the last to carry said grippers into positions to operate on the upper, a member movable to close the toe gripper on the upper, and mechanisms for closing the side grippers by movement of said member, said mechanisms comprising parts relatively movable into operative relation to one another in response to the inward movements of said supports to prevent the closing of the side grippers by said member unless said supports have received their inward movements.

33. In a machine for shaping uppers over lasts, a toe gripper for gripping and pulling an upper at the toe end of a last, side grippers for gripping and pulling the upper at the opposite sides of the last, supports for the side grippers movable inwardly toward the last to carry said grippers into positions to operate on the upper, a member movable to close the toe gripper on the upper, and mechanisms carried by said supports for closing the side grippers by movement of said member, said mechanisms comprising parts movable by said member at all times and other parts arranged to occupy positions out of operative relation to said first-named parts unless said supports have received their inward movements.

34. In a machine for shaping uppers over lasts, a toe gripper for gripping and pulling an upper at the toe end of a last, side grippers for gripping and pulling the upper at the opposite sides of the last, supports for the side grippers movable inwardly toward the last to carry said grippers into positions to operate on the upper, a treadle depressible to close the toe gripper on the upper, and mechanisms carried by said supports for closing the side grippers by depression of said treadle, said mechanisms comprising members movable at all times by said treadle and other members arranged to remain idle unless said supports have been moved inwardly and to be operated by said first-named members to close the side grippers after such inward movements of the supports.

35. In a machine for shaping uppers over lasts, a toe gripper for gripping and pulling an upper at the toe end of a last, side grippers for gripping and pulling the upper at the opposite sides of the last, supports for the side grippers movable inwardly toward the last to carry said grippers into positions to operate on the upper, a member movable to close the toe gripper on the upper, levers carried by said supports and movable by said member, devices also carried by said supports for closing the side grippers on the upper by movements of said levers, said devices including links arranged to occupy positions out of operative relation to said levers prior to the inward movements of said supports, and means for moving said links into operative relation to said levers in response to the inward movements of said supports.

36. In a machine for shaping uppers over lasts, a toe gripper for gripping and pulling an upper at the toe end of a last, side grippers for grip-

ping and pulling the upper at the opposite sides of the last, supports for the side grippers movable inwardly toward the last to carry said grippers into positions to operate on the upper, a member movable to close the toe gripper on the upper, means for imparting to said supports their inward movements independently of movement of said member, and mechanisms dependent for their operation upon such previous inward movements of said supports for closing the side grippers on the upper by movement of said member.

37. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, means for closing said grippers on the upper, members movable inwardly widthwise of the last to lay the margin of the upper over the bottom of the last, and devices controlled by said members prior to their inward movements for holding the grippers closed on the upper and for releasing the grippers to permit them to open in response to said movements.

38. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, means for closing said grippers on the upper, members movable inwardly widthwise of the last to lay the margin of the upper over the bottom of the last, and latches arranged to cooperate with said members prior to their inward movements to hold the grippers closed on the upper, said latches being releasable to permit the grippers to open in response to the inward movements of said members.

39. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, members movable to close said grippers on the upper, latches carried by said members, and devices movable inwardly widthwise of the last to lay the margin of the upper over the bottom of the last, said devices having thereon means for engaging said latches to hold the grippers closed on the upper and for releasing the latches to permit the grippers to open as said devices are moved inwardly.

40. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, members mounted for swinging movements to close said grippers on the upper, latches carried by said members, and wiper-carrying slides movable inwardly widthwise of the last relatively to the grippers to lay the margin of the upper over the bottom of the last, said slides having thereon abutments arranged to engage said latches to hold the grippers closed on the upper and to release the latches to permit the opening of the grippers in response to the inward movements of the slides.

41. In a machine for shaping uppers over lasts, a gripper for gripping the margin of an upper on a last and for pulling the upper, means for closing said gripper on the upper, a member movable inwardly in a path substantially parallel to the bottom of the last to lay the margin of the upper over an insole on the last, and a device controlled by said member prior to its inward movement for holding the gripper closed and for releasing the gripper to permit it to open as said member moves inwardly.

42. In a machine for shaping uppers over lasts, a gripper for gripping the margin of an upper on a last and for pulling the upper, means for closing said gripper on the upper, a slide movable inwardly to lay the margin of the upper over an

insole on the last, and a latch controlled by said slide prior to its inward movement for holding the gripper closed and releasable by the inward movement of the slide to permit the gripper to open.

43. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and provided with arms arranged to swing inwardly toward the last to close the grippers on the upper, and means for operating said devices.

44. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and having arms arranged to swing inwardly toward the last to close the grippers on the upper, and a member movable by the operator and common to both said devices for operating them.

45. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and having arms arranged to swing inwardly toward the last to close the grippers on the upper, and means carried by said supports for locking said devices to hold the grippers closed.

46. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and having arms arranged to swing inwardly toward the last to close the grippers on the upper, said devices being provided also with other swinging arms, and locking members arranged to act on said other arms to hold the grippers closed.

47. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and having arms arranged to swing inwardly toward the last to close the grippers on the upper, levers also carried by said supports for operating said devices, and means for operating said levers.

48. In a machine for shaping uppers over lasts, side grippers for gripping and pulling an upper at the opposite sides of a last, supports for said grippers movable inwardly widthwise of the last to carry the grippers into positions to operate on the upper, gripper-closing devices rotatably mounted on said supports and having arms arranged to swing inwardly toward the last to close the grippers on the upper, members pivotally mounted on said arms, and springs for transmitting closing force yieldingly from said members to the grippers.

BERNHARDT JORGENSEN.

CERTIFICATE OF CORRECTION.

Patent No. 2,181,896.

December 5, 1939.

BERNHARDT JORGENSEN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 9, first column, line 41, claim 20, for the word "shoe" second occurrence, read --toe--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of August, A. D. 1940.

(Seal)

Henry Van Arsdale,  
Acting Commissioner of Patents.